



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

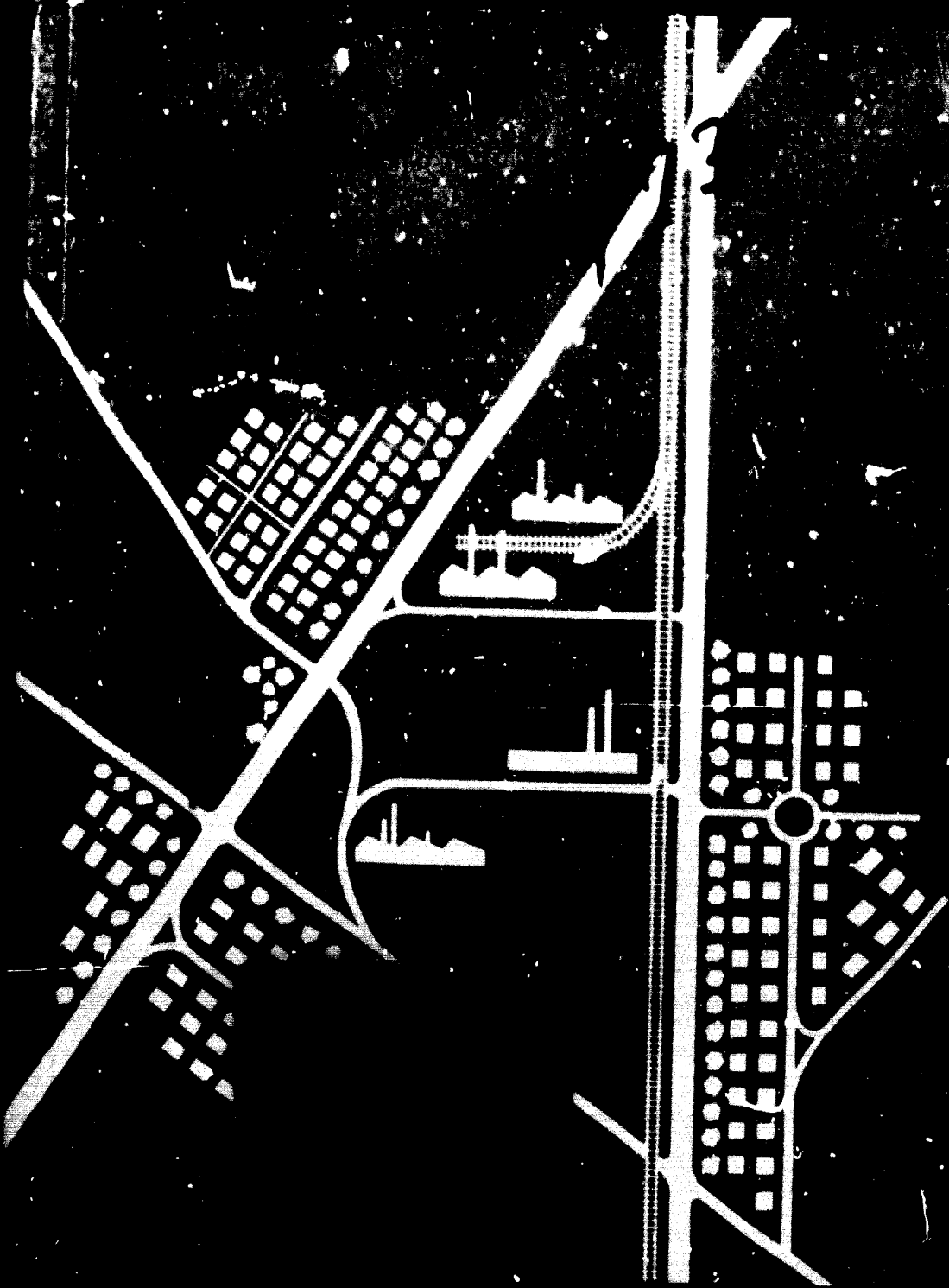
FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org



The quality of the paper in the original copy of this report may not be up to the agency's quality standards, even though the best possible copy was used for preparing the master file.



Department of Economic and Social Affairs

**INDUSTRIAL ESTATES
IN ASIA AND THE FAR EAST**



**UNITED NATIONS
New York, 1962**

140. The Seminar considered that transport was amongst the essential services, especially for the estates situated at a distance from towns or in remoter rural areas. It felt that common transport services for the estate could be operated and charged at rates which would enable the costs to be covered.

Assistance facilities

141. The Seminar noted that the normal assistance facilities offered to small units under the development programmes of the countries were available to the units on the estates. These often included loans by the government, technical and marketing advice, supply of machines on hire-purchase terms, supply of raw materials in short supply, training facilities and business management and accounting. It felt that measures might be taken by governments and the agencies directly responsible for the establishment and management of estates to ensure that the prospective occupants of the estates, as well as those already established on them, were fully informed about the various facilities which were available for their use.

142. The Seminar also suggested that, as far as possible, the prospective occupant should decide about the industry which he wished to take up before he came into actual occupation. This would avoid delays in commencing production after occupation. However, where the entrepreneurs had not taken such a decision, the normal facilities for technical advice should be made available to them. Schemes for quality control and standardization might have scope for greater success in respect of units on the estates and might with advantage be introduced into the estates.

Special inducements

143. The Seminar recognized that it would be useful to distinguish between special inducements proposed for the establishment of industrial estates and those proposed for units on the estates. In regard to the former, it noted that when estates were established by governments, the question of special inducements generally did not arise. However, a suggestion was made that loans made by a central government authority to local government agencies for the establishment of estates should carry concessional rates of interest. A further suggestion made in this connection was that assistance for schemes of a developmental character should be provided in the form of grants rather than loans. The Seminar agreed with these suggestions and commended them for acceptance by countries in the region.

144. In regard to special inducements for the units on the industrial estates, the Seminar noted that, in no country of the region, a rent lower

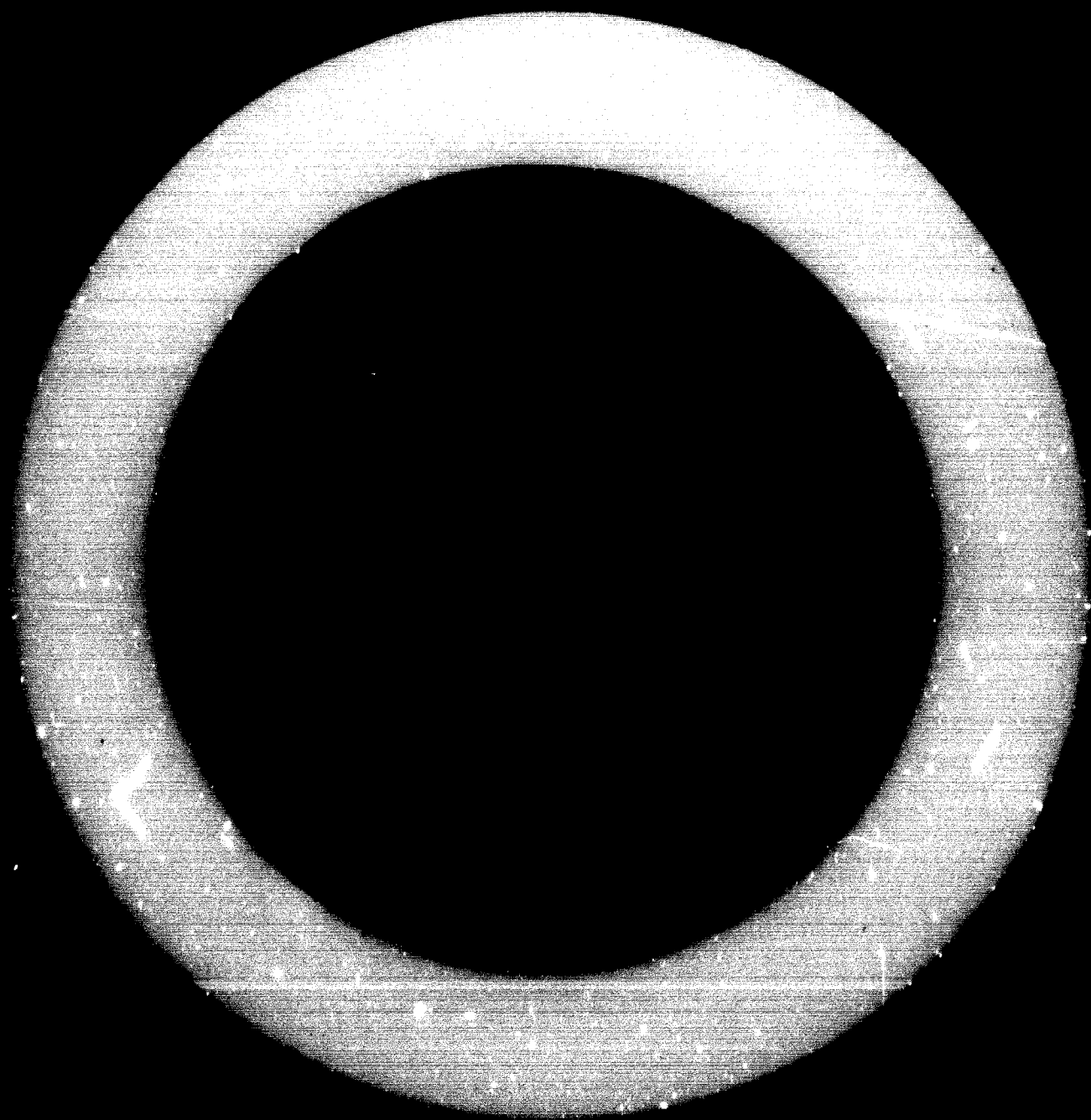
TABLE OF CONTENTS

	<u>Page</u>
PREFACE	1
Part I. REPORT OF THE SEMINAR ON INDUSTRIAL ESTATES IN THE ESCAPE REGION	9
Part II. INDUSTRIAL ESTATES IN COUNTRIES OF THE REGION -- POLICIES, PLANS AND PROGRESS	57
<u>Discussion papers</u>	
United Nations: Establishment of industrial estates in under-developed countries	59
United Nations: Physical planning of industrial estates	60
Aspects of labour and management on industrial estates with special reference to small industries in Asian countries, by the International Labour Office	61
The role of industrial estates in the industrial development of Ceylon, by E.C.S. Paul	85
Co-operation between and assistance to small- scale units in industrial estates in India, by A. S. E. Iyer	150
Physical planning of industrial estates, by T. S. Vedagiri	171
Establishment of industrial estates in a rural setting, by Y. Lang Wong	206
<u>Information papers</u>	
Burma	230
China	233
Federation of Malaya	240
India	248
Role of industrial estates in Indian planning, by D. K. Mahotra	259
Major problems in setting up production units in industrial estates, by the Indian Investment Centre	264
Industrialization and the changing dimensions of caste occupation in India, by the United Nations Educational, Scientific and Cultural Organisation	267
Indonesia	271
Iran	274

	<u>Page</u>
Japan	277
Korea	286
Laos	290
Nepal	291
Pakistan	296
Thailand	315
Hong Kong	321
Sarawak	342
Singapore	344
 Part III. INDUSTRIAL ESTATES IN CERTAIN DEVELOPED COUNTRIES OUTSIDE THE REGION	 353
<u>Discussion Papers</u>	
The port and industrial zone of Marghera, by G. Giavi	355 ✓
Problems in establishment of large-scale industrial estates, by G. G. Latham	389 ✓
Some controversial questions concerning industrial estates, by A. Molinari	414 ✓
<u>Information Papers</u>	
Union of Soviet Socialist Republics	444
United States of America	457

LIST OF PLANS AND MAPS

	<u>Page</u>
Ceylon - Industries	138
Ceylon - Industrial establishments in the Ratmalana and Ja-Ela areas	144
Ceylon - Diagrammatic preliminary plan of industrial town Ja-Ela	148
Ceylon - Layout plan of industrial estate Ja-Ela, facing Typical layout for an industrial estate	148 205
China (Taiwan) - Industrial districts (as of the end of 1961)	235
Federation of Malaya - Industrial estates (as of the end of 1961)	245
India and Nepal - Industrial estates (as of 31 March 1962)	250
India - Layout plan of industrial estate, Sanatnagar, Hyderabad, Andhra Pradesh	255
India - Plan of industrial estate, Guindy, Madras	256
Japan - Industrial estates set up with subsidies from central and regional Governments in 1961/62	281
Thailand - Bangkok-Thonburi, Industrial areas and industrial estate	319
Hong Kong - Existing distribution of industry	329
Hong Kong - Kwan Tang, Outline development plan	336
Singapore - Preliminary plan of Jurong New Town; Industrial estates and Jurong New Town ...	347 363
Italy - The port and industrial zone of Marghera, Venice	381
Italy - Marghera, Modernisation and expansion of the industrial port facilities	406
United Kingdom - Location of I.C.I. Milton Works	429
Southern Italy - Proposed economic development areas..	439
Italy - Industrial zones and nuclei and areas of industrial development (as of April 1962)	450
United States of America - Industrial districts and parks (as of April 1960)	facing



PREFACE

The present publication is the third in a series of studies and reports on problems relating to industrial estates to be published by the United Nations. Work on industrial estates has been undertaken by the organization in response to the growing interest evinced for this tool of industrialization in many developing countries throughout the world.

This interest, and the value of the device, were recognized by the Economic and Social Council in resolution 709 A (XVII), in which the Council, among other things, requested the Secretary-General to "lay particular emphasis on projects of direct practical value to economic development" and, in particular, to "projects concerning industrial zones and estates". In accordance with this request, a report entitled Establishment of Industrial Estates in Under-developed Countries was prepared by the Division of Industrial Development of the Department of Economic and Social Affairs and published early in 1961 (United Nations publication, Sales No.: 60.II.B.4). Another report, Physical Planning of Industrial Estates, prepared by the Bureau of Social Affairs of the same Department, is scheduled to be published towards the end of 1962 (Sales No.: 62.II.B.4).

In November 1961, the first in a series of regional seminars on industrial estates, covering the region of the Economic Commission for Asia and the Far East (ECAFE), was held in Madras, India, under the joint sponsorship of the United Nations and the Government of India. The Seminar was organized by ECAFE, the Division of Industrial Development and the Bureau of Technical Assistance Operations of the Department of Economic and Social Affairs. It was attended by fifty-seven participants and observers from twenty-three countries and sixteen representatives of the United Nations, the specialized agencies and non-governmental organizations.

The Seminar had before it ten discussion papers relating to the various items on the agenda; these included the two above-mentioned United Nations reports, one paper prepared by the International Labour Office, and seven papers commissioned by the United Nations from experts on industrial estates. In addition, seventeen information papers describing policies, plans and progress in the establishment of industrial estates in countries of the region were prepared by Governments or their respective participants in the Seminar. Three other information papers were prepared by the United Nations Educational, Scientific and Cultural Organization, a United Nations consultant and an Indian non-governmental organization, respectively.

The present publication contains the report of the Seminar on Industrial Estates in the ECAFE Region and large excerpts from the discussion and information papers submitted to the Seminar. It is divided into three parts.

Part I contains the Seminar's report. Part II contains the discussion and information papers relating to industrial estates in countries of the region. Part III contains the discussion and information papers relating to industrial estates in certain developed countries outside the region. It will be seen that while the report of the Seminar and most of the discussion and information papers are focused on regional conditions and needs, much of the experience described and many of the findings and conclusions contained therein appear to be of interregional significance. For this reason, the present collection is offered as reference material of interest to the industrializing countries in general.

The report of the Seminar contains recommendations on objectives and policies in establishing industrial estates, organization, management and financing, integration of industrial estates projects with programmes of urban and regional development, and international and regional co-operation in the development of industrial estates. In view of the fact that, in most countries of the region, the objectives of industrial estates programmes are to promote the development of small-scale industries and to influence industrial location in accordance with policies of decentralization, the discussion and the recommendations of the Seminar were mainly focused on these two aspects.

For the same reason, all the discussion papers contained in part II relate to industrial estates with special reference to small-scale industries.

The paper entitled "Aspects of Labour and Management on Industrial Estates", prepared by the International Labour Office, discusses industrial estates as a means of creating employment and improving management and productivity in small industrial undertakings established in industrial estates. It examines the prospects offered by industrial estates for organizing vocational training programmes, improving the welfare of the workers and modernizing labour-management relations.

The paper on "The Role of Industrial Estates in the Industrial Development of Ceylon" by Mr. E. C. S. Paul, Director of Industries, Ministry of Industries, Government of Ceylon, describes and analyses the trends in the industrialization policies of Ceylon over a period of nearly thirty years, which finally led to the adoption of an industrial estate programme. This study has been commissioned as a discussion paper because Ceylon's experience, in different sequences and degrees, has been paralleled in many under-developed countries: Ceylon began by promoting cottage and rural industries, then set up government-owned small-scale and medium-sized factories, shifted to a policy of joint ventures with private capital participation, turned to a policy of tax, tariff and other incentives to stimulate private initiative and investment, and finally decided upon an industrial estate programme to promote the establishment of privately owned and managed small-scale industrial undertakings.

The next two studies, relating to two aspects of India's practice in the field of industrial estates, have been considered as discussion papers because of the general interest presented by India's extensive experience in carrying out the largest and most ambitious industrial estate programme in the region.

The first of these papers, "Co-operation Between and Assistance to Small-scale Units in Industrial Estates in India", by Mr. A. S. S. Iyer, Principal, Central Industrial Extension Training Institute, Ministry of Commerce and Industry, Government of India, describes the comprehensive system of assistance, support and guidance devised by the Indian Government to promote the development of small-scale industries and its integration with the industrial estate programme. The paper reviews the pattern and progress of assistance to units established on industrial estates, and provides some case histories as an illustration.

The other paper, "Physical Planning of Industrial Estates", by Mr. T. S. Vedagiri, Superintending Engineer and Secretary, Buildings Projects Team, Committee on Plan Projects, Planning Commission, Government of India, describes India's practice in physical planning and layout of industrial estates for small-scale industries, much of which appears to be applicable in sub-tropical countries of the ECAFE region, and in other countries presenting similar economic and climatic conditions.

The last discussion paper in part II, "Establishment of Industrial Estates in a Rural Setting", by Mr. Y. Lang Hong, Consultant, Stanford Research Institute, examines the role of industrial estates in promoting the industrialization of rural areas, an objective which, in spite of admitted difficulties, is aimed at in many countries of the region. The paper, based in part on the author's experience in East Pakistan, contains practical recommendations for solving the economic, social, technical and administrative problems involved.

The information papers presented in part II describe the plans, progress and problems in countries of the region, review the objectives of the current plans and programmes and, in a number of cases, outline future developments. At the request of the Secretariat, revisions and additional information were provided by many of the participants in the first half of 1962, so that the status of many projects is described as of the first quarter or first half of that year.

As noted in the Seminar report, practically all countries of the region have programmes for the establishment of industrial estates, some of which are at the initial planning stage, while others are at advanced stages of construction and operation. The scope of the programmes ranges from single experimental projects to large networks, from developed sites or very small estates with limited facilities to "industrial townships"

providing a variety of services and amenities, and from estates with a diversified industrial composition to specialized communities of industries.

The general picture emerging from the information papers is that promotion of small-scale industries is the principal objective of the industrial estates programmes in the region. In all countries, however, urban congestion and difficulties in obtaining land for industrial purposes are becoming acute serious problems and industrial estates are also relied upon to achieve a measure of industrial decentralization. In some countries, industrial estates are also used for developing large-scale industrial centres and complexes, including heavy and light industries of all sizes, and, in a few cases, for promoting industrialization projects related to the development of ports and airports.

It is because industrial estates of the latter type are already planned or being developed in countries of the region, and because interest for such schemes is likely to broaden in the future, that three discussion papers dealing with pertinent plans and projects in certain advanced countries have been commissioned for submission to the Seminar.

The first paper in part III, "The Port and Industrial Zone of Marghera" by Mr. V. Ciavi, Director, Council of the Industrial Zone of Porto Marghera, Venice, describes the organization of a port developed and built not for transit operations, but for the exclusive use of heavy and light industries erected along its wharves. The occupants benefit not only from substantial economies in costs of loading and unloading the bulk commodities, raw materials as well as products, which most of them use or manufacture, but also from the advantages of common servicing, inter-trading and inter-servicing which are among the basic features of industrial estates.

The second paper, "Problems in Establishment of Large-scale Industrial Estate", by Mr. G. C. Latham, Design Inspector, Imperial Chemical Industries, Ltd., is mainly concerned with a specialised type of estate - the composite factory, a group of plants interrelated either because they all use some basic raw materials or process or finish each other's products. On such an estate, maximum savings are afforded in handling, storage, transport and administration costs.

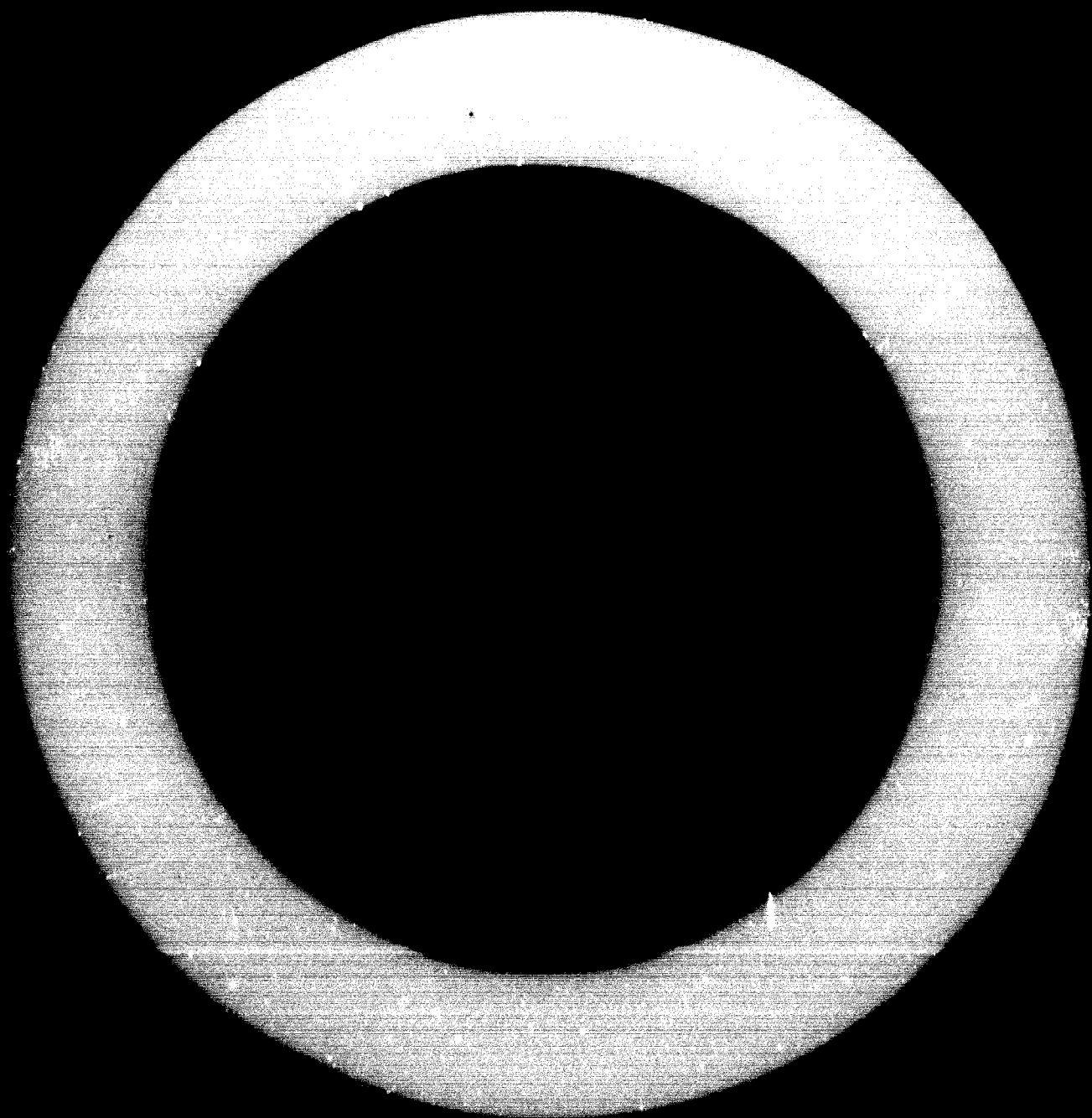
In the third paper, "Some Controversial Questions Concerning Industrial Estates", Professor A. Molinari, President, Institute for

Assistance to the Development of Southern Italy, develops a thesis which, given the policies prevailing in countries of Asia and the Far East, has some resemblance to that of the "devil's advocate". The paper presents the case for promoting a small number of large "areas of industrial development" centred on nuclei of large industries, located in areas particularly appropriate for the growth of industry and other economic activities, rather than a large number of small industrial estates scattered over a wide area.

The information papers submitted by participants from two advanced countries members of ECAFE outside the region - the Union of Soviet Socialist Republics - and the United States of America - deal, respectively, with the problems of organizing and operating industrial regions and towns in the former country, and the profit-motivated private industrial parks and districts and community-sponsored schemes in the latter.

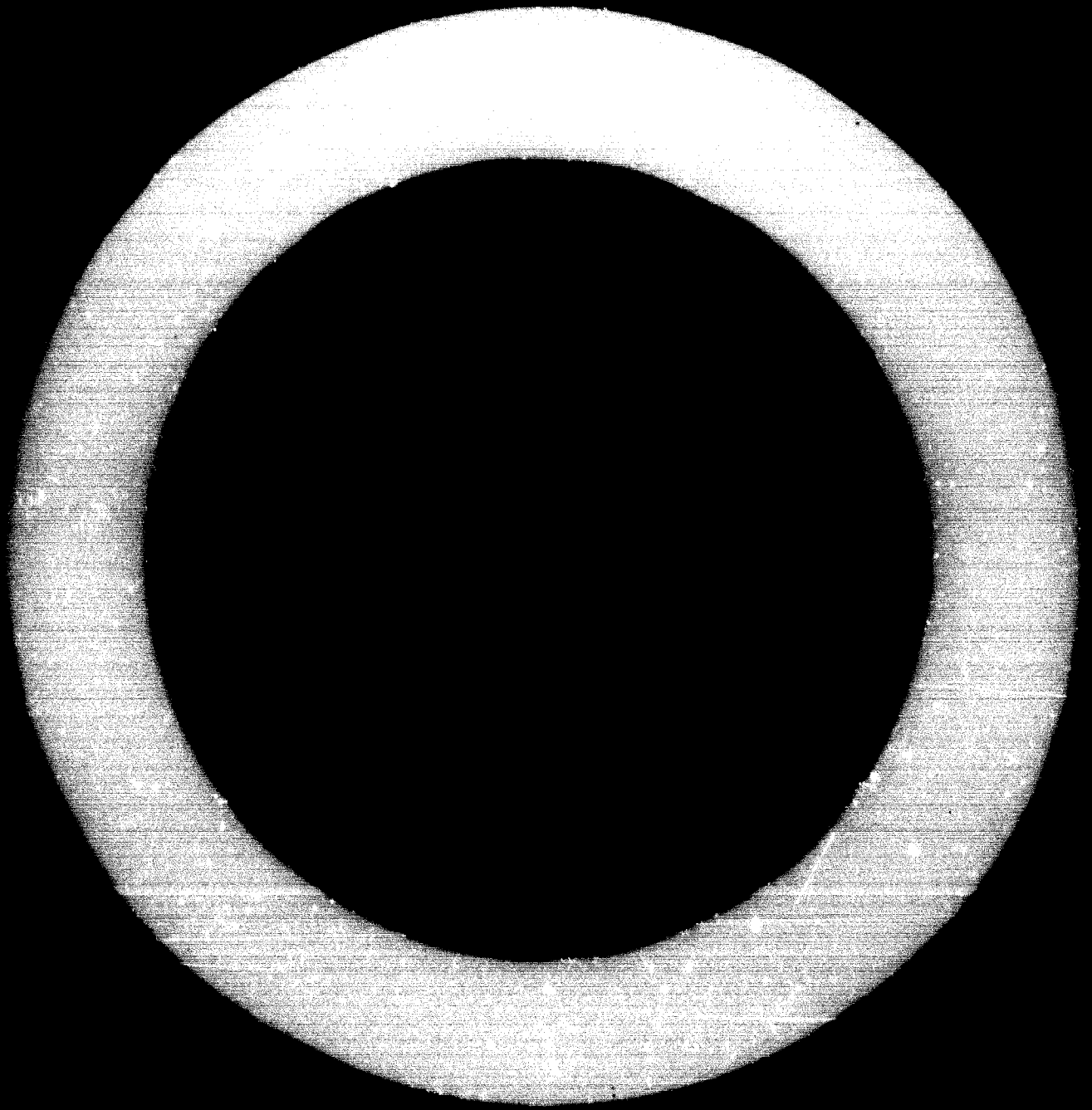
- - * * * * * - -

It is expected that by pooling expert knowledge and experience in other regional seminars and undertaking further research work on various aspects of the subject, a valuable body of information would be obtained to serve the needs of countries at different stages of development and placed in different economic, social, geographical and climatic conditions. Preparatory work has already been undertaken by the United Nations to hold a seminar on industrial estates in the region of the Economic Commission for Africa, and the possibility of convening a seminar in the Latin American region is envisaged. The relevant reports and papers will be published in due course.



Part I

**REPORT OF THE SENATOR ON
INDUSTRIAL ESTATES IN THE ESCAPE REGION**



REPORT OF THE
UNITED NATIONS SEMINAR ON INDUSTRIAL
ESTATES IN THE ECAFE REGION

I. INTRODUCTION

1. The United Nations Seminar on Industrial Estates in the ECAFE Region was held in Madras, India, from 1 to 11 November 1961.
 2. The Seminar was sponsored jointly by the Economic Commission for Asia and the Far East (ECAFE) and the Division of Industrial Development and the Bureau of Technical Assistance Operations of the United Nations Department of Economic and Social Affairs, in close co-operation with the Ministry of Commerce and Industry of the Government of India and the Department of Industries and Commerce of the government of Madras.
- Attendance
3. The Seminar was attended by participants from Burma, Ceylon, the Republic of China, the Federation of Malaya, France, India, Indonesia, Iran, Japan, the Republic of Korea, Laos, Nepal, the Netherlands, Pakistan, the Philippines, Thailand, the Union of Soviet Socialist Republics, the United States of America, the Republic of Viet-Nam, Hong Kong, Sarawak and Singapore.
 4. The Seminar was also attended by an observer from Israel.
 5. Representatives of the International Labour Organisation (ILO) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) also attended the Seminar.
 6. There were also observers from two non-governmental organizations, namely, the International Chamber of Commerce (ICC) and the World Federation of Trade Unions (WFTU).
 7. In addition, experts from the Indian Institute of Technology, the Industrial Co-ordination Bureau (ICB) and the Ford Foundation attended the Seminar as observers.
 8. A representative from the secretariat of the Economic Commission for Latin America (ECLA) also attended the Seminar.
 9. A list of participants, observers, and United Nations Secretariat members is given as appendix 1.

Opening addresses

10. Mr. N. Bhaktavatsalam, Minister for home, government of Madras, in welcoming the delegates, recalled that the All India Seminar on Industrial Estates had been held at Madras in 1960. To have Madras as the venue for a similar Seminar covering a wider region clearly indicated a recognition of the progress made in the development of industrial estates and its significant contribution to the development of industries, particularly in the industrially backward areas. He thanked the United Nations, ECAFE and the Government of India for convening the Seminar in Madras.

11. Mr. Bhaktavatsalam observed that there was an increasing realization that industrial estates could be a most effective tool to foster industrial development on a decentralized pattern. It prevented haphazard growth of "Industrial slums". The provision of well-designed factory buildings and of advisory and common facilities, services and other amenities in the estates would not only ensure the health of workers but also help to increase their productivity. During the third plan period, Madras would be encouraging the establishment of industrial estates by co-operatives and joint stock companies.

12. He pointed out that numerous problems would arise following the introduction of new ideas in the planning and organization of industrial estates. It was only through exchanges of ideas and views among countries of the region that these problems could be successfully solved. He hoped that the Seminar would also help in evolving standard patterns for the various steps to be taken in the setting up of industrial estates, though some of these steps might vary from country to country.

13. Mr. Manuohai Shah, Minister of Industry, Government of India, in inaugurating the Seminar, stressed the fact that rapid industrialization was the only solution to the problem of raising the living standards of the people. To achieve this goal, modern mechanized small industries provided the most potent tool. Small industries, which had been playing an important role in industrial development, both in the highly developed countries and in the newly developing countries, would help to ensure a balanced industrial development in all under-developed countries, but especially in vast countries like India.

14. Moreover, the satisfaction of regional aspirations definitely required the development of these small-scale industries. In the under-developed countries, where capital was scarce and unemployment was a serious problem, they were the obvious instruments for progress.

15. Only through small-scale industries could the benefits of modern science and technology be spread through out Asia and Africa, where the

wastness of the regions precluded the organization of a network of modern or large industries in every area. It was only when the light was brought to the hearths and homes of the masses that modern science gave its full benefit and it was here that small industry had its unique place.

16. Mr. Shah observed that, if the newly developing countries wanted to avoid the stresses and strains through which the industrial world had passed during the last two hundred years, they would have to adopt a planned industrial growth in which the instrument of the industrial estate would play an important role. India had had the experience of over 100 industrial estates during the second plan period and it was proposed to start a much larger number during the third plan, for they had proved to be the most economic and effective instrument for the development of small industries.

17. An industrial estate should represent all the facets of the country's economic, social and industrial life. It should become a real university where all human skill could be learned by visual demonstration. The estates had, therefore, to be planned with great care, for it was better to have no estates than to have estates which furnished bad examples.

18. Mr. Shah referred to the programs of functional estates, cooperative estates and ancillary estates. In view of the importance and usefulness of training institutions in industrial estates, he suggested that every estate should have a full-fledged industrial training institute or at least a small trade school.

19. There was, said Mr. Shah, a great social philosophy behind the development programs for small industries and industrial estates. If the pace of economic emancipation of the masses in Asian and African countries was to be quickened, increasing attention should be given in their national development plans to the development of small industries.

20. Mr. Nyah, Executive Secretary of EGAFE, thanked the Government of India and the Government of Malaya for the arrangements made in connection with the Seminar. He also thanked Mr. M. Bhaktavatsalam and Mr. Manubhai Shah for their addresses.

21. He observed that the greatest challenge today in the newly developing countries of this region was how to accelerate economic growth and improve the levels of living rapidly, both of which were objectives calling for positive institutional approaches to the many development problems involved. One of the most recent of these approaches was the widespread establishment of industrial estates. The efficacy of this means of promoting industrial development had been stressed, on several occasions, by the Economic and Social Council, as well as by the Economic Commission for Asia and the Far East.

22. He reviewed the advance of the industrial estates programmes in various parts of the world. In the EC&FE region, India had spearheaded the development of industrial estates and it was particularly appropriate that the Seminar was being held in Madras in view of its vast experience in this field. Moreover, the Guindy Industrial Estate was providing a workshop for the Seminar. He noted that a large number of progressive enterprises now being established in various parts of India would scarcely have come into being without the assistance of industrial estates and the promotional efforts of the central and state Governments.

23. In enumerating the advantages of industrial estates, he suggested that some of the limitations and pitfalls in planning them should be borne in mind. In particular, there were several basic policy issues needing careful examination, including the over-all industrial location policy in a country, the controversial questions as to the "economic size" of the estates and the problems of establishing rural industrial estates. He expressed the hope that the work of the Seminar would help not only in clarifying these basic policy issues, but also in formulating specific national or international measures to speed up developments in this field.

24. Several of the country papers presented by the governments for the Seminar especially stressed the need for close international co-operation in the development of industrial districts and estates. Already, several bilateral and multilateral programmes, including those being implemented by the United Nations and EC&FE, were providing assistance to the development of industrial estates in newly industrializing countries.

25. Finally, U Nyun observed that, to be really effective, an industrial estates programme had to be regarded as an integrated part of the over-all national development plan. Resolution 31 (XVI), unanimously adopted by the Economic Commission for Asia and the Far East at its sixteenth session, had specially stressed the need for concerted efforts by the EC&FE countries in industrial development, in the form of market-sharing or other arrangements, in order to expand the market and to attract investment. The time had now come for countries to think about their industrial location policy and industrial estates programmes in terms of regional prospects. This vital question of regional co-operation was commanding the fast growing attention of the countries in the EC&FE region.

Vote of thanks

26. The Seminar unanimously adopted a vote of thanks to the Government of India and to the government of Madras.

Election of the Chairman and Vice-Chairman

27. Mr. P. C. Alexander (India), Development Commissioner for Small-Scale

Industries, Government of India, was unanimously elected Chairman. Mr. Mohammad Aslam Khan (Pakistan) and Mr. Arshad Bin Ayub (Federation of Malaya) were unanimously elected first and second Vice-Chairmen, respectively.

Adoption of the agenda

28. The provisional agenda was adopted. The agenda is given in appendix 2.

Appointment of Technical Committee

29. The Seminar appointed a Technical Committee consisting of participants from Burma, the Federation of Malaya, India, Indonesia, Iran, Japan, the Netherlands, Pakistan, the Philippines, Thailand, the Union of Soviet Socialist Republics and the United States of America. The Chairman and the two Vice-Chairmen of the Seminar were also elected Chairman and Vice-Chairmen of the Technical Committee.

Adoption of the report

30. The report of the Seminar was adopted on 11 November 1961.

II. OBJECTIVES AND POLICIES IN ESTABLISHING INDUSTRIAL ESTATES

A. Plans, progress and problems in the countries of the participants

31. The Seminar had before it twenty information papers describing the plans, progress and problems in the countries of the participants, reviewing the objectives of the current plans and programmes, and, in a number of cases, outlining future developments.

32. The Seminar noted that the governments of most countries in the EC, FE region recognized that industrial estates were an effective means of promoting industrial development, modernizing industrial enterprises, raising their productivity, and thus reducing their costs and improving the quality of their products. Accordingly, all countries had programmes for the establishment of industrial estates, some of which were at the initial planning stage, while others were at advanced stages of construction and operation. The scope of the programmes ranged from single experimental projects to large networks, from developed sites or very small estates with limited facilities to "industrial townships" providing a variety of services and amenities, and from estates with a diversified industrial composition to specialized communities of industries.

8. The role of industrial estates with reference to development policies and programmes

33. The Seminar observed that, in most countries of the region, the objectives of industrial estates programmes were to promote the development of small-scale industries and to influence industrial location in accordance with policies of decentralization. In most cases, the major emphasis was laid on the former objective. The Seminar considered that the development of small-scale industries was justified on economic and social grounds in view of the conditions of scarcity of capital, abundance of labour and low level of productivity in countries of the region.

34. Small-scale industries generally provided employment at a relatively small capital cost. They could meet a substantial part of the increasing demand for consumer goods and simple producer goods. Many manufactured products could be economically produced only on a small scale. In many cases, no competition with large concerns was involved; in others, such competition could be economically sustained. Quite often, smallness was merely a stage in growth, as had been demonstrated, in all countries, by instances of increase, slow or rapid, in the employment, production facilities and output of enterprises originally set up as small units or workshops.

35. Yet small industries presented structural handicaps and weaknesses which were reflected in inadequacies in technical and managerial skills, low levels of productivity, lack of efficient equipment and difficulties of marketing and financing, and which could be remedied only by taking measures to strengthen and assist this economic sector. Concerted action was required to strengthen small-scale industries, either by establishing co-operative and complementary relationships among them or between them and large concerns, or by locating them in certain sites. Advice, training and financing provided by specialized institutions were needed to assist them. The Seminar considered that industrial estates were an effective means of achieving all or part of these objectives.

36. While most participants agreed that the objective of industrial estates was to promote industrialization by encouraging the formation of new small industrial enterprises or the extension of existing ones, some speakers stated that the objective in their countries was not so much to increase the number of small units as to induce the modernization of existing ones. In some cases, this was to be achieved by encouraging the formation of co-operative associations of small industrialists which would set up and operate industrial estates.

37. The major objective of industrial location policies in countries of the region was to check further congestion and overcrowding in large urban

centres. To achieve this, it was considered desirable, in some cases, to set up industrial estates in the outskirts of big cities. In other cases, industrial estates were located away from metropolitan centres in provincial towns of small or medium size where industrial potentialities in the form of labour, markets, raw materials and utilities were available. In some countries, projects to establish industrial estates in rural or under-level pod areas were planned or under way - a matter which will be discussed below in more detail.

38. The Seminar felt that industrial estates were also suitable for developing large-scale industrial centres and complexes, including heavy and light industries of all sizes, for promoting industrialization projects related to the development of ports and airports, large power plant schemes, petroleum refineries, chemical plants, etc., and for encouraging subsidiary manufacturing activities on a small or medium scale around such projects. A number of countries in the region were developing large projects of this type. The Seminar considered that, in order to promote large industries, it would not be necessary for public authorities to provide all the benefits, services and assistance usually extended in estates for small-scale industries. Yet, inasmuch as the large industries were usually confronted with the same difficulties as small industries in acquiring suitable industrial land, the public authorities might acquire the land, regulate its use by zoning and other measures, and subdivide it into plots. These could be leased or sold to the entrepreneurs at prices which included the estimated development charges, and, if need be, part of the "infrastructure" expenses as well. Such a project might be called an "industrial area" rather than an industrial estate. Most, if not all, of the government expenditures for such areas would be recoverable in the short run. In one country of the region, the management and control of an industrial area project would be the responsibility of an autonomous body - municipality or special agency - having rights of taxation for the purpose of maintaining certain services, a feature which the Seminar noted with interest.

39. The Seminar considered that, in most cases, the development needs of the countries called for both large and small industrialization projects, and therefore for industrial areas as well as industrial estates. The Seminar felt that the need for certain forms of development could not be assessed in purely economic terms, such as comparative cost and return advantages, and that social considerations, the need for a better geographical distribution of industry and balanced economic growth provided in many cases a sufficient justification for projects such as those connected with small, handicraft, and rural industries.

40. The Seminar agreed that the role of publicly-sponsored industrial estates was mainly to promote further private initiative and efforts. They

were made designed to stimulate the establishment of industry in the neighbouring area, in the form of privately-sponsored industrial estates and individual enterprises. The experience of certain countries in the region showed that the existing industrial estates induced secondary growth effects on account of the external economies to which their establishment had given rise. The Seminar expressed the view that, after the desired development had been achieved in an area, the publicly-sponsored programmes of industrial estates might be reduced in terms of numbers of estates or of the scope of facilities and services offered, and eventually discontinued altogether.

III. PLANNING OF INDUSTRIAL ESTATES

A. Feasibility studies

41. The Seminar considered that an essential pre-requisite for planning industrial estates was that there should be a formulation of government policy regarding the purpose, type and geographical distribution of the estates it was proposed to set up. On the basis of such a policy, a programme supported by the necessary legislative and budgetary measures could be drawn up. Within the framework of this programme, certain surveys would be undertaken for ascertaining the feasibility pre-requisites and industrial growth prospects for each proposed estate in one or more possible alternative locations.
42. The object of the feasibility surveys would be to select the location and, eventually, the site of each estate, and to make preliminary estimates of its size; of the type, size and number of factories and other buildings, common facilities and amenities required; and of the development and construction costs involved. The surveys would be carried out in each alternative location in respect of industries already established and of new industries whose establishment would be both desirable and feasible, and also of availability of labour, raw materials, power, water, transportation and other supporting facilities. The surveys would attempt to find out whether sufficient capital and industrial entrepreneurship would be forthcoming to ensure full advantage being taken of the facilities offered by industrial estates. They would also investigate the availability of other facilities for promoting and assisting industrial establishments.
43. The Seminar considered that surveys of industrial opportunities should preferably be carried out on a regional basis by specialized agencies. The establishment of industrial estates should not, however, be postponed until such surveys had been completed. Yet, since mistakes in advance planning might be costly and affect the subsequent development of industrial estates, the first estates might be set up in particularly favourable locations, as for instance in the vicinity of large urban centres, where they would have, in addition, a demonstration effect and thereby facilitate the development of estates in other areas. For all practical purposes, planning on the basis

of requirements expressed in applications which small entrepreneurs might be invited to submit as soon as a preliminary decision to set up an estate had been taken, might often be considered as a workable basis.

44. It was to be expected that desirability criteria for establishing new industries would be included in the policies referred to in paragraph 41. These criteria, which might also influence the rules of admission of enterprises to industrial estates (see below, paragraphs 116-120) would be taken into consideration in the general surveys referred to earlier. Experience suggested that a flexible application of these criteria would be required in areas where development possibilities and, consequently, the choice between industries were limited. The same might sometimes be true of certain feasibility criteria, such as availability of skilled labour or raw materials. For example, economic procurement of raw materials and skills from other parts of the country and sometimes from abroad might justify the setting up of industries already desirable and feasible in other respects.

45. The Seminar recognized the difficulties of pre-project planning of estates in rural areas, and the fact that feasibility studies in such areas might not always yield conclusive results. It recommended that the establishment of industrial estates in such areas be undertaken as a pioneering effort; this should be done with caution, in localities where basic facilities existed or could be economically provided.

46. As regards advance planning for large-scale estate projects, the Seminar felt that thorough studies were required in view of the importance of the financial and other risks involved.

47. The Seminar stressed the importance of ascertaining the availability or accessibility of assistance facilities at the pre-project stage of establishment of an industrial estate, in particular with a view to selecting its location, since provision of such facilities was a basic condition of the viability of an estate. This was a particularly important factor in advance planning of estates in rural areas.

B. Location of estates

48. The Seminar emphasized the importance of location for the successful establishment and operation of industrial estates. Decisions in regard to location should be taken after a careful examination of all the relevant factors. At the national level, to avoid haphazard growth, industrial location policy should be integrated with policies of industrial dispersal, regional development and town and country planning. In regard to the location of industrial estates, it should be ensured, as a part of advance planning, that conditions favourable to the success of the estates existed or could be created. Among these conditions, the more important were

availability of basic facilities, such as power, water supply and transport, and proximity to a market, sources of supply of labour and, where possible, of raw materials.

49. The Seminar felt that the factors to be taken into account in regard to location would vary from country to country. In countries of large size and population where industrial dispersal was often an important consideration, location decisions involved a choice between the possible alternatives of setting up the estates in or near metropolitan and big cities, in or near small towns and in the rural areas. On the other hand, small countries setting up a few estates might not be confronted with such a choice; they would be likely to attach greater weight to other factors, e.g., availability of basic facilities, nearness to market and the need of creating nuclei of industrial activity in selected areas. In all countries, transportation costs were an ingredient in the costs of industrial products and had thus a bearing on the location of industrial estates.

50. The Seminar considered that, although the location of industrial estates in or near metropolitan and other big cities offered a number of undoubted economic advantages, such as availability of basic facilities at low cost, industrial climate and market near at hand, a point was soon reached beyond which countervailing social considerations would make it necessary to locate the estates at sufficient distance from the cities. Among these considerations were the overstrained capacity of public utilities, population congestion, acute housing shortages, growing pressure on space and soaring land prices. The suitability of setting up "flatland factories" or "multi-storied" types of estates in the big cities was considered by the Seminar and is discussed in the section "Types of Estates". The question of "new towns" is examined in paragraph 147.

51. Location of estates in the rural areas presented problems of an opposite kind - comparative shortage or almost complete lack of basic facilities, difficulties of transport and absence of an industrial atmosphere - but held out promise of providing employment and income to workers nearer their places of residence. The Seminar felt that it would be prudent to adopt a selective approach in the matter of locating estates in the rural areas, at any rate in the initial stages. The more promising areas would be those where concentrations of artisans or persons with a minimum of skill existed, most of the basic facilities were available and arrangements for supply of raw materials and disposal of products could be organized. A view was expressed that the most suitable places for location of estates in the rural areas would be the market centres. Another suggestion was that rural areas where schemes of intensive agricultural development had been carried out and where the resulting improvement of living standards would create increased demand for industrial products would offer suitable locations for industrial estates. The Seminar recognized that, apart from the provision of other basic facilities in rural areas, there would be a need to

operate effective training and extension services, including repair facility workshops, as an integral part of, or as essential adjuncts to, industrial estates. Further, it was agreed that, in the rural areas more than in urban centres, the government would have to assume direct responsibility for the construction of industrial estates.

52. Some variants of industrial estates, i.e., more limited projects with a narrower scope, were also suggested, one of them being "workshops", that is, isolated units of accommodation designed to meet the local requirements of workers who were ready to accept more efficient methods of production which could not be carried out effectively in their homes.

53. The Seminar noted that the availability of electric power, which was essential for operating modern types of small machines, would be a limiting factor affecting the location of industrial estates in the rural areas. In this connexion a suggestion was considered for installing small generating units or "nursery" diesel power sets to supply electricity to these estates. It was felt that the cost of power from such units might be high and that the Government might have to provide liberal subsidies until national power systems were developed and transmission lines extended to the rural areas.

54. The Seminar recognized that, as a first step towards a wide dispersal of industries, it might be desirable to locate industrial estates in or near small towns. Such locations need not exclude the establishment of a limited number of industrial estates in selected rural areas. Small towns possessing several of the facilities available in the cities on the one hand, and free from many of the disadvantages of rural locations, on the other, provided an economically and socially feasible half-way habitat for the estates.

55. The Seminar recognized that a suitable location for estates would be in the vicinity of big projects. These projects gave rise not only to basic facilities and social overheads, often becoming the centre of a growing township, but also created scope for manufacturing some components and parts and for processing some of the by-products on a small scale. Around such big projects, therefore, industrial estates could be utilized to assist the growth of small-scale units.

56. The Seminar noted that, in most countries of the region, the local authorities, namely, municipalities and their counterparts in the rural areas, had not so far participated in the programmes to a significant extent and were, therefore, not involved in locational decisions. However, their role in regard to location was likely to become more important in the future.

C. Types of estates

Estates with different facilities

57. The Seminar noted that most of the estates planned or established by governments of countries of the region presented, as their main feature, a choice of general-purpose factories of all sizes. Such estates also offered a variety of common facilities, services and amenities. They were located in under-developed or rural areas as well as in or near cities of all sizes. In some countries, a few estates offering only improved sites were being developed in the vicinity of large urban centres.

58. The Seminar recommended that the type of facilities offered on industrial estates should vary with the level of industrial development of the localities in which they were to be established. It might not be necessary for the government to provide ready-built industrial accommodation or certain common services to entrepreneurs in industrially advanced urban areas. In such areas, there were spontaneous tendencies towards industrial concentration which, mainly because of scarcity and high cost of suitable land, resulted in a disorderly and socially undesirable inflow and development of industry. The experience already gained suggested that, if it was desired to set up industrial estates in such locations, provision of improved sites and common services for the convenience of the occupants, such as a bank, post office and dispensary, and an administrative building would be a sufficient incentive to the formation of industrial undertakings and the relocation of existing ones. The sites would be leased at a nominal rent or a fee where permitted by the laws of the country. Factory buildings would be put up by the entrepreneurs in conformity with norms and standards set forth by the authorities, and industrial operations would be subject to the rules and regulations of the estate. Common services for production operations, such as a tool room, laundry, etc., could be set up by the occupants under different co-operative arrangements or on a commercial basis, though in some cases governments might have to take the initiative in providing them. The Seminar recommended that consideration be given to the establishment of such estates as an integral part of urban improvement programmes and, in particular, of slum-clearance projects. As mentioned earlier, an exception might be made in countries intending to establish initially only a few estates; these might be set up in such locations with a full range of facilities so that their more rapid and successful achievements would have the desired demonstration effect.

59. The Seminar recommended that, in the less-developed localities - smaller towns or rural areas - publicly-sponsored industrial estates should provide general-purpose factories, and the necessary common services, since these were essential for stimulating industrial entrepreneurship, and improving industrial operations. In localities where development prospects were favourable, some improved sites might be kept in reserve for industrial enterprises willing to construct their own factories. Where opportunities for industrial development were limited and entrepreneurial initiatives were not likely to manifest

themselves spontaneously, it might be necessary to plan completely the type of industries to be set up; in such locations, buildings of standard type would generally be sufficient but, in some cases, provision of "custom-built" factories might also be needed. The Seminar recommended that, as a rule, the management of the estate and/or the administrative authorities should have some latitude in the provision of facilities within the framework of general policies regarding industrial estates.

60. The Seminar noted that special types of facilities were needed on large-scale estates or industrial complexes, including heavy and light industries of all sizes, composite factories, estates centred on major projects such as power plants, oil refineries, steel mills or chemical plants, estates integrated with ports, airports or railroad junction points, etc. Only a few estates in some of these categories were being planned in certain countries of the region. The Seminar suggested that further research and interchange of information on these aspects would be of value, should there be an increase of interest in projects of this type.

61. The Seminar noted that "flatted" or "multi-storeyed" factories - a few of which were being constructed in some countries of the region - were often considered to present serious drawbacks. There was a risk that such factories - which were usually established in densely-built urban locations - might result in traffic congestion and in the development of slum conditions; the cost of land, construction and special services required was usually very high. Flatted factories were likely to be needed only in exceptional cases, for example, in areas with extreme scarcity of industrial land, or in certain city areas where proximity to market, specialized labour and services and direct business contacts were essential to the operation of certain types of industry.

62. Some doubts were expressed regarding the suitability of setting up estates in under-developed areas by first providing a few factory units upon demand of local entrepreneurs and then improving plots and erecting buildings only when further demand manifested itself. It was considered that such an approach would have a limited promotional value, that provision of common services might not be economically possible for a long time, and that the results achieved might not be commensurate with the efforts and costs involved in their establishment.

63. The Seminar observed that the interrelated questions of location and type of facilities had a bearing on the orientation and tempo of industrial development and recommended that this aspect be given due weight at the earliest stages of formulating policies and devising programmes of establishment of industrial estates in countries of the region.

Special-purpose estates

64. The Seminar observed that, in certain countries of the region, there was a tendency to multiply specialized types of industrial estates. A variety of such estates were being planned or established, including estates for joint production programmes among small industries - for instance, production of parts and components for an assembly unit; estates for small industries manufacturing parts and components or processing or finishing certain product for large industries, on a subcontracting basis; estates for village craftsmen; and estates for training small industrialists or university students.

65. The Seminar cautioned that industrial estates did not provide a solution to all problems of industrial development and that public investments for their establishment could be justified only if they served community interests, and not those of limited groups, and if they induced subsequent initiative and investments on the part of the private sector. Moreover, great care was necessary if publicly-sponsored or financed industrial estates were devised for promoting the establishment of new and untried relationships between private groups, some of which might present certain economic and social problems.

66. Hence, the Seminar recommended that the establishment of industrial estates for small industries linked by subcontracting relationships with large-scale "parent" plants be preceded by studies of measures to prevent abuse and exploitation of the small units by the large concerns, and creation of conditions of subservience. Such studies would relate to the amount and price of the supplies and raw materials provided by the parent company and of the goods delivered by the subcontractors; period of payment; wage levels; labor conditions; participation in the capital of the small plants; control of their management and operation and other aspects. Such measures of protection and regulation might have to be taken since, even when such estates were set up by publicly-owned industrial enterprises, their objective was to induce private large industries to follow suit.

67. The Seminar recommended that estates for promoting joint production programmes among small industries be set up on a limited experimental basis. Here again, the role of the government would be primarily to test and demonstrate with a view to inducing private efforts. The Seminar felt that these efforts should preferably be undertaken by co-operative associations which, because of their organization and resources, might not need the degree of government assistance required by individual small entrepreneurs. The Seminar recommended that studies be undertaken of the organizational and financial arrangements involved in joint production programmes, and of the types of production for which location on a common site was required.

68. The Seminar felt that full-fledged industrial estates might not be required for rural or village handier than or cottage industries, but that

provision of workshops and other common facilities would be useful.

69. Finally, the Seminar suggested that training of entrepreneurs and students might be usefully undertaken on estates established for productive purposes rather than on specially devised educational estates. Attention was called to the merits of in-plant training - which could be given in large or small individual enterprises - for completing the professional training of graduate engineers.

1. Engineering and economic aspects

70. The Seminar stressed the need, in the planning of industrial estates, to reconcile efficiency in layout, design, construction and the types of facilities and amenities to be provided with an economic use of the scarce resources of the newly developing countries. The planning should aim at the provision of accommodation and services to the manufacturers at the lowest possible cost consistent with their operational efficiency. For these purposes, every engineering and economic aspect of developing and operating the proposed estates should be thoroughly investigated at the stage of pre-project planning. The economic results from good physical planning would be built-in and would accumulate day by day. The losses due to bad planning were also cumulative and it was often difficult and costly to remedy them.

71. The Seminar emphasized two essential requirements for the planning of an estate, namely, the undertaking of a survey of industrial potential in the area and the preparation of a master plan for the proposed estate. The former provided the necessary information for determining the site and size of the estate, the types of factory buildings, the utility requirements, etc. The latter gave a complete picture of the estate. It would facilitate orderly planning and construction of the estate according to short-term and long-term needs, thus avoiding costly improvisations and adjustments at various stages of development.

Site selection and land acquisition

72. The country in the development and operation of an industrial estate began with the selection of a site and the acquisition of land. The Seminar felt that, since in practice it would be difficult to find a site which would meet all the ideal requirements, such as proximity to transport and labour supply, availability of utilities and community services, and physical suitability (level ground, good soil for foundation, easy drainage, and proper shape and size), some compromises would be necessary. As a rule, a site entailing high development costs of land should be avoided. In most countries of the region, the cost of land was usually only a small part of the total development costs of an industrial estate, and should not be the determining

factor of site selection. The Seminar recommended that the final decision should be made only on the basis of a comprehensive analysis of the costs and benefits of all alternative sites, bearing in mind the prospective industrial development in the area and the magnitude of the social overhead investments involved.

73. The Seminar noted that the size of the estate viewed in terms of operating efficiency could vary greatly. In various parts of the world, estates varying from a few acres to thousands of acres had been operating successfully. In countries of this region, with a few exceptions, most of the estates were in the size category of 10 to 50 acres. The Seminar felt that the size of an estate could only be properly determined after a careful assessment of such factors as types and number of industries to be accommodated, the number of units and the size of their employment, the potentiality of industrial growth in the area, the availability of land and its development costs, the proximity to transport and the availability of workers' housing.

74. The costs of development and servicing per unit in a smaller industrial estate were usually higher than those in a large estate. The Seminar felt that, except for special considerations, an estate should be large enough to achieve practical economies of scale in the provision of services, special buildings and public utilities. On the other hand, it should not reach the point where diseconomies of scale - particularly traffic and administrative difficulties - might become serious.

75. The Seminar noted that the price of land acquired for industrial estates varied greatly from country to country and from site to site. Further, once an estate was developed in an area, the price of land around it usually rose sharply within a short period. Thus, in considering the extent of land to be acquired, adequate provision should be made at the outset for future expansion.

76. In the case of rural industrial estates, the Seminar recommended that the site should be within easy reach of the artisans and small shops in a village or a cluster of villages. Preferably, it should be located at the outskirts of a village where the wholesale and retail market for village products was held. This would ensure the continuation of the traditional rural practice of direct producer-to-buyer contact at the workshop site. Another consideration was that the estate should be close to an all-weather road with the possibility of its early extension to the estate entrance to accommodate truck traffic. The Seminar felt that, in some countries of the region, the village council or other local organizations might be prevailed upon to provide community land on a long-term rent-free basis for the setting up of rural industrial estates.

Estate layout and land utilization

77. The Seminar emphasized the importance of economic and efficient utilization of land in the planning and layout of an industrial estate. It noted the wide variations with regard to the subdivision of the estate and the design of the road network, such as the curved street pattern of the estates in the United Kingdom and the rectangular or gridiron pattern adopted in the United States. The Seminar felt that, in most of the newly developing countries with little experience in estate construction, a simple open grid with standard sized plots, based on a single major spine road, was the most practical solution.
78. The Seminar stressed the importance of proper zoning based on the needs of prospective occupants of the industrial estates in order to ensure maximum utilization of the site and prevent unnecessary nuisance. Industrial units without special requirements could be accommodated in the standard factories of various sizes. Enterprises in factories built to specifications should be located in a separate part of the estate. Similarly, certain units which might need location along the railway or water might be grouped together in a special zone. Separate zones should be provided for units with special but similar production requirements, and for units which might have a large amount of effluent disposal, might be noisy, cause fire hazard or emit fumes. Further zones should be allotted for landscaping, parking and non-industrial buildings. The Seminar noted with interest the development of "performance standards" for noise, smoke, wastes, etc. in certain advanced countries, but felt that further analysis was needed before this system could be recommended for industrial estates in countries of the region.
79. The Seminar considered that no rigid rule could be laid down as to the ratio of area under factory plots to the total area of the estate. This varied according to the needs of the particular sites and localities. While the maximum possible area should be utilized for factory plots, adequate land should also be provided for roads and open spaces so as to prevent undue congestion in the estate. In India, about 50 to 55 per cent of the total area of the industrial estate was under factory plots, 25 to 30 per cent under roads, 5 to 10 per cent used for open space, and the remaining 10 to 15 per cent for the various ancillary buildings. The corresponding figures for an estate of 100 acres in Pakistan were 69, 23.5, 11.5 and 6 per cent, respectively. In a recently developed area (130 acres) in Hong Kong, 60 per cent of the total area was allocated for factory plots; the road area took 27 per cent, while the open space and non-industrial buildings took 2.5 and 5.5 per cent, respectively. In Israel, building coverage was about 40 per cent of the total area of an estate.
80. In the case of rural industrial estates, the Seminar felt that the layouts should be strictly functional, in order to keep the development costs and maintenance charges down to the minimum. For small estates of 2 to 5 acres,

...providing, however, all necessary for the kind of functional use of land and adequate scope for future expansion. Land earmarked for future expansion should be developed immediately but should be allowed to remain in cultivation until required. However, the master plan of the whole estate should be prepared and the total cost of improvement estimated.

81. Another important consideration in the layout of a rural industrial estate was that small retail shops were likely to spring up around it in a haphazard manner. To prevent this, it would be advisable to include in the plan a vision for such shops in suitable locations.

Factory plots and buildings

82. The Seminar stressed the need, in planning factory plots and buildings, of bearing in mind the changing requirements of manufacturing units in the estates. Design should be such as will enable physical expansion, as well as modifications in the internal layout arising from changes in the nature of production or installation of additional facilities.

83. The Seminar noted that an industrial estate usually provided plots of varying sizes in order to cater to a sufficiently wide range of industries. The appropriate plot sizes in an estate could only be assessed on the basis of studies of potential demands. In India, for small industrial units likely to employ about 10 to 20 persons, the plots ranged from 2,000 to 15,000 square feet. In Pakistan, the size of plots in the 100-acre estate ranged from 5,000 to 10,000 square feet with a few plots of 18,000 square feet for large units. In other estates, the sizes of the plots ranged from 3,000 to 18,000 square feet with a sprinkling of a few plots of 25,000 and 27,000 square feet. A few small plots were also provided for very small units and artisans.

84. The Seminar considered that the ratio of covered area to the total area of the plot will depend on the requirements of a particular industry. Unpaved open spaces should be provided for parking vehicles and storage of materials to prevent congestion. In India, the covered area varied from one-half to one-third of the plot area.

85. The Seminar noted that, from a view to achieving economy in planning and construction, several countries had evolved norms for factory layout and building specifications. It felt that, for countries starting to develop industrial estate, it would not be advisable to have a large number of factory layouts presenting marked variations. In India, for example, for industrial estates with 150 to 200 units, the number of standard layout plans were restricted to five or six.

86. The Seminar felt that an industrial estate programme offered good scope for the large scale use of pre-fabricated parts, such as roofing elements, doors,

windows, etc., which could be manufactured on a large scale at a comparatively low cost. The cost could also be reduced by the adoption of standard spans.

87. The Seminar stressed the importance of providing flexibility in the utilization of floor space. It noted that, in India, some of the factory buildings in the estates had been constructed in twins sharing a common wall with an opening in it so that, whenever necessary, the two factory buildings could be used as one unit. In Israel, standard factory buildings in the estates were composed of modules where partitions could be easily constructed to segregate units of two, three or more modules to form a single workshop.

88. The Seminar noted that a square type of building needed less wall length and was therefore cheaper than a rectangular one for the same enclosed area. On the other hand, rectangular factory space was more suitable from the point of view of machinery layout and manufacturing processes. The Seminar also noted that, in most countries of south-east Asia, there was plenty of sunlight all the year round. In such areas, north-light glazing was of no great importance, provided the buildings were suitably oriented. Such arrangements could reduce construction and operational costs considerably.

89. The Seminar noted that various countries of the region were making efforts to use locally available low-cost materials of construction in place of traditional materials such as steel and cement, which were in short supply. It felt that there was an urgent need for more experimentation and research on the design of factory buildings, taking into account the difference in climate and available building materials in various countries of the region. The Seminar stressed the need for a continuing exchange of information among countries on the results of research and norms adopted for estates layout and building design. It recommended that the ECAFE Working Party on Housing and Building Materials might be requested to devise an effective programme of research and exchange of information in this field.

Roads

90. The Seminar considered that the roads in the estates should be sufficiently wide to ensure a free flow of traffic. It noted that, in India, the recommended widths were 60, 40 and 30 feet, respectively, for main, secondary and service roads. The paved widths in the beginning were kept as 24, 16 and 10 feet, respectively. In Pakistan, the width of main road leading into the estate was about 52 feet, with 24 feet metalling; the width of secondary roads into the estates ranged from 32 feet (16 feet metalling) to 40 feet (20 feet metalling); that of roads servicing factory sites ranged from 30 feet (16 feet metalling) to 32 feet (16 feet metalling). As the estate expanded and traffic increased, the paved portions could be widened accordingly. For the small

... .., the Seminar felt that a parking area should be adequate. On either side of each road, side-lanes should be provided for off-street parking facilities.

Drainage

91. The Seminar noted that many of the towns in countries of the region had no underground drainage and that, even when available, it was not always possible to take advantage of it. In the circumstances, independent sewerage arrangements might have to be made for every estate. Open storm water drains should also be provided in the estates.

Utilities

92. The Seminar stressed the importance of careful assessment of the quantities of water and power needed in planning an estate. Sufficient margin should be kept for future expansion. Gas, steam and compressed air might be required by some of the industries in the estates. The Seminar suggested that, in such cases, it might be desirable to group together the industries requiring these facilities in order to minimize the cost of distribution.

Common Facilities and Services

93. The Seminar felt that the type and extent of common facilities and services should be ascertained and suitably provided for in the plan. The buildings housing these services and the manufacturing units requiring them should be located within convenient distance of each other. In addition, provision might have to be made, when necessary, for the establishment of service institutes in or near industrial estates. Other elements to be taken into account in the planning were the provision of warehousing, amenities and administrative buildings.

Cost of Construction and Services

94. The Seminar noted that, in India, the average cost of construction of an industrial estate worked out at about Rs.125,000 per acre for a small estate (up to 10 acres) and about Rs.100,000 per acre for a large estate. These figures do not include the cost of land, which varied considerably from place to place, nor the cost of common facilities such as water supply, heat treatment

1/ One rupee = US \$0.21

plant, etc. The average cost of construction of factory sheds worked out to about Rs.12 to 15 per square foot (including utility installations) of the covered area. The development of site, viz. levelling the ground, laying roads, drains, sewers, water and power mains amounted to about Rs.3 to 5 per square yard. The Seminar felt that, although cost data from different countries might not be fully comparable, such information would provide useful indications for planning industrial estates in countries of the region. It recommended an interchange of information on the cost data amongst these countries.

95. The Seminar recommended that, apart from taking the various measures, such as the adoption of norms for design, standardization of building components and judicious choice of materials, referred to earlier, development and construction should be carefully phased with a view to achieving economy and efficiency. The utilities might be made available to the occupants as and when required. For instance, roads could be constructed to minimum width to start with and widened later on with increase in traffic. The administrative buildings and certain other ancillary buildings might not be put up in the first instance. The canteen and the administrative buildings could be accommodated to begin with in an unoccupied factory shed. Construction of these buildings could be taken up when the estate was expanded and there was pressing need. Similarly, expenditures on common facility services could be kept down at the beginning and increased gradually as the estate developed.

E. Related social overhead investments

96. The Seminar recognized that provision of social overheads in the industrial estates and in their vicinity was an important factor in the success of the estate. These overheads would include housing, transport, schools, hospitals, canteen, recreational facilities, etc. The Seminar was of the view that, where such overheads were not available near the estates as a part of the normal services provided by Government or municipal authorities, they should be specially provided after the estate had been set up.

97. The Seminar observed that the question of social overhead investments was closely related to that of location of industrial estates. In selecting the location, account had to be taken of the availability of housing, public transportation, schools, hospitals, etc., and of the prospective increased demand for such facilities resulting from the occupation of the estate. The Seminar considered that the availability of a minimum of social as well as economic overhead facilities was in most cases a prerequisite for the establishment of an estate in a given location. Demand for most of them would increase from the earliest stages as a result of the rise in employment and income induced by industrialization.

98. The Seminar recognized that, for many reasons, and in particular because of limitation of resources, time-lags of varying duration were likely to occur

between the establishment of an industrial estate and the provision or extension of supporting community facilities; it recommended that measures be taken at the earliest planning stages to prevent the haphazard growth of industrial units using slum zones and other undesirable developments around the estate.

99. The Seminar considered a suggestion that expenditure on social overheads on or near the estates should not be out of proportion to expenditure on such overheads elsewhere. This suggestion arose from a feeling that, if social overhead investments in the estates were provided on an extensive scale, this might result in raising the rents and, therefore, the cost of products in the estates, thus making their prices non-competitive. In this connection, it was also pointed out that a large proportion of the cost of the social overheads should not be debited to the cost of industrial estates at all, because such overheads were a part of the normal social services provided by the Government. Further it was urged that expenditure on social overheads was so vital to the health, comfort and efficiency of the worker that its importance should be fully recognized. The provision of a minimum of social overheads should be an integral part of the industrial estates programme.

100. The Seminar reviewed certain other social aspects of the establishment of industrial estates, such as welfare, health, nutrition, etc. and recommended that further studies be undertaken of both the effects of such establishments on the community and the means of using certain facilities and services in the estates to further social development objectives.

F. Programme scheduling

101. The Seminar emphasized that proper scheduling of an industrial estates programme in all stages, from initial planning to occupation of factories and to the achievement of normal levels of production by the entrepreneurs, was essential to the efficient and economical implementation of the programme. All available delays should be eliminated and the time lags between (a) planning and construction, (b) construction and occupation, (c) occupation and commencement of operations, and (d) commencement of operations and attainment of normal production, shortened so that the maximum results could be obtained in the shortest possible time from the investment made in the estates. The degree of adherence to properly worked out schedules provided a good measure of the competence displayed in carrying out the programme.

102. The Seminar noted that, in some countries of the ECAFE region, there was an interval of about 3 years between the approval of an industrial estate and the actual occupation by the entrepreneurs of the constructed factory accommodation. Of this, about 3 months were taken in selection of site, 6 months in preparation of layout, designs and estimates, 12 to 18 months in construction and provision of services, including water supply, electricity,

sewerage, etc., and about 12 months in occupation of the factory units. In another country acquisition of land was stated to have taken from 3 to 6 months. Time taken in completing land acquisition proceedings, delays involved in consultation with, and co-ordination of, a multiplicity of government departments and agencies - particularly those concerned with industries, public works and electricity; lack of advance consultation with the entrepreneurs with a view to ensuring quick occupation after construction; and, in some cases, unforeseen circumstances were responsible for delays. The Seminar felt that, to a large extent, these delays could be eliminated by evolving more efficient arrangements for selection of sites, by setting up special committees or teams representative of the departments concerned to take final decisions for providing services, by maintaining continuous liaison with prospective occupants, and by leasing out each block of factories as soon as its construction was completed. The Seminar was of the view that the possibility of setting up prefabricated structures in the estates with a view to saving time should be explored.

103. The Seminar further noted that, among the principal causes of delay in the commencement of operations by the entrepreneurs and attainment of normal rates of production, were: indecision on the part of entrepreneurs as to the industries they would take up; and, in some cases, non-availability of raw materials and machines or of essential common facility workshop and tool room facilities. Difficulties of marketing were also cited as a factor in preventing the attainment of normal levels of production. The Seminar considered that, since delays of this kind often arose from basic causes such as a shortage of raw materials, they were not readily amenable to solution; however, by careful advance planning, it should be possible to reduce them appreciably.

104. The Seminar considered whether sponsorship of estates by the government as opposed to sponsorship by private corporations or associations had any bearing on the magnitude of time-lags. It was mentioned by the participant from one country that the time-lags might have been greater for an estate if agencies other than government had not participated at certain stages of planning and construction. The Seminar felt that, on the whole, experience was still not broad enough to warrant the drawing of general inferences on this point.

105. The Seminar recognized the importance of not only holding sufficient land in reserve for future expansion of estates but also of taking steps to earmark areas for industrial estates. It also stressed that one effective way of reducing delays and obtaining the best results from expenditure incurred on the estates would be to synchronize the completion and occupation of factories with the provision of various technical and promotional services in the completed estates.

IV. ORGANIZATION, MANAGEMENT AND FINANCING OF INDUSTRIAL ESTATES

A. Sponsorship and organizational arrangements

106. The Seminar noted that, among the countries of the region where industrial estates had been set up, the initiative and responsibility for starting the programme had generally been taken by the government. In many of these countries, the government had not only sponsored the establishment of the estates but had assumed direct responsibility for practically all the operations ranging from the acquisition of land to the day-to-day management of the estates. Direct government sponsorship was inevitable in the beginning, because an industrial estates programme was looked upon as just one of the measures in the wider promotional effort organized by governments for industrialization. Moreover, many of the preliminary steps for establishing the estates - for example, the acquisition of land and its development and the provision of basic facilities such as electricity - could be taken more effectively by the government because it could not only exercise the necessary powers for the purpose but could also utilize the services of a corps of experienced administrators and technical personnel. The Seminar recognized that government sponsorship would be appropriate and even necessary at the inception of the programme, especially in those countries where autonomous corporations or well established co-operatives and associations of entrepreneurs did not exist. However, it suggested that, with the rapid expansion of the programme, progressively increasing participation by companies or co-operatives of entrepreneurs should be encouraged. For certain essential preliminaries, as for instance land acquisition, the government would have to continue its role of active participant in the programme.

107. The Seminar considered that, in respect of government sponsorship of the programme, it would be desirable to take steps to avoid delays which are often associated with joint action by a number of government departments or agencies. It recommended that all concerned official agencies should be associated with the programme from the planning stage and that, where possible, a joint action council consisting of representatives of these agencies might be set up to review periodically the arrangements and to supervise the establishment of the estates. Further, appropriate delegation of powers to lower levels should be made during the stages of site development and factory construction as well as in management.

108. The Seminar noted that, in some countries of the region, the industrial estates had been established by corporations or joint stock companies and that, in other countries where government sponsorship had been the prevalent practice so far, such corporations, or joint stock companies were being set up. Autonomous corporations could play a useful and effective role in

developing industrial estates, because they were able to devote their attention exclusively to this programme. It was, however, felt that they should be given powers commensurate with their responsibilities.

109. The Seminar further noted that the role of co-operatives or associations of private entrepreneurs in the establishment and management of estates in the countries of the region had not been significant so far. Hence private initiative and effort reflected in the formation of such co-operatives and associations should be welcomed and encouraged, as this would be an index of the recognition of the usefulness of the programme by the entrepreneurs. Care should be taken, however, that the co-operatives and associations were broad-based in membership and possessed the necessary leadership and initiative.

110. The Seminar was of the view that, even after the responsibility for the establishment or management of the estates was transferred to autonomous corporations or joint stock companies and co-operatives of entrepreneurs, the government should retain the responsibility for providing technical advice, common facility workshops and other practical services. In this connexion, the Seminar noted that, even in certain industrially developed countries where industrial areas or estates were set up by privately-sponsored local initiatives, the government rendered assistance in various forms, for instance, by sending teams of technicians to study problems and suggest solutions and by collecting and disseminating information on the experience gained.

111. The Seminar agreed that in the matter of sponsorship and organizational arrangements, no uniform or set pattern could be suggested for adoption by the countries of the region. Each country would have to decide with reference to its own conditions whether, and to what extent, responsibilities connected with an industrial estates programme should be assumed by the government and how far, and at what stage, they should be transferred to autonomous corporations or co-operatives and associations of entrepreneurs. Further, after the responsibilities had been transferred, the government would also have to decide what steps were necessary to ensure that the objectives of the programme were steadily kept in view and that certain minimum standards in the establishment and management of the estates were observed.

112. The Seminar also agreed that, since the acquisition of land might in many cases present difficulties owing to legal and administrative procedures, studies of these problems should be undertaken by the countries of the region, with a view to reducing delays and other difficulties.

B. Management

Problems of management during the construction period

113. The Seminar observed that, in most countries of the region where publicly-sponsored industrial estates had been established, the main construction work had been carried out by regional or local government agencies, usually public works departments, in cooperation with such bodies as water-works departments, public or private power agencies, and other utility or construction companies. The agency sponsoring or managing the estate supervised and coordinated the construction work. Only in a few countries was the actual construction undertaken by the sponsoring or managing agency itself.

114. The Seminar noted that, in some cases, construction by government agencies involved delays and higher costs. Some participants suggested that private contractors, supervised and controlled by the estate authority, might do a better job at lower cost. Others thought that the estate authority itself should be in charge of construction.

115. The Seminar recommended that, on estates providing improved sites, construction by the entrepreneurs should conform to standards and specifications laid down by the estate authority.

Problems of management during the operational period

(a) Admission policies

116. The Seminar noted that zoning and restrictive regulations usually led to the elimination of "noxious" industries, those having large quantities of effluent for disposal, and those creating fire hazards. In certain cases, because of local shortages, industries requiring large quantities of power or water were also precluded from settling on the estate.

117. The Seminar discussed the question as to whether admission to industrial estates should be restricted or granted by priority to new firms and extensions of existing ones and to industries of certain types. It noted that this question arose mainly in estates located near large urban centres, where demand for premises exceeded the supply. These policies varied appreciably from one estate to another. Certain estates reserved admission to new industries manufacturing with the aid of modern machinery and power essential consumer goods or other articles for which there was a strong demand and which were at present imported from abroad; those which were in short supply not only in the local area but in the country as a whole and therefore had to be transported over long distances; and

those which had a good export market and for which a growing demand was anticipated consequent upon over-all development and rising income. Elsewhere, admission was given in order of priority to certain industries, in accordance with lists and schedules established by the government for certain regions or for the country as a whole. Under this policy, the traditional industries - textiles, ceramics, wood, leather, etc. - usually had a low priority. Sometimes, preference was given to certain units whose products were needed by all or most occupants of an estate, for instance, a packing materials factory or a foundry. On other estates, new and existing enterprises of all types which qualified under the zoning and administrative regulations were admitted without question.

118. The Seminar felt that admission policies should reflect the over-all industrialization policies for the area or the country, but should not be applied in a rigid manner. In general, existing industries as well as new ones should be eligible for admission, since both could contribute to raising productivity, productive capacity and employment. This would be achieved if all industries were required to install up-to-date machinery and to adhere to modern standards in respect of processing operations, quality control, working conditions, management operations, management-labour relations, etc. The Seminar stressed again in this connection that the benefits provided in industrial estates - technical assistance, training, common services and healthy surroundings - would in themselves contribute to achieving these objectives. Admission policies could also serve other industrial development objectives, such as diversifying or strengthening the industrial structure of the area, for instance, by giving preference to new types of industrial productions as against the traditional ones; industries permitting savings or increased receipts of foreign exchange; industries providing support to agriculture, and so on. On specialized industrial estates, admission policies had evidently to be restrictive.

119. The Seminar emphasized that big concerns should not be permitted to gain a foothold in estates for small-scale industries, whether by direct or indirect investment or control. On the other hand, inasmuch as one of the purposes of industrial estates was to foster industrial growth, facilities for expansion should be given to successful occupants.

120. The Seminar also briefly discussed the question of admission of industries from abroad as an incentive to foreign investment. It felt that the question deserved further study, since it was not clear whether or to what extent standard factories or improved sites, and/or special inducements and measures of assistance such as tax or customs exemptions were needed to that end.

(b) Sales and lease policies

121. The Seminar observed that, in most countries of the region, improved sites or factory buildings were offered for rent, usually at subsidized rates. Only in a few countries were they offered for sale or on hire-purchase. In one case, sites were sold by public auction.

122. There was a consensus that leasing a factory, more than renting a site, would be a powerful incentive, since this permitted a capital cost to be converted into an operational expenditure and released resources for the purchase of machinery and for working capital - a feature of particular importance in countries where credit was scarce and interest rates were high. The Seminar also considered that rental subsidies would be required in most cases, but recommended that these should be granted for as short a period as possible, in moderate amounts and on a decreasing scale.

123. The Seminar observed that, in certain countries, there was a demand from the occupants to acquire ownership of the factories, either on outright sale or hire-purchase. Many participants felt that leasing rather than selling was generally preferable, even though it involved expenditures which would be recoverable over a longer period and thus frequently limited the possibility of setting up a large number of estates. The main consideration in discouraging individual ownership was the desirability of maintaining the corporate character of the estate.

(c) Managerial controls and responsibilities

124. The Seminar considered that the local management of the estate should have full responsibility over the various activities of the estate, within the framework of the policies laid down by the appropriate authorities. This would include day-to-day administration, co-ordination of the operation of the various servicing and assistance agencies and facilities established on the estate, and channelling of the requests of occupants for raw materials, import licences, aid in marketing, etc. to the appropriate agencies.

125. In view of the fact that industrial estates were a device to promote industrial development and improve productivity, managerial control would in general extend beyond purely administrative actions and usual owner-tenant relationships, and would cover certain aspects of the organization and operation of the enterprises on the estate, such as control of the type and quality of machinery installed, quality of product, working conditions, etc. In no circumstances, however, should control by the management of the estate extend to the spheres of activity and responsibility normally associated with individual business undertakings.

Organization and management of networks of industrial estates

126. The Seminar briefly discussed the question of organization and management of networks of industrial estates. It felt that whereas over-all supervision of estates over a broad area should be the responsibility of a central authority, a large degree of autonomy should be left to the management of individual estates. This would avoid delays, reduce costs and otherwise increase efficiency in organization and management.

C. Financing

Financing the development of industrial estates

127. The Seminar noted that, in countries of the region, the initial financing of planned industrial estates, especially for land acquisition, site development and provision of basic facilities, came primarily from government funds. In some countries, governments provided long-term loans only for land acquisition and site development, while, in others, governments advanced funds for the development of the entire project including the construction of factory buildings and the establishment of common facilities and services. In view of the slow rate of return in investment in industrial estates and of the financial uncertainties inherent in a new programme, the Seminar considered that financial assistance from the governments would be essential at the inception of the programme, especially in those countries where public corporations and industrial co-operatives and associations were not fully developed. It suggested, however, that, with the advance of the programme and following upon the demonstration of government financed estates, progressively increasing participation by corporations, commercial lending institutions and co-operatives as well as by private investors should be actively encouraged.

128. The Seminar further noted that the central governments of several countries in the region had either established a trust fund or made provisions in their long-term development plans for granting loans to the states, or to provincial or municipal governments, to finance industrial estate projects. Such loans were usually to be repaid in 20 to 30 years with interest rates ranging from 4 to 6 per cent. In some countries, the local governments were expected to make use of their existing resources, particularly for the acquisition of land, before seeking financial assistance from the central governments. Also, the state and central governments shared the costs of rental subsidies which might have to be provided to the occupants of the estates in the initial years. The Seminar felt that such arrangements based on the principle of matching contributions could stimulate active participation of local governments in the

promotion of industrial estates, especially in the under-developed countries.

129. The Seminar also observed that, in several countries, loans for financing industrial estates projects were provided through government development and investment banks which were vested with the authority to make loans to private investors or to invest in new ventures jointly with private entrepreneurs. Some of the banks provided credit facilities for equipment and machinery, together with mortgage finance for construction of factory buildings. The Seminar considered that there was considerable scope for development and investment banks in countries of the region to take an active part in financing industrial estates projects and to help in mobilizing private capital for such projects.

130. The Seminar noted that financial requirements for industrial estates varied according to the economic condition of the area and the type of estates to be promoted. In the more developed areas, government financial assistance might be restricted to the development of sites and provision of basic facilities only. The manufacturers themselves might be able to obtain the necessary finance from the conventional lending institutions for the construction of their buildings. Also, small industrialists might form companies by raising funds themselves or from commercial credit institutions. Loans by commercial banks could be made against the security of fixed assets and, if necessary, with guarantee of the government.

131. The Seminar noted that, in countries of the region, the role of co-operatives in financing and setting up industrial estates had not been very significant. It felt that liberal financial assistance from the government would be needed to promote co-operative industrial estates. In one country of the region, the government had evolved a scheme under which a co-operative society could obtain a loan of five to seven times its share capital for the purchase of land and construction of buildings. The loans were repayable in 5 to 7 years with an interest rate of 3 per cent for the first year increased by 1/2 per cent per year up to the maximum rate of 4-1/2 per cent. Further liberalization, particularly regarding the period of repayment, was reported to be under consideration.

132. It was noted that establishment of the functional and ancillary estates was still in the experimental stages. The Seminar felt that governments would have to take initiative in promoting and financing them. In the case of ancillary estates set up for small manufacturers engaged in the supply of parts and components to large industries, the latter might be persuaded to assist in financing some of the development costs.

133. The Seminar further considered that, with suitable encouragement, banking institutions and insurance companies in newly developing countries

might be induced to help in financing industrial estates. One suggestion was that they might provide the first mortgage loan and that the government agencies might take the second mortgage or provide equity investment. Another suggestion was that the governments might stand guaranteed for institutional loans. The Seminar suggested that a comprehensive study of various methods for financing industrial estates in the newly developing countries would be very useful.

Provision of credit assistance to the occupants

134. The Seminar noted that, in most countries of the region, small industries located in the estates were receiving government financial assistance for plant equipment and machinery, working capital or export credit. However, it was expected that the integrated measures of assistance usually made available on the estates, would increase the productivity of these industries and, therefore, their credit-worthiness. The Seminar felt that commercial lending institutions should be encouraged to play an increasingly important role in financing these industries.

135. The Seminar noted that several countries had evolved a hire-purchase programme for the supply of equipment and machinery and also credit insurance or guaranteed schemes. The question therefore arose as to whether special preference should be given to industries located in the estates. The Seminar felt that, in principle, all industrial units should be treated alike. However, in practice, it was found that, as a result of selective admission procedures and provision of special services, the units located in the estates were in a better position to meet the various loan requirements. The Seminar considered that, as a rule, loans to small industries should be given on the basis of their growth potential and productive efficiency.

V. CO-OPERATION BETWEEN AND ASSISTANCE TO SMALL INDUSTRIES IN INDUSTRIAL ESTATES

Co-operation between small industries in the estates

136. The Seminar noted that relationships of interdependence and complementarity among the small-scale industries in the industrial estates had not so far developed in the region to any significant extent. In no country of the region, the units on some of the estates had entered into arrangements of mutual assistance. Usually these took the form of one unit purchasing some of the components and parts needed by it from another unit, or of a unit with facilities for certain processes like electroplating or

die-casting making them available to other units. In one case, partly processed material produced by some units was taken for manufacture by other units. Such relationships were based on considerations of economic benefit; often the main factor was the nearness of the units and, therefore, the ready availability of the products and saving in the cost of transport.

137. The Seminar considered that, wherever such mutual assistance was economically feasible, it should be encouraged by arranging exchange of information regarding items of manufacture and production schedules of the units. It was, however, neither necessary nor desirable to base the planning of the estates and the admission policies on extensive relationships of interdependence and complementarity among the units. The concept of an industrial estate was not one of a closed, self-sufficient industrial community, and it was desirable to allow the units to develop relationships with both small units and large units in or outside the estates.

138. The Seminar observed that, in general, the scope for developing relations of mutual assistance on a voluntary basis would generally be greater on large estates which had a large number and more variety of industries than on small estates.

Provision of common services

139. The Seminar noted that, on some of the industrial estates set up in the countries of the region, a number of common services including common facility workshops, tool rooms, testing laboratories, central warehouse, transport, banking, fire protection, catering and recreational facilities, were being provided. These were established by the government on publicly-sponsored estates. The Seminar felt that services such as common facility workshops, tool rooms, etc. could also be set up by the government in or near privately-sponsored estates, provided that there was a reasonable prospect of their capacity being utilized to an appreciable extent. It was felt that it would be useful to distinguish between two kinds of services: (a) those which might bring commercial benefits but which an individual unit could not afford to set up for itself because of its inability to utilize the entire capacity - for example, die-casting, machinework and heat treatment - and (b) those which were basically of a developmental nature such as tool room, testing and prototype facilities. While the former services might be provided at reasonable rates, the latter could be provided by the government or privately-sponsored estates on a no-profit no-loss basis.

[Reverse title page]

NOTE

Opinions expressed in signed papers and in papers communicated by Governments are those of the authors and do not necessarily reflect the views of the United Nations Secretariat. All material in this publication may be freely quoted or reprinted, but acknowledgment is requested, together with a copy of the publication containing the quotation or reprint.

The designations employed and the presentation of the material in this publication do not imply the endorsement of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

NOTE

UNITED NATIONS

Price: 10.00 (or equivalent in other currencies)

than the economic rent was being charged to the units for factory premises for a limited period, and that the units also enjoyed certain special facilities for obtaining raw materials in short supply. It also noted that the units on the estates were, by reason of their location, subject to certain obligations, such as more close observance of factory laws and rules. They were also required in some cases to adhere to certain standards of quality of their products.

145. The Seminar considered whether additional inducements, such as the appointment of special technical personnel for the estates to advise prospective occupants, tax exemptions or abatements, reductions on customs duties on certain imported materials, reduction of prices of utilities or supplies, should also be provided to the units on the estates. The Seminar felt that, while the industrial estates had a developmental object, the intention was not to create a privileged section of entrepreneurs who would enjoy special facilities and concessions denied to those outside the estates. The provision of ready-made factory accommodation at subsidized rent, easy availability of various utilities and services and the direct supervision and interest of the government in the units on the industrial estates should be regarded as sufficient inducements to make the programme attractive and to persuade the entrepreneurs to occupy the accommodation provided. It would not be desirable to extend further the special concessions and facilities for the entrepreneurs in the estates. All forms of subsidies should be used with great care because, once introduced, they had a tendency to stay and a resistance developed among the beneficiaries to their removal or reduction.

VI. CO-ORDINATION OR INTEGRATION OF INDUSTRIAL ESTATES PROJECTS WITH PROGRAMMES OF URBAN OR REGIONAL DEVELOPMENT

146. The Seminar emphasized the need for co-ordinating or integrating industrial estates projects with programmes of broader scope. It considered that industrial estates should be planned as part of economic and social development programmes at the local, regional or national levels. Such planning involved questions of location of industrial estates with reference not only to the availability of basic facilities and services required by industry, and of social overhead investments, but also to other projects in the fields of industry, transport, agriculture, trade and services. It also involved problems of economic interrelationships between these sectors.

147. The Seminar recognized that a practical way of accounting for some of the physical and socio-economic relationships involved was to devise

urban or regional master plans. The inclusion of industrial estates projects in urban master plans would serve to check demographic and industrial congestion in metropolitan areas. The Seminar considered that the establishment of "new towns" with one or more industrial estates might in certain cases provide an effective and economic means of carrying out such schemes. As already mentioned, "resettlement" industrial estates might be set up to rehouse industries displaced by slum clearance programmes. Metropolitan master plans might provide for other types of industrial estates and for industrial areas to promote industrialization in or near large cities, when such development was considered desirable.

148. The Seminar recommended that programmes for the industrialization of large areas, particularly of the less developed ones, be integrated with regional master plans. Such areas might be mapped out on the basis of factors like present and prospective population density, present and potential resources and trade prospects within the area and between it and other parts of the country. If based on economic criteria of this type, such areas need not necessarily coincide with administrative subdivisions. The Seminar considered that, in certain cases, it would be appropriate to set up a special agency or co-ordinating body having jurisdiction over the area. Its functions in the field of industrial development might include, besides construction of industrial estates, provision of individual sites for industries which could not be given accommodation in the estates - for example, heavy and obnoxious industries - and of group sites for enterprises which did not require the estates' facilities and services. It might also be empowered to provide co-ordinate provision of infrastructure facilities to support industry, such as power, water supply, roads, housing, community and social services.

VII. INTERNATIONAL AND REGIONAL CO-OPERATION IN THE DEVELOPMENT OF INDUSTRIAL ESTATES

149. The Seminar took note of resolution 31 (XVI) adopted unanimously by the Economic Commission for Asia and the Far East at its sixteenth session which stressed the need for closer co-operation and concerted efforts among countries in the development of industries and trade in the region. In the field of industrial estates, the Seminar felt that there was considerable scope for international and regional co-operation. The Seminar noted with satisfaction that mutual assistance was already being provided within the region for the development of industrial estates. With a view to intensifying and speeding up developments in this field, the Seminar recommended that the following measures be considered by the countries concerned, as well as by the United Nations, ECAFE and other international

and national organizations:

- (1) The Seminar invited public and private agencies concerned with problems of industrial estates in countries of the region to send regularly to EC&FE all relevant information, including bibliographical material, for dissemination in countries of the region.
- (2) Study tours and observation teams on various aspects of industrialization, particularly on industrial estates, should be organized for the benefit of countries of the region.
- (3) Institutions such as the EC&FE regional Housing Research Centres in India and Indonesia might draw up norms for estate layout, factory design and specifications of building materials, for use in countries of the region.
- (4) The facilities and services of research and training institutes established in the region should be made available to countries of the region, with assistance, where required, under multilateral and bilateral programmes. As a first step towards the development of such a programme, a list of institutes in various countries might be drawn up by EC&FE in consultation with the countries concerned.
- (5) A continuously increasing fund of knowledge and experience was being evolved in the industrializing countries in all aspects of industrial development, and in particular on industrial estates. Each country should therefore set up a roster of expert personnel, consultants and institutions which might be drawn upon by the United Nations and other organizations extending technical assistance, for assignments in the field of industrial estates in the developing countries.
- (6) Regional panels of experts might be constituted by the United Nations and EC&FE to examine specific aspects of the development of industrial estates in the region.
- (7) The United Nations and its specialized agencies, other international organizations and advanced countries might be requested to provide assistance for the establishment of extension services, prototype production and training centres, and other servicing, training and assistance institutions in connexion with industrial estates projects.

(8) The following studies might be undertaken by the United Nations, ECAFE and other international organizations:

- (a) Financial problems of the establishment and operation of industrial estates for small-scale industries.
- (b) Subcontracting arrangements between small and large industries with special reference to "ancillary" industrial estates.
- (c) Problems of industrialization of rural areas, with special reference to rural industrial estates.
- (d) Problems of management and administration of industrial estates.

150. The Seminar noted that the United Nations contemplated the convening of seminars on industrial estates in other regions, and expressed interest in such projects since the findings and recommendations obtained would be likely to be of inter-regional significance.

151. Finally, the Seminar expressed the hope that the discussions in the Seminar would be valuable not only to participants from newly developing countries, but also to the advanced countries. It noted with appreciation the efforts made by different organizations and countries in providing assistance in the development of industrial estates in the region.

Appendix 1

LIST OF PARTICIPANTS

MEMBER STATES

BURMA

Mr. Kyaw Htin, Director of Industries
New Secretariat, Rangoon

U Pla Chit Tin, Industries Officer, Directorate of Industries,
New Secretariat, Rangoon

CEYLON

Mr. Sterling St. John, Jr., Industrial Estates Adviser, Ceylon Industrial
Estates Corporation, Colombo

REPUBLIC OF CHINA

Mr. Yu-Tsun Lu, Professor of City and Regional Planning, Civil Engineering
Department, National Taiwan University, Commissioner of City Planning
Committee, Ministry of Interior, Republic of China, Taipei, Taiwan

Mr. Pen-Chang Lo, Specialist, Industrial Planning and Co-ordination Group,
Ministry of Economic Affairs, Republic of China, Taipei, Taiwan

Mr. Jsiich Kwan-yi, Adviser, Industrial Development and Investment Centre,
Council of US Aid of Executive Yuan, Republic of China, Taipei, Taiwan

FEDERATION OF MALAYA

Mr. Arshad Ayub, Deputy Controller, Industrial Development Division,
Ministry of Commerce and Industry, Kuala Lumpur

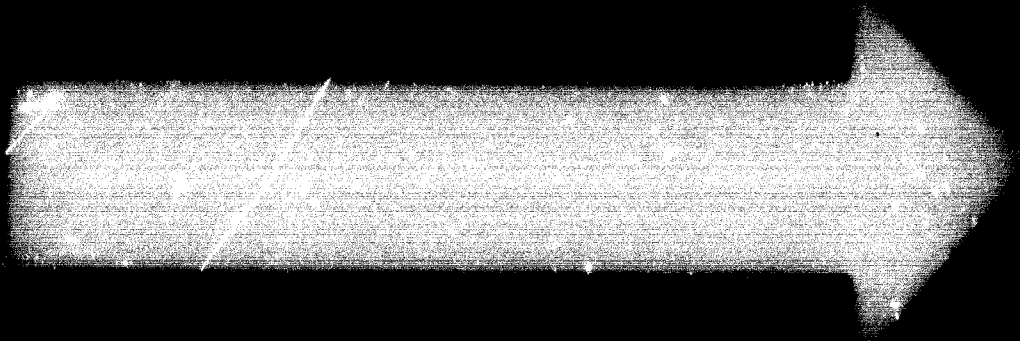
Mr. Edward O. Marsh, Manager, Malaya Development Limited, Kuala Lumpur

FRANCE

Mr. George J. Graf, Trade Commissioner for France to South India,
Madras, India

INDIA

- Dr. P. C. Alexander, Development Commissioner (Small-scale Industries), Ministry of Commerce and Industry, Udyog Bhavan, New Delhi
- Shri Harbhajan Singh, Director (Industrial Estates), Office of the Development Commissioner (Small-scale Industries), New Delhi
- Shri A.D. Bohra, Principal, Central Industrial Training Institute, Udyog Bhavan, New Delhi
- Shri T.M.S. Balakrishnan, Secretary, Indian Investment Centre, New Delhi
- Shri C.N. Shastri, Special Director of Industries and Commerce, Government of Andhra Pradesh, Hyderabad
- Shri Anil De, Director of Industries, Government of Andhra Pradesh, Hyderabad
- Shri J. Sroerama Murthy, Joint Director of Industries, Government of Andhra Pradesh, Hyderabad
- Shri C.B. Tewary, Deputy Director of Industries, Government of Bihar, Patna
- Shri C.B. Patel, Director of Industries, Government of Gujarat, Ahmedabad
- Shri K.P. Vishwanathan Nair, Director of Industries, Government of Kerala, Trivandrum
- Shri N. Swami, Director of Industries, Government of Madhya Pradesh, Bhopal
- Shri F. Sabarayagan, Director of Industries, Government of Madras, Madras
- Shri C.V.V. Chetty, Joint Director of Industries and Commerce (Small-scale Industries), Government of Madras, Madras
- Shri V. Srinivasan, Deputy Director, Office of the Director of Industries and Commerce, Government of Maharashtra, Nagpur
- Shri K. V. Seshadri, Deputy Secretary to Government of Maharashtra, Bombay
- Shri S.M.R. Askari, Office of Director of Industries and Commerce, Government of Mysore, Bangalore
- Shri C. B. Jain, Director of Industries, Government of Orissa, Cuttack

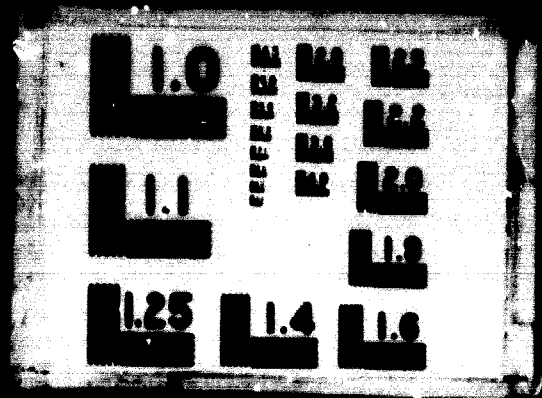


15. 7. 74

2 OF 9

DO

3736



INDIA (contd)

Shri J. N. Thadani, Director of Industries, Government of Punjab,
Chandigarh

Shri Gordan Singh, Director of Industries and Commerce, Government of
Rajasthan, Jaipur

Shri M. Sanniuddin, Director of Industries, Government of Uttar Pradesh,
Kanpur

Shri U. Sethuraman, Joint Director (Industrial Estates), Government of
Uttar Pradesh, Kanpur

Shri C. P. Agarwala, Manager, Industrial Estate, Kanpur

Shri B. C. Mallik, Director of Industries, Government of West Bengal,
Calcutta

Shri Gobind Sahai, Director of Industries, Himachal Pradesh Administration,
Simla

Shri S. Santhasoolan, Director of Industries, Pondichery Administration,
Pondichery

INDONESIA

Mr. Rochman Oesman, Director, State Enterprise for Mechanization Aid,
PNPR - Da.Ya.-Ya.Ga., Djakarta

IRAN

Mr. Siamak Mossadeghi, Economist, Plan Organization of Iran, Teheran

JAPAN

Mr. Toshinobu Wada, Chief, Management Section, Fostering Division, Smaller
Enterprise Agency, Ministry of International Trade and Commerce, Tokyo

REPUBLIC OF KOREA

Mr. Ua Ick-Ho, Chief, Industrial Administration Section, Bureau of
Industry, Ministry of Commerce and Industry, Seoul

LAOS

Mr. Honthong Sadettan, Chief of Financial and Economic Studies, Ministry of Plan, Commissariat for Planning, Vientiane

NEPAL

Mr. Gohendra Dev Pathak, Director of Commerce, His Majesty's Government, Ministry of Commerce and Industry, Kathmandu

THE NETHERLANDS

Mr. C. Voormolen, Director, Economic Technologic Institute, Assen, the Netherlands

PAKISTAN

Mr. Mohammad Aslam Khan, Director, Small Industries, Ministry of Industries, Government of Pakistan, Chakiala, Rawalpindi, West Pakistan

Mr. Mohamed Asstullah Khan, Joint Director, Small and Cottage Industries Corporation, EPSIC, Dacca, East Pakistan

THE PHILIPPINES

Mr. Micanor D. Magpali, Chief Patent Examiner, Patent Office, Department of Commerce and Industry, Manila

Mr. Enrique J. L. Ruis, Board Director, People's Homesite and Housing Corporation, Manila

THAILAND

Mr. Padma Baryapant, Ministry of Industry, Government of Thailand, Bangkok

UNION OF SOVIET SOCIALIST REPUBLICS

Mr. N.I. Korobov, Member of State Committee of Building, Gosstro, Moscow

UNION OF SOVIET SOCIALIST REPUBLICS (contd)

Mr. L.M. Smirnov, Main Specialist of State Economic Council, State Economic Council of the USSR, Moscow

Mr. I.K. Marzikulov, Vice-President of Tadzhik Academy of Sciences, Dushanbe, Tadzhik Soviet Socialist Republic

Mr. Anischuk, Interpreter (from the USSR Embassy in India)

UNITED STATES OF AMERICA

Mr. Theodore K. Paine, Chief, Business Analysis Division, Area Redevelopment Administration, United States Department of Commerce, Washington, D.C.

Mr. Nathaniel Rafter, Chief, Private Investment Division, International Co-operation Administration (ICCA) USOA, Taipei, Taiwan

Mr. George M. Bonnsky, Economic Officer, American Consulate General, Madras, India

REPUBLIC OF VIET-NAM

Mr. Le-thien Ng, Expert, Industrial Development Centre, Saigon

ASSOCIATE MEMBERS

HONG KONG

Mr. Richard Charles Clarke, Head, Planning Division, Public Works Department, Hong Kong

SARAWAK

Mr. Shin Kah To, Manager, Berne Housing Development Ltd., and Berne Development Corporation, Ltd., Kuching

SINGAPORE

Mr. Lee Ek Hua, Assistant Manager, Singapore Factory Development Ltd., Singapore

OTHER STATE

ISRAEL^{a/}

Mr. Meidan Israel, Director, Israel Institute of Productivity, Tel-Aviv

SPECIALIZED AGENCIES

International Labour
Organisation (ILO)

Mr. W. Van Wamel
Senior Area Officer,
ILO Asian Field Office
Bangalore, India

United Nations Educational,
Scientific and Cultural
Organization (UNESCO)

Prof. Pierre Bossignet
Acting Director
UNESCO Research Centre on Social and
Economic Development in Southern Asia
Delhi, India

NON-GOVERNMENTAL ORGANIZATIONS

International Chamber of
Commerce (ICC)

Mr. C. L. Motha
Madras, India

Mr. G. Subbaraju, Andhra Pradesh
Chamber of Commerce, Director
SI&IS, Industrial Estate,
Bozwada, Andhra Pradesh, India

Mr. M.V. Arunachalam
Madras, India

World Federation of Trade
Unions (WFTU)

Mr. K.B. Pannikar
Permanent WFTU Representative to
EC.FE,
New Delhi, India

^{a/} Member of the United Nations, participating in a consultative capacity under paragraph 9 of the terms of reference of the Commission

OTHER PARTICIPANTS

Indian Institute of Technology

Mr. A. Subbakrishnaiah
Department of Architecture and
Regional Planning
Indian Institute of Technology
Kharagpur, India

Industrial Co-ordination Bureau
(ICB)

Mr. Hans Langenskiöld
President
Industrial Co-ordination Bureau
Stockholm, Sweden

Ford Foundation

Mr. J. E. Stepanek
Consultant on Small Industries
The Ford Foundation
New Delhi, India

Mr. George Rosen
Development Economist
Calcutta Metropolitan Planning
Organisation
c/o The Ford Foundation Group
Calcutta, India

UNITED NATIONS SECRETARIAT

ECONOMIC COMMISSION FOR ASIA AND THE FAR EAST (ECAFE)

U Nyun

Executive Secretary

Mr. I. F. Tang

Chief, Industrial Studies Section
Industries Division

Mr. J. B. Plopondo

Officer-in-charge, Cottage and
Small-Scale Industries Section
Industries Division

DIVISION OF INDUSTRIAL DEVELOPMENT
DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS

Mr. Igor Krestovsky

Chief, Small-scale Industries Unit
Division of Industrial Development
United Nations, New York

BUREAU OF SOCIAL AFFAIRS, DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS

Mr. Halvor Gillo

Chief, Division of Social Affairs,
EC.FE
Bangkok, Thailand

ECONOMIC COMMISSION FOR LATIN AMERICA (ECLA)

Mr. Nuno Fidelino de Figueiredo

Director, Industrial Development
Division, Economic Commission for
Latin America (ECLA)
Santiago, Chile

CONSULTANT

Mr. D.K. Malhotra

Joint Secretary, Planning Commission,
Government of India
New Delhi

Appendix 2

AGENDA

1. Opening addresses
2. Election of Chairman and two Vice-Chairmen
3. Adoption of the agenda and timetable proposed
4. Objectives and policies in establishing industrial estates
 - (a) Plans, progress and problems in the countries of the participants
 - (b) Role of industrial estates with reference to development policies and programmes
5. Planning of industrial estates
 - (a) Feasibility studies
 - (b) Location of estates
 - (c) Types of estates
 - (d) Engineering and economic aspects
 - (e) Related social overhead investments
 - (f) Programme scheduling
6. Organization, management and financing of industrial estates
 - (a) Sponsorship and organizational arrangements
 - (b) Management
 - (c) Financing
7. Co-operation between, and assistance to, small industries established on industrial estates
8. Co-ordination or integration of industrial estates projects with programmes of urban or regional development
9. International and regional co-operation in the development of industrial estates
10. Adoption of the report

Appendix 3

LIST OF DOCUMENTS ISSUED

I. Discussion Papers:

United Nations

Establishment of industrial estates in under-developed countries
Physical planning considerations relating to industrial estates

International Labour Organisation (ILO)

Aspects of labour and management on industrial estates with special
reference to small industries in Asian countries

Giavi, G.

The port and industrial zone of Marghera

Iyer, A.S.B.

Industrial estates in India - co-operation between, and assistance
to, small-scale units

Lanhan, G.G.

Problems in establishment of large-scale industrial estates

Molinari, A.

Some controversial questions concerning industrial estates

Paul, E.C.S.

The role of industrial estates in the industrial development
of Ceylon

Vedagiri, T.S.

Physical planning of industrial estates

Wong, L.

Problems of developing industrial estates in a rural setting.

II. Information Papers: 1/

Burma: Industrial estate scheme for Burma

Republic of China: Development of industrial districts in Taiwan, China

The Federation of
Malaya: Industrial estates in the Federation of Malaya

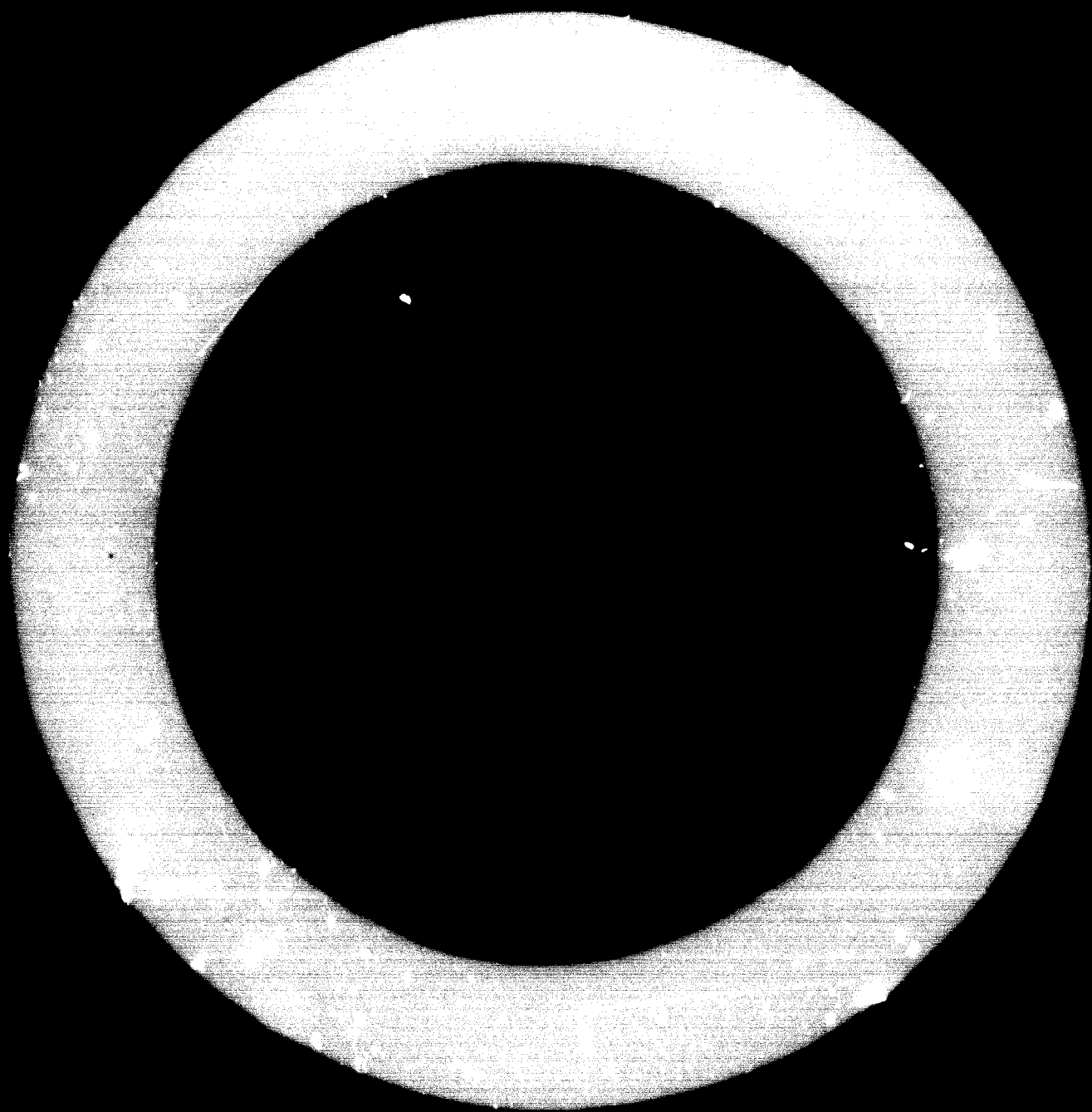
1/ Unless otherwise specified, these information papers were prepared by the
Governments concerned or by their respective participants in the Seminar.

India:	Industrial estates programme in India Role of industrial estates in Indian planning, D.K. Malhotra The major problems in setting up units for production in industrial estates, Indian Investment Centre Industrialization and the changing dimensions of caste occupation in India, Research Centre on Social and Economic Development in Southern Asia, United Nations Educational, Scientific and Cultural Organization (UNESCO)
Indonesia:	Possibilities of integrating industrial estates with the central production plants and mechanisation aid
Iran:	Planning the expansion of small industry in Iran
Japan:	Industrial estates for small-scale industries
Republic of Korea:	Korean industrial estates and medium and small industry
Laos:	The development of industrial areas in Laos
Nepal:	The development of industrial estates in Nepal
Pakistan:	Industrial estates in Pakistan
Thailand:	Industrial development, industrial zoning and industrial estates in Thailand
USSR:	Practice of construction and development of industrial towns in the Soviet Union
USA:	Planned industrial parks (industrial estates) in the United States
Hong Kong:	The development of industrial estates in Hong Kong
Sarawak:	Industrial estates in Sarawak
Singapore:	Role of industrial estates in the industrial development of Singapore

ra

Part II

INDUSTRIAL ESTATES IN COUNTRIES OF THE REGION
POLICIES, PLANS AND PROGRESS



UNITED NATIONS: ESTABLISHMENT OF INDUSTRIAL
ESTATES IN UNDER DEVELOPED COUNTRIES

This report, prepared by the Division of Industrial Development of the Department of Economic and Social Affairs and published in February 1961 ^{1/}, was submitted to the Seminar as a discussion paper. It deals principally with the role of industrial estates in policies of industrialization with special reference to promotion of small-scale industries. It gives first a general picture of industrial estates projects - planned and completed - in various countries. It then describes and analyses in detail the objectives and policies bearing on the establishment of industrial estates in three industrial countries, the United States, the United Kingdom and Italy, and two under-developed countries, India and Puerto Rico. Detailed information is also provided on policies and achievements in Jamaica, Mexico, Brazil, Nigeria and Pakistan.

The experience of these countries is assessed in the next chapter. Four main types of policies in which industrial estates play a role are distinguished: location and development policies based, respectively, on indirect and direct control; industrialization policies based on inducements to investors from abroad; and industrialization policies based on provision of integrated measures of assistance, a type which is particularly suitable for the promotion of small industries. The chapter also contains a discussion of the types of estates suitable for under-developed countries at different levels of industrial development, and of policies of location and admission. It concludes with an examination of certain secondary effects of industrial estates, and of the role of the latter in development schemes of broader scope.

In the last chapter, industrial estates are discussed as a means of promoting small-scale industry, with special attention to problems of technical and financial assistance. Problems of planning industrial estates are examined in two appendices to this chapter: the first deals with exploratory surveys; the second contains a case study concerning the establishment of an industrial estate in an under-developed country.

^{1/} United Nations publication, Sales No.: 60.II.B.4.

UNITED NATIONS: PHYSICAL PLANNING OF
INDUSTRIAL ESTATES

This report, prepared by the Bureau of Social Affairs of the Department of Economic and Social Affairs and scheduled to be published towards the end of 1962 ^{1/}, was submitted to the Seminar as a discussion paper. Its purpose is to provide guidance in locating, planning, laying out and building industrial estates, especially those for small-scale industries. It discusses first the question of location and planning of industrial estates within the broader context of town and regional planning. It then examines the various problems of planning and laying out an industrial estate, including choice of site in relation to availability of transportation, utilities and services; provision of utilities; size of the estate and size and coverage of factory lots; layout of plots, roads, loading and parking spaces; size, layout, design, and construction materials for factory buildings of various types, such as "standard", and "nursery" or "nest" factories, and for administrative and ancillary buildings and facilities, including storage and warehousing. The report also discusses the role of special industrial estates such as "flatted factories" and urban industrial parks in programmes of urban industrial development and redevelopment. It contains data on the norms for plots, factories, road widths and land use adopted or recommended in various countries.

^{1/} United Nations publication, Sales No.: 62.II.B.4

ASPECTS OF LABOUR AND MANAGEMENT ON INDUSTRIAL ESTATES

With special reference to small industries

in Asian countries

Prepared by the International Labour Office

This paper considers briefly in what ways and to what extent labour and management in small industries in Asian countries may be affected by the establishment and operation of industrial estates^{2/}. The discussion is limited to certain aspects which are of particular interest to the International Labour Organisation. Some of the problems involved are complicated, and relatively little experience is available to draw upon, especially in so far as industrial estates in developing countries are concerned. Therefore, the purpose of this paper is not to present solutions but rather to stimulate discussion.

The following observations are divided into five sections. Section I discusses industrial estates as an instrument for promoting employment in industrial development. Section II is concerned with opportunities to improve productivity and to raise managerial skills in small enterprises in industrial estates. Possibilities of coordinating programmes for vocational training with these for industrial estates are discussed in Section III, and Section IV examines how industrial estates may affect the welfare of the workers. Finally, Section V deals with the contribution which industrial estates may make to the modernization of labour-management relations in small manufacturing enterprises.

I. Industrial estates and the creation of employment

As is widely known, a number of countries in the Asian region are faced with a serious problem of urban unemployment and rural under-employment. The stubbornness of the employment problem in these countries has been borne out by their recent experience in economic development. In India, for example, despite its sustained development effort and appreciable increases in national income over the period of the Second Five-Year Plan, the estimated

^{1/} Small industries are understood to mean manufacturing undertakings which differ from larger enterprises by a significant lack of specialization in management. Such undertakings range from craft shops, in which the self-employed owner works together with members of his family, to the small mechanized factory. See International Labour Office: Services for Small-scale Industry (Geneva, 1961), pages 5-6.

^{2/} For a definition of industrial estates see United Nations: Establishment of Industrial Estates in Under-developed Countries (Sales No.: 60.II.B.4), page 1.

number of jobless has increased from 5 million in 1950 to 9 million in 1960. Although, under the Third Five-Year Plan, it is expected to create 14 million new jobs for wage and salary earners, it is estimated that at the end of the period, in 1956, India will have at least 12 million unemployed; the magnitude of the problem will be much greater if the volume of chronic under-employment is taken into account. In the Philippines where there was a fairly high rate of economic growth over most of the past decade, by the middle of 1959 about 750,000 workers still remained wholly unemployed; they represented about 7 per cent of the estimated labour force. Considerable unemployment and under-employment also persist in other Asian countries such as Ceylon, Indonesia and Pakistan.

It is beyond the scope of this paper to discuss employment problems and policies in the context of economic development in these countries. For present purposes, it may suffice to stress one important fact, namely that the volume of employment directly created by the development of modern industry is fairly small in relation to capital investment and to output. Again, experience in India is significant. A recent study covering a large part of manufacturing industry indicated that while between 1947 and 1958 industrial output increased by no less than 53 per cent, the number of factory workers concerned largely remained stationary. During this period a considerable number of new modern industrial enterprises were set up, requiring, on the average, a rather high amount of capital per worker employed; consequently, the employment potential in these enterprises is relatively low. On the other hand, the output per worker was rising markedly in the enterprises already established, thus reducing their labour requirements. The absence of any significant increase in factory employment in the face of a rapid increase in factory output seems to have resulted from the joint operation of these two factors. In other Asian countries the underlying forces determining the relationship between output and employment in industrial development are broadly similar.

The preceding observations would emphasize the importance of giving careful consideration to the possibilities of using the establishment of industrial estates to promote employment. The industrial estate would long

3/ For a systematic analysis of these problems, see International Labour Office: Employment Objectives in Economic Development; Report of a Meeting of Experts (Geneva, 1961), mimeographed.

4/ B.N. Datar, "Wage Movements Since Independence" in The Indian Worker, Vol. IX, No. 75-76, August 15, 1961, Independence Number, page 38. Factory establishments and factory workers are those as defined in the Factory Act, 1948.

960.
million
the
ni-

itself fairly well to this purpose because it is a flexible instrument, which can be adapted to meet various specific objectives in economic and social development planning. Generally speaking, there are several ways in which an industrial estate policy may serve the employment objective.

hey
such
and
or
at
rge
8
ried,

In the first place, in so far as the establishment of industrial estates succeeds in fostering a more rapid rate of industrial growth, it would contribute to the creation of more employment. "Marginal" entrepreneurs might be drawn into manufacturing industry by establishing their undertakings on industrial estates where attractive facilities are available designed to reduce the risks of industrial entrepreneurship in developing economies. Such facilities may include the availability of factory premises for rent, common servicing facilities to create the necessary external economies, a guaranteed supply of power and raw materials, and the provision of technical and financial assistance. Thus, the employment effect of an industrial estate policy would be positive if directed in particular to those entrepreneurs who would otherwise keep aloof from the industrialization process in the country. However, for reasons indicated above, the volume of additional employment created may be fairly small if the estates would attract mostly larger industries.

edly
re-
the
he
r-
in

The position should be more favourable if industrial estates were used as an instrument for the promotion of small industries. Small industrial development is generally considered to be a means of promoting employment because, among other things, small manufacturing undertakings require less capital per worker employed and are more amenable to labour-intensive production. In this way the establishment of industrial estates might serve, at the same time, both the objectives of economic growth and of employment creation.

ond
r

Industrial estates may make a further contribution to the creation of employment if they are particularly designed to promote subcontracting arrangements between smaller and larger enterprises. Successful co-operation between industrial units largely depends on the ability of the small manufacturing undertaking to meet its obligations as to quality, quantity and delivery time of the subcontracted parts and components. With the exception of Japan, small workshops in Asian countries have great difficulty in meeting these obligations, resulting in a retarded industrial growth, in particular of the light engineering sector with its appreciable employment creation potential. It would appear that conditions on an industrial estate could be particularly helpful to small plants in entering into satisfactory subcontracting arrangements; if so, this would open new fields of production for small industry to which it has so far had only limited access.

For employment policy as well as for development policy, the cost of construction of industrial estates merits close investigation. A planned, large-scale and concentrated approach to constructing factory sites, premises and physical facilities on a prescribed area should be expected to reduce the cost of construction. Even so, for certain types of industrial estates, especially those designed to meet modern industrial standards, the overhead costs per worker are believed to be fairly high. For instance, public expenditure for the construction of industrial estates in India is estimated to be approximately 2,200 rupees per worker ^{5/}; by contrast, costs of land and buildings for various small industries operating outside the estates in privately owned, simple but adequate premises are calculated at an average of 1,250 rupees per worker ^{6/}. Obviously, the enterprises which occupy the estates are obliged to adopt methods of production yielding a net output per worker large enough to compensate for the overhead cost involved. This might necessitate, inter alia, a substantial degree of mechanization which is not conducive to the immediate objective of employment creation. Efforts would need to be made to explore the scope and possibilities of substantially reducing the capital costs of constructing industrial estates without sacrificing the quality of services; particular attention should be paid to mass production methods of construction, including for instance, the techniques of pre-fabrication.

A question closely related to the problem of construction costs of industrial estates concerns the amount of capital employed per unit of output in small enterprises on the estates. A priori, with the various cost advantages provided by the estates, their unit capital costs should be expected to be lower than those of the corresponding small enterprises outside the estates. The question arises however how these costs compare with those of large-scale enterprises. If the unit capital cost in small-scale manufacturing is higher, then it would be preferable from the point of view of economic development to use industrial estates to foster the growth of large industries, even though in small enterprises the amount of capital per worker were smaller. This question, the answers to which are likely to differ from industry to industry, would deserve careful examination. So far not

^{5/} In 1959, the Indian Government envisaged a public expenditure of Rs.111 million to finance construction of 90 estates which, when fully occupied, will contain 3,600 factories giving employment to 50,000 persons. See United Nations, op. cit. page 18. (One rupee = US\$0.21.)

^{6/} Government of India, Planning Commission, Small-scale Industries, Analysis of Investment and Production per Worker (New Delhi, 1959), table I.

much factual information is available to throw light on this question. One recent study of small enterprises in Indian industrial estates would seem to indicate that output per unit of capital is not particularly favourable as compared with that obtainable in larger factories in India ^{7/}. The average output-capital ratio for a number of estate factories (having an average size of 19 workers per unit) is calculated to be 0.31, with variations between 0.15 and 0.41. On the other hand, the Census of Indian Manufactures, 1958, indicates output-capital ratios in undertakings with 250 to 500 workers of 0.30 for vegetable oil pressing, 0.34 for woollen textile mills, 0.41 for cotton textile mills and for electric fan manufacture, 0.55 for tanneries, and 0.80 for flour milling. In the view of the authors "one of the reasons for the low output-capital ratios in the estates (and the high capital-labour ratios) is the high cost of construction of the estates". Another reason is that, unlike large factories, the small industrialist usually finds it difficult to run more than one shift because of managerial limitations.

Thus far consideration has been given to the possibility of using industrial estates to promote employment through the development of small industries. In addition, an industrial estate policy could include in its objectives the promotion of employment through its influence on the location of industry. Broadly, as concerns the locational aspect, industrial estates could serve employment objectives in two ways. First, the establishment of estates could be used to foster industrial development in those regions of the country where the problem of unemployment and underemployment is particularly serious as, for instance, is attempted in the case of southern Italy.^{8/} Secondly, certain special types of industrial estates might be established in villages or in small towns with the explicit objective of promoting local employment in rural areas; such policy would have the additional advantage that a fuller utilization of manpower might tend to reduce the outflow of population from rural areas, thus preventing the rise of unemployment in urban centres ^{9/}. To plan industrial estates as an instrument for influencing the location of industry in both these directions involves consideration of a great variety of factors - economic, social, technical and geographical - and there is as yet little actual experience available for appraisal. Never-

^{7/} P. N. Dhar and H. F. Lydall: The Role of Small Enterprises in Indian Economic Development (Institute of Economic Growth, University of Delhi, July, 1960), mimeographed, pp. 69 ff.

^{8/} United Nations, op. cit. page 12 ff.

^{9/} For the causes of the movement of labour out of agriculture see: International Labour Office: Why Labour Leaves the Land, a Comprehensive Study of the Movement of Labour out of Agriculture (Geneva, 1960).

theless, in view of their close bearing on employment promotion as well as the general problem of industrial development in the region, the locational aspects of an industrial estate policy deserve most careful study in order to provide a sound basis for planning and further action.

Lastly, industrial estates could also influence the rate of employment creation through their policy with respect to the admission of occupants. For instance, if preference is given to small firms managed by at least two partners, this might facilitate double shift operation, resulting simultaneously in an increase in employment, reduction of the capital-labour ratio and an increase in output per unit of capital. Further, if the enterprises occupying the estates have been transferred, either wholly or in part, from elsewhere, the effect will be chiefly a matter of shift of employment from one locality to another with no or relatively little net addition to total employment ^{10/}. On the other hand, if the estates are to be occupied primarily by new undertakings whose operation creates additional demand for labour, the employment-creating effect would be favourable. This would be particularly so if the industrial estate policy emphasizes the admission of entrepreneurs with an expected high and fast growth potential. It should be pointed out, however, that besides employment creation, other important factors governing an estate's admission policy may include the desirability of transferring existing small enterprises out of urban slum or plight areas, or the economic advantage of permitting large-scale factories to set up feeder units in estates established for the purpose of taking over some of the operations formerly performed on the premises of the large enterprise.

II. Improvement of management and productivity in industrial estates

As already noted, small-scale manufacturing undertakings are characterized by a significant lack of specialization in management. The small plant owner or the appointed manager, assisted at best by one or two foremen and a clerk, is unable to perform in a satisfactory manner the many and varied tasks required for the operation of any enterprise. Managerial performance in most small plants is unbalanced, with the inevitable result that some management functions are neglected and the progress of the undertaking is retarded. Since the small firm has no sizeable group of people engaged in managerial activities, it does not have the advantage of the mutual exchange of attitudes and skills which come naturally in the large enterprise having a staff of top, middle and lower executives. Moreover, while the larger firm has the resources to develop its

^{10/} S.B. Sarkar: "Role of Industrial Estates - An Appraisal" in Economic Review (Fortnightly Journal of the Economic and Political Research Department, All India Congress Committee, New Delhi), January 6, 1961, pages 69 to 72.

managerial talent through systematic training programmes and is furthermore able to call upon outside consultancy services as and when required. In fact, smaller undertakings have little access to such facilities. The scattered nature of the industry and the great variety of management problems related to the various small industrial branches, makes the organization of management training schemes in this sector particularly difficult.

Governments in the Asian region have become increasingly aware of this difficulty, and have in recent years taken measures to meet the special requirements of small industry by making institutional arrangements for training and advising small plant management. An extensive system of management consultancy services is provided by the Small Enterprise Agency in Japan, and the Government of India operates a network of small industry service institutes whose duties include management training and advice. Plans for the establishment of similar institutes in a number of other countries of the region are under active consideration. This new emphasis on arrangements to assist small plants in improving their managerial performance is an important development since the measure in which small industry may contribute to higher productivity, increased employment opportunities and improved labour standards depends essentially on the attitudes and skills of management in the small industrial sector.

It would appear that an industrial estate would offer particularly favourable opportunities to facilitate the process of developing managerial skills and to render services designed to raise productivity and operational levels in small plants. Prerequisites for successful management improvement are the creation of a climate of favourable opinion and understanding, and the availability of technical knowledge to carry it out. In these respects, the industrial estate has some natural advantages which, although not similar to, are comparable with those available in large undertakings. The very fact that a number of employers are concentrated in a single physical area equipped with modern facilities is in itself a powerful incentive to change the attitudes of the small plant manager and to make him more receptive to new ideas, as compared with the managers of geographically dispersed small workshops operating under depressed conditions. An industrial estate will promote contacts among employers, and will facilitate the dissemination of attitudes and skills of the most progressive among them; this in turn will provide a favourable starting point for rendering institutionalized services in the management field. The establishment of employers' associations, as in nearly all Indian estates, will further facilitate this automatic process of management development.

Centres for management development and productivity as established in various Asian countries, in some cases in co-operation with the ILO, are

usually on a broad national scale ^{11/}. They would therefore require some scaling down and adjustment in the type of services rendered to make them applicable to an industrial estate. With the necessary modifications, centres of this kind do offer distinct possibilities of rendering valuable assistance to undertakings on and in the vicinity of the estate, particularly if such centres were to combine training with consultancy services and facilities for active participation in production operations and administration. Such a concept might have its practical application in the establishment of a management service centre on an industrial estate. The main purpose of such a centre would be (a) to provide training in managerial and supervisory skills, (b) to give technical assistance in the solution of management problems, and (c) to render to all small undertakings these services in specific fields for which a joint approach is suitable.

In matters of general management, the centre's training programmes would cover broadly the nature of planning, decision-making, organization, control of operations, and the use of management techniques particularly adjusted to the requirements of small-scale industries ^{12/}. In the operational field, training could be given in accounting, purchasing, work study, preventive maintenance, marketing and last but not least in supervisory skills and the maintenance of good labour relations. Training activities may take the form of regular courses, conferences, seminars and study group sessions, at which management problems of mutual interest could be discussed under expert guidance. The proposed management development programme would, of course, have to be specifically designed for, and clearly have direct relationship with, the small enterprises concerned so that the trainees would readily appreciate the significance of the training imparted and its relevance to their special problems. This would also make it easier for the centre to have its advice accepted, and for the managers to accept willingly the services offered them. The provision of consultancy services would provide the staff of the centre with an intimate knowledge of the special operational conditions in each

^{11/} International Labour Office: Raising Productivity: Conclusions of Three International Meetings of Experts (Geneva, 1959).

^{12/} For a discussion of the problems involved see The Adaptation of Management Techniques to Small Undertakings, ILO Technical Meeting on Small-Scale and Handicraft Industries, Report SSW/1961/2II (Geneva, 1961), mimeographed.

plant; this in turn would ensure that the training programme would take fully into account the objectives of each firm and the personal characteristics of each individual seeking training and guidance.

As a practical example to indicate the nature of activities for management development, the centre could initiate a programme of inter-firm comparison through the aid of management ratios ^{13/}. Management ratios refer to the measurement of various relationships between factors governing the operation of an enterprise ^{14/}; they are referred to as management ratios because they indicate the measure of success which management has obtained in planning, co-ordinating, directing and controlling the activity of its business. Within the undertaking, current ratios may be compared with those of earlier periods. Between undertakings, they are useful for comparison of performance of firms manufacturing similar products or a similar range of products. From this it is clear that any scheme for inter-firm comparisons through management ratios could be particularly successful if applied in a so-called "functional" industrial estate where all enterprises are engaged in the same trade. The use of management ratios may stimulate management in searching for inefficiencies as well as for their causes; the managers concerned are in a way being put "in inquiry," and this may well contribute to the raising of production in small plants participating in such a scheme. It is recognized that employers may be reluctant to disclose their figures to each other; this difficulty may however be overcome by presenting the relevant data under code numbers so as to assure anonymity. To make the scheme fully effective it would be necessary to educate the participating enterprises in the advantages of the scheme, and to make them desirous of comparing their performance with that of other plants in an objective manner. Also, training would be necessary in producing for the centre data which are comparable and suitable for further processing and dissemination.

^{13/} International Labour Office: Report to the Government of Israel on Productivity Measurement and Inter-Firm Comparison (Geneva, 1958), mimeographed.

^{14/} Such as the ratio between profit and capital employed; sales income and capital employed; cost and sales income; sales income and debtors; liquid assets and short-term liabilities; fixed and current assets; share and loan capital; and other indicators.

Apart from training and consultancy services for the solution of specific problems within the undertaking, the centre might be designed to establish central servicing departments to relieve the small plant manager of functions which lend themselves to being carried out as a joint service. Such central management services might profitably include the operation of a central bulk purchasing and stock unit which would handle the buying for the various undertakings, keep stock records, receive and issue supplies, and so lighten the burden of the individual manager in respect of materials control. Apart from this, there would be the advantage that in the aggregate less capital will be tied up in stocks. When the cost of stock-keeping by, say, 50 individual plants is considered, the idea, though presenting many problems, would be quite feasible. Further, preventive maintenance services designed for each undertaking with in-the-spot service could be introduced, and a maintenance service unit could be established to carry out major plant maintenance. In addition, a common accounting service would certainly present possibilities of rationalization and substantial economies in cost; and a central quality control unit would be of special interest for estates established to promote subcontracting arrangements between small units and larger undertakings. How well these services could be utilized would depend largely on the initial training given to the managers, and their attitudes to concentration of certain managerial functions. The question of secrecy is bound to arise, especially when common accounting facilities are considered; therefore, the reaction of individual managers will have to be carefully examined, and confidence established that financial information concerning each firm would be treated as strictly confidential.

The cost of establishing and maintaining a management service centre would have to be decided on the basis of precise information as to the type and size of the industrial estate, the number of undertakings, the total number of employees, the trades in which the individual plants are engaged, whether there is any concentration of small industries in the vicinity of the estate, and similar questions. Thus, the organization of a centre in a "functional" industrial estate would be very different from one in an estate where each of the enterprises manufactures different products. Similarly, the functions of a centre in an estate where the units manufacture components and parts for larger firms on a subcontracting basis would be different from one which would render services to small plants manufacturing products for direct sale to consumers, either locally or abroad. Furthermore, an estate designed for newly established undertakings, with inexperienced managers, would obviously require more intensive managerial training than an estate where established entrepreneurs are located. Also, estates operated solely as nursery beds for growing enterprises would require a different approach and emphasis in the centre's training programme. It may well be that an industrial estate composed of one or two large factories and a number of small units having subcontracting arrangements with each other would be the ideal one for the establishment of a management service centre.

There are certain dangers inherent in the scheme, one of which could be that the centre would be highly successful in the first few years, but that the demands on it, particularly in relation to training, would decrease unless the estate is planned to expand gradually both in size and number of units. It might be, however, that the staff of the centre could be transferred to other estates to be established in the country; or that some of the staff of the centre could gradually be absorbed into posts in firms which are growing in size. It would seem, nevertheless, that consultancy and training services of some kind, and on a suitable scale, would be needed indefinitely, so as to assist management in adjusting itself to the continuously changing conditions in a developing economy.

III. Vocational training programmes in conjunction with industrial estates

One of the most serious difficulties facing developing countries is the severe shortage of skilled personnel at various levels and of various types. In meeting the need for such skilled workers, it would seem that larger undertakings are at an advantage as compared with smaller enterprises. Large industries generally attract the best personnel available on the labour market because they offer higher wages, more welfare facilities, better prospects for advancement and greater job security. Because they command larger resources, both human and financial, large industries sometimes establish their own training centres; the effective organization of such centres is greatly facilitated by the fact that the large undertaking has a more precise knowledge of present and future manpower requirements in terms of number, levels and types of skills. Large industries are also in a favourable position to utilize the various training schemes organized by or in co-operation with the government, such as apprenticeship training, accelerated training schemes to meet the demand for skilled workers in short supply, special courses for skill upgrading, and programmes for the development of supervisory skills. With the exception of Japan, where the apprenticeship law applies to both small and large-scale enterprises, government-sponsored apprenticeship schemes in such countries as India, Malaya and Pakistan are predominantly utilized by larger undertakings. In general it would appear that in developing countries large industry has the best opportunity to pursue a comprehensive training policy which is fully integrated with the short and long-term objectives of the enterprise.

There are, however, advantages in establishing training schemes for small enterprises by taking into account programmes for the establishment of industrial estates. In doing so, favourable opportunities arise for the development of integrated training programmes including some of the advantages of training policies pursued in large-scale undertakings. Again, such training schemes could be particularly effective when operated in conjunction with a large industrial estate of the "functional" type, on which, say, 100 small undertakings are located, employing together some two to three thousand workers engaged in one or more related trades. The effectiveness of the

scheme would obviously be further enhanced if it is operated in an area with an appreciable concentration of industry.

The organization of vocational training schemes at or near an industrial estate would have the further advantage that employers (and where appropriate, workers' representatives as well) could be closely associated with the planning, development, operation and supervision of various training programmes for different levels of skills. This would contribute to providing more effective training, since the co-operation of employers and workers would help to ensure that training programmes, in terms of theoretical and practical knowledge, are closely geared to the actual requirements and anticipated developments in the industries concerned. Also, active and participatory methods of instruction can be more easily arranged when a vocational training scheme operates in close co-operation with industry as is possible in an industrial estate. Further, use might be made of the experience of persons from industry, employing them as part-time teachers for special subjects in training institutions. It would seem worth while to explore this suggestion further and to consider whether in some cases managers of small plants could be engaged for the purpose; this would have the additional advantage of giving these managers a deeper understanding of the process of training as related to the needs of a developing small industry. In the following paragraphs some basic considerations for the establishment of a vocational training programme implemented in conjunction with an industrial estate are briefly examined.

A vocational training programme for an industrial estate should provide for training both existing and potential workers. As regards the training of existing workers, this might be carried out in one or both of the following ways: (a) those who are immediately in charge of the existing work force might themselves be given training, both to upgrade their skill and in methods of instruction; when trained, such charge-hands would be in the best position to carry out systematic on-the-job instruction of workers engaged in the enterprise; and (b) special arrangements might be made whereby workers can acquire job or related knowledge after working hours, or at times which fit the operating schedule of the industry.

As regards the training of potential workers, apart from type (b) mentioned above, methods commonly used for such training are institutionalized accelerated training and apprenticeship programmes. The purpose of accelerated training is to impart the essential skills of a trade to a person in as short a time as possible; it is often given in special centres equipped for the purpose, and may make an important contribution to relieving the scarcity of skilled workers in a developing economy. Apprenticeship may be defined as

a system by which an employer undertakes by contract to employ a young person and to train him or have him trained systematically for a trade over a specified period of time, the duration of which might be fixed in advance and in the course of which the apprentice is bound to work in the employer's service. In Japan, for example, several small firms join together and organize apprenticeship training schemes on a co-operative basis. Under this system, trainees rather attend classes for theoretical instruction and also practice together as many fundamental techniques as possible. Related in-plant training is provided in the workshop of the co-operating small employers; since the individual plant is seldom equipped to provide all-round training in the chosen trade up to the level of the skilled worker, the trainees are moved from plant to plant to acquire a variety of practical experience. In accordance with the vocational training law, the Japanese Government assists such joint training schemes by meeting part of the cost involved and by placing public vocational training facilities at the disposal of the co-operating small industrialists 15/.

By co-ordinating the activities of a vocational training scheme with those of a management service centre as earlier suggested, it should be possible to make suitable arrangements to assist workers who intend to set up on their own as independent small entrepreneurs 16/. Apart from having them fully trained in the necessary technological skills, the management service centre could complete the education of such workers by giving training in supervisory skills and simple management techniques. An integrated training programme, designed to assist workers to establish their own undertakings, would seem to fit in very well with Government policies primarily directed towards operating industrial estates as nurseries for developing small industries, so that vacancies which occur when growing undertakings leave the estate to build their own factories would be taken up by newly established small enterprises.

The combination of an industrial estate with a training centre would seem to be particularly important where estates are established in rural

15/ As of April 1960, 514 mutual vocational training organizations had been approved by the Government; 34,513 enterprises had joined these organizations which had at the time 42,606 workers under training. Ministry of Labour, Present Situation of Vocational Training in Japan (Tokyo, 1961)

16/ For a study of former factory workers who have established their own workshop see James J. Borna, Industrial Entrepreneurship in Madras State (Bombay, 1960), pages 57 to 60.

... specific urban areas, the level of the small industrial units, urban centres. Vocational training institutions are mainly concentrated in large and medium-sized towns; because of the limited availability of labour, rural people generally make little use of such institutions. Moreover, young people from rural areas who receive training in urban centres generally prefer to seek employment in the urban setting, even in occupations which are different from the one for which training has been provided. It is generally recognized that the defective infrastructure in rural areas in Asian countries imposes severe limitations for rural industrialization. Since the lack of skilled workers is an important contributing factor to the defective infrastructure, the success of any programme for the establishment of rural industrial estates will require taking corresponding measures to provide industry with a trained labour force.

Obviously, co-ordinated action between industrial estate programmes and vocational training programmes will not solve to any appreciable extent the many existing difficulties encountered in the establishment of effective training schemes for the small industrial sector. Even if a country takes forceful action to establish a sizeable number of estates, the workers to be employed there would in all probability still be unreliable. Due to the dispersal of industry, lack of forward planning at the level of the undertaking, defective statistical coverage, and problems encountered in establishing a comprehensive development plan for the small industrial sector, it is extremely difficult to assess properly the present and future manpower requirements in which all training programmes have to be based. Further, practical problems restrict the participation in existing training schemes of workers employed in small plants. Whilst most such schemes admit trainees from all sources, the low training capacity of the small undertakings would in many instances prevent it from continuing beyond a few days to the workers pursuing their training under such schemes. Moreover, while a large factory will be able to send a few of its employees for training without any particular operational difficulty arising, the absence of a worker from a small workshop may hamper the plant's capacity to produce. Finally, working hours in small enterprises might be prohibitive of a part-time training.

A further complication is that the need for vocational training is not sufficiently recognized by small-scale industrialists. Many small plant managers are satisfied with having their workers trained on the job through informal instruction. This tends to perpetuate ineffective methods of work rather than to prepare the young worker to be a better producer. Even the most progressive small plant managers are in the main more concerned with the technical aspects of the enterprise and with instructing in a few technicalities than with measures to develop systematically the skills of their workers so as to have the best use made of the available equipment 17/.

17/ In Japan where, as indicated earlier, extensive training programmes have been introduced in smaller industries, the beneficial effects of these (cont'd)

Moreover, the "learner" or "apprentice" is often regarded as a cheap source of labour. When employers are in the same line of business, mutual suspicion often makes co-operation between them extremely difficult and existing entrepreneurs are not likely to welcome the emergence of new competitors when schemes are initiated to assist workers in establishing their own workshops. Because of all these factors, it may well be that initially much of the vocational training for industrial estates might have to be limited to ad hoc on-the-job training, perhaps as a part of an industrial extension service.

IV. The welfare of the workers on industrial estates

Working conditions in most small manufacturing enterprises in Asian countries are unsatisfactory. In particular, the standards in partly mechanized small-scale industries located in urban and semi-urban areas, and which employ hired labour, are substantially below those prevalent in larger undertakings. These workshops are often dark and poorly ventilated, workshop space is cramped and badly laid out, amenities are lacking, working hours are long, and wages low 16/. The physical conditions within the undertaking, as well as the environment in which the worker lives, have an important although not easily measurable impact on the morale and efficiency of the labour force; and the depressed labour conditions in many such industries are part of a vicious circle whereby low productivity is both cause and effect of the unsatisfactory position of the small undertaking in these respects. Since one of the basic objectives of economic development is to raise the living standards of the people, any sound policy to develop small industry should look toward raising labour standards to a level recognized as adequate in the countries concerned.

17/ (cont'd)

programmes have become evident. It has been observed, for instance, that workers in small plants who have received some formal basic training reach higher levels of productivity as compared with untrained workers. Such workers can more easily and quickly adapt themselves to new production systems and renovated equipment and facilities, their sense of responsibility is enhanced, and they have a favourable effect on other workers in the observance of workshop regulations and in fostering modern attitudes to the manufacturing process in general. See Asia Kyokai, The Small Industry in Japan (Tokyo, 1961), page 42.

18/ Labour and Social Problems of Small-scale and Handicraft Workers in Asian Countries, ILO Asian Regional Conference, Report II (Geneva, 1957), mimeographed, pages 107 to 132 .

It is important, however, that measures to improve the welfare of the workers should take into account the probable effects on the growth of the small industrial sector, the ability of the public authorities to enforce such measures, and of small undertakings to comply with them. Consequently, when deciding on a course of action in this respect, initial emphasis should be placed on those small industrial trades whose economic position would enable them to bear the increased charges involved, and to those where better working and living conditions would contribute to higher productivity, thereby increasing the capacity to pay of the undertakings. Economic growth is the main road to social progress, and any policy to improve labour standards in small industries can lead to lasting results only if it takes account of this.

It is important, however, that measures to improve the welfare of the workers should take into account the probable effects on the growth of the small industrial sector, the ability of the public authorities to enforce such measures, and of small undertakings to comply with them. Consequently, when deciding on a course of action in this respect, initial emphasis should be placed on those small industrial trades whose economic position would enable them to bear the increased charges involved, and to those where better working and living conditions would contribute to higher productivity, thereby increasing the capacity to pay of the undertakings. Economic growth is the main road to social progress, and any policy to improve labour standards in small industries can lead to lasting results only if it takes account of this.

One of the main objectives in setting up industrial estates through public action is to encourage industrialization by making factory premises available both to new entrepreneurs and to industrialists whose possibilities of expansion may be hampered by their existing unsuitable premises. Alongside the economic objective, the public authority financing or subsidizing the industrial estate will naturally bear in mind the social objective, wherever possible. For this reason factory premises in industrial estates have been constructed to conform to the requirements of factory legislation in regard to space, layout, ventilation, the provision of amenities, etc. They are certain to continue to be so constructed in the future although, as emphasized earlier in this paper, special efforts should be made in economizing on construction cost without sacrificing essential elements required to provide a suitable working environment. In this connection, the ILO Model Code of Safety Regulations for Industrial Establishments ^{19/} provides valuable guidance.

^{19/} International Labour Office, Model Code of Safety Regulations for Industrial Establishments for the Guidance of Governments and Industry (Geneva, 1949); amendments, 1959.

dance not only in regard to safety measures but also to the construction of factory premises in general and the provision of amenities designed to protect the health and ensure the well-being of the workers.

Tenants taking up factory space in newly-established industrial estates may be of two kinds: (a) industrialists moving from existing premises and (b) industrialists setting up new enterprises in the estates. Where the allocation of factory space on the estate is restricted to small industrial enterprises, many of the employers mentioned in category (a) will probably have employed fewer than 10 workers on their former premises, and may continue to do so for some time after their removal to the estate. In several Asian countries this category of employer has not hitherto been subject to the provisions of factory legislation which, in countries such as Burma, India and Pakistan, for example, do not apply to undertakings employing fewer than 10 workers if the manufacturing process carried on involves the use of power, or to plants employing 20 workers in case no power is used. Some entrepreneurs setting up a small-scale industry for the first time on an industrial estate may also employ fewer than 10 workers, and consequently they would not be legally required to conform to the provisions of factory legislation if they chose to occupy premises off the industrial estate. However, since industrial estates are primarily designed to create favourable growth conditions for small industries, it is likely that small employers may gradually increase their labour force to such an extent that they come under the provisions of factory legislation. In such cases they will find that some of the obligations which would impose appreciable financial outlay on the individual small employer operating in isolation can be met much more easily on an industrial estate.

For an idea of the obligations normally imposed on employers by factory legislation, it may be useful to refer to some typical provisions by way of example. Thus, health provisions require the maintenance of factory cleanliness by daily sweeping and weekly washing of floors, and the periodical painting or whitewashing of walls and ceilings; adequate ventilation and the maintenance of a suitable working temperature; the prevention of overcrowding; the provision of suitable lighting, possibly of prescribed standards; the provision of adequate supplies of wholesome drinking water; and adequate lavatory accommodation. Required welfare measures include the provision of adequate and suitable washing facilities for the workers, and may also include the provision of accommodation for clothing not worn during working hours, and facilities for drying wet clothes; and the maintenance of first-aid posts. A small employer on an industrial estate would be able to provide several of these services and facilities by sharing the cost of common services provided both for his own employees and for those employed in other undertakings on the estate. For instance, a common cleaning staff both for daily sweeping and for periodical washing and painting might be employed jointly by several

employers; supplies of drinking water might serve more than one small factory; a block containing lavatories, washing facilities, etc. might be used in common by the workers of several undertakings; one first-aid post could serve a number of plants. In this way the small employer could benefit from some of the advantages derived from spreading certain overhead costs over a large number of employees, as in the case of large-scale producers.

As observed earlier, improved working conditions on industrial estates should result in higher labour productivity, both quantitatively and qualitatively. This may be achieved through a reduction in lost time caused by accident and sickness, and through a decrease in the amount of spoiled work caused by bad lighting, overcrowding or other sub-standard working conditions. Unfortunately, figures showing increases in productivity brought about by improved working conditions are not available. This is hardly surprising, since an improvement in working conditions usually takes place simultaneously with other changes. For example, a move to more spacious premises is usually the occasion for the installation of new and more modern machinery and perhaps also a change both in the number of workers employed and in their levels of skill; it has been observed that a move away from existing premises to those provided on estates generally coincides with a change in applied technology. In such circumstances it is difficult to isolate the particular factors which may have contributed to the increase in productivity and to attribute proportions of such increase to each factor.

There are certain other types of welfare services which the small employer on an industrial estate may find it desirable to provide or to make available for his workers on a voluntary basis. Two such services to which particular importance is attached are transport facilities and canteens.

Action in respect of transport facilities may, in fact, become essential if the workers employed live at a distance from the industrial estate. The subject of the provision of transport facilities is included in the ILO Welfare Facilities Recommendation, 1956 ^{20/}. This Recommendation emphasizes, *inter alia*, that where a substantial proportion of the workers experience special difficulties in travelling to and from work owing to the inadequacy of public transport services or unsuitability of transport timetables, the undertakings in which they are employed should endeavour to secure from the transport authorities the necessary adjustments or improvements

^{20/} Official Bulletin, International Labour Office, Vol. XXXIX, 1956, No. 2, The Welfare Facilities Recommendation, 1956.

in their services. A proposal included in the Recommendation which would seem to be particularly applicable to large industrial estates refers to the need to adjust or stagger times of starting and finishing work in the undertaking in cases where the workers' transport difficulties are primarily due to peak transport loads and traffic congestion at certain hours. It should be emphasized that the provision of adequate transport facilities should ensure to individual employers gains in output arising out of more regular and punctual attendance on the part of the workers, and a reduction in the physical fatigue imposed on them through being obliged to travel under difficult conditions.

For the small employer carrying on his operations in an isolated unit, the provision of a canteen might prove to be difficult for financial reasons, and even setting aside space for use as a mess-room would often be far from easy. However, on an industrial estate grouping together a minimum of, say, 250 workers, joint action by employers becomes feasible. In this connexion also the Welfare Facilities Recommendation establishes certain principles, such as the need to set up canteens providing appropriate meals and operated in or near undertakings, having regard to the number of workers employed, the demand for and prospective use of the facilities, the non-availability of other appropriate facilities for obtaining meals, and any other relevant conditions and circumstances. As in the case of improved working conditions, no exact figures can be quoted to show increases in productivity due solely to better feeding arrangements. Nevertheless, it is entirely reasonable to conclude that a worker who is enabled to eat better meals in a canteen than he would be able to afford if left to his own devices is bound to enjoy better health and physical stamina, which in turn lead to higher output and to a decrease in absenteeism due to illness. Further, feeding at the expense of or with financial assistance from the employer would seem to be especially important in case workers' health is endangered because of defective nutrition habits of the working population. The provision of a canteen may also, where necessary, facilitate adjustments in work schedules by reducing the time needed for meals by workers who would otherwise seek refreshment outside the estate or prepare their own meals on the premises.

Apart from working conditions within the undertaking, the housing in which the workers live is an important determinant for the measure of well-being of the labour force and its consequent ability to produce more. Governments in Asian countries are therefore paying increasing attention to measures and methods to provide better housing for the working population.

When industrial estates are developed in or near population centres where there is already a sufficient number of workers available to man the undertakings to be established in the estate, provision for workers' housing and related community facilities may not necessarily be included in the plans

related to the establishment of the estate. The housing of such workers will usually be considered as part of the problem of housing of workers in general. In some cases, however, for instance where the estate is located at some distance from normal centres of population, or where the nature of the employment requires that the workers should be available at short notice, it may be appropriate to include provision for workers' housing and related community facilities in or near the estate. In such cases due consideration may be given to a number of suggestions concerning town, country and regional planning which have been included in the Workers' Housing Recommendations, adopted by the International Labour Conference in 1961 21/.

This Recommendation suggests, inter alia, that workers' housing should, in so far as practicable, be within easy reach of places of employment and in close proximity to community facilities. Furthermore, in the design of houses and the planning of new communities for workers, every effort should be made to consult the representatives of future occupants who are best able to advise on the most suitable means of meeting their housing and environmental needs. The selection of sites for industrial estates in connexion with which it is intended to provide workers' housing should also be made with the principles of town and country planning in mind. In this, the Recommendation stresses the desirability of providing for inter-related zones in towns and cities, such as residential, commercial and industrial zones, with a view to ensuring as agreeable an environment as possible for the worker and his family, thereby minimizing the time spent and risks incurred by workers in going to and from work. In order to lessen overcrowding in large urban centres, plans for future development should be formulated on a regional basis, with a view to preventing over-concentration of industry and population and to achieving a better balance between urban and rural development 22/.

21/ Official Bulletin, International Labour Office, Vol. XLIV, 1961, No. 1, The Workers' Housing Recommendation, 1961.

22/ Additional detailed suggestions which it would be useful to follow if workers' housing is to be constructed as part of an industrial estate have been made by the Iron and Steel Committee of the ILO at its Sixth Session in 1957. Though the reference in this case was to a new steel plant, the same considerations can be applied by analogy to a new industrial estate. See Official Bulletin, International Labour Office, Vol. XL, No. 5, 1957, pages 264 to 266.

It would appear that the industrial estate would provide particularly favourable opportunities for implementing aided self-help housing schemes which are being successfully established in various developing countries. Under such schemes, the workers themselves largely build their houses with assistance from Governments and/or employers; such assistance may include training in techniques and skills, supply of materials and equipment, technical supervision and, in some cases, money. The cost of providing workers' housing is thereby suitably reduced and a class of small home owners is created. This contributes to stability in the labour force and also promises better upkeep of the houses than when workers live in rented premises. Aided self-help housing schemes require for successful implementation the co-operative action of a number of workers under expert guidance and control; these requirements may be more easily met in an industrial estate. The Workers' Housing Recommendation suggests that measures be taken in co-operation between governments, employers' and workers' organizations, to provide technical services, such as architectural assistance and competent supervision of the work, the training of the workers in the more simple house-building operations, the sale or hire of equipment, materials and tools at less than cost, making credit available at concessional rates of interest or as subsidies, the sale of land at less than developed cost and long leases of land at minimal rents, and lastly, appropriate measures to give the worker and his family information concerning the maintenance and rational use of facilities in the home ^{23/}.

V. The modernization of labour-management relations in industrial estates

Efficient operation and higher productivity in any undertaking, whether large or small, depends largely upon the quality of human effort. Apart from the levels of skill of both management and labour, an important contributory factor in this is the state of human relations within the enterprise. In this respect, it would seem that the small undertaking has certain advantages over large-scale industry. In the small workshop, the employer-employee relations are on a close, more personal basis, providing a more favourable social and psychological climate for co-operation. The owner-manager of the small plant is still the person who hires and fires the workers, organizes and supervises their activities and determines wages and other conditions of employment. As long as the undertaking is very small

^{23/} For a factual description of such aided self-help housing schemes see T. K. Djang, "Aided Self-Help Housing Programmes for Workers in Taiwan", International Labour Review, Vol. LXXIII, No. 1, January 1956, pages 37 to 57.

and has less than, say, 10 to 15 employees, the employer frequently works side by side with his workers and this will make him more aware of their needs and aspirations. It is significant, for instance, that interviewed workers during a sample survey recently undertaken in small enterprises indicated that camaraderie and companionship were felt to be one of the most desirable aspects of their present jobs. At the same time, unsatisfactory working conditions, limited opportunities for advancement, low remuneration and lack of job security were also mentioned by the workers as undesirable aspects of their present employment 24/. While information is lacking for a clear understanding of the state of labour-management relations as related to the size of the undertaking, there are indications that, with an increase in the number of employees in smaller enterprises, greater attention has to be paid to maintaining good labour relations. In a recent study on the operational problems of employers in growing small to medium size undertakings in India, it was pointed out that one of their major problems was poor employer-employee relations 25/. Causes of disputes varied from serious disagreements over wages and working conditions to trivial shop-floor incidents, with poor working conditions and low wage levels being recognized as contributing causes. This would suggest that dissatisfaction felt by workers in small enterprises is closely related to the unsatisfactory economic position and correspondingly low labour standards prevalent in many small industries in Asian countries. The fact that these conditions affect equally employers and employees should be a strong inducement for them to pull together for greater productive efforts that will mean higher incomes and a better life for both 26/.

Because of the small size of the undertakings, low educational levels of the workers and a close personal relationship between employers and employees, workers in Asian small industry normally are not organized to any great extent. In Japan a few years ago only 4.5 per cent of the workers in manufacturing establishments employing fewer than 30 employees were members

24/ National Economic Council, Bureau of Census and Statistics, UNESCO, National Commission of the Philippines, the Statistical Centre, University of the Philippines: Social Implications of Small-scale Industries in the Philippines (Manila, June 1960), pages 65-66.

25/ James J. Berna, *op.cit.* pages 106 ff.

26/ Labour-Management Relations, ILO Asian Regional Conference, Report IV (Geneva, 1957), mimeographed, pages 72-75.

of trade unions against over 90 per cent in enterprises with more than 500 workers 27/. In the Philippines less than 10 per cent of the undertakings employing between 20 and 50 workers have organized labour unions 28/ and the position in India does not seem to be much different 29/. It is likely however that workers on industrial estates will in time become more receptive to unionization than the labour force employed in smaller enterprises in general. Just as the small plant owners on nearly all of the larger industrial estates in India are feeling the need to organize themselves in employers' associations, it is reasonable to expect that the concentration of a large number of workers in a single physical area will promote the establishment of trade unions.

It may be important to foresee this development and to prepare in advance measures designed, for example, to avoid the evils of trade union multiplicity and rivalry, and to promote stable workers' representation in collective bargaining and labour-management co-operation, while ensuring that the fundamental guarantees of freedom of association are not violated. Special efforts would also be needed to promote among the employers and workers alike a better understanding of the role of trade unions. Unionization will create opportunities for the development of a new pattern of labour relations in the interest of both employers and workers if both parties are aware of their respective obligations. Trade unions are still too frequently associated in the public mind with industrial strife and its attendant inconveniences. It is, however, becoming increasingly recognised that while cases may arise in which conflict is inevitable, the development of trade unions not only vindicates the fundamental right of workers to associate themselves but also serves an essentially constructive purpose. National economic and social progress, as well as the best interests of employers and workers themselves, demand a more constructive tie of labour-management relations, based on the recognition that labour and management are mutually dependent on each other and that there is a need for co-operation between them in matters of common concern.

The brief examination in preceding sections of opportunities to introduce more advanced standards in management and labour in small enterprises located on industrial estates would suggest that organised labour could play a useful role in this modernisation process. Representatives of workers could be asso-

27/ T. Yamamaka and Y. Kobayashi, History and Structure of Japan's Small and Medium Industry (Tokyo, 1957), page 57.

28/ National Economic Council, op.cit. page 16 .

29/ D. T. Lakdawala and J. C. Sandesara, Small Industry in a Big City - A Survey in Bombay (Bombay, 1961), page 92 .

cialist with certain management decisions with regard to the introduction of measures to raise productivity. This would seem to be particularly important since improvements in labour productivity depend in large measure on the outlook of labour, its aspirations for social and economic progress and its interest in the enterprise in which it is engaged. Workers' representatives could further contribute to the proper functioning of vocational training programmes established in conjunction with industrial estates; they could co-operate in finding ways and means to promote the provision of labour welfare facilities jointly for a number of small plants, and their participation in organizing aided self-help housing schemes should be particularly useful. In some cases the government as the initiator of the industrial estates programme may find it desirable and feasible to contribute to the process of modernization of labour relations in the small industrial field by providing a legal framework for labour-management co-operation. Current legislation in force in a number of countries provides for joint consultation machinery in establishments employing more than a certain number of workers (usually at least 100). Consideration might be given in appropriate circumstances to extending the coverage of such legislation to industrial estates of a certain minimum size in terms of the total employed labour force.

It should further be most useful to explore the practical possibilities of providing facilities for the organization of workers' education programmes so as to give the employed labour force the understanding required for effective labour-management co-operation. In certain countries, as for example in India, workers' education programmes are being introduced in public and private undertakings with financial and organizational assistance from the Government and in co-operation with employers' and workers' organizations; present schemes cover mainly larger undertakings. Frequently such programmes are developed in agreement with Government but on the initiative and under the control of workers' organizations themselves. With the gradual development of workers' organizations on industrial estates, workers' education programmes for the employed labour force may be the necessary cornerstone in the process of modernization of labour relations in small manufacturing industries.

DC3737

THE ROLE OF INDUSTRIAL ESTATES IN THE INDUSTRIAL DEVELOPMENT OF CEYLON

by

E. G. S. Paul, Director of Industries
Ministry of Industries, Government of Ceylon

PREFACE

This paper has been written at the invitation of the Division of Industrial Development of the United Nations Secretariat, which called for treatment of the subject under pre-selected headings.

As the reader will find, a large amount of the contents is devoted to historical and descriptive accounts of the early promotional measures to provide the first ingredient of industrialization, namely, a sound industrial base which contributed to making a suitable climate for the establishment of an industrial estate.

At the moment, the industrial estate is still in its formative stage; while a fully autonomous corporate body has been set up for the purpose of establishing this estate, it has yet to encounter several problems, some of which are foreseen and discussed in this report.

Many claims have already been made for space on the estate, but it is much too early to decide how many of them are serious, or to predict the probable scale of production and employment.

Consequently, it is impracticable to make any realistic estimate of the results likely to materialize through the establishment of the estate in the form of labour employment, increased productivity and foreign exchange savings.

In any event, the writer hopes that this paper will serve some purpose in outlining the problems faced by Ceylon in its infant stage of setting up the first of a series of five industrial estates under Government management.

The views expressed in it are personal to the writer, and in no way reflect the policy or attitude of the Government of Ceylon.

E. G. S. Paul

DIRECTOR OF INDUSTRIES

Colombo
26 December 1960

INTRODUCTION

What factors favour the establishment of an industrial estate? In form, an estate may be "as varied as the motives behind it".^{1/} The pioneer estates set up in the United Kingdom in 1896, and many of those established in the United States since 1899 were privately-owned business ventures influenced by profit motivations. In some cases, private industry is encouraged by the Government to set up industrial estates. Thus, in Bangalore, India, the Hindustan Machine Tools Factory is reported to be planning its own estate as a supporting unit to produce a range of parts and components hitherto purchased in the open market.^{2/}

In most cases the impelling reasons are social and economic and the purpose is to further the public interest. The economic depression which hit the United Kingdom in the nineteen thirties saw the use of the industrial estate as a solution to employment depressions in certain areas. Nowadays, it is used as a device for controlling industrial location. In many countries, estates have been used to overcome regional unemployment and to encourage a shift of population (as in the Netherlands and in Mexico), or to arrest a decline in employment opportunities in agriculture. In many cases, these objectives are combined with those of town and country planning, and industrial estates are used to remedy haphazard industrial growth taking root in and around major urban areas. In most under-developed countries, they are generally planned as an incentive for promoting the formation of new capital.

Although Ceylon's first estate is expected to materialize only in 1961, the project stems from an identical proposal made twenty-five years earlier. As the subsequent discussion will show, a necessary prerequisite to the success of the industrial estate is the existence of a sound base, that is, of an industrial consciousness and an industrial environment in the field of industry.

Four stages can be identified in Ceylon's progress to set up its first industrial estate. In the first stage, efforts were made to diversify agricultural occupations by providing training in techniques for cottage and rural industries. Various institutional devices were used to build up an industrial potential.

1/ William Brede - Industrial Estates - A Tool for Development, (Glencoe, Illinois, 1960)

2/ The Statesman (India), 8 December 1960

The second saw the beginning of factory industry and the first steps towards the development of an industrial tradition. The coincidence of this period with the war years gave this movement an artificial character of enforced nationalization; nonetheless it provided a valuable training ground for the build up of skills and techniques and the further development of the industrial base.

The third stage includes a reappraisal of State industry, the use of incentives for attracting private capital, and measures adopted for encouraging private capital to take a share with the Government in State industrialization.

The last stage is concerned with the immediate subject of study, the deliberate use of the industrial estate as a promotional device for accelerating the development of the country.

Chapter 1

THE RELATIVE IMPORTANCE OF THE INDUSTRIAL SECTOR IN CEYLON

1940 - 1960

Statistical material on the more important aspects of economic development in Ceylon is unfortunately very scarce, but some inferences can be made from the available material.

The war years with their scarcities provided a stimulant to the development of private industry. Industrial activity of a recognizable type can be said to have begun in Ceylon about 1940. As there is no estimate of the gross national product for that year, the contribution made by the agricultural and industrial sectors is shown in table 1 for 1938, and certain years of the period 1947 to 1959:

Table 1. Economic Growth: Contribution to the Gross National Product by the Agricultural and Industrial Sectors, 1938 to 1959

(Millions of rupees)^{a/}

Sector	1938	1947	1950	1953	1956	1959
Agriculture	264	829	1,478	1,477	1,624	1,668
Industry	23	145	282	569	719	877
Total gross national product	656	2,409	3,501	4,491	5,096	5,753
Percentage (1938 = 100)						
Agriculture	100	314	560	559	615	632
Industry	100	630	1,226	2,474	3,426	3,813
Gross national product	100	367	534	685	777	877

Source: Statistical Abstract of Ceylon

^{a/} One US \$ = Rs. 4.75.

Industrial growth has tended to be cumulative and, to a large degree, to feed upon itself. In spite of a relative scarcity of domestic raw materials, the growth was continuous. A good part of the increase is attributable to State enterprises. (See tables 7 and 10 and Annex F).

Few statistics are available to study the growth in employment over this period. The two census years 1946 and 1953 establish that the number engaged in agriculture in 1953 was 1.6 million, an increase of 300,00 over 1946, or 23 per cent; the number engaged in industry, inclusive of mining, was 320,000 in 1953, an increase of 50,000 or 19 per cent over 1946. The total gainfully employed population in these two years was 3 millions in 1953, an increase of 400,000, or 19.4 per cent.

As regards investment, the composition of the capital budget supports the conclusion that investments in manufactures and mining are also increasing.

Table 2. Composition of Capital Budget, 1954/55 to 1958/59

(Millions of rupees)

Year	Agriculture, Irrigation and Fisheries	Manufacture and Mining
1954/55	158.1	11.3
1955/56	148.7 ^{a/}	15.1 ^{a/}
1956/57	132.4	1.4 ^{b/}
1957/58	136.3	27.0
1958/59	217.4 ^{a/}	34.1 ^{a/}

Source: Planning Secretariat.

a/ Estimated.

b/ Presumably an error.

The increase in population in the four principal towns in Ceylon has been as follows:

Table 3. Population in the Four Major Cities, 1931, 1946, and 1953
(Thousands)

	1931	1946	1953
Colombo	284.2	362.1	426.1
Galle	38.4	49.0	55.8
Kandy	31.1	51.3	57.2
Jaffna	45.7	62.5	77.2

Colombo and Kandy seem to have attracted the highest migration of population, but it cannot be assumed that such attraction was entirely based on the growth of industry. Part of the increase is attributable to the desire for white-collar jobs: in Colombo, because it is the capital of Ceylon and the centre of trade and commerce; and in Kandy, by reason of the establishment of the University. The following table brings out the shift of population from the rural to the main urban areas.

Table 4. Percentage Distribution of Population in Rural and Urban Areas, 1931, 1946 and 1953

Province	1931		1946		1953	
	Rural	Urban	Rural	Urban	Rural	Urban
Western	72.1	27.9	66.5	33.5	65.6	34.4
Central	92.5	7.5	91.1	8.9	90.8	9.2
Southern	89.7	10.3	89.1	10.9	89.6	10.4
Northern	86.8	13.2	87.0	13.0	86.5	13.5

Source: Statistical Abstract of Ceylon.

Chapter 2

THE FOUNDATIONS FOR INDUSTRIALIZATION, 1931-1938, AND THE DEVELOPMENT OF RURAL INDUSTRIES, 1931-1959

Early promotion activities: Cottage industries

At the beginning of the period under consideration, the over-all picture of Ceylon's development was essentially one of expansion in agriculture - then a substantial earner of foreign exchange. The industrial policy consisted of providing mass instruction and improvement in techniques in rural and cottage life and a revival of decadent arts and crafts. There was nothing yet in this programme which called for the centralization of industry on an estate; it aimed rather at vitalizing rural life to use spare time, off-season labour and family co-operation for developing cottage industries in agricultural areas.

Technical education

The spearhead of the Government's promotional drive was a series of tours by skilled teachers scattered in groups throughout the country. Local talent was used to some extent; however, for instruction in the field of coir, textiles and sericulture, reliance was placed on Indian experts who were recruited to help in furthering the programme. The industries selected for the programme of systematic instruction were those which were traditional to the country, particularly coir weaving, pottery, textile and mat weaving, carpentry work, needle work, basket ware, iron and brass work, and blacksmithy. In the course of time several other branches were added. Rural centres of practical training, with a certain amount of theoretical instruction, were set up in a number of villages, and aptitudes gradually weaned towards a reasonable degree of proficiency.

By 1941 a new type of training institute was introduced which absorbed twenty-eight textile schools, seventeen carpentry schools and one ironwork school from the Department of Education. These schools were run on more rigid lines, admission being confined to pupils aged fourteen to twenty-one. The courses were longer than at rural centres, and greater emphasis was placed on theoretical aspects.

A difficulty encountered in both the rural centres and the schools was that many participants were not content with part-time study and part-time work. To meet this difficulty, and to satisfy the urgent desire for progressive improvement and to accelerate the translation of the training courses into practical careers, the workshop was evolved as a device where pupils could

also find salaried employment. At the same time, steps were taken to encourage the establishment of such workshops by private groups. In both cases, the workshops were to be operated by the workers as co-operative societies. State assistance was given to the workshops in the form of loans for machinery at low rates of interest and long terms of repayment. At a later stage, the Industrial Products Act was used as a further measure of assistance for facilitating the disposal of the produce of the rural industries.[✓]

The pattern followed by the Government at the early stages was thus to encourage industrial careers and to create an industrial consciousness by promoting localized pockets of industry. It was also believed that by keeping contented the work force in rural areas, the threatened migration of peasants to townships in the hope of earning white-collar jobs would be stemmed (see table 4).

Some indications of the progress achieved in the rural industries by the end of 1959 are set out in the following tables:

[✓] See Chapter 4, section "Marketing assistance".

Table 5. Rural Industries: Number of Centres and Societies, Schools and Workshops, 1941 to 1959

Industry	Centres and Societies				Schools				Workshops			
	1941	1945	1950	1959	1941	1945	1950	1959	1941	1945	1950	1959
Textile	23	198	295	1040	28	81	149	52	4	55	44	-
Coir	13	34	73	98	8	1	-	-	4	9	30	2
Mat	7	24	31	21	2	1	-	-	-	-	-	-
Paper pulp toys	1	13	13	11	-	-	-	-	-	4	-	-
Pottery	5	29	42	94	3	1	-	-	-	-	-	-
Twine	-	13	4	2	-	-	-	-	-	-	-	-
Hana	4	6	-	-	-	-	-	-	-	-	-	-
Wetakoia/Indi- kola/Palmyrah	-	9	21	47	-	-	-	-	-	1	-	-
Rattan	-	2	5	9	-	-	-	-	-	-	-	-
Carpentry	-	-	-	206	17	20	40	58	-	1	6	4
Iron and brass	-	-	-	9	2	-	-	1	-	-	-	-
Needlework	-	-	22	77	3	5	-	6	-	-	-	-
Basket weaving	-	-	-	4	1	-	-	-	-	-	-	-
Dyeing	-	-	-	-	1	-	-	-	-	-	-	-
Nursing	-	-	-	-	1	-	-	-	-	-	-	-
Printing	-	-	-	-	9	-	-	1	-	-	-	-
Lacquer	-	-	-	1	-	-	-	-	-	-	-	-
Onion koodu	-	-	-	1	-	-	-	-	-	-	-	-
Net weaving	-	-	-	4	-	-	-	-	-	-	-	-
Bamboo work	-	-	-	-	-	-	-	1	-	-	-	-
Jaggery	-	-	-	1	-	-	-	-	-	-	-	-
Bata tate	-	-	-	1	-	-	-	-	-	-	-	-
Talipot	-	-	-	2	-	-	-	-	-	-	-	-
Brass and silver	-	-	-	3	-	-	-	-	-	-	-	-
Brick and tile	-	-	-	4	-	-	-	-	-	-	-	-
Fisher	-	-	-	1	-	-	-	-	-	-	-	-
Sericulture	-	-	7	-	-	-	-	-	-	-	-	-
Hosiery	-	-	1	-	-	-	-	-	-	-	-	-
Miscellaneous	-	-	30	-	-	17	-	-	-	-	3	-

Source: Cottage Industries Administration Report

Hana - a fibre for making fishing nets and fancy goods.

Wetakoia)

Indikola)

Palmyrah)

a leaf used for basket and mat weaving and for hats.

Koodu - a basket made from the mid-rib of the palmyrah leaf.

Bata - a bamboo used for making window blinds.

Talipot - a palm leaf for making baskets.

Proposal for an industrial estate

In 1936 a spirited but unsuccessful attempt was made by the then Director of Commercial Intelligence - Mr. J.C.W. Rock, C.C.S. - to secure acceptance of a Government industrial estate. Its failure to materialize in the subsequent years was mainly due to two reasons.

In the first place, there was an inadequate base of industrial tradition for such an estate to operate as an effective inducement. Over a century of colonial rule had seen such a vigorous growth of agriculture reaching a degree of eminence in exports, that a break-away to industry meant substituting the unknown for the known, and sacrificing lucrative agricultural incomes for speculative risks in unproved new ventures. Moreover, pioneer efforts at industrialization during the early period had shown a high mortality rate (see table 6).

Table 6. Industrial Mortality Rate, 1940 to 1958

Year	Number of companies registered	Number of companies voluntarily liquidated	Number of companies struck off by the Registrar
1940	26	7	1
1941	33	14	10
1942	46	19	9
1943	79	22	20
1944	48	10	1
1945	138	12	4
1946	213	13	2
1947	176	19	5
1948	114	16	5
1949	109	26	..
1950	116	60	30
1951	182	26	16
1952	161	26	22
1953	145	31	23
1954	131	35	39
1955	130	35	14
1956	126	18	..
1957	112	11	..
1958	87	33	..

.. Not available.

In the second place, land had no scarcity value at that time to justify State intervention in controlling the haphazard growth of industry. While municipal laws placed some restraint on the free choice of land for industry in areas under their jurisdiction, land for the purpose was still available in mapped-out industrial zones. Industry at that time was not so pressing that it could not find its legitimate requirements either in, or close to, urban areas.

Chapter 3

THE BEGINNINGS OF FACTORY INDUSTRY, 1938-1947

In 1938, an administrative reform changed the outlook on industry. With the creation of the Department of Commerce and Industries, fresh life was infused into the Government machinery, and development plans could be beaded. The cottage industry stream had acquired enough momentum to sustain itself and multiply, principally owing to the instructors who, earlier, had begun their careers as pupils in the same movement. The need of the day was for a nucleus of factory industries. Under the Balfour reforms,^{4/} a series of factory industries was planned for development by the private sector. The spirit of the policy at that time was to "open up avenues of economic industrial exploitation which private enterprise had hitherto not attempted to traverse".^{5/}

The role of Government

The Government's first approach was to serve as a promoter of industrial projects; the Government studied, analysed and passed them as reasonably economic. A positive refusal by the private sector to take up the first scheme (the manufacture of plywood chests)^{6/} offered to it as a joint venture, the Government offering to underwrite the entire issue, forced the Government to adopt a socialized pattern of direct State industrialization.

Nine factories were set up in the period 1939 to 1943, all as departmental institutions (see table 7). The Minister commented on these State projects as follows: "These factories are elements in a plan for industrializing the country...intended to create an industrial consciousness and an industrial environment in the field of industry".^{7/}

^{4/} D.H. Balfour, C.C.S., Director of Commerce and Industries, later Director of Industries.

^{5/} Sessional Paper XIV of 1953, page 113.

^{6/} International Bank for Reconstruction and Development, Economic Development of Ceylon, Johns Hopkins Press, Baltimore, Maryland, 1953, page 253.

^{7/} Sessional Paper XIV of 1953, page 113.

Table 7. Establishment of Government Factories

Year	Factory	Planned output (Annual)	Unit
1940	Plywood	4,800,000	Square feet of 3-ply boards
1940	Coir products	To market demand	-
1940	Leather footwear	36,000	Pairs
	Tanned leather:		
	(a) Chrome	56,890	Square feet
	(b) Bark	104,520	Lbs.
1941	Steel rolling	1,500	Tons
1941	Ceramics	450	Tons
1942	Drugs		
	Quinine	24,000	Lbs.
	Shark liver oil	Variable	
1942	Acetic acid	100	Tons
1942	Paper	275	Tons
1943	Glassware	450	Tons

The choice of site for the Government factories

With the Government playing a lone hand in industrialization, it is surprising that no serious study was directed at the economic advantages of locating some of the factories in a Government industrial estate. In fact, several factors pointed to Colombo as the obvious choice for the purpose (see Industrial Map of Ceylon, Annex A):

- (a) Colombo was the main port for imports of fuel, raw and packing materials, and all chemicals;
- (b) it was the seat of foundries and engineering workshops for speedy repair and fabrication of spare parts;
- (c) it was the seat of the only Industrial Research Laboratory and of technical institutes for servicing factories;

- (d) it was the main port for export of factory produce, which was of relevance to the plywood and coir products industries;
- (e) in Colombo, piped water of high purity and in sufficient quantities was available, though none of the industries could be said to be heavy water consumers;
- (f) power for industry was concentrated in Colombo; elsewhere, independent power generation would have been needed for supplying substantial amounts of electricity.

In support of decentralization, only one reason of economic relevance can be found - the proximity to raw materials. Yet, it is doubtful that the weight of this circumstance alone sufficed to tip the scales in favour of the sites ultimately selected.

The following table brings out some interesting points:

Table 8. Government Factories: Location Advantages

Factory	Location ^{a/}	Distance to Colombo (Miles)	Distance to raw materials (Miles)	Power	Water	Market for finished goods
Plywood	Galle	72	25	Independent	Well	Colombo and export
Coir	Katunayake	18	0	Independent	Well	Colombo and export
Paper	Kakkapalliya	48	48	Independent	Well	Colombo
Ceramics	Negombo	26	Felspar 10 Quartz 95	Independent	Well	Colombo
Steel rolling	Colombo	0	5	Main	Town supply	Colombo
Leather	Colombo	0	5 to 72	Main	Town supply	Colombo
Drugs	Colombo	0	80	Main	Town supply	Colombo
Glass	Nattandiya	38	5	Independent	Well	Colombo
Acetic acid	Madampe	45	10	Independent	Well	Colombo

^{a/} See Map, Annex A.

Some justification for the location of the following raw-material-based factories may be found, but even so, it is doubtful that the advantages of siting them in Colombo had previously been accurately assessed: The plywood industry was close to forests for timber supplies. The coir industry was close to the coconut area and to a lagoon, an advantage for the retting of husks. The steel industry was in the centre of collection of iron and steel scrap from engineering workshops and the railway. The leather industry was close to the municipal slaughter houses where 50 per cent of all hides and skins are available. The glass industry was close to the main raw material - quartz sand. The acetic acid industry was in the heart of coconut plantations where coconut shells are obtained as a by-product of the copra industry.

A more detailed analysis would have shown that the location of the following factories could not be supported:

The paper industry: the main raw material was scrap paper and printers' off-cuts, available only from Colombo; the market for the finished product was Colombo.

The glass industry: though the main raw material, viz. sand, was in the neighbourhood, the high transport costs involved in shipping by rail fragile material like glassware and the absence of power and workshop facilities on the site would have supported Colombo as an alternative.

The ceramic industry: only one raw material, viz. felspar, was in the neighbourhood, but quartz had to be obtained 95 miles away. The main ingredient, kaolin, had to be imported through Colombo. Like glassware, the high transport cost of a fragile article like ceramic-ware would have justified Colombo as a better alternative.

The drugs industry was an exception. Raw materials for quinine, strychnine and pyrethrum were 80 miles away from Colombo, involving expensive bulk transport, though in respect of shark liver oil, Colombo was more convenient and economic. Even then, the whole of the drugs factory was a little more than a pocket edition of the name it bore. Had the problem been tackled rationally, the shark liver project would have been separated and located in Colombo, and the other products would have been manufactured near the raw material site.

Prior to the establishment of the last four factories, some consideration had been given to locating them on a common site in Colombo, which might have been the beginning of a small industrial estate. The site available had enough power and water to meet the needs of all four factories. A central organization could have been formed to provide them with common services such as purchases, stores, sales and advertising, and repairs.

Everything was there: economic reasons gave the scheme sufficient ballast; the means for establishing the industries existed; suitable land was available in Colombo; the objective of "creating an industrial consciousness and an industrial environment in the field of industry" could have been fulfilled. Yet, except for drugs, different sites were ultimately adopted for these projects.

Where lay the fault? As is the case in most under-developed countries, the reason was the inadequacy of pre-plan budgetting. State investment in industry was Ceylon's first calculated move on the industrial chess board. Enthusiasm for a speedy checkmate exposed weaknesses in the flanks. The factory pawns were, territorially, moving "out of bounds". Establishment on an industrial estate would have given them a sporting chance which would have minimized the heavy losses which, as will be seen below, eventually resulted in their closure.

The fact is - the advantages of an industrial estate location had escaped official notice. The planning staff at that time consisted of chemists and engineers. Had planning specialists been available, the odds are that an industrial estate would have been established, and the economic picture today would be considerably different.

Chapter 4

POST-WAR PROBLEMS, 1947-1956

A war invariably carries with it a trail of consequences, some good, some bad. On the positive side, war scarcities created openings for State leadership through a socialized pattern of nationalized industry. Initially, the prosperity of these State projects infused a degree of buoyancy in the industrial movement, and helped to sustain interest for some years even after the war. With the resumption of normal trade, many of the State factories began, unfortunately, to show losses, the repetition of which reduced public confidence in the value of investment in industry. The unorthodox entry of the State in the speculative field of industry had been criticized from many quarters; however, once the plunge had been made, retreat into liquidation had to be ruled out. Well before the onset of losses, the Government had wisely planned a systematic reorganization of the more promising State projects, the closure of uneconomic ones, and the planning, with the advice of expert consultants, of a series of new projects as a second stage of the Government's development programme. The need for closure of some factories which, admittedly, had been set up as pilot ventures, with no prospect of survival after the war was fully realized; yet closure was a political decision of considerable moment.

The issue was concluded after it had been referred to the Gunasena De Soysa Commission. The Commission was critical in condemning the State enterprises.^{8/} It considered that the industrial activities of the Government "suffered from a great deal of original sin". Although it conceded that these activities had "started in terms of an approved policy", it condemned the schemes on the grounds of lack of planning and preliminary investigation. Later, in deference to a rider of protest from one member of the Commission (Mr. D.H. Balfour, Director of Industries, who was the author of these State schemes), it added a tail piece that, "apparently, there was no lack of planning and investigation, although execution suffered owing to the war". Indeed, the Commission congratulated the Ministry on "its romantic resourcefulness in conjuring up an acetic acid factory, a steel rolling factory, a drugs factory and a paper mill, out of practically nothing, to provide for the starving needs of the country during a period of the direst difficulty".

As regards closure, the Commission pointed out that political considerations weighed strongly when the psychological moment for closing the factories was reached. Delayed decisions on closure had increased trading losses, which added to the volume of criticism from the public.

^{8/} Sessional Paper XIV of 1953.

Several reasons have been ascribed for these losses: low output, bottlenecks in production, inadequacy of raw materials due to difficulties of imports during the war period, breakdown in machinery involving difficulties in importing spare parts and replacements, ineffective salesmanship and, in some cases, production of sub-standard quality articles. In particular, the regimentation of State enterprises under Governmental rules and regulations hindered the effective operation of these projects. The situation was worsened by the release of surplus stocks of the Armed Forces in Ceylon at "take-away" prices, which upset the market for local ceramic-ware, glass ware, leather products and rolled steel. Moreover, with the resumption of normal import trade, cheaper paper, plywood chests, acetic acid and drugs came on the market. In the case of drugs, malaria was no longer an insidious problem, and the demand for quinine was dropping. Now substitutes, more effective than quinine, like mepacrine, had already made an impression on the market.

The conclusions of the Commission on the immediate questions referred to it are summarized in the following table:

Table 9. Recommendations Regarding Government Factories, 1953.

Factory	Recommendations
Steel rolling	Close; plans for a new factory should be reconsidered
Glass	Offer to a joint stock company with Government participation, if necessary
Tannery and leather	Offer to a co-operative wholesale establishment. If not accepted, offer to a joint stock company.
Ceramic ware	Close; plans for a new factory require full investigation
Acetic acid	Close; plans for a new factory should be carefully reexamined.
Paper	Close; plans for a new factory should be carefully reexamined.
Coir goods	Close; organize the workers in co-operative societies to take over the factory.
Drugs	Close.
Plywood and saw mill	Transfer to the Forest Department
Cement	Transfer to a public corporation

Thus, the Commission considered that the glass and leather industries should be joint ventures with private capital participation, while the "basic industries" - steel rolling, the new ceramic-ware factory, the new acetic acid factory, the new paper factory and the (already started) cement factory - should be nationalized and run as State corporations.

In partial acceptance of the recommendations of the Commission, the war-time projects (see table 7) were liquidated, except the plywood and leather factories which were in a position to retrieve their losses by timely reorganization. The coir industry alone was transferred to a cooperative organization of workers. In the matter of joint participation with private capital, the Government considered that the joint stock device was inappropriate, as it might repeat the results of a previous similar offer to the public: an invitation to join in the establishment of the plywood industry had failed to attract even one offer.

What was needed was a compromise - a co-partnership deal where the initial investment would be made by the Government, the door being left open to private investment to participate or take over once success was achieved and the value of the products confirmed on the market. It was important to convince the public that the new Government schemes would not share the fate of their war-time predecessors.

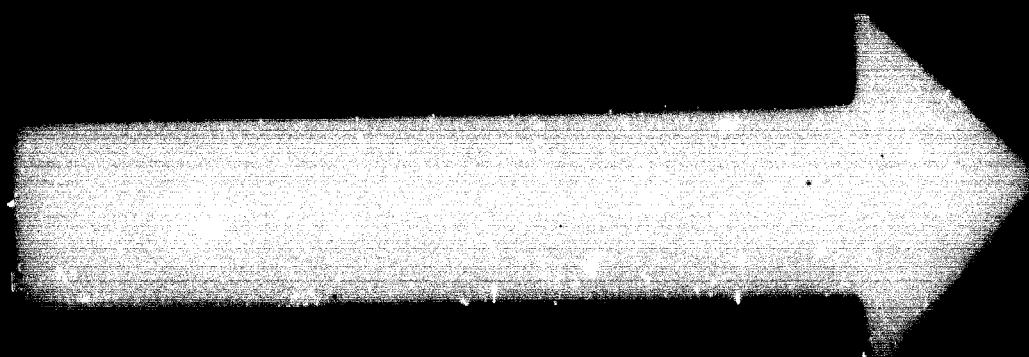
The co-partnership solution was proposed in the Government-sponsored Corporations Act No. 19 of 1955, which gave the Government power to set up a series of statutory corporations to take over any industrial project of the State already established or under construction.

The legal provisions were as follows:

"Where the Government considers it necessary that a corporation should be established in order to take over and carry out the purposes of a manufactory maintained or wholly or partially constructed by the Government, the Minister, with the approval of the Government, may by Order (hereinafter referred to as the "Incorporation Order") published in the Gazette:

- (a) specify the manufactory (hereinafter referred to as the "Specific Manufactory") to which the Order relates;
- (b) declare that a corporation shall be established to take over and carry out the purposes of the "Specific Manufactory".

The initial capital was divided into shares, all of which were entirely subscribed by the Government. The incentive to private capital partnership

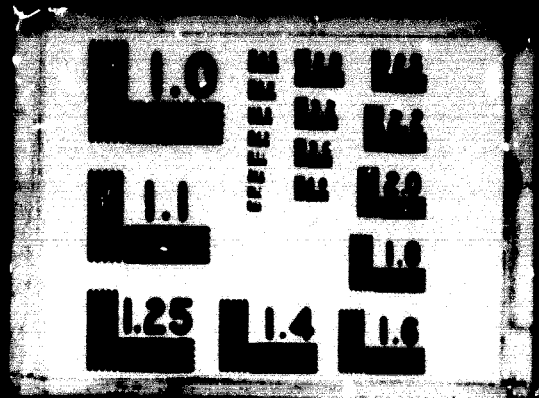


15. 7. 74

3 OF 9

DO

3736



lay in the provision for the appointment on the Board, at the initial stages, of persons in the private sector so as to stimulate their interest in the scheme and hasten the transfer of Government stock to private ownership as soon as evidence of response was forthcoming.

The first group included seven corporations. Five of them were new industrial projects; the two others were survivals of the war period revitalized by reorganization schemes:

Table 10. Government-established Corporations, 1955.

Project	Main product	Capital (rupes)	Annual output
Cement (new)	Cement	26,811,900	100,000 tons
Paper (new)	Printing and writing papers	22,000,000	4,500 tons
Oils and fats (new)	Vegetable oils	19,750,000	9,000 tons
	Cattle food		45,000 tons
Ceramics (new)	Crockery	3,000,000	450 tons
Salt (new)	Refined salt	2,800,000	1,000,000 tons
	Gypsum		32,000 tons
Plywood (reorganized)	Tea chests	1,700,000	450,000 chests
	Panel		To demand
Leather (reorganized)	Tanned hides and skins	1,400,000	458,500 lbs.
	Footwear		65,000 pairs

Section 53 of the Act provided for the dissolution of the corporation "when the Government ceases to hold more than 20 per cent of the capital of the corporation". At that stage, the corporation was to be reconstituted as a joint stock body; thereupon, all the movable and immovable property of the corporation would vest in the joint stock body and all contracts be deemed to be contracts of the new Company. Operation of the factory was not to be interrupted. This co-partnership deal was to provide a means enabling private capital to participate in industrial development once the trials and hazards of a new industry had been overcome with State capital. When a degree of success was reached, sufficient avenues would be opened for canvassing private support. The initial Government capital which would have been redeemed through the sale of its shares to the private sector would thereupon be recovered for further investment in new schemes, following the same mechanism. It was considered that this would eliminate the obstacle presented by private capital's unwillingness to take major risks in an unknown field.

Incentives

The Corporation Act was one of several incentives offered by the Government for attracting private capital as a prerequisite for building up the industrial base of the country. The incentives included tax exemptions, tariff concessions, marketing and financial assistance and research services.

Tax exemption

In 1951, for the first time the Government conceded a "tax holiday" to approved private industry for the "production or manufacture in Ceylon of commodities".^{9/} A corporation could qualify for a complete tax exemption if the Government had participated in its formation and had contributed to its capital, however small the contribution might have been. Where the Government was not associated with the formation of the corporation nor had contributed to its capital, a partial tax exemption was conceded to approved industries; tax relief was equivalent to 5 per cent of the invested capital. In both cases, the tax exemption was granted for the first year of business, and a five-year period thereafter.

Tariff concessions

Tariff reforms were carried out with a view to creating inducements for stimulating private capital investment. Two methods were used: the lowering of duties on raw materials and/or the raising of duties on competing goods. It may be noted that the tariff structure prevalent at that time was a heritage from the past period of colonial administration; it followed a two-line tariff - a preferential margin for Commonwealth countries and a non-preferential margin for other countries. Most of the prevalent tariffs were at levels which had been determined more with a view to creating revenue than to protecting local production, though a moderately protective effect was achieved. In the reforms, no fixed principles were laid down to differentiate between the tariff on imported goods and raw materials, each case being decided on its own merits. Unfortunately, the administrative machinery for securing tariff adjustments was cluttered up with lengthy procedures, which reduced its effectiveness.

Marketing assistance

An imperfect understanding of the mechanics of marketing was, together with the lack of adequate skills and a poor assortment of machinery, a major obstacle to the development of industry in Ceylon.

^{9/} Income Tax Ordinance, Sections 7A and 7B.

For years Ceylon had used imported goods and some feeling of hostility towards the products of local origin had developed. To some extent, the sub-standard quality of the local production justified the scepticism as to its merits. In the few cases where quality was above criticism, isolated efforts at marketing had failed in a climate of consumer and importer resistance. An important incentive was the institution of the Industrial Products Act No. 18 of 1949, which introduced a quota system of regulation of imports on licenses. No restriction was placed on the quantum of imports, but a licence was pre-required for importing those products which were declared to compete with local goods. Basically, the Act was a marketing device. An import licence would only be issued if the importer purchased in advance the prescribed proportion of the local product. It was considered that, by making the importer a statutory partner in the sale of the local product, barriers of resistance would be broken down and that, eventually, the importer, through a close acquaintance of the merits of the local product, would not need the compulsion of the Act to purchase them.

Several local products benefited by the scheme, including rolled steel, plywood, cotton textiles, glassware, rubber footwear and cotton vests.

As a safeguard against the marketing of sub-standard quality products, power was granted under the Act to prescribe certain standards. Power was also given to prescribe the price at which the local product will be sold.

Though implementation of the Act was considerably criticized, it served, nonetheless, a definite purpose in establishing some local products on the market. When used with judicious restraint, this Act serves a definite purpose as a supplementary incentive to the private sector for speedy industrial development.

Credit facilities

An important contribution to the acceleration of economic development was the provision for a new credit agency based on the recommendations made by the World Bank Mission in 1952. A Development Finance Corporation was established by the Development Finance Corporation Act No. 35 of 1955.

The Corporation was established as a body corporate to assist in the establishment, expansion and modernization of private industrial and agricultural enterprise in Ceylon, and also to encourage and promote the participation of private capital, both internally and externally, in such enterprises.

In carrying out its purposes, the Corporation had a wide range of powers. Finance would be provided on long-term and medium-term loans, either with or without security. Shares or securities could be purchased. The Corporation

could underwrite new issues of shares and securities, including bonds and debentures. It could furnish managerial, technical and administrative advice.

For the first time in the history of governmental credit, specific power was given to the Corporation to lend money without security. In including this provision, the Government intended to distinguish between normal trading risks - which required unassailable and adequate security for loans - and industrial risks - where speculative investments on loans would have to be guided by business judgement on the prospects of success in the industry concerned without necessarily involving security.

Research facilities

A further aid to private capital formation was the establishment of an Institute of Scientific and Industrial Research, another recommendation of the World Bank Mission. This body was established by Parliamentary Act No. 15 of 1955. Its funds consisted of an annual grant from the Government of Rs. 1 million, for five years. The World Bank and the United Nations Technical Assistance Administration furnished organizational help and experienced direction. Equipment, overseas training and further technical assistance valued at several million rupees were contributed by the United Kingdom, Canada, the United States, and the Asia Foundation.

The Institute is not a Government agency. It was established as an autonomous non-profit corporate institution to be operated on business lines with its own governing board, administration and full-time staff of practical research engineers, scientists, craftsmen, and assistants. It deals directly and confidentially with its clients, charging for its work on a fair and uniform basis to meet operating costs. Creation of the Institute filled a conspicuous void in the various incentives available to the private sector. For the first time, private capital could obtain a scientific assessment of planned projects, before an actual investment was made. Any person making a payment to the Institute for services rendered could claim the amount of such payment as a deduction from his income, thereby greatly easing the burden of pre-operational expenditure.

*
* *

Some of these reforms proved to be little effective. Thus, the tax holidays failed to attract even one application in a three-year period for lack of publicity. Even though the framework of incentives had been broadened, no thought had yet been given to using the industrial estate

for mobilizing private capital formation; nonetheless, more and more masons for the construction of the industrial edifice were found from private capital, while the Government continued to supply the bricks and mortar for this work through the various measures already outlined.

Chapter 5

THE INDUSTRIAL ESTATE

In July 1957, the role of the State in industrial development was clarified. Three sectors were distinguished (see annex B):

- (1) A basic or essential sector of seven industries, for the development of which the State alone would be responsible.
- (2) A consumer sector of twenty-three industries, for the development of which either the Government or private capital, or Government and private capital jointly, would be responsible.
- (3) another consumer sector of eighty-two industries, reserved exclusively for private development.

In announcing this policy, the Minister of Industries said in Parliament: "The policy of the Government is not only to engage in large-scale industry but also in small-scale industry; not to sacrifice one for the other... We are not only going to encourage these but we are also going to offer them inducements by way of tax concessions, tariff protection and so on..."

The seven basic industries were not intended to give a de jure monopoly to Government. On this point, the minister said: "The State will continue to own and manage the leather factory, the plywood factory, the ceramic factory and the other new Government enterprises. But if private capital wants to start another ceramic factory either privately owned or jointly owned by both private enterprises and the State - the State would welcome it".

Proceeding further, the Minister added: "The development programme of the Government has also to be concentrated on these small-scale industries in which there will be a certain amount of private capital in this country, because it is the policy of the Government to attract whatever private capital that is available..."

Though the inducements offered in the statement did not include an industrial estate, an opportunity was provided for re-opening the proposal to establish an industrial estate as an added incentive.

Revival of the proposal for an industrial estate

By 1957, industrialization had spread sufficiently to justify optimism in reviving the proposal for an industrial estate. The focal point of space demand was still Colombo. Land elsewhere was available, but remoteness to Colombo raised difficulties such as management absenteeism, inadequacy or shortage of transport, skilled labour, power, water and repair facilities. Excluding service industries already established in Colombo, which were identified with the civic life of the city, the more important industries already settled in Colombo at the end of 1957 were: machinery for manufacturing or processing cigarettes and tobacco, tea, rubber and coconut, boat building, envelopes and exercise books, plastic films, paints and varnishes, agricultural machinery, footwear and tannery, terrazzo tiles, soaps and oils, spinning, weaving and finishing, tin cans, biscuits, confectionery, miscellaneous concrete works, cosmetics and perfumery. The demand for new space for factory industry was pressing and the writer, in his capacity of Director of Industries, re-opened the subject. In his report he said:

"Land and buildings in close proximity to our main market (which still remains Colombo) are becoming increasingly scarce and expensive. Moreover, ordinary amenities like water, transport, banking and marketing become expensive when removed from the main consuming centre.

"The small-scale capitalist is somewhat lost in the general plan for industrial development as he has neither the capital nor the means wherewith to buy himself a suitable site readily accessible to the market.

"It is for the State to take the initiative by providing the minimum essentials needed for the small-scale capitalist to industrialize. This type of problem has been solved in many industrial countries. The concept of an industrial estate is fairly well advanced".

Two points were emphasized in the report - the increasing scarcity of land in or near Colombo and the inadequacy of capital for the small-scale entrepreneur. It is these two elements which, sometimes separately, have influenced the establishment of industrial estates in other countries. In Ceylon, both factors have jointly contributed to speeding up the estate project.

At first, the official reaction was not in favour of setting up an industrial estate. The Government's war-time experience of corporate ownership did not match the expectations. It was thought that the Government should

confine itself to the role of a real estate proprietor and not entangle itself in management and provision of operational staff for working the amenities on an industrial estate. The Government would only provide the land for the estate, and offer lots for rent based on acquisition costs; it would select promoters and offer them such incentives as tax exemption, tariff protection, and technical assistance and machinery through foreign aid funds.

Shortly thereafter, a twenty-one-man Committee (including the writer) of the National Planning Council on Incentives to Private Investment gave full support to the establishment of industrial estates. The Committee said:^{10/}

"Another serious handicap experienced by private enterprise at the moment is that of a lack of physical and other facilities to put up plant.

"Considerable difficulties are being encountered in acquiring land and getting such other facilities as water, electricity, etc. Many small-scale and medium-scale enterprises have to spend a good proportion of their capital in putting up buildings and providing these facilities. Consequently, they are badly handicapped by lack of capital for starting production.

"Another result of this is the tendency for such firms to establish themselves in Colombo, and thus add to the congestion in the city of Colombo.

"We, therefore, suggest the creation of industrial estates such as have been started with marked success in several countries. In these projects the Government acquires land as a block and sets it apart as an area for industrial development. It then provides standard factory buildings for small and medium industries and serves the area and the buildings with basic facilities such as water, electricity, and postal and telecommunication services. On the over-all view, such estates would not involve a financial burden to the Government".

It is significant that this Committee had independently emphasized the very two problems which were then facing the Government in its plan for economic development - land scarcity and capital inadequacy.^{11/}

^{10/} Report still unpublished.

^{11/} A few years earlier a Committee on Decentralization of Industries and Trade had emphasized the rapid growth of industries in areas near the port of Colombo, which was the principal export outlet for the country's agricultural produce. The density of population averaged 48 persons per acre, though some areas counted 266 persons per acre.

After analysing the trends and needs for decentralization, the Committee, in its final report, recommended the establishment of trading estates (the equivalent of industrial estates) as a special inducement for attracting capital formation outside Colombo (see Annex C).

The Government eventually agreed to set up an industrial estate. The plan aimed at five such estates at various points in the island for dispersing industry and satisfying an insistent demand for an outlet for country development. It called for the acquisition of 70 acres for the first estate.

The Ja-Ela industrial estate

In view of the fact that Colombo was the main port in which repair and service facilities were concentrated, and the centre of trade and commerce for the distribution of market produce, it was obvious that the small-scale and medium-sized industries which did not require location near the sources of raw material supply would have to be situated as close as possible to that city.

For reasons already pointed out, location of the estate in Colombo itself was out of the question. Four alternative areas were available, lying in the vicinity of the four main roads leading to Colombo: to the north at Ja-Ela; to the north-east, in the mid-country; to the south-east at Ratnapura; to the south at Ratmalana.

Choice of site

The choice of the site for the estate was the first problem before the Government. Over the years, the general scarcity of land in Colombo resulted in some overflow of industry towards Ratmalana - 10 miles south of Colombo. In Ratmalana, power and water were available; the main civilian airport was a fraction of a mile away; industry was settled in this area and an industrial tradition was established. Government railway workshop, and the Irrigation Department's engineering stores were located there. Private capital had set up a shirt factory, an asbestos cement factory, a rubber footwear factory, a tractor assembly factory and two drugs factories. There was thus a basis for the establishment of an industrial estate. A rubber estate, called St. Catherine's, located on the main road, was known to be available for sale, and could be acquired for the industrial estate. However, the two drugs factories, which had shortly before bought up small blocks of land in this estate for their own purposes, sent up land values and placed a premium on the residual areas.

An alternative to Ratmalana was a site in Ja-Ela - 10 miles north of Colombo. In this area, land was cheaper, but the amenities were relatively poor. The cheaper cost of land at a site as accessible to Colombo as that of Ratmalana had already attracted a larger group of small and medium-scale

industries such as soap, matches, fibre and oil mills, timber works, and so on. These activities were dispersed over a wider area than in Ratmalana, and there was no high premium on bare land.

The comparative features of the two sites are presented in the following table:

Table 11. Comparative Advantages of the Ratmalana and Ja-Ela Sites

Item	Ratmalana	Ja-Ela
Resident population	21,300	4,500
Surrounding population within 6 miles	169,000	45,000
Availability of water	Pipe-borne water and wells	Shallow wells and rivers
Accessibility to roads	Very good	Good
Accessibility to railways	Direct connection	Direct connection
State of roads	60-foot road - very good	27-foot road - reasonably good
Availability of gas	Could be made available	None
Availability of electricity in city	By Maquette's	Limited: 2,000 kilowatts
Average value of one acre	Rs. 60,000	Rs. 7,000
Proximity to nearest bank	6 miles	10 miles
Availability of telephones	Good	Poor - none planned for immediate future

Table 12. Comparative Advantages of Four Alternative Sites

Item	Ja-Ela	Mid-country	Ratnapura	Ratmalana
Distance from Colombo	10 miles	10 miles on Kandy Road	58 miles	10 miles
Cost of land	Rs. 7,000 per acre	Rs. 30,000 per acre	Rs. 40,000 per acre	Rs. 60,000 per acre
Water	Dambagana River and wells	Only wells	Kalapi river and wells	Only wells
Floods	None	In small areas	Subject to floods	None
Railway costs (haulage per ton mile)				
(a) 1st class (Cement in wagon loads of 12 tons)	-/02 1/2 cts per ton mile			
(b) 2nd class (empty bottles, boards for packing, locally produced agricultural goods)	-/17 1/2 cts per ton mile			
(c) 3rd class (soap)	-/21 3/4 cts per ton mile			
(d) 4th class (plywood, paper bags, refined salt)	-/23 cts per ton mile			
(e) 5th class (asbestos cement products, packed furniture)	-/27 3/5 cts per ton mile	Same rates	Same rates	Same rates
(f) 6th class (unpacked furniture and unserviceable old machinery)	-/33 cts per ton mile			
(g) 7th class (machinery other than electrical)	-/39 3/5 cts per ton mile			

Table 12 (continued)

Item	Ja-Fla	Mid-country	Patnaura	Ratmalana
Railway costs (haulage per ton mile) (cont'd)				
(h) 8th class (explosives)	-/60 cts per ton mile			
Power	adequate supply	adequate supply	Adequate supply	adequate supply
Population that could be gainfully employed	15,000 persons	49,400 persons	22,500 persons	56,000 persons
Main industries already established	Soap, matches, desiccated coconut, fibre and oil mills, timber, cardboard-boxes, candles, aerated water, ink, plastic goods, arreck, tinker works, textile weaving, etc.	Bricks and tiles, aerated water, biscuits, tinker products, textile weaving, coconut oil mills, timber, confectionery, pencils, canned products, tannery, footwear, rubber mills, ready-made garments.	Timber, coconut oil mills, candles, hosiery, fire-works, aerated water, bricks and tiles, rubber processing.	Footwear, hosiery, ink, pharmaceuticals, buttons, milk-foods, cigarettes, ready-made garments, asbestos cement products, biscuits, galvanized goods, basic technical-training institute, railway workshop, Govt. film unit, technical-college, carpentry work-shops, cottage industries training institute, airport.

The question was - would the higher cost of land in Ratmalana, with its established facilities, offset the cost of setting up the estate in Ja-Ela on lower-priced land with less facilities?

The writer has been unable to find in the official records any reason for which the Ja-Ela site was finally accepted, apart from the fact that land values were cheaper. The data in table 12 which compares the advantages of the four alternative sites, brings out some fundamental differences which indirectly support the decision to locate the estate in Ja-Ela.

From this table it will be seen that:

- (i) power and railway costs are identical in all four cases;
- (ii) Ja-Ela and Ratmalana score in their immunity from floods; Ratmalana, however, has a more limited supply of water;
- (iii) Ja-Ela scores heavily on capital costs of land acquisition, a fact which has a bearing not merely on the immediate acquisition of land for the estate, but also on the general development of the township and community facilities in and around the area;
- (iv) the low density of industries in the Ratnapura district is due to the annual risk of floods, a factor which rules out the establishment of an estate in that area.

On balance, the selection of ~~Shesha-Ela~~ site for an industrial estate finds independent confirmation from this analysis.

The physical characteristics of the Ja-Ela site

- Road:** Highway access to the site is relatively good by existing standards. It takes 45 minutes to reach the site by car, discounting delays at railway crossings and road flood hazards. It is also accessible from the north and east of Ceylon on main highways without passing through congested Colombo.
- Railway:** Ja-Ela is a railway stop on the broad-gauge railway from Colombo to Chilaw. The site is 2 miles from the railway and could be directly linked up by a spur line. Merchandise could be shipped to all rail points in Ceylon from Ja-Ela.
- Airport:** Katunayake airport is about 7 miles north of the site, giving jet flight access to world markets.
- Soil:** The soil is sandy, with an average elevation of 20 feet above mean sea level. The area is relatively level, which reduces site preparation to a minimum. No rocky extrusions or intrusions are found.
- Water:** The estimated requirements of thirty light industries (small and medium-scale) are placed at 50,000 gallons per day, an amount readily obtainable from shallow wells. Larger quantities could be obtained from the Dandagama river.

The Industrial Estates Corporation

In many countries legislative measures have been passed to enable planning on a national scale, rather than on an individual or experimental scale. Thus, in the United Kingdom, under the New Towns Act of 1946, development corporations could be appointed to plan and build new industrial towns and to provide re-housing for the population which it was desired to shift from large urban centres. Power was also given to steer industry towards the Development Areas, and three Industrial Estates Management Corporations have been set up to assist in this task.

In Ceylon where the problem is much smaller in scale than in the United Kingdom, no special legislation has been passed to create an agency of this type. Nor has legislation been passed to create a national authority to set up industrial estates on a national scale. The Government thought that the setting up of a corporation to set up and operate industrial estates was a business activity which could be carried out without special powers. The State Industrial Corporations Act No.49 of 1957 was already on the statute book. Under this Act a corporation could be set up, but it must be an "industrial undertaking". The Act does not define what ingredients make up an "industrial undertaking".

Corporate status is secured by the publication of an Incorporation Order made by the Minister under section 2, which also specifies the initial capital, the first directors, the objects of the corporation and the location of its principal place of business. Under this Act the Industrial Estates Corporation was established in January 1960.

Objects and powers of the Corporation

Five objects were enumerated in the Incorporation Order of the "Industrial Estates Corporation"; it will be seen that none of them contemplates the establishment or management of such an estate. The objects are:

- "1. the carrying on of the business of providing buildings, roadways, communications, electric power, steam, gas, water, sewerage, warehouses, repair workshops and other similar facilities of a capital nature required for the establishment and the carrying on of an industry or industries by any person or body of persons;
- "2. the construction, operation and management of all processes connected with, required for, or subsidiary to, the aforesaid purposes;

- "3. the purchasing and the sale of raw materials, engineering equipment, spare parts, fuel and other things required for industrial purposes;
- "4. the sale of industrial products; and
- "5. the sale of any surplus electrical energy not required for the purpose of the Corporation".

The State Industrial Corporations Act is evidently inappropriate for the establishment of an Industrial Estate Corporation. The assortment of objects and powers of this body as given in its Incorporation Order shows a loosely-knit enumeration of the functions of a real estate agency. There is little in the objects of this Corporation to suggest that it complies with an "industrial undertaking" to justify its establishment under the Act. None of the objects are directed to the primary purpose reflected in the name of the Corporation, namely, the establishment of an industrial estate.

As a corporate body, the Corporation has an indivisible capital fixed initially at Rs. 2 1/2 million. The whole of this capital has been voted by the Parliament to the Corporation in two stages. If more funds are needed, a resolution of the House of Representatives is required to increase the "initial" capital. All capital payments are non-interest bearing grants. Loan capital could be secured by borrowings; money could be borrowed from the Treasury at 4% to 4 1/2% interest per annum on varying periods of repayment.

By an agreement entered into by the Government of Ceylon with the United States Operations Mission (USOM), counterpart funds of equal amount to the paid-up capital of the Corporation will be provided by the USOM for the purposes of the Corporation.

The USOM will also provide such number of technical experts as is required to assist the Corporation in its work. The basic salaries of such staff will be met by the USOM, but the local living expenses of each member of this staff are met by the Corporation.

The Government has acquired 70 acres of land valued at, approximately, Rs. 500,000 for the first industrial estate, but no decision has yet been made whether this land is to be vested in the Corporation or to be leased to it on the usual terms applicable to Crown leases. If the land is vested in the Corporation, the Government will presumably require the cost to be capitalized by an equivalent increase in the initial capital of the Corporation.

Chapter 6

PLANS AND PROGRAMMES OF THE INDUSTRIAL ESTATE CORPORATION

In this chapter the writer has attempted to present some of the views and policies of the Corporation. He is greatly indebted to its Chairman for permission to use material submitted to the Board of Directors by the USOM industrial estates advisor, Mr. Sterling St. John, Jr. The following notes by Mr. Sterling St. John relate to the development of Ekala; this is the larger tract of land surrounding the Ja-Ela estate.

Development of the Ekala area

Three forces will inevitably result in the urbanization of the Ekala area:

- (1) The Ja-Ela industrial estate will bring in workers and, with them, demands for housing and convenient access to the area.
- (2) The development of the Katunayake airport demands, and will result in, the construction of a new highway. The building of this modern stretch of roadway will impel the growth of areas through which it passes, including the Ekala area.
- (3) Housing pressures in congested Colombo are forcing the development of suburban areas, and will soon include the Ekala area.

The settlement and development of the Ekala area should be planned systematically. If development is permitted without planning, the result will be over-crowded slum conditions, inadequate community facilities, uneconomic use of land, land speculation and no protection of land values.

On the other hand, if wise and careful thought is devoted now, modern town planning and community development will be obtained and costs will not be prohibitive. It is suggested that development of the Ekala community can become the pilot model for similar schemes throughout Ceylon. By master planning, zoning and public administration, Ceylon not only can meet its own needs for housing and local employment, but it can set the example for all of south Asia in this field.

The above points will be examined in more detail:

- (1) Full development of the 70 acres in this site might well require the employment of 3,600 workers by the tenant industries. The present population of the area within a six-mile radius from the estate is 45,000. On that basis, it is estimated that about 2,000 local persons might be employed by the estate industries. When the remaining workers are brought into the area, housing, schools, places of worship, medical services, recreational and shopping facilities, and other amenities and services will be required for about 1,600 additional families. Currently, there are no housing, utilities or other community amenities available to care for such an influx.
- (2) Substantial economies may be expected from the simultaneous development of the Katunayake airport and the Ekala industrial estate. In particular, these projects will permit construction of a modern, limited-access highway from Colombo to Katunayake, which will contribute to economic development along all of its length. This highway may herald the beginning of a modern highway system for the west coast of Ceylon. It may be estimated that 50,000 persons will be added to the present population in the area situated between Colombo and the airport and industrial estate.
- (3) Twelve thousand shanties and three times that number of sub-standard housing exist in Colombo. An ever-expanding population is being forced chaotically into Colombo's suburbs. The daily commuter crush has long been a real problem. It will become worse as the suburbs are built up.

The development of new "bedroom" communities to ring Colombo is being discussed. In designing these, account should be taken of the prospective employment opportunities. Ekala should develop as one of these communities. It will provide a pressure relief valve for Colombo as well as employment opportunities in its industrial estate and the commercial establishments that will be established around it.

Proposed development

The Ekala area includes some 2,500 acres, divided into neighbourhoods, each with its local centre for shopping, schools and places of worship and with its network of local streets tying in with community access roads. (see plan in Annex G).

The industrial estate is located centrally in a neighbourhood of some 500 acres. This neighbourhood is subject to a number of special considerations not common to the other divisions of Ekala.

Within this neighbourhood the protection of the estate and the providing of its requirements are essential. There must be adjacent land kept available for the physical expansion of the estate or for the establishment of non-estate industries at non-speculative costs. There must be land for low-cost workers' housing, which again, must be available at non-speculative prices. There must be protection of the estate from trespassers and of residences from manufacturing noise, dust, smell and fumes. This protection, in the form of "greenbelts" and fencing can be very costly if the land required is purchased at high cost.

Industrial traffic will be relatively heavy to and from the estate. Wide access roads of special design will demand an appreciable amount of land. Also, it is likely that the limited-access airport highway will be slicing along the western boundary of the neighbourhood. Land for these roads and for non-through interior roads in the residential areas will subtract appreciably from the total area of the neighbourhood available for housing and community amenities. Special consideration must be given to the heavier consumption of water and power in this neighbourhood and to the necessity for adequate sewage disposal, surface drainage, telephone service and similar items incident to an industrial and concentrated worker community.

To coincide with the establishment of industries in the estate and the inflow of workers, there must be a parallel programme of workers' housing in close proximity.

It is foreseen that the elongated paddy depression which dominates the Ekala area will become, in time, a park and recreation area for the entire district.

The necessary land must be obtained at low cost by the Government in anticipation of all these uses, including the probable expansion of the estate in the near future.

Development plan

In order to avoid undesirable conditions, modern town planning and development techniques and adequate laws to initiate them are necessary for developing the Ekala area.

The area of approximately 2,500 acres surrounding Ekala has been demarcated by the Industrial Estates Corporation and the Department of Town and Country Planning, working together, on the basis of aerial survey photographs and taking into account political, property and natural boundaries.

The recommended development plan which may be projected in detail as necessary, would provide for residential areas, shopping and service areas, school and church sites, recreation and park areas, public buildings, roads and utilities, most of which would support the Ekala industrial estate - the major factor in the area.

Within this larger area for community development, it is planned that some 400 acres immediately surrounding the industrial estate would be acquired by the Government for estate housing and for expansion reserves. The purpose is to forestall land speculation and to ensure that land is available for housing and secondary industrial development which are vital to the success of the estate.

The necessary Government co-operation

To ensure orderly development of the 2,500 acre Ekala community, the first formal step should be for the Government to declare the site as an urban development area under Section 6, Part II of the Town and Country Planning Ordinance No. 13 of 1946, as amended by Section 3 of the Town and Country Planning (Amendment) Act No. 10 of 1955. Should it be deemed desirable, because of administrative, economic or other reasons, the town of Ja-Ela might also be declared to be within the area.

As a second step, the Minister of Local Government and Housing should direct, by authority of Section 21 of the Town and Country Planning Ordinance, that a planning scheme (master plan and zoning regulations) be prepared for the area.

The third formal step should be the acquisition by the Government of the 400-odd acres in the immediate vicinity of the industrial estate. This land should be taken over in the same manner as the land for the industrial estate. It should be incorporated in the over-all planning scheme, and would constitute the core of initial community development.

The fourth and final step would be the setting up of an Ekala Development Committee. To this Committee in addition to a representative

of the Industrial Estates Corporation, would be appointed representatives of the several Departments that would be concerned with the various aspects of community development. Through this Committee budgeting, scheduling and undertakings of the departmentally-assigned work would be programmed and controlled.

It should be stated that the Industrial Estates Corporation will give its time, leadership and advice to those who will be concerned with the community development. It will not, as outside of its frame of reference, take on responsibility for construction or services beyond its industrial estate boundaries.

Short-term Plans of the Corporation

The funds available to the Corporation are Rs. 5 million, half of which is contributed by Government and the balance on loan funds through the USOM. This sum is obviously inadequate for developing the full 70 acres of the estate at Ja-Ela, not to mention the development of the Ekala district on the plan outlined by Mr. Sterling St. John.

At the moment the Ja-Ela estate is devoid of the elementary facilities that would be the normal complement of a development township. Ja-Ela is still a village and the decision to locate the estate there involves large capital expenditures for the provision of civic amenities, particularly roadways, water supplies and sewage disposal, banking, marketing, post office facilities, organized transport to and from the estate and many of the other incidentals attaching to a township. While the costs of some of the amenities would devolve on the central or local governments (railway, post office), private parties (banks, marketing depot and shops), or local authorities, (community centre, recreation grounds, canteen), the residual obligation for concentrated development of the estate will remain with the Corporation.

Layout of the estate

The layout of the estate is shown in Annex H. The estate is to be divided in four areas, to be developed in four successive stages:

- I. a nursery block of 25.3 acres;
- II. a custom-built block for larger industries of 12.4 acres;
- III. a segregated block of 18.3 acres for noisy, dust producing and similar industries like foundries, forges and industries which generally come under the category of obnoxious trades, and
- IV. a public service area of 14.2 acres where such institutions as the post office, banks, marketing depot and public canteen will be installed.

Work on stage I began in 1960 and was expected to be completed in 1961. Work on stage III was expected to commence in 1961, but its progress will have to be subordinated to demands expressed in private applications.

Conceivably, the Corporation may entertain private applications to set up nuisance industries for settlement on the estate and thereby relieve itself of the need to allocate funds for this purpose. Similarly, work on stage II will depend on the extent of private demand, but no decision has yet been taken on the scale or elevation of the buildings that would be licensed by the Corporation for construction on the estate. These buildings will have to conform to the Corporation's rules.

In stage I - nursery block - it was proposed to construct a total of twenty units, details of which are set out in the following table:^{12/}

^{12/} For certain reasons, the introduction of rigidity in the building layout - in particular, the impossibility of expanding buildings of fixed sizes - does not seem desirable. In some sections of the community, industry is a career, and prospective success is pre-determined by consultation through religious rites. It is only after a religious blessing is secured that a decision on the site is made.

The writer fears that resentment may be expressed by some tenants whose settlement on the estate was preceded by such religious rites if they were refused space for expansion on the same site, and were asked, instead, to move out to another site. Superstition over a break in success by a change of site can be a resistant force. A suitable compromise would be for the estate to make provision in its scale of units for moderate expansion of the same factory unit leased out.

Table 13. Ja-Ela Industrial Estate: Units in the Nursery Block

Number of Units	Site Area (foot)	Productive Area (square foot)	Service Area (square foot)	Yard Area (square foot)	Total Area (square foot)
8	81 1/2 x 54	1,250 (ground floor)	1,250 (second floor)	3,151	4,401
6	81 1/2 x 108	2,500 (ground floor)	2,500 (ground floor)	3,804	8,804
4	81 1/2 x 162	5,000 (ground floor)	2,500 (ground floor)	5,703	13,203
2	81 1/2 x 216	7,500 (ground floor)	2,500 (ground floor)	7,608	17,608

The smallest unit of 81 1/2 x 54 feet will be a two-storied block; all the others will be single storied blocks.

For the present the plan is to construct factory buildings in brick and mortar with concrete floors and asbestos cement roofing. On a rough calculation an expenditure of Rs. 37,500 would have to be allocated for the construction of one of the smallest units complete with water supply, sanitation and power, at the rate of Rs. 15 per square feet.

Water

Fifty thousand gallons of pure, soft water will be pumped each day from wells in the public service area of the estate. This water will be stored in a huge water tower 70 feet high centered in the estate's plaza. This water tower will be the distinguishing feature and symbol of the industrial estate at Ja-Ela. Radiating from the tower to all sections will be four-inch mains to serve each factory and each fire hydrant.

Effluent disposal

From each factory, drains will carry neutral effluents to the sewage treatment plant located in the public service area. Sludge will be removed, treated and dried for use as fertilizer. The remaining purified liquid will be discharged through pipes into the Ja-Ela river. In this modern plant there will be no odours, no flies, and a useful fertilizer will be recovered.

Power

The Colombo-Norambu power transmission line, which runs adjacent to the estate, will supply 2,000 kilovolt-amperes of electricity, which is more than adequate to meet the immediate needs of the estate and its tenants. This power block can be increased as required. Supply from 33,000 volts at a sub-station, electrical power will flow to each factory at 1,500 volts where it will pass through transformers and meters at voltages suitable for use.

Roads

A network of access roads, interior roads and alleys will serve each factory site and link the estate with highways leading to all parts of Ceylon. Main roads will be 36 feet from curb to curb and will have, in addition, cycle paths, sidewalks and utility strips.

Surface drainage

Surface water will be carried away by a storm sewer system adequate to prevent any danger of flooding, no matter how hard or how long it may rain.

Landscaping

The entire estate will be landscaped with trees, flowering shrubs and grass. These, together with attractive factory buildings, will create a garden spot for industry, ensuring that the estate will not degenerate into a slum district. Additionally, "greenbelts" will surround the estate, insulating it from noise and trespass.

Responsibility for construction

As far as can be seen, the Corporation plans to utilize its initial budget for the construction of twenty nursery units and the general development of the seventy-acre site. Thoughts are being directed to the question of inviting private capital to set up certain service amenities. Criticism is

hardly likely to arise whether by this act the Corporation would be surrendering a statutory function. As long as the work done conforms to the Corporation's own plan, the source of capital is immaterial. What is important is that the Corporation should supply these amenities or cause them to be supplied.

Rent policy

The success of the estate is inextricably bound up with the attractiveness of the rents that the Corporation will charge. Until the actual costs of the development of the estate, including the construction of the nursery block are known, the rental policy must remain in abeyance. In Colombo, factory rents vary from 50 cts to Rs. 1 per square foot, but invariably these rents take into account the availability of civic amenities which are already established in Colombo, either through local or central authorities such as transport, power, water and sewage disposal, banks, commercial institutions and so on.

In a short while the Corporation will be preparing its budget.

Components of the budget

Accurate budgeting, broken down into narrow compartments, is the only safeguard to proper costing. In time, these will provide material for determining a satisfactory rent policy. The major components of a capital nature would be:

1. Land acquisition
2. Site development:
 - (a) Landscaping
 - (b) Turfing
 - (c) Tree planting
 - (d) Surface drainage
3. Roadways
 - Main
 - Internal
4. Water
 - Wells
 - Pumps
 - Water tower, piping and distribution

5. Sewage disposal and treatment:
 - Domestic
 - Industrial
6. Electric power:
 - Street lighting
 - Internal
 - Sub-station and distribution
7. Fire fighting
8. Recreation and welfare:
 - Green belt and park
 - Playground
9. Boundary walls and fences, gates and sentry posts
10. Buildings:
 - Administrative
 - Factory units
 - Service depots
11. Telephones
12. Office equipment
13. Transport:
 - Carrier cycles
 - Vans
14. Special equipment
15. Contingencies

The following facilities will be established outside the estate, but adjacent to it, at no cost to the Corporation:

- Warehouses
- Market depots
- Repair workshops
- Garages
- Canteen
- Hostel
- Hospital
- Shops

School
Bank
Post office
Open air cinema

The decision on rent policy would have to take into consideration expenditures of indirect and direct nature. The writer ventures to think that the following would be the main features of expenditure in the determination of the ultimate rents to be charged:

Indirect costs

- (a) The proportionate cost of land, amenities like roadways, water supply and distribution, sewage disposal system, electric power, go-downs, parks, canteens,^{13/} hospital,^{13/} and administrative buildings;
- (b) the proportionate operating costs of wasting assets;
- (c) the proportionate depreciation on total capital works;
- (d) the proportionate hypothetical interest on total capital investment excluding factory units.

Direct costs

- (a) The direct cost of the factory unit leased out;
- (b) the hypothetical interest on the cost of the factory unit leased out;
- (c) the depreciation on the buildings and fixtures leased out.

Though factory buildings may cost Rs. 15 per square foot, in the writer's opinion the total cost of the development of the entire area on the plan outlined in Annex H would bring the cost of built-up factory space nearer to Rs. 30 per square foot.

An area of 2,500 square feet of factory space would thus involve for the Corporation an expenditure of Rs. 75,000.

^{13/} If included in the Corporation's budget. See Annex, "Other amenities".

On a twenty-year term, the proportion of capital cost per month would work to Rs. 43. Reduced to a basic rent per square foot, this would mean that the lowest level of rent to be charged for one square foot would be approximately 12 cts. per month. Therefore, a rental policy of 15 cts. would provide the Corporation with a sufficient margin for paying the operating costs of the entire establishment. While the need for subsidizing rents is being kept in mind, it is unlikely that a request for a subsidy would be made to the Government until the budget has been prepared on a realistic basis and the prospects of loss accurately assessed.

It may be relevant to note that in these empirical calculations no allowance has been made for the Corporation allowing any part of its land to be sold to a private party for private development. Neither the constitution of the Corporation, nor the State Industrial Corporation Act give the Corporation authority to sell its land, though there is power to mortgage it subject to Government's approval.

Technical assistance

Reference has already been made to the role of the Ceylon Institute of Scientific and Industrial Research in promoting industrial development. The Corporation has already secured an agreement in principle from this Institute to set up a branch on the estate to provide direct service to the clients. As the Institute has on its staff a wide range of experts in all fields, this staff could readily assist in servicing the industries to be set up on the estate. Laboratory testing facilities of a non-routine nature will be carried out by the Institute at its headquarters in Colombo.

Choice of industries

It is the view of officials of the Corporation that if the Government invites foreign capital to participate in the development of the country, there would be more advantages in allowing space on the estate to such foreign capital than to allow that capital to purchase land, and thereby acquire a permanent interest in that land.

As regards the question whether the estate should be regarded as an outlet only for new industry as against existing enterprises, it may be noted that in some of the industries already established a fairly high degree of saturation has been reached. (See Annex I). Encouraging new competition would defeat the objects of the estate. In some industries, however, there are conspicuous gaps in consumption which could be filled by settlement on the estate. In both these matters the Corporation plans to be guided by the Government's decisions regarding industry selection.

Other amenities

- (a) Fire protection: It is proposed to maintain watchmen and fire patrols on the estate and to make available fire-fighting equipment and hydrants with an adequate water supply.
- (b) Hospitals: In the over-all plan of the Corporation, provision has been made for a hospital outside the estate, but it is uncertain at this stage who will bear the capital and operating costs of this institution.
- (c) Canteens: Provision has been made for the inclusion of a restaurant for the supervisory staff, but nothing has been decided as to the institutional arrangements for the operation of this canteen; in particular, whether it would be run as a joint co-operative venture by tenants of the estate, or let out on lease for the benefit of tenants of the Corporation. Each tenant will, however, have limited canteen facilities in the factory he leases out.
- (d) Shops, schools, and common warehouses: All these institutions have been considered by the Corporation and are planned to be set up outside the immediate area of the estate.
- (e) Post office and marketing depot: Provision has been made for a post office to be established by the Government.
- In the present stage of the Corporation's plans, no thought has been given to establishing a marketing depot, although this is admittedly a statutory function of the Corporation.
- (f) Labour, warehousing, transport, etc.: The advantages to be found in an industrial community are the development of a labour pool of skilled workers and the community sponsorship of any services such as warehousing, cartage, equipment, etc.
- (g) Other technical assistance services: The corporation will provide an organisation for assisting tenants in financial, managerial and productive development matters, either through its own instrument or through other agencies which are to be organized for the purpose.
- (h) Tax incentives: In a conversation with the Chairman of the Corporation the writer inquired what his views were on the possibilities of moving for an

amendment of the law to give tax-free benefits to the Estate Corporation.^{14/} The case of the Gal Oya Development Board, a parallel institution performing a social service was cited. Although this matter had not been specifically considered by the Board, the Corporation's Chairman was inclined to support the writer's view that in its work, the Corporation should be made exempt from customs duty, tax on income, and stamp duties, so as to cheapen the costs of the service to the tenants.

Would the estate be used to accommodate State corporations?

In the context of the current policy, State corporations are virtually giants, with space demands far in excess of the land available on the estate. Although these corporations may initially make a bid for a fraction of the land that could be spared on the estate, one cannot rule out the possibility that, in the course of time, development works would call for substantial encroachment on the surrounding areas which may impinge on earlier plans of the Corporation for the settlement of other tenants.

Although this question has not arisen, the writer ventures to think that the estate will stand as a social contribution by the Government for private industrial development, and that it will not be used for the accommodation of any State corporation. As far as can be seen, the future policy of the Government in the matter of State corporations, apart from the fourteen already established, is to set up:

- (a) a fertilizer factory, which conceivably may be sited alongside the proposed petroleum refinery;
- (b) an iron and steel factory, on which a decision has already been made for location elsewhere;
- (c) a motor-car tyre and tube factory, on which a decision has been similarly taken for location elsewhere;

^{14/} An exemption from personal income tax had been granted, in the course of a three-year period, to investors in industries declared to be for essential industrial development. If the investor was an individual, the level of investment was Rs. 1,000 at the minimum and Rs. 50,000 at the maximum; for a corporation the maximum level was Rs. 100,000. Investments within these limits could be treated as deductible expenses, as in the case of donations for approved charities. This incentive expired with the fiscal year ending 31 March 1960.

- (d) three more sugar factories, two of which would be tied up with multiple-purpose development schemes working through hydro-power, and one of which would be linked with the existing Kantalai Sugar Corporation on the latter's site;
- (e) the development of by-products of sugar, including paper and newsprint, hardboard, power alcohol, acetic acid and rayon acetate which, on economic grounds, would need to be identified with the existing sugar factories.

On the other hand, the National Small Industries Corporation has projects scattered over many sites covering a miscellaneous assortment of works like tile factories, drugs factory, and carpentry workshops.

It is remotely possible that for one of the future small-scale enterprises of this Corporation, space may be requested on the industrial estate.

Concluding remarks

It is unfortunate that this article cannot conclude with more precise information of the eventual shape of the estate. As already pointed out, the Corporation is in its formative stage and on the eve of resolving such fundamental issues as budget allocations, scale and output of amenities to be established on the estate, type of tenants to be selected, policy to be followed on rental of factory buildings, some of which have been touched on in this chapter.

It is indisputable that the estate will stand as a monumental contribution by the Government to the industrial development of the country. That interest in the rental of space on the estate is alive will be evident from the following applications received by the writer prior to the establishment of the Corporation:

1. Brass foundry and water supply fittings
2. Compound fertilizers
3. Rubber goods
4. Vegetable oil
5. Coir products
6. Fibre mills
7. Rice mills
8. Beam and weighing scales
9. Leather footwear
10. Writing ink
11. Cashew nuts and cashew shell oil
12. Motor car accumulators

13. Polythene films for packing
14. Polythene pipes, toys, bottles and other plastic goods
15. Marble chips
16. Terrazzo tiling
17. Sewing thread
18. Distilled water
19. Aluminium foil
20. Enamel-ware
21. Paper clips and pins
22. Tea chests
23. Kerosene stoves
24. Fibre suitcases
25. Prints and varnishes

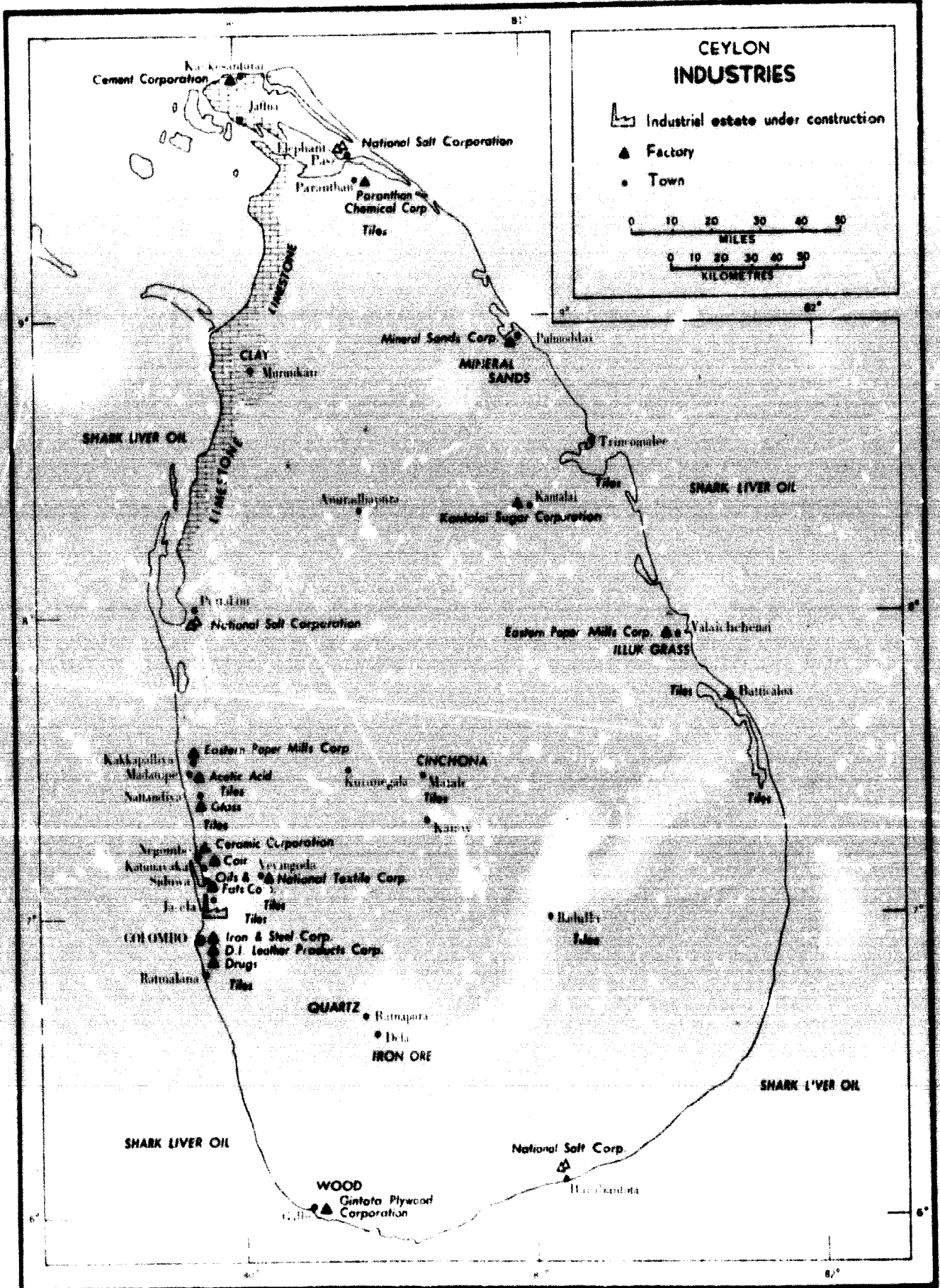
The writer acknowledges with gratitude the assistance he has received from the Chairman of the Industrial Estates Corporation, Mr. Jermyn Fernando, and his advisor, Mr. Sterling St. John, for much of the information in Chapter 6, and in particular for permission to use material and documents for the purpose of this paper.

He is also indebted to Miss K.S. Thomas, Statistician of the Department of Industries, for much of the other statistical information in this paper.

The following information has been communicated by the Industrial Estates Corporation:

	<u>Estate measurements</u>	<u>Square feet</u>
(i)	Twenty factory sites under construction in nursery section. Covered area: 30 per cent Yards and landscaped ground: 70 per cent The first twenty units are to be occupied and in operation by October 1962	304,718
(ii)	Alleys (4,780 square foot) and unassigned ground (10,319 square foot) in above nursery section, part or all of which may be included in revenue-earning land	15,099
(iii)	Balance of nursery section reserved for construction of 150,000 square foot of standard units	483,233
(iv)	Alleys in balance of nursery section, all of which may be included in revenue-earning land	12,540
(v)	South section reserved for "compatible" industries requiring custom-built units. Up to 50 per cent of land can be used for buildings	454,100
(vi)	North section reserved for "nuisance" industries. Up to 50 per cent of land can be used for buildings	631,980
(vii)	Principal and secondary roads (458,220 square foot) and utilities reservation (685,849 square foot). These areas are to be maintained in the public service and are not directly revenue-earning	1,144,069
(viii)	Total gross area, not including Public Works Department's right of way (26,361 square foot)	3,052,739

<u>Estate development costs</u>		<u>Rupees</u>	<u>Rupees</u>
(i)	Costs incurred or obligated as of 31 March 1962		
	Acquisition of land	280,000	
	Site clearance, fencing and fees	15,344	
	Roads and drains and fees	592,237	
	Utilities and fees	1,702,170	
	Factories, yards, planting and fees	2,327,797	
	Administrative costs	151,759	
	Total	<u>5,069,307</u>	
	Balance of funds allocated for 1961/62		<u>335,693</u>
	Total development costs as of 31 March 1962		5,405,000
(ii)	Estimate of development costs for additional stages beyond the initial phase shown above:		
	Final site clearance	20,000	
	Roads and drains, extension	541,000	
	Utilities, extension	401,000	
	Completion of nursery block (483,233 square foot) in ratio:		
	20 A Units at Rs.77,630	1,552,600	
	12 B Units at Rs.101,821	1,221,852	
	10 C Units at Rs.156,281	1,562,810	
	6 D Units at Rs.203,927	1,223,562	
	Completion of north section (631,980 square foot):		
	315,990 square foot of units at Rs.20 per square foot	6,319,800	
	Completion of south section (454,100 square foot):		
	227,050 square foot of units at Rs.20 per square foot	4,541,000	
	Expansion of utilities	1,000,000	
	Total:		<u>19,403,624</u>
	Estimated investment for complete estate construction:		23,808,624



ANNEX F

List of Industries Listed as
Suitable for Establishment

Schedule 'A'

Industries which will be
State-owned

1. Iron and steel
2. Cement
3. Chemicals
4. Fertilizers
5. Salt and its by-products
6. Mineral sands
7. Sugar, power alcohol and rayon

Schedule 'B'

Industries in which there
will be State and private
ownership

1. Textiles spinning and weaving
2. Automobile tyres and tubes
3. Tiles
4. Asbestos products
5. Bicycles
6. Industrial alcohol
7. Acetic acid
8. Sugar
9. Vegetable oil refining
10. Ceramic ware
11. Kaolin
12. Glass ware
13. Leather products
14. Plywood

15. Paper
16. Electric bulbs and lighting equipment
17. Dry cell batteries
18. Accumulators
19. Barbed wire
20. Lumber industry
21. Agricultural implements
22. Woodworking, furniture and cabinetry
23. Concrete products

Schedule 'C'

Industries which would be left
exclusively to the private sector

1. Motor car assembly
2. Bicycle tyres and tubes
3. Boats and launches
4. Foundry products
5. Steel products
6. Sewing machines
7. Aluminium ware
8. Aluminium linings
9. Metal containers
10. Hurricane lanterns
11. Razor blades
12. Kerosene stoves

- | | |
|--|--------------------------------------|
| 13. Weighing scales | 43. Umbrellas |
| 14. Crown corks | 44. Suitcases |
| 15. Tin painting | 45. Pharmaceuticals |
| 16. Cutlery | 46. Milk foods |
| 17. Wire drawing | 47. Biscuits |
| 18. Wire nails | 48. Chocolates |
| 19. Paper clips | 49. Confectionery |
| 20. Pins | 50. Boiled sweets |
| 21. Hair clips | 51. Margarine |
| 22. Solder and soldering wire | 52. Cured meats |
| 23. Zip fasteners | 53. Sauces and fruit juices |
| 24. Metal fittings | 54. Tooth paste |
| 25. Bolts, nuts, rivets and screws | 55. Perfume |
| 26. Brass nails, screws, hinges
and nails | 56. Face powder |
| 27. Galvanizing | 57. Soap |
| 28. Galvanized buckets | 58. Tanning of leather |
| 29. Enamelling | 59. Hard-board |
| 30. Hollow bricks | 60. Cardboard and pressboard |
| 31. Sanitary ware | 61. Paper cartons |
| 32. Earthenware | 62. Fountain pens and propelling pen |
| 33. Insulators | 63. Ink, writing and printing |
| 34. Electric fans | 64. Pencils |
| 35. Gas mantles | 65. Penholders |
| 36. Assembly of radio receivers | 66. Nibs |
| 37. Ready-made garments | 67. Slates |
| 38. Banner knitting and weaving | 68. Abrasive papers |
| 39. Hosiery | 69. Emery cloth |
| 40. Waterproof clothing | 70. Fire works and bon-bons |
| 41. Ball thread | 71. French polish and varnish |
| 42. Spectacle frames | 72. Paints |

73. Paintbrushes
74. Distemper
75. Linoleum
76. Waxes and polishes
77. Citric acid
78. Caffeine
79. Glue, organic and synthetic
80. Rubber products
81. Fungicides and pesticides
82. Activated charcoal

COPY

ANNEX C

Committee on Decentralization of Industries
and Trade (shifting of industrial and commercial
activities outside the City of Colombo),

1951

D.C.R. Gunawardane Esqr., C.C.S.,
Permanent Secretary,
Ministry of Local Government.

In accordance with your instructions of the 5th instant, we have not pursued our investigations with regard to the decentralization of existing industries which we have recommended should not be permitted to operate within the city of Colombo. We are, however, submitting herewith a brief note on the subject.

In our first Report we have referred to inducements that should be offered to existing industries to move out of the city. We do not propose to go into the details of procedure, but we state here a few general principles on the subject of inducements. Inducements, to be attractive, must be concrete. They should provide alternative areas for encouraging the migration of non-essential trade and industry outside the city of Colombo. We recommend that either Government or any other specially constituted statutory body should acquire sites in suitable areas outside the city for the establishment of trading estates. A trading estate is one in which the Government or the authority responsible, would set up a number of buildings, constructed in one or more unit sizes and provided with:

- (a) cheap power, ample supplies of fresh water and road and rail facilities;
- (b) housing of approved types for the accommodation of labour;
- (c) markets, banks, educational institutions, post offices, hospital services and
- (d) recreational facilities.

Trading estates are by no means an innovation. They are employed extensively in the United Kingdom and are the appropriate answer to the small capitalist who looks for some convenient place for the location of his occupation. We emphasize that a properly planned housing scheme must be an essential ingredient of a trading estate; otherwise there would be a strong temptation for existing labour to remain in their areas within the city, providing no solution to the slum problem.

A few examples of trading estates in Great Britain are to be found in the New Town at Harlow, at Slough, and at Liverpool. These trading estates have proved to be a potent means of attracting industry to predetermined locations.

In the New Town at Harlow an area of 160 acres has been set apart for industrial development and in this area the Harlow New Town Development Corporation has put up buildings specially designed for pilot industrial projects with electric power, water and transport facilities; sectional factories of units of approximately 2,000 square feet floor area are let in these buildings at rack rents to smaller industrialists who, when their business is established could obtain long lease sites or acquire sites within the same estate and build their own factory. Residential and other development around this estate is so planned that the industrial area can at a later date expand freely if further factory sites are required.

At Speke in Liverpool, the Liverpool Corporation has opened a new industrial area with a similar trading estate and sites for the erection of factories. The demand for space in the trading estate and for industrial sites has been so great that the industrial area has been extended by 100 acres. The original estate which is divided into 46 factories sites and leased for 999 years subject to pepper corn rental, provides employment for about 12,500 persons. Two new trading estates are being developed by this same Corporation in the periphery of the City.

We recommend that if the costs of acquisition are prohibitive in any selected area there should be suitable legislation to create a new concept of statutory lease. Under such a device the Planning Authority will be empowered to contact owners of substantial land suitable for trading estates to set up the necessary buildings and facilities required for such a trading estate within a period of a year at their expense. If lack of capital prevents this development, the authority should have power to take the land on a statutory lease for 50 years, paying ground rent throughout the period of the lease, with the right to develop it as a trading estate. The revenue from this estate in the lease of buildings would more than amply cover the normal ground rent payable to the owner of the land. An option could also be given to the owner to acquire the land at its improved value, on condition that he retains the same pattern of development for ever.

Sgt. O. Weerasingho,
Govt. Town Planner
Chairman
Sgt. E.C.S. Paul,
Deputy Director of Industries
Sgt. C. Carthigesum,
Asst. Commissioner of Labour
Sgt. I. Kannangara,
Asst. Supdt. of Census

ANNEX E

Appropriation Bill 1960/1961

Extract from the Budget Speech of the Hon'ble F.R. Dias Bandaranayake

Foreign Investment

"One of the highlights of policy set out in the Sri Lanka Freedom Party manifesto was the controlled introduction of foreign capital to give an impetus to the progress of our economic development. In the Throne Speech, the Government has already declared that a statement will shortly be made setting out conditions under which foreign capital investment would be welcome. I should like to take this opportunity, Mr. Speaker, to make an authoritative declaration on behalf of the Government to define the scope and purpose of our objective.

It is the view of our Government that participation of foreign capital would be welcome in the following conditions:

- (1) that it will generally be for productive purposes, particularly in new fields of industrial activity or in fields where the private sector has not already established itself in this country;
- (2) that it should generally be permitted in collaboration with local enterprise, such collaboration being dispensed with only if local enterprise is not forthcoming, or if the enterprise undertakes the manufacture of products for export under trade names of wide usage;
- (3) that it should lead to progressive domestic manufacture substituting ultimately for imports to the highest practicable degree;
- (4) that it should provide for the training of management and skills locally; and
- (5) that it should generally not enter the fields reserved for the expansion of the public sector, which include at present:-

1. Iron and steel
2. Cement
3. Chemicals
4. Fertilizers

5. Textile industry
6. Tyres and tubes for motor vehicles
7. Sugar and its by-products
8. Mineral sands
9. Salts
10. Ceramics
11. Plywood
12. Leather footwear
13. Paper
14. Roofing tiles
15. Ayurvedic drugs

Foreign capital that will conform to these requirements will be welcome in Ceylon. Such capital will enjoy all the tax, tariff and other benefits accruing to local capital and will in addition, be given the following assurances:

- (1) the repatriation of dividends and the eventual repatriation of assets will be freely permitted;
- (2) the bringing in of necessary technical and managerial personnel will be freely permitted;
- (3) such personnel will be permitted to transmit a part of their earnings abroad;
- (4) the Government agrees in principle to make provisions for the avoidance of double taxation by means of Government to Government agreements.

We believe, Mr. Speaker, that these inducements and assurances should be sufficient for the attraction of private foreign capital. Indeed, these compare very favourably with the terms and conditions offered by other countries, both in this region and elsewhere. The incentives provided in the existing tax laws are already well known and do not require repetition. It is clear, however, that these incentives have not produced the desired results because it would appear that what is principally needed is an assurance that the terms on which foreign investment is permitted in any particular case are not liable to variation with the vagaries of every general election. Our Government has decided, therefore, that when the terms on which foreign investment is allowed in any particular enterprise or undertaking have been so tied, they should be set out in a document under the hand of the Minister of Finance and tabled in this House for its approval in the usual way. All safeguards necessary for the investment of foreign capital in any particular undertaking could be provided in such documents, and I do not think that any better assurance of security can be given than this".

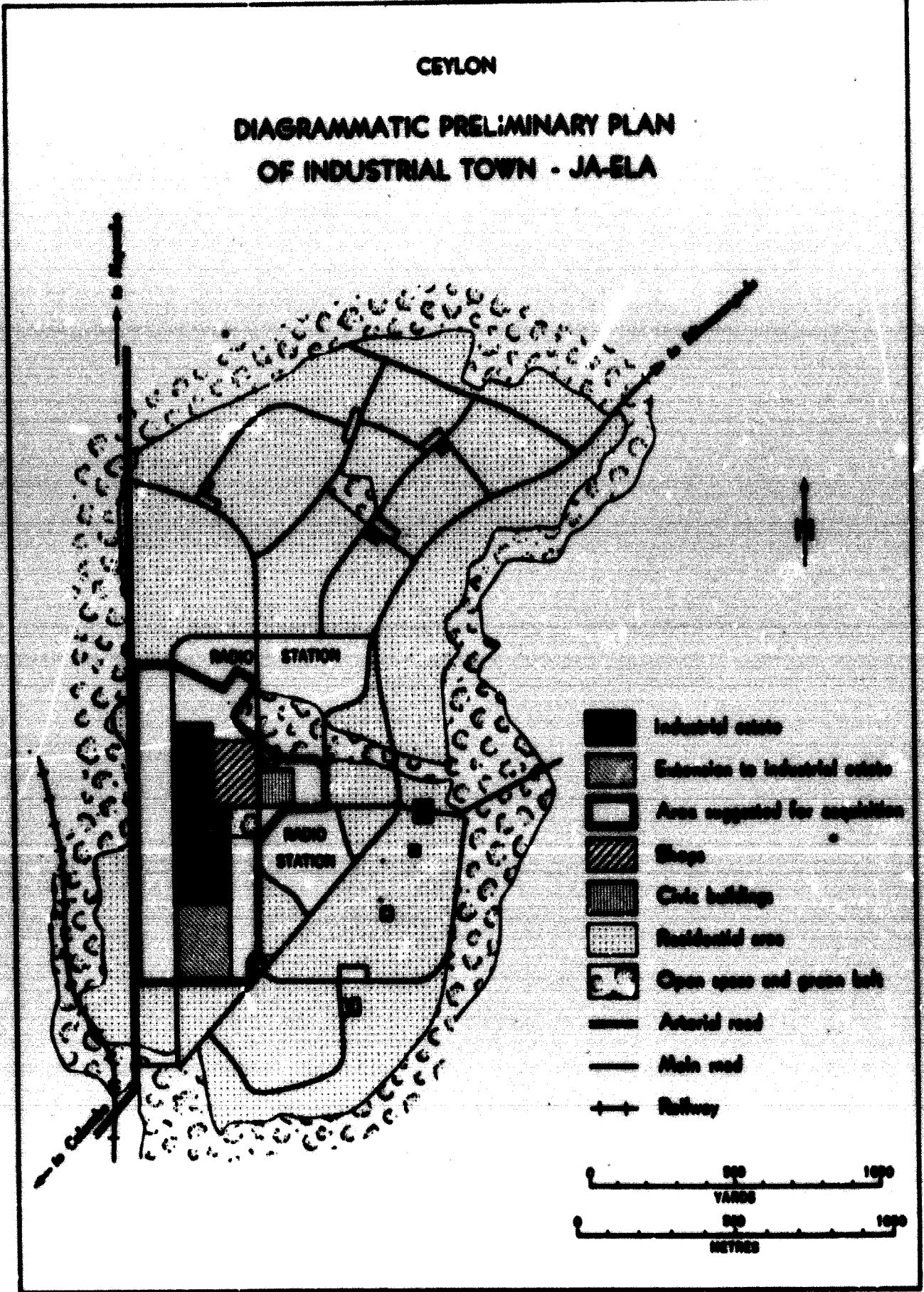
ANNEX F

Government-sponsored Corporations and
State Industrial Corporations

Name of Corporation	Government-sponsored Corporation		State Industrial Corporations		Initial Capital (Rupees)
	Act No. 19 of 1955 Gazette Number	Date of Incorporation	Act No. 49 of 1957 Gazette Number	Date of Incorporation	
Eastern Paper Mills Corporation	10,823	1.8.1955	11,404	1.7.1958	22,000,000
Ceylon Oils and Fats Corporation	10,823	1.8.1955	11,466	1.8.1958	19,750,000
Ceylon Ceramics Corporation	10,823	1.8.1955	11,466	1.8.1958	3,000,000
D.I. Leather Products Corporation	10,898	1.3.1956	11,632	1.1.1959	1,700,000
Gintota Plywood Corporation	10,898	1.3.1956	11,632	1.1.1959	2,800,000
Paranthan Chemicals Corporation	10,898	1.3.1956	11,632	1.1.1959	15,682,000
Ceylon Cement Corporation	10,986	1.11.1956	11,634	2.1.1959	26,811,900
National Textile Corporation			11,237	10.1.1958	41,100,000
Kantalai Sugar Corporation			11,212	3.12.1957	21,500,000
National Salt Corporation			11,212	3.12.1957	14,000,000
Ceylon Mineral Sands Corporation			11,212	3.12.1957	8,000,000
National Small Industries Corporation			11,424	23.7.1958	1,000,000
Ceylon Hardboard Corporation			11,958	18.11.1959	3,000,000
Industrial Estates Corporation			12,028	1.1.1960	2,500,000

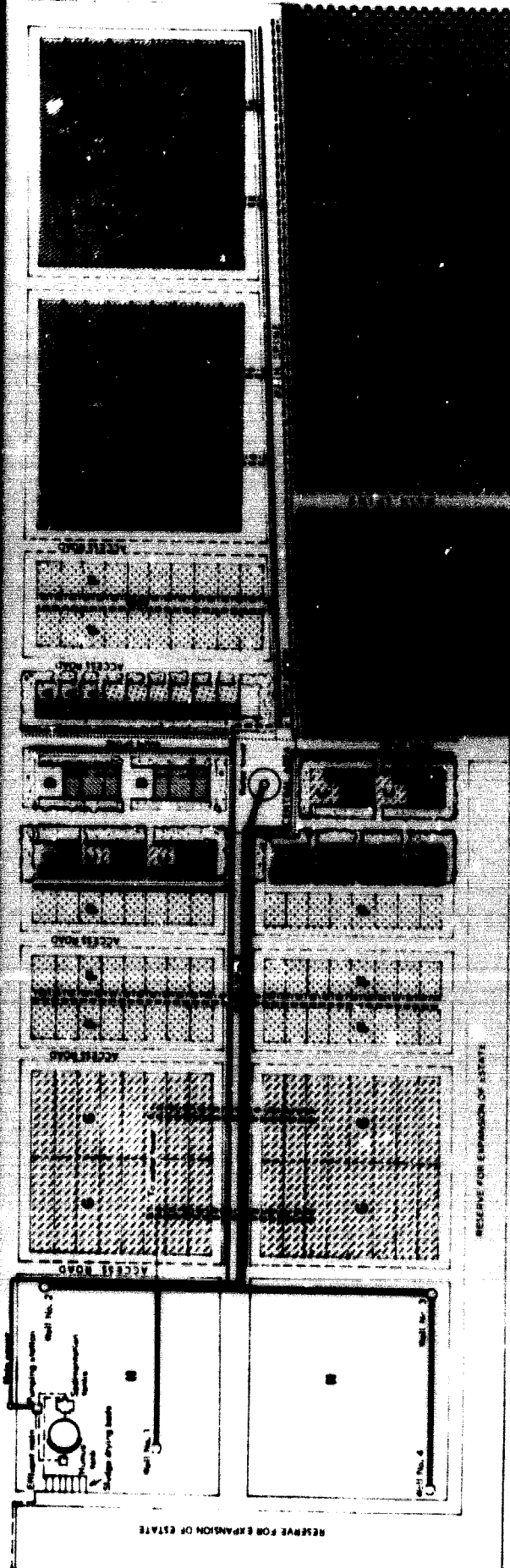
CEYLON

DIAGRAMMATIC PRELIMINARY PLAN
OF INDUSTRIAL TOWN - JA-ELA



LAYOUT PLAN - INDUSTRIAL ESTATE - JA - 82A

GENERAL 1/4" = 10' SEE CROSS



AREA	PROJECTIONS	SERVICE
A	1200 square feet	1200 square feet
B	2500 square feet	2500 square feet
C	5000 square feet	5000 square feet
D	1500 square feet	1500 square feet

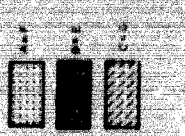
SITE

A - 100' x 100' Block
 B - 100' x 100' Block
 C - 100' x 100' Block
 D - 100' x 100' Block

1 - 100' x 100' Block
 2 - 100' x 100' Block
 3 - 100' x 100' Block
 4 - 100' x 100' Block

LEGEND

Water Supply to Industrial Estate
 Electric Supply to Industrial Estate
 Access Road
 Reserve for Expansion of Estate



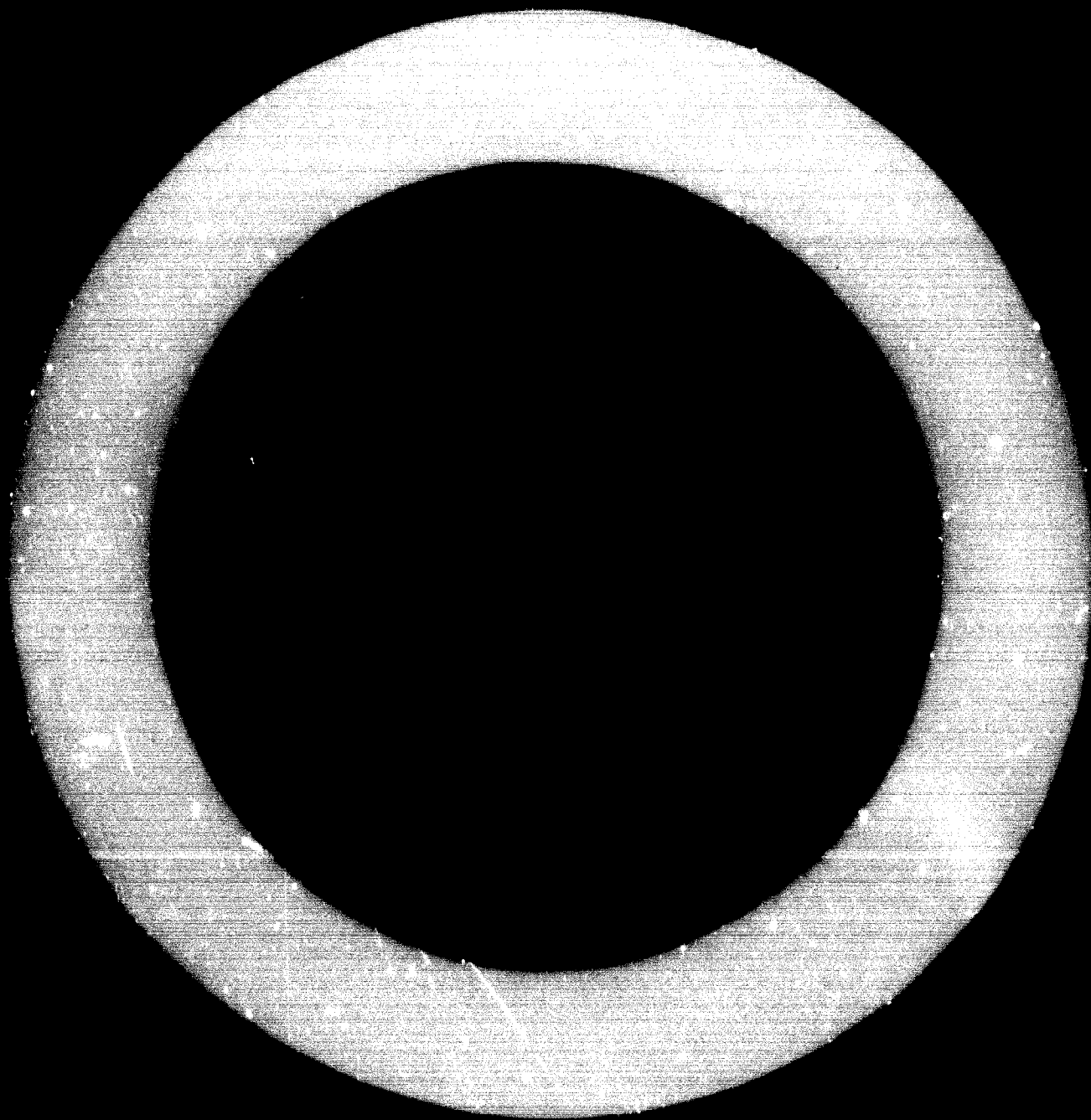
SCALE

0 100 200 300 400 500 Ft.

0 50 100 m

Check site for offices such as P.T. Office, Warehouse, etc.
 Also check for existing buildings, water supply, sewer, storm water, etc.
 Telephone, distribution system, etc.

RESERVE FOR EXPANSION OF ESTATE



ANNEX I

Production Capacity and Apparent Consumption in Selected Industries, 1959

Industry	Number of factories	Unit	Consumption	Production Capacity
Bicycles	1	Pieces	42,000	45,000
Accumulators	1	Pieces	45,000	50,000
Asbestos cement products	1	Tons	17,000	24,000
Dry cell batteries	1	Pieces	18,000,000	24,000,000
Plastic film	2	Tons	122	120
Electric bulbs	1	Pieces	3,000,000	2,000,000
Tooth brushes	1	Pieces	1,600,000	1,600,000
Wood screws	1	Cmts.	700,000	705,000
Crown corks	1	Cmts.	700,000	2,050,000

D03738

CO-OPERATION BETWEEN AND ASSISTANCE TO SMALL-SCALE UNITS
IN INDUSTRIAL ESTATES IN INDIA

by

A.S.E. Iyer
Principal, Central Industrial Extension
Training Institute, Ministry of Commerce and Industry
Government of India, New Delhi

Technical assistance

In industrially under-developed countries, small industrialists are in special need of technical advice, but can ill afford to pay for it. In India, the Government considered that the improvement in the technology, production and management of small-scale industries was a basic objective of Government policy, and decided to extend free technical guidance to these industries through extension centres, common facility centres and workshops set up in different parts of the country. Sixteen Small Industries Service Institutes, one in each state, have been set up under the supervision of the Central Small Industries Organization; to each one has been or will be attached a general workshop with the necessary modern equipment and laboratory for testing. Seventy-two Industrial Extension Centres were planned for the second five-year plan period and fifty-six have actually gone into operation. The Extension Centres, provided with up-to-date machinery and equipment, are responsible for (a) assisting manufacturers in meeting common technical problems, unusual or difficult problems being referred to the Small Industries Service Institute of the state concerned; (b) visiting factories or workshops in the vicinity and suggesting improvements in design and better manufacturing techniques; (c) training managers and workers to improve techniques of production, management and marketing; and (d) serving as common facility centres. The Extension Centres are set up in places where there is already a concentration of small industrial units or where there are prospects of such a concentration on the basis of surveys of market, availability of raw materials, entrepreneurship, etc. Extension Centres or common facility centres have been set up by the Government of India in the industrial estates at Delhi, Madras, Lucknow, Surat, Bangalore, Bhopal, Indore, Gwalior, Hoshiarpur and Jaipur.

When the Small Industries Service Institutes were set up in 1954 and technical officers of the Institutes went round the units to offer advice and assistance, there was considerable resistance on the part of the small industrialists to permit them to visit their units, and to let them extend

advice and assistance. Obviously, they feared interference from Government officials in the working of their units and wished to withhold information on the operation of their business. Moreover, free technical advice and assistance had been unknown to them before. Gradually, however, resistance broke down as practical demonstrations were made by technical officers and enterprises increasingly accepted advice and assistance.

In the beginning, visits to small units were undertaken as a matter of routine; now, the demand for assistance and guidance has increased to such an extent that it has become necessary to undertake visits only on request. Visits are also made to follow up earlier action taken by the Institutes. The Industrial Extension Service provides all types of assistance, including selection of particular industries by entrepreneurs, selection of the necessary machinery and equipment, planning the layout of equipment, estimate of investment, working out the economics of a particular unit, solving marketing problems, raw materials supply, etc. The service is available to all small units in general, irrespective of their location. Since the establishment of the Organisation in 1954, technical assistance has been rendered to tens of thousands of units in the country. The number of units approaching for advice and assistance is on the increase, as is evident from the following table.

Table 1. Services Provided by the Industrial Extension Service of the Small Industries Organization, 1955/56 to 1960/61

	<u>1955/56</u>	<u>1956/57</u>	<u>1957/58</u>	<u>1958/59</u>	<u>1959/60</u>	<u>1960/61</u>
Number of cases given technical advice	3,601	8,108	17,278	18,710	23,976	34,085
Number of cases given information to start new industries	385	845	3,470	7,978	14,547	23,169
Number of cases given other advice	2,687	5,182	9,967	18,649	26,442	32,857
Number of factory visits paid	7,127	15,170	19,861	27,657	39,511	43,807

Source: Central Small Industries Organization, Report for 1960-61 (New Delhi, 1961)

Though the Institutes and Extension Centres have been staffed with technically qualified persons, they cannot always solve all the problems of small units which are referred to them, since the posting of technical personnel to a particular Institute or Extension Centre is dependent on the types of industries concentrated in the surrounding area. For example, there may not be a foundry expert in a certain Institute or Extension Centre because there is no concentration of foundry units in the area. If an isolated foundry unit in that area has a problem to be solved, the local Institute or the Extension Centre refers the problem to the foundry expert posted in an Institute located in an area where there is a concentration of this industry. When received, the solution is passed on to the unit. Such posing of the problem and obtaining solution by correspondence without practical demonstration is not necessarily very effective; besides, the process is time-consuming.

A suggestion has been made that a panel of technical experts in different fields working in large private industrial units should be constituted and attached to the various Institutes and extension centres, the members of the panel being paid a nominal amount for the services. Complicated problems would be referred to this panel for expert advice; implementation is likely to be deferred as it is felt that the small-scale industries, in the present stage of development, cannot afford to pay for technical advice. A few examples of the type of assistance and advice rendered by the Small Industries Organization are given in Appendix II.

Common facilities

Workshops

The establishment on industrial estates of workshops and laboratories attached to the Institutes and Extension Centres is financed by the Government. The cost of equipment and personnel varies from centre to centre, depending upon the extent and concentration of trades in the surrounding area. To give an example, the cost of machinery and equipment for the workshop and laboratory attached to the Okhla industrial estate (Delhi) is Rs. 414,000¹ and the monthly expenditure on staff and contingencies comes to about Rs. 9,300, while the equipment in the workshop and laboratory in the industrial estate at Sanatnagar (Hyderabad) costs Rs. 218,000 and the monthly expenditure on staff and contingencies, Rs. 4,950. These workshops afford common facilities to small industrial units, for which a nominal charge is levied. The question whether any charge should be levied or not has been discussed in some details and it was decided that unless a nominal charge was levied it would be impossible for the workshops and laboratories to cope with the demand for common facility work. The charges levied vary for developmental work involving research and common facility work. The following gives a rough idea of the charges:

- ¹ One rupee = US \$0.21
One lakh = 100,000
One crore = 10 million

<u>Description</u>	<u>Developmental work</u>	<u>Common facility work</u>
1. Where no machines other than hand-tools are used	Labour charges plus 50 per cent	Labour charges plus 100 per cent
2. Where machines are used	Labour charges plus 100 per cent	Labour charges plus 200 per cent
3. Where some design work has to be done and machines are used	Labour charges plus 150 per cent	Labour charges plus 300 per cent
4. Where design is involved and only hand-tools but no machines are used	Labour charges plus 100 per cent	Labour charges plus 200 per cent
5. Ancillary, demonstration or training	100 per cent of cost of materials plus 30 per cent.	

In addition, if the workshops or Extension Centres use their own raw materials in respect of items 1 to 4 above, the total cost of the material actually used is charged.

The common facilities provided on industrial estates by the Extension Centres include machine shop, sheet metal shop, heat-treatment shop, testing laboratory, chemical laboratory, forge shop and others. Thus, the small units in the Okhla industrial estate avail themselves of facilities for precision grinding, milling, engraving and turning. They also get their dies, tools, jigs and fixtures manufactured by the Government centre. Proper heat-treatment facilities for tools, dies and other materials are also provided. There is equipment for testing of materials at all stages, from raw materials to finished products.

As a result of the rapid growth of industrial units in the small-scale sector, the demand for tool-room facilities is very much on the increase and every state government is pressing for the setting up of tool-rooms in different parts of the country, especially in industrial estates. It is proposed to provide these facilities in as many industrial estates as possible, the size of the tool-room depending upon the predominance of particular trades in each estate. Depending upon the needs and demands, tool-rooms have been and will be equipped with lathes of different types, milling machines, shaping machines, boring machines, drilling machines, metal band-saw and filing machines, grinding machines, universal tool and cutter grinders, precision measuring instruments for inspection and quality control, cutting

tools, grinding mills, heat-treatment equipment and power hammer. The function of these tool-rooms are (a) to demonstrate the use of modern machine-tools necessary for the manufacture of proper tools, dies, jigs and fixtures needed for efficient production of uniform products; (b) to manufacture prototypes of modern tools, dies, jigs, and fixtures for small industries; (c) to serve private industrialists who need certain operations done on the tools, dies, jigs and fixtures they are manufacturing and for which they do not have the proper machines; and (d) to train private entrepreneurs and their staff on how to operate modern machine-tools and tool-room equipment in case they desire to procure similar machine-tools and equipment for their own units.

While it is contemplated that every industrial estate, irrespective of its location, should have some kind of general workshop, the implementation of this idea in respect of every industrial estate is likely to take time. Meanwhile, units located in rural areas are being served by mobile workshops which constantly tour the interior of the country. There are in all forty-seven mobile workshops fitted with modern machinery and equipment and dealing with the following trades: (i) blacksmithy; (ii) sheet-metal work; (iii) electroplating; (iv) carpentry; (v) leather and leather footwear; (vi) glass; (vii) ceramics; (viii) repair workshop for engines and pumps.

The vans are equipped with machinery for such trades as are commonly located in the interior of the country. The visits of these vans to the interior of the country are pre-planned and the vans are stationed for periods from two days to a fortnight in particular areas, affording common facilities to units in the locality, training workers in industrial units, as well as demonstrating the utility of modern equipment to entrepreneurs.

In addition to the various types of assistance to units in the industrial estates provided directly by the Government of India, the state governments have also set up a number of common facility workshops in the industrial estates for the benefit of the occupants. For example, in the Guindy industrial estate, the Government of Madras has provided the following facilities: (i) tool room; (ii) forging and heat-treatment shop; (iii) precision instruments workshop; (iv) enameled wire-making unit; (v) pressure die-casting unit; (vi) foundry; (vii) wood-working shop; (viii) scientific glass works. (ix) The Government of Madras is also running a common lease shop which houses about eighteen types of machine-tools which small-scale industries can ill afford to own themselves. These machines are rented to entrepreneurs in the estate. As the demand for use of these machines is very heavy, a committee of entrepreneurs, with the administrator of the estate as chairman, has been constituted to decide on the requirements of individual units and fix priorities. The machines are

worked by government-paid workers and the charges levied are just enough to cover establishment costs, depreciation and overhead. (x) There is an excellent technical information centre which has a technical library of the latest books, periodicals, annuals, bulletins and catalogues of machines and model schemes, which are freely made available for consultation. In addition, there are (xi) a raw materials depot; (xii) a testing and analytical laboratory and (xiii) a training institute for blacksmiths, carpenters, draughtsmen, electricians, fitters, and other specialized workers. The total investment on all these facilities is Rs. 87.95 lakhs, employment is of 2,002 persons and total monthly turnover, Rs. 17.51 lakhs.

Almost similar facilities have been provided by the Governments of Punjab, Uttar Pradesh, Andhra Pradesh, Bihar, Kerala, Madhya Pradesh and Assam, in the industrial estates at Ludhiana, Kanpur, Sanatnagar, Ranchi, Ollur, Patna, Batala, Agra, Visakapatnam, Mysore, Indore and Gwalior.

Raw materials depots

The Government of India has advised all the state governments to set up raw materials depots in each industrial estate. Where the state government finds it difficult to do so by its own means, the occupants of the industrial estate are encouraged to form a joint-stock company or a cooperative society and start a depot with the assistance of the state government. The government of Madras has a raw materials depot in the Guindy industrial estate. The Okhla Industrial Estate Association is contemplating the establishment of a co-operative society to start a raw materials depot. It should be noted that it is easier for units in industrial estates to obtain raw materials in amounts sufficient to meet at least one-shift requirement, for the first year. Wherever there are complaints that units are not working because of lack of raw materials, the highest placed officials in the Import Control Department visit the industrial estates and take on-the-spot decisions. The Chief Controller of Imports and Exports once visited all the units in the Okhla industrial estate and within a week of his visit import licenses were issued to all the units deserving such licenses. Similarly, the Deputy Chief Controller of Imports and Exports, Madras, visits the estates as often as he can to examine individual cases and take spot decisions.

Prototype production and training centres

Units located in industrial estates are better placed than those outside to take full advantage of another scheme of assistance to small-scale industries that has been initiated by the Government of India. Under this scheme, prototypes of machines and machine-tools which are capable of being manufactured by units in the small-scale sector will be built in

special centres, in which workers from industrial units having the necessary equipment and declared to be competent to undertake commercial production of the developed prototypes will be given training for varying periods. The idea of setting up Prototype Production and Training Centres in different parts of the country has evolved from a project, conceived five years earlier, to set up common facility workshops for training Indian personnel in the development and adaptation to Indian conditions of small machinery and productive equipment. The Technical Co-operation Mission of the Government of the United States, pursuant to its technical assistance programme, agreed to finance the supply of basic machinery and equipment for a training and demonstration unit to be located at the Okhla industrial estate, at that time the country's first pilot industrial estate.

The project of setting up a Prototype Production and Training Centre for manufacturers of machines and machine tools was formulated in the report of a German expert team which visited India in 1955 and toured various centres where small-scale units are concentrated. Pursuant to the submission of the report, the Government of India and the Government of the Federal Republic of Germany held negotiations which resulted in the decision to set up the Indo-German Prototype Production and Training Centre at Okhla, Delhi. The agreement between the authorities of the United States Technical Co-operation Mission and the Government of India resulted in the establishment of an Indo-American Prototype Production and Training Centre at Rajkot. An agreement has also been concluded with the Government of Japan for the setting up of such a centre at Haverah, and negotiations are in progress with the French Government for setting up a similar centre at Guindy, Madras. These four centres are within or adjoining the industrial estates.

In all these projects, the foreign government supplies the necessary machinery and equipment, and provides experts to operate the centre for a period of time and to develop the prototypes. The Government of India bears the cost of land, building, employment of Indian personnel and other costs in local currency, including stipends to trainees. The latter include, besides workers from small industrial units, technical officers of the Small Industries Organization associated to the centre.

The Indo-American Centre at Rajkot has started functioning. Its programme is to develop prototypes of moulding, forging and wood-working machinery.

The programme of the Indo-German Centre at Okhla is to develop prototypes of small milling machines, small lathes, and tool and cutter grinders. The Centre was opened on 1 April 1961.

The Indo-Japanese Centre at Howrah will develop and manufacture prototypes of foundry machinery, thermo-plastic extruders and rubber extruders with thermostatic control, heading machines for hot processing, thread-rolling machines, re-rolling mills, die-casting machines, wire-threading machines, switch-board measuring instruments, etc.. The Centre was expected to begin operations in the latter half of 1961.

The Indo-French Centre at Guindy is expected to develop and produce prototypes of machines and machine-tools for the production of precision and high-precision instruments needed by most industrial undertakings.

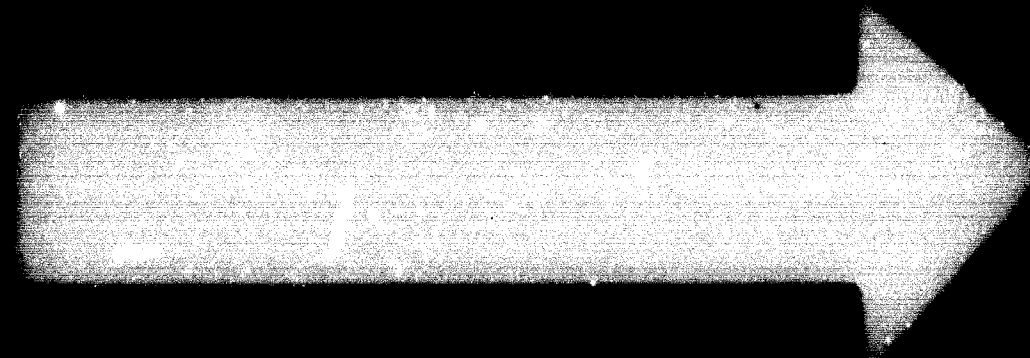
Other training programmes

Training of managerial personnel and artisans is provided by the Small Industries Organization in all its Institutes and Extension Centres. The courses include blue-print reading, heat-treatment, electroplating, pattern-making, etc.. There is a Footwear Training Centre in the Guindy industrial estate, in which foremen and managers of units engaged in footwear manufacture are trained for a period of eighteen and twenty-one months respectively. Long-term and short-term courses on management techniques are conducted regularly by the Small Industries Service Institutes; the subjects dealt with include financing of industries, fundamentals of accounts and audit, principles of cost accounting, factory and personnel management, quality control, advertising and publicity, marketing and sales promotion.

All these types of training are apart from training in the use of modern equipment and machinery at the various common facility centres run by the central and state Governments.

Government stores purchase scheme

Another important measure taken by the Government of India to assist small-scale industries is the Government Stores Purchase Scheme which gives price preference to stores manufactured by small-scale units over similar goods produced by industrial enterprises in the large-scale sector, provided standards of quality and workmanship are on par with those of the latter. Until 1956, when this scheme was introduced, very few units in the small-scale sector could be registered with the Directorate General of Supplies and Disposals (DGS & D), the largest purchase organization of the central Government. Because of their financial and technical weakness, they could not always overcome successfully the various procedural hurdles inherent in a government purchase system. To be registered with the Directorate General, the units had to satisfy the officers of the purchase organization about their technical competence, financial soundness and other details which, to them, were often irksome.



15. 7. 74

4 OF 9

DO

3 7 3 6



Registration of the units was entrusted to the National Small Industries Corporation. Officers of the Service Institutes visit the units and, where appropriate, certify units as competent to manufacture the stores required by the central purchase organization. On the recommendation of the Institutes, the Corporation registers such units as competent and entitles them to receiving the facilities provided by the central purchase organization. Since the inception of the scheme, about 7,000 small industrial units have been enlisted with the Corporation. In brief, the scheme operates as follows:

All indents received from various Government agencies by the central purchase organization are classified into four categories:

- (1) Items which can be produced only in the large-scale sector.
- (2) Items which by their nature require large-scale firms as prime contractors, but afford substantial scope to the large-scale contractors to purchase components and parts from small-scale units.
- (3) Residuary items which both large-scale and small-scale firms can supply.
- (4) Items which could be reserved for procurement from small-scale units only.

The classification of the items is decided upon by a committee consisting of representatives of the central purchasing agency and the National Small Industries Corporation. Small units are mainly interested in items falling under groups (3) and (4). In respect of items falling under group (3), small-scale units are in competition with large-scale units, but are granted by the central purchase organization a price preference up to 15 per cent over the lowest acceptable tender received from the large-scale unit. Items under group (4) are reserved for purchase from small units. There are twenty-seven items under this group and the number may be increased. Before any item is included in this group, the capacity of small-scale units which are expected to produce and supply the stores is verified; the item is included only when there is the fullest satisfaction that the indentors will not suffer as a result of non-supply of stores. The following figures of value of contracts indicate how the units in the small-scale sector have progressively benefited from the stores purchase programme:

<u>Year</u>	<u>Value of contracts received by small units with the help of the Corporation</u> (Rupees)
1955/56	467,750
1956/57	119,353
1957/58	6,214,964
1958/59	25,612,337

The impact of the scheme will be further evident from the following data:

<u>Period</u> (1)	<u>Value of contracts between DGS&D and large units</u> (2)	<u>Value of contracts between DGS&D and small units</u>	
		<u>Total</u> (3)	<u>Of which value of contracts obtained with the assistance of NSIC</u> (4)
(Rupees)			
April 1957 to March 1958	1,562,811,000	19,649,000	6,214,964
April 1958 to February 1959	1,047,029,000	41,301,000	23,419,428

A more or less similar scheme has been introduced by the Indian Railway Department which is the second biggest buying agency in the country. Some of the state Governments have also introduced similar schemes to encourage small-scale units in supplying stores required under Government contracts.

Co-operation and mutual assistance

Interdependence and mutual assistance between enterprises in the industrial estates are slowly developing, as capacity to undertake certain operations becomes available in neighbouring units. Following are some examples of complementary relationships between units in the Guindy and Okhla industrial estates:

At Guindy, a unit manufacturing air-brake switches gets most of its components and parts from another unit which has a general engineering workshop.

A wire-drawing unit supplies the requirements of wires of a unit manufacturing welded wire mesh.

A firm manufacturing bolts, nuts, rivets, hinges, washers and brass forgings supplies these articles to most of the units in the estate.

A unit manufacturing elastic industrial components and wires supplies the requirements of units manufacturing electrical goods.

Another firm engaged in electroplating makes available its facilities to at least half a dozen units which do not have the necessary equipment.

A unit manufacturing light fittings gets its processed plastic sheets from another unit in the estate.

Moreover, seventeen units in the Guindy industrial estate are fully engaged as ancillaries to large-scale industries outside the estate, among which the Government of India's Integral Coach Factory, an automobile manufacturing unit and an engine assembly unit.

In the Okhla industrial estate, a foundry unit, which hitherto had been supplying castings to outside firms only, now provides them to four machine-tool manufacturers in the estate. Eight units need their articles to be electroplated, but only three of them have electroplating equipment. While two of the latter cannot afford to take outside work, there is excess capacity in the third unit; the five other units in the estate are negotiating with this unit to get their articles electroplated. The machine-tool manufacturers (drilling machines, power presses, shearing machines and lathes) are supplying their products to units inside the estate. There is a radio assembly unit which gets radio components and parts from two other units in the estate. The manufacturers of razor blades in the Okhla estate get their polythene packing material from another unit in the estate. A firm manufacturing electric motors supplies these to the machine-tool manufacturers who require electric motors of varying horse-power.

Financial assistance

Before the introduction of India's comprehensive assistance programme to small-scale industries, most of these obtained their financing from money-lenders at exorbitant rates of interest, or from friends and relatives. The banking institutions were reluctant to make advances as they did not consider the small-scale industries credit-worthy. Some of the complaints of the banking institutions were that small-scale units did not maintain proper accounts, did not have the proper technical ability to produce marketable goods and did not possess enough security. It is estimated that the total advances made by all the banks in India to small-scale industries in 1957/58 were in the neighbourhood of Rs.220 to 230 million, representing just 3 per cent of their total advances.

In 1955/56, the Government of India introduced a liberalized credit system, in co-operation with the state Governments. Under this system, the central Government provides two-thirds of the funds required and underwrites losses, if any, on a pro rata basis, provided the security and other terms are liberalized by the state Governments. The Government of India also meets the difference between the rates of interest at which the state Governments obtain funds from it and the concessional rates of interest that may be charged to small-scale units. These rates are 2 1/2 per cent for industrial co-operatives on amounts up to Rs.2 lakhs, 3 per cent for loans sanctioned to industrial undertakings with a capital investment up to Rs.2 lakhs, 4 1/2 per cent to undertakings with a capital investment of Rs. 2 to 4 lakhs and 6 per cent to undertakings having a capital investment of more than Rs.4 lakhs. As of 1959/60, the state Governments had advanced to small-scale units over Rs.100 million as follows:

(Million of rupees)	
1956/57	18.96
1957/58	27.04
1958/59	26.67
1959/60	30.11
Total	102.78

In 1957, the State Bank of India, a state-owned banking institution, initiated a pilot scheme to make advances to small-scale industries under liberalized terms. The State Bank has so far advanced over Rs. 88 million to small industrial units in different parts of the country as shown below:

	(Millions of Rupees)	(Number of Units)
As on 31 December 1959	46.21	1,496
As on 30 September 1960	68.64	2,230
As on 31 March 1961	88.45	2,633

The organization of the Development Commissioner, Small-Scale Industries, Government of India, has been called upon to play a very important role in ensuring that small-scale units, needing finance both for their day-to-day work and for capital equipment, obtain funds with as little difficulty as possible. During the operation of the State Bank's Pilot Scheme, officials of the Development Commissioner's Organization, spread over the country, were associated in surveying industries as well as individual units and making reports about the needs and qualifications of particular industries or units. As a result, a large number of units, which hitherto had to look to money-lenders for their financial requirements have obtained advances under favourable conditions.

There are other agencies set up by the state Governments for financing of industries - the State Financial Corporations. These mainly advance long-term loans for investment in land, machinery and building; working capital loans are also advanced, though to a lesser degree. In addition to employing their own funds, they also act as Government agents for the purpose of disbursing loans provided by state Governments. The Corporations had advanced, as on 31 March 1958, Rs. 23.89 million which went up to Rs. 46.64 million on 31 March 1960 and further to Rs. 60.9 million on 30 June 1960.

Another type of credit is made available to small units by the National Small Industries Corporation, a Government of India undertaking, by means of a popular scheme - the supply of industrial machinery on a hire-purchase basis. The corporation grants priority to units in industrial estates for obtaining the required machinery. The scheme has been of considerable assistance in setting up new industrial units in the small-scale sector. Its popularity can be gauged from the figures of supply of machinery in recent years. Ending March 1960, 3,446 items of machinery valued at Rs. 3,110 million had been supplied. The figures stood at 2,234 machines valued at 1,840 million and 978 machines valued at 756 million as on 31 March 1959 and 31 March 1958, respectively.

Under the guidance of the Reserve Bank of India, initiatives were taken to change the outlook of the commercial banks of the country in regard to small-scale industries. Following a Seminar held in Hyderabad in 1959 to

discuss the question of advances to small-scale industries, a scheme was prepared by the Reserve Bank of India under which the bank would give guarantees to a number of commercial banks on behalf of the Government of India, in respect of advances made by the latter to small-scale industries. The scheme was put into operation with effect from July 1960 and its impact will be known only after some time.

Units in the industrial estates get the fullest advantage of the liberalized credit schemes of the state Governments and the State Bank of India, in view of their location in common sites. The banks which have their own offices within the estates find it easier to obtain all the information required without the delays usually occurring when units are scattered in different parts of the city, and funds are made available quickly. Inquiries at Guindy and Okhla -the two biggest industrial estates in India- reveal that the small-scale units located there avoid the difficulties in getting advances from banks which they had to face before coming to the estates. The Administrator of the estate is in a position to assist the borrower as well as the lender in regard to the different procedures and facts required to make the loan. From a survey of small units in Delhi, both in and outside the Okhla industrial estate, it appears that units outside the estate obtained less financing from lending agencies than those within the estate. The Government advanced to units in the estate about 3.8 per cent of the total investment and about 1.3 per cent to those outside of the estate. Other financing agencies accounted for 12.4 per cent of the total investment of the units on the estate while units outside obtained only 3.3 per cent. The following table shows the sources of capital in the total investment of thirty-one units in the industrial estate at Okhla:

Source of Capital	Fixed	Working	Total	
	Capital	Capital	(Rupees)	(Percentage)
Private savings	1,871,020	1,782,073	3,653,093	51.0
Friends, relatives and money-lenders	186,000	998,000	1,184,000	16.5
Financial agencies ^{2/}	Nil	890,000	890,000	12.4
National Small Industries Corporation	514,800	Nil	514,800	7.2
State Bank of India	Nil	479,000	479,000	6.7
Government	84,690	190,200	274,890	3.8
Other sources	Nil	171,000	171,000	2.4
Total	2,656,510	4,510,273	7,166,783	100.0

^{2/} Other than State Bank of India, State Financial Corporation and Co-operative Banks.

The following table shows the amount of capital obtained from different sources by fifteen small-scale units located in different parts of Delhi, outside the estates, and chosen at random:

Source of Capital	Fixed	Working	Total	
	Capital (Rupees)	Capital (Rupees)	(Rupees)	(Percentage)
Private savings	926,250	898,300	1,824,550	62.1
Friends, relatives and money-lenders	Nil	646,200	646,200	22.1
Financial agencies	Nil	96,300	96,300	3.3
National Small Industries Corporation	42,000	Nil	42,000	1.4
State Bank of India	Nil	150,000	150,000	5.0
Government	1,250	37,000	38,250	1.3
Other sources	Nil	144,000	144,000	4.9
Total	969,500	1,971,800	2,941,300	100.0

The foregoing two tables give a clear indication that units situated within the industrial estates are very much better off than those situated outside in obtaining their credit requirements under the liberalized credit scheme.

In 1960, the Government empowered state Governments to extend guarantees for loans by banking institutions to private agencies - co-operative societies and joint stock companies - set up to establish industrial estates. If such agencies raise, as share capital, one-sixth to one-fifth in the case of a co-operative, and one-fourth to one-third in the case of a corporation, the balance of the funds required for construction may be advanced by credit institutions - commercial banks or co-operative central banks. Loans will be made against security of land and factory sheds, with the guarantee of the state Government. Loans will be at normal rates, and the period of repayment will extend from seven to ten years.

APPENDIX I

Case-histories of small industrial units in industrial estates started by entrepreneurs who are altogether new in the industrial field

Case No. 1: Three technically qualified young men working as sales engineers in a leading firm of importers decided to set up a unit for the manufacture of gears, gear-boxes, gear pumps and instrument gears which were being imported in large quantities. Having very little financial backing, they pooled together their resources, approached the National Small Industries Corporation for securing machinery under the hire-purchase scheme, and obtained space in the industrial estate at Guindy (Madras). They have been working for over a year now. They employ fifteen workers and have a monthly turnover of over Rs. 20,000, saving valuable foreign exchange for the country.

Case No. 2: A dealer in electrical light fittings, realizing that import restrictions were decreasing his sales turnover, decided to undertake the manufacture of the very items he was selling. He obtained the necessary machinery and got accommodation in an industrial estate, where he started manufacturing flood-lights, water-tight fittings, street-light fittings. His monthly turnover is about Rs. 25,000 and he employs twenty-three workers. The products are sold to Government departments and municipalities.

Case No. 3: Four years ago, razor blades were being imported in large quantities. An insurance agent conceived the idea of setting up a modern unit to manufacture this item. Besides whatever financial support he obtained from his family, he approached the National Small Industries Corporation which supplied machinery worth Rs. 2 1/2 lakhs under its hire-purchase scheme. He was also allotted factory space in the Okhla industrial estate. A retired military officer joined him, and their unit is now employing sixty-six persons and producing razor blades valued at Rs. 170,000 per month. They are negotiating with east African and middle-eastern countries for exporting one million blades a month.

Case No. 4: A company of businessmen engaged in the cloth trade set up a small industry with assistance by the Government. They had no industrial experience, and approached the Small Industries Service Institute for guidance. They were advised to undertake the manufacture of electric motors, of which there was an acute shortage at the time. The machinery was installed and the firm is at present manufacturing 400 units of electric motors varying from fractional to 50 H.P. It is employing 131 persons.

Case No. 5: A visit to the All India Industries Exhibition at New Delhi inspired a businessman engaged in photography at Hyderabad to start an industrial unit at Sanatnagar. He approached the Service Institute to learn about the polythene industry and its future possibilities. On the advice of the Institute, he set up an industrial unit with machinery worth Rs. 32,000 supplied by the National Small Industries Corporation under its hire-purchase scheme. The unit produces polythene bags and sheets which are in good demand. It employs twelve persons with a production of Rs. 4 lakhs per annum.

Case No. 6: An electrical contractor in Hyderabad who was facing difficulties in obtaining imported air-brake switches for fulfilling his contracts, decided to set up a unit for manufacturing these items. High-tension air-brake switches of 11 KV., 33 KV and 66 KV capacity are required for isolating transmission lines and power transformers when necessary for attending to repairs and maintenance. The demand for such switches is very heavy. With imported machinery, the unit has gone into production at the Sanatnagar industrial estate. It is employing eleven workers and during the period April to October 1960 produced switches valued at Rs. 85,000. Difficulties in obtaining imported raw materials have resulted in under-utilization of the installed capacity. Switches manufactured by this unit are easily sold as they conform to the British standard specifications.

Case No. 7: On the advice tendered by the Small Industries Service Institute, Bangalore, a military-canteen contractor has set up a unit in the Bangalore industrial estate to manufacture bicycles. The unit has obtained some of its machines from the National Small Industries Corporation under the hire-purchase scheme. It is now assembling about forty bicycles per month and the production is on the increase. The unit depends on another small-scale unit in the industrial estate for electroplating some of its components. The unit employs ten workers.

Case No. 8: A person working as a turner in a spinning and weaving mill in Bangalore gained experience in the manufacture of silk preparatory machines. Knowing that the demand for such machines was good, he decided to set up a unit in the Bangalore industrial estate, with financial assistance from the State Bank of India and from friends. He is now manufacturing silk twisting spindles, bench vises and drilling machines. He employs fifteen workers and his unit has an average monthly production valued at Rs. 6,000. Production is on the increase.

Case No. 9: A worker employed in the Hindustan Aircraft Factory has set up, with financial assistance from friends and with his own savings, a unit in the industrial estate of Bangalore, producing fish-pot covers, small-size tanks, pedestals, screws, bolts, nuts and springs, all of which are required for the assembly of starters, switch-gears, etc. The firm employs

thirty-seven workers and its annual production is Rs. 4 lakhs. The capital of the unit rose from Rs. 15,000 in 1957 to Rs. 1.51 lakhs in 1960.

Case No. 10: In the course of a discussion with an officer of the National Small Industries Corporation at the Japanese Industrial Exhibition in Bangalore in 1959, a qualified electrical engineer working for various electrical firms decided to set up a small-scale industrial unit for the manufacture of paper envelopes. In view of the fact that there were not many mechanized units in this line, specially in the area from which he hailed, he decided to use automatic machines. He set up a unit in the Ollur industrial estate (Kerala), his native town, and obtained most of the machines from the National Small Industries Corporation under its hire-purchase scheme. The capacity of the machinery is 20,000 bags or envelopes per hour. Fifteen workers are employed. The unit is awaiting imported raw materials to go into production.

Case No. 11: An agriculturist belonging to a joint family in a village near Ludhiana (Punjab) decided to come to town, following a dispute in the family, and do his own business with all the finances he could gather. In view of the fact that a diesel engine was in use on the joint family farm, the young man decided to engage in the manufacture of certain parts required in the assembly of diesel engines. He purchased some equipment in the locality and obtained technical assistance from the Small Industries Service Institute. Gradually he developed his business, obtained a workshop in the industrial estate at Ludhiana and started manufacturing diesel engines. The assistance which he received from adjoining units engaged in similar work on the estate has served him as much as, if not more than, the assistance extended by the Institute.

Case No. 12: A commerce graduate, just out of the college, having some financial resources, decided to set up a unit in the industrial estate at Ludhiana and take the fullest advantage of the various facilities offered by the central and state Governments. He has bought machinery locally and has undertaken the production of cycle pedal axles and mud-guards. He is taking advantage of the testing and finishing centre set up by the Punjab Government in the industrial estate for getting the manufactured parts heat-treated.

APPENDIX II

Some typical cases of units having received assistance and guidance from the Small Industries Organization

Case No. 1: In 1959, a Calcutta importer dealing in graphite crucibles thought that the time had come when manufacture of these items should be undertaken in India, and approached the Small Industries Service Institute for advice. The Institute supplied him with the list of machinery and equipment required, prepared the factory layout, designed the down-draft type furnace and assisted in setting up the factory. Different mixtures of graphite were tested for trial purposes. Samples of different sizes were made to accommodate different sizes of crucibles. The factory has now gone into production, and will assist in saving foreign exchange.

Case No. 2: A firm of business men in Agra (Uttar Pradesh) wanted to start a small-scale industrial unit manufacturing an item which was being imported. They were advised to manufacture three-wave plug pins required by the Post and Telegraphs authorities. A list of the required machinery was supplied to the firm by the Small Industries Service Institute and they were assisted in setting up the unit. The first few samples produced by the unit in accordance with the drawing supplied by the Post and Telegraphs authorities were not approved as the outer dimensions were found incorrect. The Institute supplied the firm with a drawing of the profile ten times enlarged to enable proper checking of such dimensions with the naked eye. The firm now produces three-wave plug pins acceptable to the Post and Telegraphs authorities.

Case No. 3: A machine-tool manufacturing unit in Aligarh (Uttar Pradesh), engaged since 1957 in the manufacture of lathes, shapers, drilling machines, etc., approached the Small Industries Service Institute for technical assistance and advice. The firm was advised to concentrate on the production of one particular item, viz. lathes with 24-foot bed, and specialize in producing quality goods. After two years of constant assistance and advice the unit is today producing quality lathes and selling them at Rs. 3,500 a piece, as against its earlier price of Rs. 2,250. Its employment has gone up from twenty-eight to thirty-nine and the annual turnover from Rs. 1,85,589 to Rs. 3,39,775.

Case No. 4: A firm in Delhi (Uttar Pradesh) engaged in the manufacture of 24-foot lathes is now ready to start its units certified as 'Good' by the Government departments concerned. This was made possible after two years of continuous technical guidance given by the Small Industries Service Institute, which earlier had advised the firm to improve its lathes. It now finds no

difficulty in marketing its lathes while two years ago it was considering closing down the factory; at that time it was producing four and a half foot bed lathes which did not find ready market even at Rs. 1,500 a piece. Today, its 24-foot lathe fetches Rs. 8,000. On the advice of the Institute, the firm has added equipment necessary to improve the quality of its product.

Case No. 5: A lathe manufacturing unit in the Okhla industrial estate sought the advice of the Institute as its quality of production was poor. Following the advice and assistance rendered by the Institute, its production has gone up from six to eight lathes per month. The number of workers has increased from thirty to forty and the value of the lathes has increased by 15 per cent.

Case No. 6: A small-scale unit at Phagwara (Punjab) manufacturing low-tension porcelain insulators faced several production problems:

- (i) cracking of the article in green stage and during firing;
- (ii) incomplete vitrification;
- (iii) irregular glazing.

The officers of the Service Institute found that the body mixture was neither proper nor well mixed up and kneaded. The unit was advised to adopt the following body mixture: good china clay 45 parts; ball clay 5 parts; quartz 25 parts; felspar 25 parts.

In the absence of a pug-mill, the unit was advised to mix the dry mixture by hand in accordance with the process of quartering and coning. As a result of the advice given, the breakage both at the green stage and after firing was brought down to less than 10 per cent. Incomplete vitrification was found to be due to low temperature of firing, and irregular glazing was traced to excessive use of oil. The unit was advised to use cones or a pyrometer and to fire the articles to 1275°F, and spray the oil instead of using swab. Rejections have been brought to a minimum.

Case No. 7: An educated unemployed in Uttar Pradesh approached the Extension Centre at Aligarh for guidance in setting up a small industrial unit. He was advised to undertake the manufacture of swivel-base machine vises, an item required by small industrialists in that locality. A design and a prototype were made at the Centre and supplied to him. He now produces in his unit twenty swivel base machine vises per month and readily sells them at Rs. 75 per unit. Production is slowly on the increase.

Encouraged by the guidance and advice given by the Extension Centre, the same individual decided to undertake the manufacture of finisher machines, an imported item, used for finishing articles like locks, wooden toys, plastic articles, sports goods, etc. He obtained the machinery, set up the

second unit, and is now manufacturing twelve Linisher machines every month and is marketing them at Rs. 390 each without meter and Rs. 650 each with 1/2 H.P. electric motor. The price of an imported machine is Rs. 800.

Case No. 8: A small industrial unit in Bombay had purchased an automatic two-colour printing machine for manufacturing heat releasing transfers used in the textile and woollen industry. The unit was unable to obtain suitable printing compositions for printing the transfers. The manufacturers of the equipment had given them certain compositions but the ingredients of these compositions were not locally available as they were based on imported materials. More than Rs. 15,000 worth of goods produced by the unit were rejected by the large companies to which supplies had been made, and, finally, the machine was left lying idle. The unit approached the Service Institute for making experiments on the manufacturing process. The Institute analysed the composition used in printing the transfers and found that it did not have the suitable elasticity and adhesion; the composition used to peel off when the transfers were stored for some time. Suitable changes in the formula were made and trials were conducted for a period of one month. Now the unit has gone into regular production and is successfully meeting the needs of the large-scale woollen mills.

D03739

PHYSICAL PLANNING OF INDUSTRIAL ESTATES

by

T.S. Vedagiri, Superintending Engineer
and Secretary, Buildings Projects Teams,
Committee on Plan Projects, Planning
Commission, Government of India

INTRODUCTION

Role and problems of small industries

Small industries[✓] are an integral element of most national planning schemes for industrial development, both in industrially advanced countries and those which are in the early stages of industrialization.

In an industrially advanced country such as the United Kingdom, there has been, especially after the depression of the thirties, a shift of emphasis towards the promotion of small and medium-sized industries with a view to solving the problems of unemployment in selected areas and bringing about a better distribution of industries.

In under-developed countries, the development of small-scale industries is considered as an answer to some of the problems which need urgent solutions, such as increasing employment, mobilizing resources in capital and skill, and achieving a more equitable distribution of income.

In most industrially under-developed countries, the main problems experienced by small entrepreneurs pertain in general to lack or inadequacy of credit for working and fixed capital, and of assistance for improving techniques of production and management, inadequacy of factory accommodations, training facilities, supplies of controlled or imported raw materials, etc.

✓ Small industries are defined, in India, as enterprises having a capital investment of not more than Rs. 5 lakhs (one lakh = 100,000; one crore = 10 million . One rupee = US\$0.21).

In their quest for factory accommodations, small entrepreneurs are confronted with difficulties in obtaining funds for purchase of land and construction of factory buildings, procedural delays involved in purchase of land and building materials, siting the factory or workshop in the vicinity of the sources of raw materials, power, market, trained personnel and labour, etc. Because of these difficulties, small-scale industries tend generally to congregate in crowded lanes and back alleys of large cities and towns. Even in such locations, small entrepreneurs have normally to pay a high rent.

It need hardly be emphasized that accommodation of industries in small and old buildings with bad lighting and ventilation and their concentration in thickly populated localities of large cities and towns are conducive neither to their efficient operation nor to the welfare of the workers and the neighbourhood. Such conditions often create serious problems for municipal authorities. Therefore, provision of proper factory accommodation is an important part of any programme for encouraging the development of small-scale industries. Further, since the provision of proper factory accommodation and of the necessary basic facilities such as electricity and water involves problems usually too big to be solved by the small entrepreneurs themselves, co-operative effort or assistance from the State becomes imperative.

Industrial estates programmes

In the United Kingdom, before the legislation of the nineteen thirties, sporadic attempts had been made to attract new industries to the depressed "Special Areas". Most of these efforts were of no avail. It was seen from that isolated factory sites scattered over a wide area did not offer an adequate inducement and that appropriate locations were required for the establishment of light industries. The authorities, therefore, took recourse to planned development of large industrial areas providing common facilities for a number of industries, and a whole network of industrial estates was established.

The success of industrial estates in the United Kingdom induced the Governments in other countries to explore the possibilities of undertaking such programmes for promoting the planned growth of small industries. In particular, the Government of India decided that the conditions obtaining in the country justified sponsorship of a network of industrial estates by the Government both at the centre and in the states. The sizeable amount of Rs.11 crores was provided for industrial estates in the second five-year plan. About sixty industrial estates were expected to be established by the end of the second plan period. In all, they were to contain about 700

factories or workshops providing employment to about 10,000 persons. The industrial estates programme was closely associated with the industrial extension service, under which the Government of India has sponsored a number of small industries service institutes and extension centres with a view to affording technical assistance and training to small entrepreneurs.

The object of the Indian industrial estates programme is to provide small entrepreneurs with developed plots or factories planned in compliance with health and municipal regulations and equipped with the necessary facilities such as water, sewerage, gas, transport, etc. An important feature of the programme is that it promotes the setting up of common services such as electroplating, heat treatment and the like, to be made use of by all entrepreneurs. By grouping a number of units in this way, it is possible to set up a common organization for the procurement of raw materials as well as for the sale of finished products. The concentration of a number of industries at a place will also facilitate inter-trading and inter-servicing which, ultimately, will reduce production costs. It also makes it easy for the authorities concerned to make provision for other facilities, such as a bank, a post office and an employment exchange and civic amenities like shops, clubs, and recreation centres.

A programme for industrial estates may take different forms. In India, the practice has generally been, so far, to provide not merely developed sites but complete factory buildings and to let these out on rent. For the first few years, the full economic rent is not charged, but it is to be progressively increased year by year so as to reach, eventually, the economic level. Proposals are now under consideration for making factory buildings available on a hire-purchase basis. It is also proposed in some areas to provide only developed sites and leave it to the small entrepreneurs to put up their own factory buildings.

Need for thoughtful planning

The important role which the industrial estates may play in the economy of under-developed countries is obvious. To a great extent, success depends on thoroughness on planning and economy in design and construction of the various facilities. In the competitive world of industry, every avenue of cost reduction should be fully explored, and attention should be paid to every detail.

Preliminary planning

The planning of industrial estates is not much different from that of any big industrial undertaking. The expression "physical planning", as used

here, includes the layout of the estate as a whole, the internal layout of the factory and other technical and structural considerations having a bearing on the establishment of the estate. The preparation of such layouts is possible only when the requirements of the prospective industrial occupants are known with a reasonable degree of accuracy. Both in assessing the requirements and in planning, the principles of "work study" may find an interesting application^{2/}.

Assessment of requirements

It may be useful to undertake an "area development survey" and an "industrial outlook survey" to produce an inventory of the industrial resources and investment opportunities in a region and to determine the technical and economical problems of industries, existing or proposed, with a view to evaluating their expansion potential. Such detailed prior investigations have been used to advantage by private sponsors of industrial estates in advanced countries. They should throw light on the type and area of factories or work-sheds required for different classes of industries, the services desired and the wishes of the entrepreneurs, in particular, whether they need developed land only or a completed factory to be sold or let out on rent or hire-purchase.

One of the purposes of establishing industrial estates is to shift industries from congested urban areas and place them in more congenial surroundings with a view to fostering their growth on sound and healthy lines. There is usually a ready demand from such industries and it is important that this should not hamper the setting up of new industrial enterprises. A survey of existing and potential industries is desirable in order to achieve a balanced industrial development in the industrial estate. Apart from a survey of this type, work study of certain existing industries which need to be shifted to the new area would be useful in order to reveal inadequacies or deficiencies in layout, operation programme, material handling, storage and services. A systematic work study can be carried out with a view to assessing in a logical manner the space and service requirements when extending existing industries and setting up new ones. The institution of a work study programme would be of invaluable help to the planner in the preparation of an efficient layout for the estate as a whole and the individual factory units. The study would throw light on future trends of industrial development in the region, the knowledge of which is necessary for planning the estate in a realistic way to meet the present needs while maintaining adequate provision for future extension.

^{2/} See International Labour Office, Introduction to Work Study (Geneva, 1957)

Site requirements

After having carried out such a survey and work study programme, the next step is to determine the location of the industrial estate or estates in the region. Several considerations come to play in this connexion. The essential requirements relating to a site for an industrial estate are: (a) the site should be fairly level and permit easy drainage; (b) its shape and size should be such as to permit proper orientation of the various facilities; (c) it should be close to the marketing centre; (d) road transport facilities should be available; (e) supplies of water and power at reasonable rates should be ensured; (f) labour should be available nearby; (g) the site should preferably be close to a railway station with good yard facilities.

Need for "all-in-cost study" of different sites

In practice, it is difficult to select a site which will satisfy in full all the above requirements, and some compromises will be necessary. A detailed study of the credits and debits of the various sites and the all-in-cost calculations of each location would be helpful in selecting the site for the estate. Special emphasis must be laid on the all-in-cost study, as the financial disadvantage due to one factor may outweigh the advantages of several other factors put together. Yet, certain intangibles are also to be taken into account and some evaluation should be made of the extent to which such factors may affect the project's over-all economy; in such an evaluation, a good knowledge of local factors and experience may provide guidance. To illustrate the point, the choice may be between (a) a cultivable land near a railway siding and (b) a barren land well connected by roads but away from a railway siding. Assuming that all other requirements are satisfied in both sites, the advantage of the former is that a spur can be taken into the estate when needed; on the other hand, the cost of land may be greater and that of foundation may also work out to be higher due to the lower bearing capacity of the site. In the second case, the cost of land would be comparatively less and there may not be any difficulty regarding foundation. The "all-in-cost balance sheet" would favour location (b). Still, there is an intangible factor which cannot be accounted for in any such calculation, namely, the proximity to the railway line. In such a case, it is for the authorities concerned to estimate its relative importance, now and in the foreseeable future. If small industries which do not normally require a siding are to be set up on the estate, proximity to the railway line would be no advantage and preference would normally be given to the other, cheaper site. Both a critical analysis of the prospective industrial development and the all-in-cost balance sheet of different sites are essential; in the absence of the analysis, preference might be given to a site which might lead to higher construction costs, or, still worse, to higher transport costs which would be of a continuing nature.

Choice of location

In general, three types of locations for industrial estates may be considered: (a) near large urban centres, (b) near smaller towns and (c) in rural areas.

Locations near big urban centres will most probably satisfy all the essential requirements. Entrepreneurs will normally favour such locations as they can easily get their skilled labour and arrange for the purchase of raw materials and the marketing of finished goods. Another advantage is that provided the industrial estate and slum clearance programmes are properly co-ordinated, the industries in slum areas of the city could be shifted to better surroundings. However, there is a serious drawback that such locations will add to the concentration of population and might aggravate slums and blighted areas.

The second alternative seems to be quite promising as most of the advantages accruing from location near large urban centres obtain also in smaller towns without adding to congestion and concentration of population. Land near smaller towns is comparatively cheaper and the towns may be capable of absorbing the additional population attracted by the establishment of the industrial estates.

The third type - location in rural areas - appears at first sight to be a promising means of promoting industrial development in regions which are industrially backward. However, success depends on a number of factors which are not often found present together in a rural area, such as adequate supplies of raw materials, skilled labour, electricity, water and communications. Rural industrial estates should therefore be set up on an experimental basis and be further developed only if these difficulties can be reasonably overcome.

Layout of an industrial estate

How often than not, little or scant attention is paid to layout - one of the important aspects of planning. It should be clearly understood that a poor layout is a source of constant loss. A good layout costs little more to install than a poor one; the additional cost of a good layout is only that of the more careful study that precedes its development. The economies that result from a good layout are, as it were, built-in and accumulate day by day. The losses due to bad layout are also cumulative and it is often difficult and uneconomical to eliminate them.

The layout of the estate should be mainly based on the data collected through the survey of industrial units, their inter-relationship and the

details obtained through the work study programme. Any layout of an industrial estate can be broken down into the following four major components: (a) factory plots; (b) roads; (c) administration and common amenity buildings; (d) open space. Efficiency in planning depends upon the logical juxtaposition of the various facilities, the proportion of plot area to the total area of the estate, the extent and coverage within the plot, and the size of work-sheds and their internal arrangements. It is needless to emphasize that the maximum portion of the estate should be affected to factory plots without hampering transport facilities and giving rise to overcrowding.

Efficient layout is also important from an economical point of view. If the work-sheds are to be rented out to entrepreneurs, the economic rent should allow for adequate returns on the capital invested in land and development, work-sheds and internal services, common facilities and services. Any disproportionate expenditure on common facilities or on roads would tend to increase the economic rent. The success of the estate depends in part on the capacity of the entrepreneur to pay the economic rent three or four years after his establishment on the estate. During this early period, the rent could be subsidized by the Government on a diminishing scale. Any imbalance in planning which would tend to increase the economic rent would jeopardize the very success of the estate. As stated in a report on building projects in India, "the answer to low rent is lower cost of construction and not higher subsidy."

A logical approach to the problem of layout is to consider the ancillaries first, that is, the roads, the open space and the area reserved for common facilities.

Lines of communication

As regards the lines of communication, the prospective intensity of traffic in the present and the foreseeable future may be estimated on the basis of the data collected on the type of industries, the volume of raw materials they require, the volume of finished products expected to be turned out, the number of workers in the estate as a whole, the mode of conveyance needed, etc. Carrying out a detailed survey of this type in some of the existing industrial estates would be of great assistance in anticipating the pattern of development of future estates.

The land width and the carriageway can be determined on the basis of the pattern and intensity of traffic. It is better to start with a minimum carriageway, which could be widened as and when the need arises. To facilitate this, trees, underground cables and utilities should be located so that

3/ Government of India, Committee on Plan Projects, Report on Slum Clearance (New Delhi, 1958)

they would not interfere with the future widening of roads. Also, the length of roads is an important factor in the cost of development. This can be kept to a minimum if the flow pattern of traffic is worked out with some imagination. The estate should be planned in such a way that all roads leading to work-sheds would branch off from one incoming road and lead to another common out-going road. By proper planning, it should be possible to keep the area under roads within the desirable limit of about 25 per cent of the total estate area.

Open spaces

Open spaces are necessary to avoid overcrowding. However, an exceedingly generous provision of open space might result in an inadequate and inefficient utilization of space in the estate which in turn might adversely affect development cost and economic rent. Reserving up to 10 per cent of the gross area of the estate for open space should normally be adequate to meet the requirements of aesthetics and give a feeling of openness.

Factory plots and auxiliary buildings

The above proportions being determined for roads and open spaces, an area of 65 to 70 per cent obtains for work-sheds, common services and amenity buildings. Within this group, the area under common facilities and amenities might be restricted to about 5 per cent, which would leave 60 to 65 per cent for factory plots.

Extent of coverage within the plots

The determination of an optimum percentage for factory plots is only one step in preparing an efficient layout for an industrial estate. The extent of coverage within the plot itself has also an important bearing on over-all economy. It is, however, difficult to propose a ruling percentage for this as the requirements of uncovered area may differ for various industries. For example, a foundry needs a large uncovered area while a manufacture of zip fasteners does not require any. It is thus desirable to classify the plots into two categories - those requiring a large amount of uncovered area and those requiring very little of it. However, in both cases provision must be made for building up a smaller area in the beginning and extending it later in stages. Some zoning within the estate is desirable to group together industries like foundries which require large uncovered areas and segregate different types of industries involving nuisance and hazards.

Types of factory sheds

The next step in physical planning is to determine the number and type of factory sheds, their internal layout, and their structural features and specifications. Again, planning would be based largely on the information gathered through the surveys and work study. The size and shape of work-sheds will naturally depend upon the type of factories to be accommodated. It is a well-known principle in industrial planning that the "layout should be planned around the process and the machinery and building around the layout." This principle, however, cannot be rigidly followed in planning the work-sheds in an industrial estate as these have to cater to a variety of industries. Yet, through a careful study of the prospective industries, it is possible to arrive at a few representative layouts along the lines of which different types of work-sheds can be planned. In planning industrial estates, it should be kept in mind that since a certain number of work-sheds are to be constructed, standardization of elements such as span heights would lead to reductions in the construction cost. It follows that it is not advisable to have a large number of factory layouts presenting marked variations. At the same time, it is not possible to keep down the number of types and sizes to a very low figure since the needs of a number of industries could not be fulfilled. A mean has to be struck taking into account all these factors. For large industrial estates with 150 to 200 work-sheds, it should be possible to restrict the types to five or six.

Sizes of work-sheds

For the types of small-scale industries that are normally located in industrial estates, the floor area inside the work-sheds need not be more than 6,000 square feet. The minimum can be 100 to 600 square feet. The plot area for a small work-shed can be about twice the covered area depending upon the type of industry and its requirements of open space. For a larger one, the plot area need not be more than 1-1/2 times the covered area. It should be left to the entrepreneur concerned to decide whether the covered area should be built to the fullest extent at the beginning or in stages. The industrial estate authorities should frame necessary regulations regarding frontage, front and side setbacks, etc. so that the buildings in the estate would be architecturally pleasing.

Layout of work-sheds

There are several ways of grouping the factory sheds on an estate. The smaller sheds may be of row construction, the medium ones, semi-detached, while the larger ones may be fully detached. Certain advantages are claimed for grouping four factory units as shown in figure 1. This enables an entrepreneur to have two, three or even four units. A serious drawback of this scheme is that it does not allow sufficient cross ventilation.

Shape of plots

A rectangular plot with a length to breadth proportion of 2 to 1 is considered to be satisfactory. For larger plots, a slight departure from this proportion may be necessary. A rectangular shape reduces the frontage on the street and thereby permits to reduce the length of roads and utilities. Further, with a rectangular plot it is easy to site a rectangular shaped factory which, from the point of view of manufacturing operations, is considered desirable. Very narrow or odd-shaped plots should be avoided as they would make the siting of the factory sheds difficult.

Internal planning of work-sheds

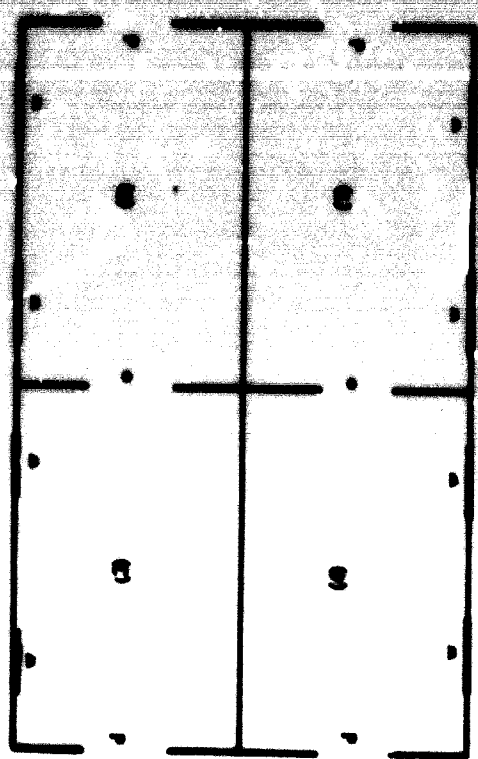
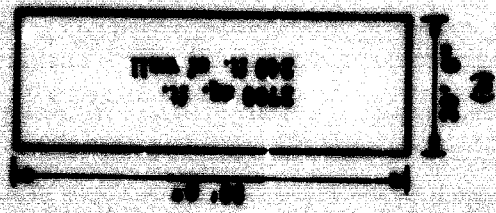
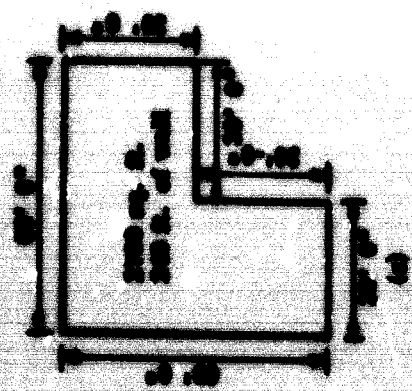
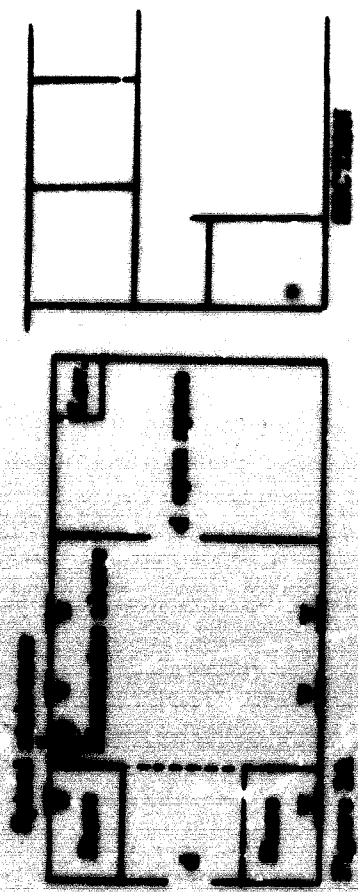
The internal planning of the work-shed deserves serious consideration as the efficiency of performance of the industry depends to a great extent on it. Great attention to details is necessary. All industries will normally require space for a small office, for storage of raw materials and finished goods, for work and for lavatories. It is advisable to plan the lavatories in a separate block within the plot or at the extreme outer corner of the shed itself. Demarcation of internal space for office, store, and other uses, requires a correct knowledge of the requirements of the particular industry that has to be housed in the work-shed. In certain cases it may be desirable to leave the space within the work-shed free so that the entrepreneur would partition it according to his needs. A generally satisfactory way is to provide for a mezzanine in one section of the shed to serve as office, the portion below it being used for storage of raw materials and finished products as shown in figure 2A.

Structure of work-sheds

The structure of the factory building can be made quite simple. The types of industries that are to be located in the estate do not normally require any crango. A height of 14 feet to the level of roof should usually be sufficient. The factory floor can be 6 to 9 inches above the crown of the adjoining road as this will enable easier handling of materials by hand trucks or trolleys. Higher plinth levels would hinder movement and should always be avoided.

Shape of factory

From the point of view of manufacturing operations, a rectangular shape is found to be satisfactory. Generalization, however, is not desirable as the shape should normally depend upon the type of industry, layout of machinery and flow of operations. The shed which is square or nearly square has the minimum wall length. Sketches (a), (b) and (c) show how different sheds with the same wall perimeter give widely different floor areas. Where material saving is of prime importance, the square plan should be advocated.



1000
1000

Figure 1

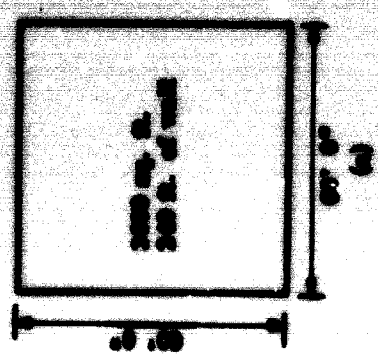


Figure 2

Choice of spans

The spans adopted for roofing should be such as to permit an unobstructed floor space. A column-free area naturally gives greater flexibility for the layout of machinery but extreme extension of the principle may lead to extra cost. The desirability of a column-free area should be properly balanced with the prospective increase in cost of the structure itself. For the type of operations normally involved in the industries located on industrial estates, a span of 30 to 40 feet would appear to be adequate. It is desirable to have two or three fixed spans so that roof elements could be standardized and manufactured on a large scale for cost reduction. For smaller factories, a single span of 30 feet should be adequate; for medium ones one can have a double span of 30 feet or a single span of 40 feet. For larger factories, single or double spans of 60 feet would be satisfactory. The actual arrangement would depend upon the probable layout of the equipment in sheds of various sizes.

Day lighting in work-sheds

For best lighting, the factories should as far as possible be oriented in such a way that their longitudinal axis would run in the east and west direction. In certain countries, there is a school of thought according to which artificial lighting should be preferred to natural daylight. It is argued by the protagonists of this view that the production schedules of most factories include night shifts for which adequate lighting has to be provided in any case. However, men need psychologically to be in close contact with nature and it is increasingly recognized that artificial lighting should supplement natural lighting and should never be made to supplant it. In tropical countries, where there is abundance of sunlight, it should be desirable to take advantage of it and to reduce the recurring cost of artificial lighting.

Window area

In industrial structures, day lighting is generally obtained through roof glazing since windows are of little value in lighting the interior of large halls. In small work-sheds, the width of which may not be more than 30 to 40 feet, lighting from windows would be quite adequate for most operations. In particular, when buildings in tropical countries are aligned in the east-west direction with windows on the north and south walls, the lighting so obtained should be adequate. The extent of window area may vary from 15 to 25 per cent of the floor area.

Principles of roof lighting

Where the width of the factory building is greater than mentioned above, the lighting through windows has to be supplemented by roof lighting. The principal methods for roof lighting are (a) glazing distributed along the slopes of double pitched or curved roofs, (b) saw-toothed roofing where glazing is arranged in one direction and (c) monitors in conjunction with slope roof where glazing is arranged in vertical strips.

Studies conducted at the Building Research Institute in the United Kingdom on the comparative advantages of the above three methods indicate that for the same extent of glazing area, the double pitch roof gives the maximum intensity of well distributed light. The saw-toothed roof comes next. From the cost point of view, however, the saw-toothed roof is costlier by 10 to 15 per cent and its use should therefore be restricted. In tropical countries there does not seem to be any special advantage in using north light roof as the main purpose of giving glare-free light will not be fulfilled in most locations. For areas north of the Cancer or south of Capricorn, the saw-toothed roof (north light or south light respectively) will have an advantage. In other areas and for most of the industries that will be accommodated in industrial estates, the double pitch roof with or without monitor should be sufficient.

Extent of roof glazing

The extent of glazing to be provided in factories is another point which requires careful consideration, especially since the cost of glazing is quite considerable in India and adjoining countries. An effective glazing area of about 20 to 25 per cent of the floor area gives a reasonable standard of lighting in our climate, consistent with economy. Further, to keep down the cost of glazing, it is essential to determine precisely the extent and standard of lighting that would be necessary for various trades.

Ventilation in work-sheds

Ventilation is a problem allied to lighting that requires careful consideration in planning work-sheds in industrial estates. In the present state of the economy of most of the countries in the south-east Asian region, the air-conditioning of interiors cannot be thought of. As a rule, comfort should be ensured by means of natural ventilation, and forced or mechanical ventilation should be resorted to only in exceptional circumstances. In hot and humid regions, the windows and permanent openings should be kept as low as possible to ensure through ventilation at the working level. In arid regions, large window areas would lead to discomfort because of dry hot winds in summer and cold winds in winter, and window areas in such regions can be

conveniently reduced. In work-sheds with gable roofs, windows can be provided in north and south walls and ventilators in the east and west walls. In addition, slots may be provided between the wall and the roof along the eaves of the building. Where monitors are provided, the slots can be fitted in it. Where saw-toothed roofing is provided, ventilators along the longitudinal walls at about one foot above floor level and louvers above the glazing as shown in figure 3 should be satisfactory.

While planning windows or other glazed areas, the architect must consider the following points so that the location and size may be scientifically determined to ensure maximum comfort for work within:

- (a) brightness or glare;
- (b) angle of light;
- (c) heat effects to personnel, materials within;
- (d) drafts on personnel when open;
- (e) resistance to fire, shock and wind;
- (f) access for cleaning or repair.

Should any of these factors be overlooked, the resulting inconvenient positioning of glazing might hamper the working of personnel inside or lead to accumulation of dirt and dust which would further reduce its effectiveness.

Floors for work-sheds

Floors in industrial buildings account for 10 to 15 per cent of the building cost. The important requisites of floors are that they should be strong enough to carry machines, have adequate resistance to shock abrasion or vibration, be non-slippery, noiseless and capable of being kept clean. It is difficult to specify one type of floor which will answer all the requirements. For work-sheds in industrial estates, the floors can normally be of cement concrete 2 to 2-1/2 inches thick laid over a 4 to 6 inch base course of leaner cement concrete. Addition of ironite or rockot to the topping would be advantageous in certain circumstances; however, because of their high cost, these materials should be avoided as far as possible. During construction, it is desirable to lay the top course of flooring after the machinery has been installed. Failure to do so will lead to unnecessary dismantling and relaying.

Doors

The number of entrances and exit doors to be provided depends upon the requirements of each factory. For smaller work-sheds, two doors are usually sufficient. The main door may be 8 x 8 feet while the other may be 8 x 6 feet. The shutters would be of the sliding or rolling pattern.

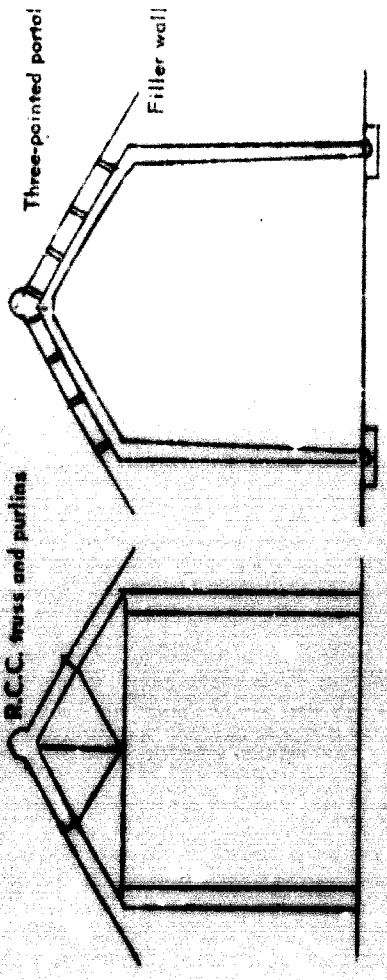


FIGURE 4

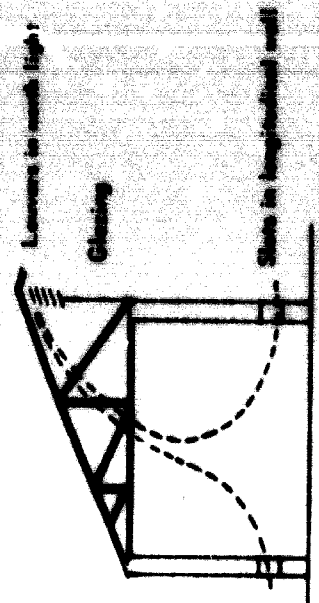


FIGURE 3

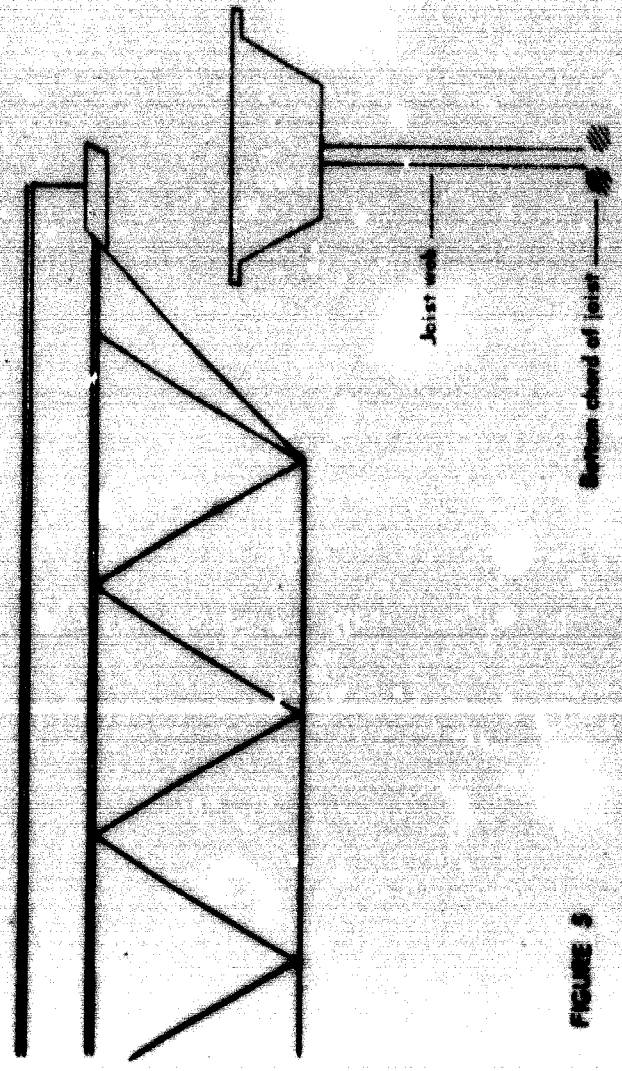


FIGURE 5

Roofing

The roofing of work-sheds will consist mostly of steel or reinforced concrete trusses with covering of asbestos cement sheet or galvanized iron sheet. Use of excessive steel in roofing of industrial buildings, especially of the lighter type encountered in industrial estates, should be avoided due to scarcity of the material in India, Burma and other countries. Alternative possibilities have to be carefully considered.

Consideration of alternative types

There are in general four alternative types of roofing that could be considered for factory buildings in industrial estates. They are (a) timber roofing, (b) reinforced concrete roofing, (c) pre-stressed concrete roofing and (d) steel roofing.

Timber roofing

As a rule timber is not adopted for factory construction because of its low fire rating. This objection, however, cannot have much force in the case of work-sheds in industrial estates since most operations do not involve an appreciable fire hazard. Further, there are ways of increasing the fire rating of timber through proper treatment.

In recent years, a considerable amount of research has been done in the use of secondary species of timber for construction. Laminated construction with nailed joints or connectors have become popular in the United Kingdom and other countries. The Forest Research Institute in India has also conducted useful experiments in this line and has evolved trusses of a 50 to 60 foot span.

The adoption of secondary species of timber for structural purposes is especially important in India to avoid excessive dependence on teak and sal which are in short supply. The programme of industrial estates offers a good opportunity for adopting treated timbers. An important pre-requisite in adopting such trusses is the facility for seasoning and treatment. As any industrial estate programme involves the construction of several sheds requiring a large number of trusses, there should be no difficulty in setting up a seasoning and treatment plant in the vicinity.

Reinforced concrete roofing

Reinforced concrete has wide applications in factory construction. Combined with the technique of pre-casting, it offers an economical and

speedy method for putting up industrial structures. As any industrial estate programme has the advantage of repetitive work, there is a considerable scope for exploiting the possibilities of pre-casting. The roofing may consist of pre-cast trusses and purlins or pre-cast portals and purlins (figure 4). In the latter case, the walling can be only of the filler type. It may be either of brick or pre-cast concrete blocks depending upon the relative economy of materials.

Application of the technique of pre-stressing

There has been rapid progress in the past two decades in the development of pre-stressed concrete as a potential building material. Application of pre-stressing to trusses of 40 foot span or over would prove quite advantageous and economical. In such truss construction, only the tie need to be pre-stressed. This reduces considerably the steel consumption and self-weight of trusses. The pre-stressing technique is quite simple and can even be done at site by trained gangs.

Steel roofing

As explained earlier, steel roofing should be considered as the last alternative. Even when steel has to be used, there are several ways of reducing the amount of steel which should be fully explored. The tendency to adopt standard north light trusses or fink trusses with purlins made up of T sections or angles should be discouraged.

Adoption of space trusses and purlins

It is well known that adoption of space trusses and purlins would lead to appreciable saving in materials. Added to this is the technique of welding which is now quite well-established. Several types of pre-fabricated purlins and rafters are available in the United States (figure 5).

With the development of a steel industry in the country, it should be possible to set up plants to manufacture such standardized roof elements for different spans and loading conditions. The adoption of such light gauge built-up sections will lead to considerable savings in cost and materials in addition to facilitating quick erection.

Selection of the type of structure

Several alternatives for the structure of work-sheds have been outlined. Selection of the type to be used at a particular place depends upon the relative economy. Comparative costing of the possible alternatives should always be done taking into account not only the initial cost of construction but also the cost of maintenance. Some systematic economy studies should

be initiated before making the final choice. There are a number of methods outlined in standard books for undertaking such studies. The author's experience suggests that the "present-worth cost method" is best suited for application to buildings as it takes into account the differences in the life of the alternatives considered. A brief description of the method with a worked out example is given in appendix I.

* Planning for services

The next consideration in physical planning relates to the services provided in an industrial estate. Normally, water supply, surface drainage, sewerage, electricity for lighting and power are the common services provided for. Gas, steam and compressed air may be needed by certain industries. In such cases it may be preferable to group together the industries requiring these facilities in order to minimize the load of distribution and maintain uniform pressure.

Water supply

The amount of water required will vary widely and should be calculated on the basis of a detailed study of the requirements of each industry. For general purposes the water supply requirements can be reckoned on the basis of 5 to 10 gallons per day per head of population in the estate. Additional provision may have to be made for fire-fighting. As a rule, very few industries will require an overhead sprinkler system for extinguishing fires within the factories. It may be convenient to get water in bulk from the municipality or any other body in charge of the town's supply and distribute it to the units in the estate according to requirements. An overhead reservoir may be required for balancing purposes and also for producing the necessary head required in certain industries.

Surface drainage

Surface drainage is another item of importance in the scheme of planning for services. Inadequate attention to this in early stages may lead to flooding of the estate and consequent damage to structures and equipment. Open drains with brick pitching on both sides of the main road and on one side of subsidiary roads would be an economical and satisfactory solution. Where drains become deep, an underground piped system with concrete pipes can be adopted. The storm water must be led off into a natural drainage nearby or connected to the main storm water drainage of the town.

Sewerage

It goes without saying that the estate should be adequately sewered. The main sewer can be connected on to the sewerage of the town or may be led

to a separate treatment work. Normally, there will be no industrial wastes of complicated character in an industrial estate since noxious industries are prohibited. Yet, the effluent from some industries may be of this type; in such cases, pre-treatment of the effluent should be insisted upon before connexion is made to the sewerage system of the estate.

Power

The power requirements of the estate depend upon the actual requirements of industries. It will be advantageous to buy power in bulk and step it down to the required voltage for distribution within the estate. Overhead wires for distribution are normally cheaper but from the point of view of safety underground conduits should be adopted.

Street lighting

As a rule, street lighting will not be a big problem on an industrial estate as there will be rarely more than two shifts working. The lighting can therefore be confined to a minimum consistent with security requirements, but care must be taken to provide adequate peripheral lighting.

Special services

As indicated earlier, industries requiring special services, such as gas, steam, compressed air, etc. should be grouped together so that the generating plants can be located more or less at the centre of gravity of the load.

Telephones

Since provision of individual telephone connexions in industrial estates may prove to be very expensive, a local exchange with 50 to 100 lines, located in the administrative building, would serve the purpose. The external lines need not be more than five or ten at most.

Banking facilities

Provision of banking facilities in an estate is a convenience to industrialists in making cash withdrawals and deposits in their day-to-day transactions. In India, branches of the State Bank of India are being established in some of the industrial estates for extending credit facilities to industrialists. This is a step in the right direction and provision for this should be made in all industrial estates excepting those where banking facilities exist close-by.

Civic amenity and administration buildings

Among the buildings for civic amenity are a canteen, first-aid unit, club and recreation centre. Most of these facilities may be provided in the administration building. This should be so located that it would be easily accessible both from the outside and from the factory area. The administration building may also contain a small exhibition centre where the articles of the various manufacturers can be displayed. It may be desirable to plan for three or four suites of rooms with attached baths in the top floor of the administration building which may be used by visitors to the estate or by the entrepreneurs themselves.

Maintenance of the estate

In the day-to-day administration of the estate, the problem of maintenance will figure prominently. The requisite staff for maintenance should be provided for from the very beginning and be attached to the general administration. The maintenance staff should have one or two rooms at its disposal in the administration building. It also should have a room for storing its materials and equipment.

Caretaking and conservancy

It has been mentioned earlier that at the time of site selection, care should be taken to ensure that no undue expenditure be incurred on providing residential accommodation for the employees. However, quarters for the essential caretaking and conservancy staff may be provided at a suitable location in the layout.

Common technical services

It should be stressed again that one of the important advantages of industrial estates is that certain services like electroplating, heat treatment, etc. can be provided on a common basis to the entrepreneurs. This obviates the need for the entrepreneurs to invest an important proportion of their capital on services which they will not require on a full-time basis. The type and extent of such services should be ascertained before time and suitably provided for in planning. The buildings housing these services should be located near the work-sheds requiring them. The establishment of service institutes in or near industrial estates to train technicians in different lines should be correlated with the pattern of allotment or work-sheds to the industries. This will provide maximum advantages both to the institutes and the entrepreneurs.

Provision of general warehouses

There may be distinct advantages in providing small industrial plants, such as those located in an industrial estate, with general warehouses, space within which would be let out for rent. Such warehouses may be operated by the estate itself or by private enterprises or on a co-operative basis. The raw materials required for the various industries in the estate and the finished products can be stored conveniently and economically in warehouses planned and constructed specifically for storage purposes. The existence of independently operated warehouses for stocking raw materials and finished products would also facilitate the award of credit facilities to the entrepreneurs.

Design of warehouses

The rapid changes in materials handling and the possibilities afforded by the use of "built-in" or "run through" facilities have revolutionized the planning of warehouses. Palletised storage dictates to a great extent the choice of spans and spacings of structural framework and the height of warehouses. It is the experience today that it is profitable to have a ceiling height of at least 20 feet and a bay size of 30 by 40 feet for effective space utilization.

Flatted factories

So far, the discussion has been concerned with the planning of industrial estates with normal single-storeyed shed-type factories. A marked deviation from this is now being tried in certain countries such as the Netherlands, Belgium, Sweden and Denmark where industries are grouped in multi-storeyed structures. Technically known as "flatted factories", these are intended to be located in the very heart of the city to provide adequate communication with clients and good transportation facilities for the goods as well as the employees. In India too, the construction of a flatted factory is being under-taken in Bombay. The construction of such factories poses a number of problems which, if not taken into consideration at the initial stages, may lead to an over-concentration of industries resulting in traffic congestion and the development of slum conditions. Within the building itself, the problem of transport of goods and employees from floor to floor does not lend itself to a satisfactory solution. Provision of ramps leads to waste of costly space and lifts and hoists are expensive to install and operate. The cost of the building itself would be very high; added to it would be the cost of the special services necessary for flatted factories. On the whole, the flatted factories do not seem to be a promising proposition in most countries in the south-east Asian region except in stray cases when one is constrained to put up a group of industries in the thickly populated area of a city where land is scarce and very costly.

Need for a master plan of the estate

In the previous paragraphs, the main aspects of physical planning have been considered with reference to the preparation of a comprehensive layout for the industrial estate. The layout should naturally take into account a provision for future expansion. It is always advisable to prepare the plan of a complete estate and then phase out the construction according to the needs of the situation instead of planning in parts. In the latter method it is difficult to get a picture of the estate as a whole and the lack of appreciation of the global plan may lead to a defective or inadequate provision of facilities which will give rise to improvisations and adjustments not conducive to efficiency or economy. The plan at the end of the report shows a typical layout for an industrial estate.

Phasing of construction

Proper phasing of construction is of utmost importance, especially in a developing economy. Every rupee has to be conserved and the expenditure at any point of time should be commensurate with the returns. The success of a project can be adversely affected by injudicious phasing of work or inappropriate programming of its various elements. A balanced phasing of work requires skill and ingenuity. It should be borne in mind that it is not the quantum of expenditure that marks the success of planning; it is the attainment of physical targets in a logical sequence relating costs to benefits at every phase of the project.

These criteria are essential in phasing an industrial estate programme. The distribution of most of the utilities to the components may be done as and when each area of an estate develops, but their main intake or outfall may be provided from the earliest stage. Roads may be constructed to narrow width to start with and can be widened later on according to the demands of traffic. The administrative building and certain other common buildings need not be put up in the first instance. The canteen can be constructed in one of the small work-sheds while another work-shed accommodates the administrative office. Construction of these buildings can be taken up when the estate expands and there is pressing need. Such phasing would minimize expenditure in the initial stage and increase it progressively as the estate prospers. It would also affect directly the economic rent of the work-sheds and would help in keeping the rent within reasonable limits.

Programming the programme

The programme should be the programme of various components of works. The "time-phasing" can be done in a variety of ways and in each programme the programme should be well defined and clearly stated in its

construction illustrate the application of line of balance technology in programming several facilities in an industrial estate. The preparation of such a chart requires orderly thinking on the part of project officials in devising the various controlling steps and their logical sequence in time and causation. In such an analysis it is difficult to overlook any item of importance. Determining the time schedule for the components indicates when the different tasks have to be started to keep in phase with the conceived target; it also leads to a logical assessment of the over-all time required for completing the project. During the execution of the work, the line of balance can be struck at periodical intervals with a view to ascertaining the pattern of imbalance of the various constituent elements. This enables the management to take corrective steps in time to restore the balance, or to readjust the objective itself.

Reduction of cost

In the preceding paragraphs, an attempt has been made to highlight the importance of layout, the essential elements of physical planning, correct phasing and proper programming of work, as means of achieving efficiency and economy in planning and constructing industrial estates. Since cost is a primary consideration, particularly in developing economies, some of the subjects discussed earlier are briefly examined now from the standpoint of cost reduction.

Proper planning

Proper planning is one of the main avenues of cost reduction. It is not always fully appreciated that the time spent on systematic and integrated planning will pay for itself. Attention to details and advance indenting for materials will lead to savings in cost and time.

Careful choice of site

Land and development costs amount to nearly 15 to 20 per cent of the cost of the estate, and great care is needed in selecting the site so that the costs of development and foundations would not become excessive. As mentioned earlier, the preparation of all-in-cost details for alternative sites would be a good guide in such selection.

Efficient layout

Efficient layout is another factor which has a direct bearing not only on the initial cost but also on the rent that has to be charged to the entrepreneurs. To achieve good results, architects and planners should plan the layout in such a way that the figure of design efficiency would be 60 to 65 per cent. (The figure of design efficiency is the ratio of plot area under

work-sheds to the total area of the estate).

Standardization

Achieving a degree of standardization is equally important in any scheme of cost reduction. As an industrial estate programme offers good scope for repetition, the roofing elements, doors and windows of work-sheds can be standardized and manufactured on a large scale. Pre-cast construction can be effectively adopted for roofing as well as for the frames of doors and windows. Keeping the number of spans to a minimum is another way of reducing costs.

Judicious choice of materials

Economy cost can also be achieved through a judicious choice of materials for construction. Where bricks are available, they are invariably the cheapest materials for construction. In places where stones are available, stone masonry construction may be economic. Where the soil does not permit the manufacture of good bricks, the possibility of using solid or hollow cement concrete blocks should be explored. In areas where timber is in plenty, timber trusses and purlins can be adopted. As mentioned earlier, the possibility of using secondary species of timber for structural purposes should be fully explored in order to reduce the demand on other species of timber which may be in short supply. At present, steel is not available in required quantities in most of the countries of south-east Asia. Its use should, therefore, be restricted to the barest minimum. As now steel factories are set up and the supply of steel improves, the fabrication of standard types of bar joists and other roof elements so successfully adopted in the United States should be undertaken.

Methods for getting fast returns on capital

A related problem is that of obtaining maximum returns out of the amount earmarked for the development of industrial estates. This is of particular importance since, in the existing scheme of priorities, any diversion of funds, for instance for the industrial estate programme, would affect developmental activities in other spheres. Steps permitting to obtain fast returns on capital investment would accelerate the pace of turnover. One of the ways of achieving this object is to sell developed plots to entrepreneurs who would put up their own buildings in accordance with certain standards laid down by the authorities. Another way is to encourage co-operative societies to put up industrial estates by giving them land and providing them with utilities and other facilities. Such steps would reduce the outlay and make it possible for the money earmarked for the programme to go a little further.

An attempt has been made in this paper to highlight the importance of layout, the different aspects to be considered in physical planning and the methods to achieve cost reduction in planning and building industrial estates. The author hopes that the material in the paper will be of use to the authorities in charge of planning industrial estates in the south-east Asian region since the economic background and the availability of materials and skill are more or less the same in most countries in this region. He is thankful to the United Nations for giving him an opportunity to present this paper before the Seminar on Industrial Estates in the ECAFE Region and to the Government of India which has permitted him to prepare the paper and contribute to this project.

SELECTED REFERENCES

- R. Muthor, Practical Plant Layout (McGraw Hill, New York, 1956)
- F.W. Dodge Corporation, Buildings for Industry (New York, 1957)
- Government of India, Committee on Plan Projects, Report of the Selected Buildings Projects Team on Industrial Estates (New Delhi, 1959)
- Government of India, Committee on Plan Projects, Report on Slum Clearance (New Delhi, 1958)
- National Productivity Council, Report of the Productivity Team for Factory Buildings Layout and Construction (New Delhi)
- William Brode, Industrial Estates - Tool for Industrialization (Glencoe, Illinois, 1960)
- Government of India, Committee on Plan Projects, Planning and Programming of Works (New Delhi)
- E. Paul De Garmo, Engineering Economy (New York, 1960)

APPENDIX I

Comparative cost study of alternative structures for work-sheds

There are a number of methods of making the detailed economic analyses needed for selecting the type of structure of work-sheds in industrial estates. Each has its own merits and sphere of application. In the author's opinion, the "present-worth cost" method is the most advantageous for civil engineering structures, as it takes into account the difference in the life of structure and the variation in yearly expenditure.

In making this analysis, the present worth of lump sum expenditure and recurring expenditure is determined. It is customary to include the first cost of all assets, thus eliminating the need for considering the depreciation or amortization costs. Using this general concept, the basic pattern for a present-worth cost is:

$$C + (O+M+I) 1v^1 + (O+M+I) 2v^2 \dots\dots\dots + (O+M+I) Lv^L$$

where C equals first cost of assets; O, operation charges; M, maintenance charges; I, interest on (borrowed) capital and v the present-worth conversion factor.

Applying this principle, economic analyses have been made of two alternative structures for work-sheds, namely, (a) reinforced concrete (RCC) columns, steel trusses and galvanised iron (GI) sheet roofing and (b) RCC gable frame with RCC purlins and asbestos cement (AC) sheet roofing; the results are tabulated in tables I and II.

The present-worth cost of alternative (a) on the basis of cost of construction and maintenance prevalent in Delhi works out to Rs.13.66 per square foot of shed area while the present-worth cost of alternative (b) on the same basis works out to Rs.10.27 per square foot of shed area - a figure lower by about 25 per cent than in alternative (a). The choice should therefore fall on the latter.

The importance of such an analysis lies in the fact that it takes into account not only the capital cost of construction but also the cost of operation and maintenance throughout the life of the structure. Where the lives of two structures are different, the effect of this is also reflected in the analysis.

Table I PH.S.MT.-WORTH STUDY OF SMALL T.OSS CONSTRUCTION

Data:

- (1) Shed area: 6,000 square feet
- (2) Capital cost: Rs. 60,000
- (3) Rate per square foot of shed area: Rs. 10.00

Sl. No.	Description	Quantity	Rate Rs.	Per Unit Amount Rs.	Sinking Fund factor $i = 4.5\%$	Sinking Fund value
(1)	(2)	(3)	(4)	(5)	(7)	(6) : (8)
I. Maintenance						
1.	White washing - every year	10,000 sft.	0.62	100 sft	1.000	62.00
2.	Painting wood work - once in 3 yrs.	400 sft.	7.50	100 sft	3.133	9.57
3.	Painting iron work - once in 4 yrs.	2,500 sft.	7.50	100 sft	4.267	44.00
4.	Painting G.I. sheet - once in 4 yrs.	11,500 sft.	7.50	100 sft	4.267	202.25
5.	(a) Replacing G.I. sheet - once in 10 yrs.	9,000 sft.	85.00	100 sft	7.650	
	(b) Replacing eave gutter - once in 10 yrs.	312 rft.	3.80	rft	1.186	
	(c) Replacing ridge - once in 10 yrs.	156 rft.	2.24	rft	<u>399</u>	
	(d) Deduct salvage value of 20% G.I. sheet $9,000 \times 80/100 = 7,200$				9,255	
	eave gutters $312 \times 3.75 = 1,170$					
	Ridge $156 \times 2.19 = 342$					
					<u>1,712</u>	610.80
					<u>7,493</u>	
6.	Miscellaneous					<u>71.38</u>
7.	Total annuity of maintenance					<u>1,000.00</u>

Table I. (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
8. a)	<u>Present worth cost of maintenance</u> Present value of annuity of 1 for a period of 75 years at 4.5% compound interest = $\frac{1}{i} - vn \text{ where } vn = \frac{1}{(1+i)^n}$	= 21.401					
b)	Present worth cost of maintenance per square foot of shed area						
II.	<u>Capital cost</u> Cost per square foot of shed area:						
		60,000					3.57
		<u>60,000</u>					
					$\frac{1.000 \times 21.401}{6000} =$		
III.	<u>Present cost of trusses replaced at 50th year cost = 15,000</u> Present value of 1 = $\frac{1}{(1+i)^n} = 0.1109$						
	Present worth cost per square foot of shed area:						
		15,000					0.28
		<u>6,000</u>					
IV.	<u>Total outlay</u>						13.85
V.	<u>Product:</u> Present value of the truss replaced at 50th year = 15,000 x 25% = 3750 Present worth cost per square foot						0.08
		3,750					
		<u>6,000</u>					

Table II
PRESENT WORTH COST OF R.C.C. GABLE ROOF CONSTRUCTION

Data:
 (1) Shed area: 6,000 square feet
 (2) Capital cost: Rs. 50,000
 (3) Rate per square foot of shed area: Rs. 8.33

Sl. No.	Description (2)	Quantity (3)	Rate Rs. (4)	Per Unit (5)	Amount Rs. (6)	Sinking Fund factor (7)	Sinking Fund value (8)
I.	Maintenance						
	1. White washing - every year	10,000	0.62	100 sft.	62	1.000	62.00
	2. Painting wood work - once in 3 yrs	400	7.50	100 sft.	30	3.133	9.57
	3. Painting iron work - once in 4 yrs	1,500	7.50	100 sft.	113	4.267	26.49
	4. Replacing asbestos sheet - once in 15 yrs	9,000	80.00	100 sft.	7,200		
	Ridge - once in 15 yrs	154	3.80	fft.	585		
	Eave gutter - once in 15 yrs	308	2.24	fft.	690		
					<u>8,475</u>		
	Deduct salvage value						
	Sheet 5%)						
	Gutters 5%)						
	Ridge 5%)						
	Miscellaneous						
					<u>24</u>	20.156	399.45
					<u>8,051</u>		<u>52.0</u>
							<u>550.00</u>
	6. Present worth cost of maintenance per square foot						1.97
					<u>550 x 21.401</u>		
					<u>6,000</u>		

II. Deduct salvage cost
 (a) Roof, doors, frames, etc. lump sum = 3000
 (b) Present worth cost ... 3000 x 0.0369
6,000

Net (1.96 - 0.02) 1.94

Table II (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
III.	<u>Capital cost:</u>						8.33
IV.	<u>Present worth cost of capital and maintenance per square foot of shed area:</u>						Rs. 10.27

Note: The operation charges (C) and interest in capital (I) have not been considered for comparison since they are almost identical for both.

APPENDIX II

Application of line of balance technology to the planning of an industrial estate

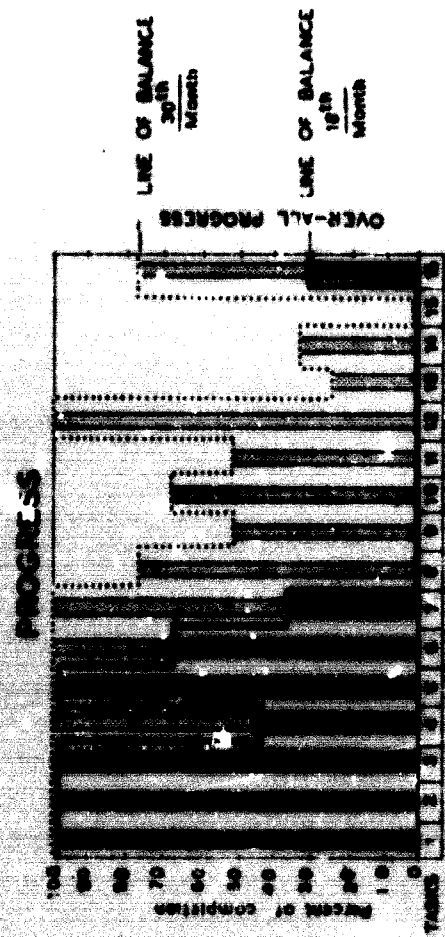
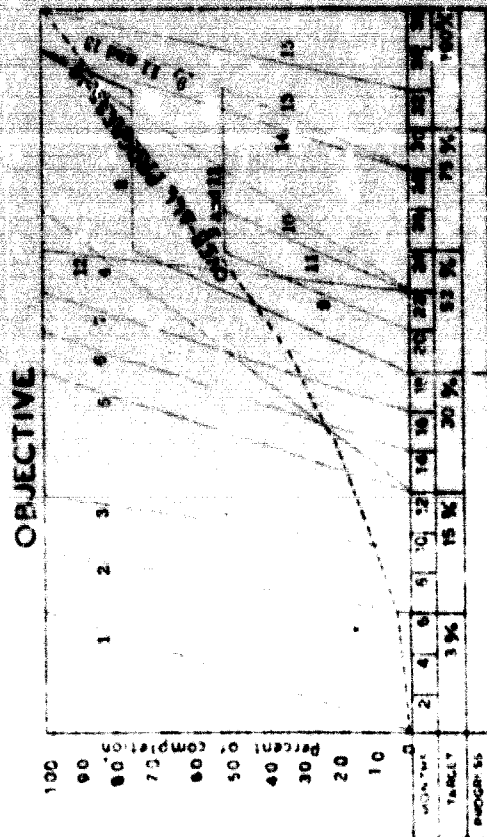
The scheme considered here is the setting up of an industrial estate with 100 work-sheds and other appurtenant works in a projected period of three years. The programme is so phased that fifty work-sheds would be complete in all respects at the end of twenty-six months after the start and the rest at the end of the three-year period. The progress in completing the programme is depicted by the dotted line of the "Objective" graph.

The "Programme" chart depicts the key operations and their lead time relationships up to final completion. The curves for individual tasks in the "Objective" graph have been drawn from this chart.

The "Progress" chart depicts the progress and the line of balance. The line of balance has been drawn for two points of time, namely eighteen months and thirty months after the start of work. The lines indicate what should be the progress with respect to each task on the date of study so as to be in phase with the schedule of completion. The progress at each point of time can be worked out to see whether it is in phase with the objective or not. If the bar charts of certain items are below the balance line, the management has to pay particular attention to those items. On the other hand, if the bars reach above the balance level, they indicate that the pattern of investment needs to be checked. In either case the management can take a conscious view of the situation.

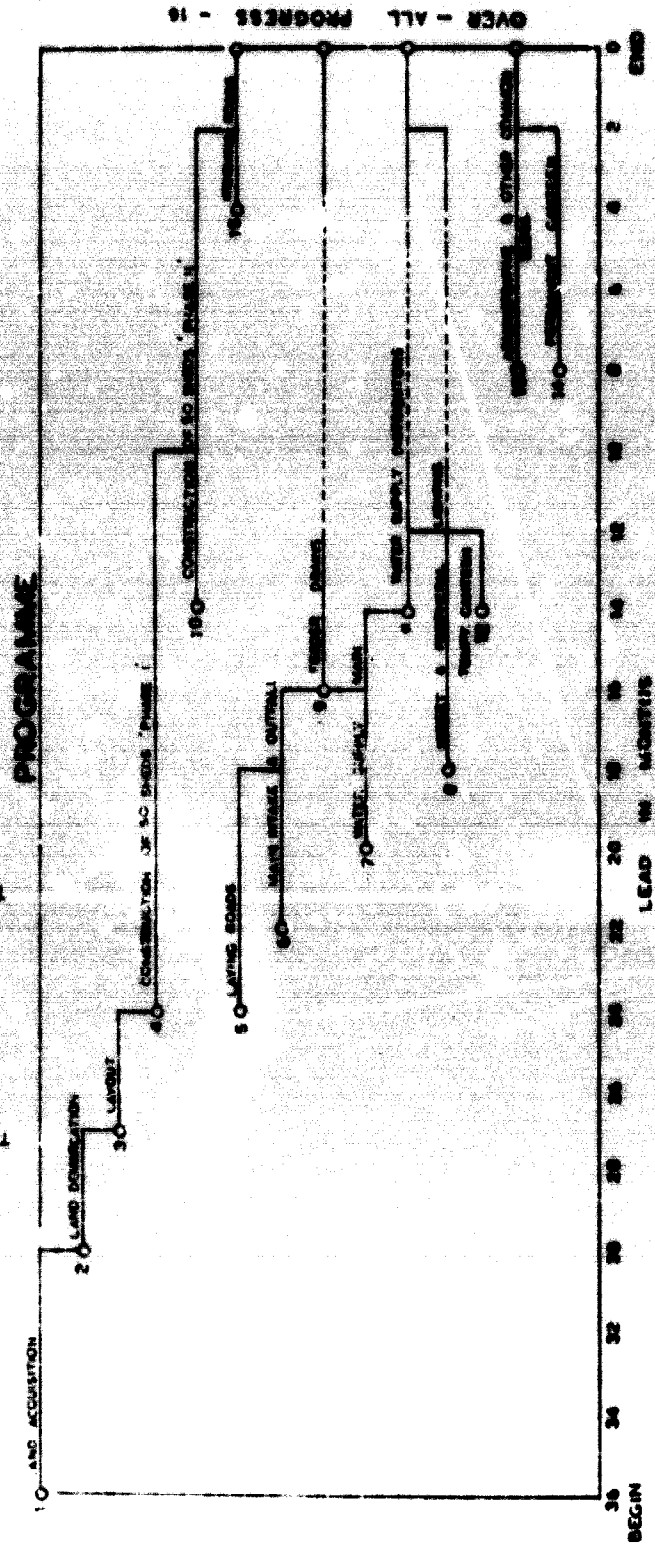
The preparation of such a chart will enable the management to take corrective steps in time to restore the balance or readjust the objective itself.

APPENDIX II
PLANNING OF AN INDUSTRIAL ESTATE
 Application of Law of Balance Technology



Time of study

Time of study



OVER - ALL PROGRESS - 11

BEGIN

LEAD IN MONTHS

END

D03740

ESTABLISHMENT OF INDUSTRIAL ESTATES IN A RURAL SETTING

by

Y. Lang Wong, Consultant, Stanford Research Institute

The object of this paper is to examine the problems raised by the lack of essential services in many of the rural areas, and to set out the requirements for establishing rural industrial estates, taking into consideration the systems of rural economy, sociology and community organization prevalent in many countries of the ECAFE region.

While there is now considerable experience in, and knowledge of the establishment and operation of industrial estates in or near large towns, only limited efforts have been directed towards the development of industrial estates in the rural setting. The problems posed by the latter are peculiar to it and somewhat different in nature from the former; not all of the experience gained thus far with large town-based estates is applicable here.

Experience indicates that the most successful industrial estates have been those located in close proximity to cities and, to a somewhat lesser degree, in large town areas. This may be attributable to the fact that such locations are better situated in respect of markets for manufactured products, dependable raw material sources, reliable and up-to-date information on market conditions and business trends, and close contacts with prospective buyers. The adequate credit and banking facilities available in cities and large towns have been helpful to small enterprises. The proximity to government offices has expedited licensing and the obtaining of permits for rationed raw materials, and the securing of contracts for government purchases. The closeness to large industries in cities has allowed for the development of ancillary relationships between small and large industries.

Some industrial firms in the cities have sought space in rural estates nearby to expand their business, notwithstanding higher costs due to additional charges for handling and transporting raw materials and finished goods between the estate and city factories and godowns; it is true that such increases are partly offset by appreciably lower rental terms and wage rates; labour, however, is less efficient.

In contrast, smaller estates situated in outlying towns have fared less well. Factors peculiar to the rural environment, such as remoteness from large markets, lower purchasing power, poor communications, lack of

electric power, absence of banking facilities, and so on, pose a different set of problems. These questions are discussed in the following sections.

Economic aspects

In a broad sense, the expression "industrial estate in a rural setting" would include all estates located in rural areas, regardless of their size. However, the expression is commonly understood to refer to the smaller sized estate located in such areas, which cater to the needs of small enterprises. Some estates located on the outskirts of large towns might belong to this category. The term "village workshop" is often used for rural industrial estates located in villages with a population of 5,000 or less, devised to upgrade the skills and modernise the operations of local artisans. In general, industrial estates located in or near small towns are considered as rural industrial estates.

Governments of the ECAFE region often offer special inducements and liberal terms to prospective occupants at the early stages of establishment of industrial estates. It is intended, however, that each estate should eventually be self-managed and self-supporting. Governments providing only certain forms of assistance, mainly industrial advisory services. In rural areas, it is very important to promote the development of industrial estates only in those locations which have a growth potential, and where there is a genuine interest for industrial entrepreneurship on the part of the local business community.

Location

Selection of location for rural estates should be made with utmost care, on the basis of economic and social - not political - considerations. Quick feasibility surveys should be made, taking into account the extent of present markets and their possible expansion, the potential for industrial growth, and the type and amount of assistance that can be given. Early success is likely to be achieved in rural estates situated in well populated areas, where there is already some industrial activity, access to markets, and good transport facilities not only with the surrounding rural areas, but with more distant centres as well. It makes good sense to develop rural estates outwardly and progressively around cities and industrializing towns, rather than to establish them in thinly populated, remote and isolated areas. A progressive linking up of fair-sized towns with industrially developing rural areas would foster a mutually beneficial growth process.

Rural estates should be set up in those village and town centres which are the natural economic foci of the surrounding rural areas. Such centres

are usually well known for their regular or specialized markets, and buyers come there even from fairly distant towns. In many cases, some industry, usually in need of improvement, modernization or expansion is already established there.

Estates located in such centres would be sound. Whenever possible, a rural industrial estate should be built around a common facility serving the needs of many occupants. Such a joint facility would help to improve the quality of their products, and lower their costs of production. A reduction in costs, particularly of products for which demand is elastic, permits the expansion of existing markets and the development of new ones. This in turn would stimulate further production, develop new entrepreneurship, and provide new employment opportunities. A more efficient production, and an improvement in product quality, would enable the enterprises in the rural estate to compete effectively in the more discriminating city markets. The expansion of the local market would be an incentive to go into production, which otherwise might not have been possible, since even the smallest production unit has often a capacity which far exceeds the demand of the local rural market.

Commercial centres for farm produce are potentially good locations for rural industrial estates. Farmers bring in their produce to the market, and have cash to spend. Buyers of produce also often bring goods to sell. In such centres, rural estates could be established around agricultural processing activities such as rice, flour and oil milling, and provide a shop for servicing farm tools and transportation equipment. In time, small units could spring up turning out manufactured products needed by the rural buyers.

The best locations for rural industrial estates are thus: (i) centres where a well-known product having an extensive market outside the area is already produced, and where there is a need for a common facility operation, and (ii) centres which are natural markets for farm produce and distribution points for shipping farm surplus outside the area, and where there is a need for developing agricultural processing facilities. These two cases may be illustrated as follows:

A village or a cluster of villages are nationally famous for their handloom products. Several thousand looms are in operation in the area. Each week, a textile market brings out thousands of weavers with products to sell. Although the railway station is many miles away, large numbers of traders come by road and rail from places as distant as 500 miles to buy wholesale and retail. They often bring also products to sell and a large volume of business is transacted.

There is no electricity in the area. A co-operative calendering mill generates its own power. There is scope for a second calendering unit, and for a yarn dyeing plant. These two needed facilities may form the base for a rural industrial estate. A small machine shop equipped with forge and foundry would provide servicing of farm implements and transport equipment, adding special repair equipment, for instance, a welding set, in the course of time. A second shop might grow out of the first one, to do specialized foundry work and to make loom spares and replacement parts for bicycles and sewing machines. Village carpenters might require lathes for turning, or the facilities of a joinery for making cut pieces for their village shops. Demand may develop for steel trunks, simple lanterns, tin boxes, and other items of manufacture. Since this is also a farming area, there is scope for establishing mills to process farm produce. Although the local population may be small and have a limited purchasing power, there are good prospects for industrial growth. With proper publicity and promotion, the local population and the buyers of textiles from outside the area can become good customers for other products as well.

In an assembling centre for farm produce, a rural industrial estate might be set up around a number of processing facilities for rice, flour and oil. An agricultural implement workshop may be established and extended later on to fabricate simple improved equipment such as paddy weeders and wheat threshers. Such centres are likely to have good links with outside areas through well developed road transport. A good motor repair workshop may be needed to undertake engine and body repair work, and tyre vulcanizing. Other development possibilities such as those mentioned in the preceding paragraph may also be envisaged here, since farm produce marketing centres could also serve as distribution points for the sale outside the area of locally manufactured articles.

Other potentially good locations for rural industrial estates are villages where there are concentrations of single types of artisans whose products are in good demand, and the markets for which can be expanded if better production facilities are introduced. Thus, a blacksmithy village specialising in the making of sickles, daggers and tapping knives in the traditional manner could benefit from the establishment of a modern heat treatment plant. Eventually, this would permit a branching off into the manufacture of finer lines such as table cutlery, stainless steel articles, and building hardware. Similarly, the introduction of certain machines for joint use in a cobblers village would reduce costs, produce better finish, and thereby broaden markets, as well as make possible the development of new lines and styles of shoes. Last copying units could be set up to produce wooden lasts for new styles in standard sizes. The establishment of allied industries could be stimulated, such as production of belts and straps, suitcases and hold-alls, suitcase hinges, locks, and

belt buckles. A small electroplating plant may be needed. Similar possibilities for rural estates exist in villages which have sufficient concentrations of tanners, potters, and other craftsmen, and where full use of common facilities would be warranted.

The above discussion suggests that the size of population in the area surrounding a proposed rural industrial estate, while important, need not be the determining factor in the final selection of the estate's location, provided the village or town centre chosen has long-established and extensive trade connexions with markets outside the area. As regards the new lines of manufacturing activity which might eventually be taken up by local enterprise, account should be taken not only of local advantages, but also of the future competitive position, should the production of similar lines be undertaken in those outside areas where it is planned to market the products in question. The outside buyer who comes to trade may hold the key to this situation. The extent to which his inter-area trading activities can be developed will be the deciding factor.

In making the final choice of location, account should be taken of the impact that large-scale factories may have on the development of small industries in rural areas. In many instances, small feeder industries can be developed to supply certain needs of large mills, and equipment maintenance and repair services can be provided by a general workshop located in the rural estate. In general, the presence of a large industry will lend support and provide strength to a rural estate.

When rural estates are located near large towns, the conditions for growth are especially favourable because of the larger local market and the presence of large numbers of itinerant traders. When the estate is to be located on the outskirts of a town, it should be outside that end of the town which is nearest to the main commercial marketing centre. This convenience would enable buyers to come easily to the estate for direct business negotiations with producers. Ideally, the site should not be further than a mile or so from town. This would allow workers to commute daily.

Site selection

Feasibility and general location of a rural industrial estate having been determined, the next task is to select the most suitable site within a given village area. An estate located at the outskirts of a village where the weekly wholesale and retail market for specialized village products is held, has natural advantages, and makes possible the continuation of the traditional rural practice of direct producer-to-buyer contact at the workshop site. The estate should be located close to an all-weather road, and have access to the estate entrance to accommodate truck traffic

should be possible. Convenience to rail and water is of lesser importance since the transport of small quantities of goods by these means is still in the developing stage in many countries of the region.

The final selection of site will depend upon the availability of land. The village council might be prevailed upon to provide community land on a long-term rent-free basis for the purpose. As in urban areas and even more so, private land should not be acquired by expropriation which may sometimes result in unpleasant consequences. Acquisition should be through friendly negotiation, not by force. In any event, owners should be reimbursed for their land at the prevailing market rate. When active farmers are displaced, they should be assisted in locating alternative plots of cultivable land to continue their farming, or be retrained for another occupation, possibly for later employment in the estate. Where more land has been purchased than can be used immediately, the surplus should not be improved but allowed to remain in cultivation, the former tenant farmer having priority rights. Such surplus land thus remains in production, and public funds are not tied up in premature land development. Some time will elapse before the expansion of estate activities reaches the stage where development of additional land is needed.

Choice of industry and occupants

As mentioned earlier, a sound basis for a rural estate would be a common facility serving the needs of a fairly large number of rural artisans and village shops. On this assumption, the top priority in allocating space would be given to a common facility shop. The second priority would be given to a small independent mechanical workshop providing services to other industrial units in the estate and in the village as well. The best liked and most progressive blacksmith might be induced to set up such a shop with the help of the estate authorities. He should be further assisted to acquire the new skills required, by providing him, free of charge, for one or two years, with the services of one or two technical specialists. It is preferable that the management of such a shop be controlled by government authorities.

The allocation of space to individual artisans, and to individual units not serving a common need will not be an easy task, mainly because workshop space is usually limited by the amount of public funds available for rural estate development. In general, it would not be possible to allot space to all artisans in the village area. However, in most cases, it is unlikely that there would be a brisk demand for space, since most village productive enterprises are operated on a marginal basis and may not be able to afford the luxury of better work quarters for which rent must be paid. The artisan usually works in his own home, does not pay rent,

and does not include it in his cost of production. Rental subsidization is not recommended since it can create a false impression of business progress, and introduces an unhealthy habit of reliance upon Government. Thus, a majority of the rural artisans working on a cottage craft basis would probably not apply for space in a rural estate. On the other hand, the more enterprising of the rural artisans who have a genuine interest in, and definite plans for the expansion of their business and the modernization of their production facilities should be given every encouragement and assistance in establishing their enterprises in the industrial estate. Such an allotment of workspace in a rural industrial estate will ensure an optimum use of its facilities, and justify the sizable public expenditure and the intensive effort spent on its development.

A question often raised is whether entrepreneurs from outside the area should be allotted space in a rural industrial estate. In principle, space should be available only to residents of the local rural community, but, in fact, the admission of outside entrepreneurs may be highly desirable, especially when local initiative and enterprise are not forthcoming. The example set by outsiders may stimulate the local entrepreneurs to follow suit. The outside entrepreneur should be a very carefully selected person of unquestioned integrity.

Raw materials

Rural small industry is much less dependent upon local sources of raw materials than is larger industry. The majority of small and cottage industries in rural areas do not use local raw materials but depend upon outside sources of supply.

Potentially valuable raw materials for industry are often found in abundance in the rural areas. These include sugar cane and its waste product, bagasse, coconut fibre, rice and wheat straw, jute fibre and stalks, grasses, reeds, cane, and others. However, many of these cannot be utilized in any extensive way by local small industry, since their processing may involve large-scale manufacturing requiring substantial capital investment. Small quantities of certain materials may be used in making a low grade inexpensive product for strictly local consumption. Thus far, it has not been found feasible to process certain materials such as cane and bamboo, which grow abundantly in many regions, at the source even on a cottage basis. It is more economical and less expensive to ship bulk cane in cut lengths to market centres, than to transport finished cane products, such as furniture, from source to markets. The former arrangement provides the added advantage of maintaining direct contact with retail customers.

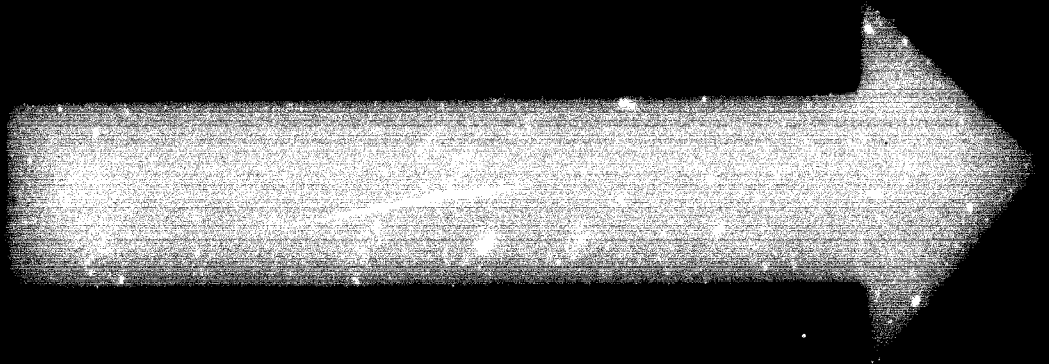
Social aspects

Social considerations are very important when dealing with rural people. Even more than in urban areas, there is a need for appreciating and understanding the problems peculiar to the environment and the setting. The opinions of the rural people must be respected, and their viewpoints appreciated. Rural people are conservative in outlook; it requires time, patience and tact to create the proper atmosphere for understanding. There may be suspicions and fears deep-rooted in some unfortunate experience in the past and the sincerity of purpose of those who come to assist may be doubted. An intimate knowledge of the situation is most important when trying to win the support of the local community for a rural development program.

It is equally important to recognize that external innovations and programmes brought into the area are likely to require some modification either in the approach, the plan or the implementation. It is necessary to give due regard to the local customs, traditions, work habits, and needs of those who are to benefit from the programme. Respected local leaders of the community are in the best position to give guidance and suggestions and should be consulted. Many rural industrial programmes have not been successful, not because of lack of soundness, but for want of appreciation and understanding. Whole-hearted co-operation of the local community is most important if success is to be achieved.

Reluctance to change is universal, and exists to a more marked degree among rural people living in the more remote areas. Traditions and customs have considerable influence upon this behaviour. When net income is sufficient to take care of simple wants, there is little incentive to earn more. It is necessary to provide an external stimulus to motivate the desire to improve, to possess, to own. Only then will there be an urge to do more work, to accept changes in work practice. In those areas where intensive agricultural development is taking place, a more progressive outlook will generally be found. In such areas, there will be greater acceptance of change, industrial development will proceed more quickly, and tangible results will be achieved in a shorter time. Additional incomes from improved farming operations would be available for the purchase of better tools for farming operations and various manufactured goods, for the production of which additional facilities will be required. A good base for industrial growth would thus be established.

The ultimate test of success is the extent to which projects continue to function after government aid has been withdrawn. Assuming that an industrial project is sound in all aspects, and is serving an ascertained local need, the degree to which the local community is involved will be a



15.7.74

5 OF 9

DO

3 7 3 6



good indicator of the likely outcome. In many countries it is a current practice to include the people's representatives on committees to advise on local development projects. For an industrial estate undertaking, a very active participation by the community is desirable. Local bodies should assume specific functions and responsibilities in such tasks as assisting in selection of site, negotiating for the acquisition of community and private land, undertaking industrial promotion activities, allocating land and work quarters, and obtaining public support and finance as needed. The more businesslike and industrially-minded local leaders should be chosen to sit on the estate management advisory committee. In time, such a committee would assume some executive functions and, if there is evidence of continuing interest, and a willingness to assume responsibilities, might be reconstituted as a management board. Representatives of industrial establishments located within the estate would, of course, also sit on this board.

Technical aspects

Estate layout

Rural estate layouts should be functional. Spacious lawns, open spaces, parking areas, and wide roads add appreciably to development costs. Overhead and maintenance charges should be kept at a minimum, if rentals are not to be too high in relation to the means of the rural artisan or entrepreneur. Economy in design and layout of rural estates is therefore of vital importance.

As already mentioned, land reserved for future expansion should not be developed immediately but allowed to remain in cultivation until required. However, a master plan of the whole estate should be prepared and the total cost of improvement estimated. Costs could then be proportionately shared by all occupants. This is particularly important in the case of low land which requires more filling and improvement work than higher land.

The total area of an industrial estate is customarily divided into the three categories of (a) factory plots, (b) roads and open spaces, and (c) administrative, ancillary and amenity buildings. The following percentages are commonly used in some countries of the region for industrial estates of different size:

	<u>Size of estate</u> (Percentage)		
	<u>Large</u>	<u>Medium</u>	<u>Small</u>
(a) Factory plots	65-55	55-50	40
(b) Roads and open spaces	25-35	30-35	40
(c) Administrative, ancillary and amenity buildings	10	15	20

Rural estates should be as compact as possible. There should be maximum use of land and space for industrial units, and expenditure for roads, power transmission, and so on, should be minimized. It is suggested that, for a small rural estate, the above proportions might be altered so as to achieve 65 to 70 per cent for factory plots, 15 per cent for roads and open spaces, and 15 to 20 per cent for administrative, ancillary and amenity buildings. Compactness would also facilitate access to common workshops, godowns, offices and services and allow for better supervision of the estate premises. For this reason a rectangular layout is desirable for small rural estates of two to five acres. A quadrangle pattern saves space, allows for maximum functional use of land, and provides adequately for the expansion of existing units as well as the accommodation of new ones.

Small retail shops of various description may spring up around an industrial estate in a haphazard manner. This would introduce confusion and congestion, and the beauty and attractiveness of the estate would be marred. To prevent this, it is advisable to include in the master plan provision for neat rows of sales shops along the frontage on either side of the main entrance. These would be rented to carefully selected occupants likely to keep premises tidy and willing to co-operate with the estate's management, in particular, in matters concerned with sales promotion. These shops would cater to the needs of workers in the estate, and of rural folk from nearby villages as well.

A display room as part of a main estate building would have an outside entrance and would be open to the general public. This would be in contrast to display centres in most industrial estates which are usually located inside the gates and are therefore relatively inaccessible. Such display rooms would also be useful as lounge rooms for prospective buyers. Articles made in other estates and other areas of the country might also be displayed.

Roads within the estate

In the countries of the region, the present trend is for industrial estates to have well-paved metalled roads, wide enough to permit two-way truck traffic. Very often these roads are better paved and wider than the high-ways and roads leading to the estate. This is done despite the fact that traffic, even in the larger estates, is seldom heavy. In the smaller estates, where the total daily output of all the units hardly exceeds one or two tons, the need for wide roads is even less. Thus, expenditure for two-lane roads with metalled surfaces would be hardly justified. For small rural estates ten-foot roads paved with brick and topped with cement would be quite adequate and would give years of good service. On either side of such roads, there would be additional eight-foot shoulders paved with broken brick for off-street parking and loading. This would be in contrast with the wide roads advocated for estates in India and Pakistan as the following table indicates:

<u>Type of road</u>	<u>Land width</u> (in feet)			<u>Paved width</u> (in feet)		
	<u>India</u>	<u>Pakistan</u>	<u>40^{a/}</u>	<u>India</u>	<u>Pakistan</u>	
				<u>Ultimate</u>	<u>Immediate</u>	<u>Ultimate</u>
Main or arterial	60	60	40 ^{a/}	40	22	24
Secondary	50	40	30	30	22	16
Service	40	30	20	22	..	10

a/ For small rural estates.

Industrial buildings

Ready-made buildings of standard design are usually made available on long-term rentals to estate occupants. This is usually the main attraction and inducement to the artisan or small entrepreneur to locate within the estate, since it enables him to get quickly into business, and to use as working capital funds normally invested in factory buildings. Where buildings are not provided, development is likely to be much slower, unless special arrangements are made by the estate or government authorities with a financing institution to provide mortgage loans to intending occupants.

For small rural estates, the average standard unit of work-space should be at least 20 by 20 feet, since a floor area of less than 400 square feet would be inadequate. The enclosed work-space might be supplemented by an

equivalent amount of space in an open shed.

Single-storied buildings of brick construction are likely to give the greatest comfort to workers in hot and humid climates. In the rural areas, it is customary to work in the open, in open sheds, or beneath houses built high off the ground. For this reason, an open shed may be the best type of rural workshop building. A combination of brick building and an open workshop will favor with the rural entrepreneur and his workers. A brick building would provide maximum security in housing valuable machinery, and serve as godown and business office. The open shed would be the main work area; it would be screened with expanded metal wire for protection. For an equivalent amount of floor area, the combination of brick building and open workshop would be less costly.

A common practice in the region is to accommodate small industrial shops in independent single-storied buildings, though double buildings are sometimes also available. For a small rural estate, an economic workspace pattern making maximum use of limited land area would be a shed type of long building, say 100 feet long and 20 to 30 feet deep, with 20 foot spans, and partitions erected later as required to suit the need of tenants.

The present trend is to construct industrial estate buildings of brick and concrete, with steel or wooden trusses and concrete slab or galvanized iron sheet roof. For the small rural estate, a simpler and less expensive construction should be adequate. Walls might be of adobe, to avoid the use of cement and brick, which are often in short supply. A feature of adobe construction is that it keeps interiors reasonably cool even in hot weather, thus adding materially to the comfort of the worker. In contrast, single-storied brick buildings can become uncomfortable. As regards durability, much effort has been directed in recent years towards improving the weather-resistant qualities of mud construction and preventing its deterioration. Even without improvement, an adobe building does give years of useful service, and its cost is very much less than that of a brick building.

Brick, wood or bamboo pillars, and bamboo roof trusses with thatch or galvanized iron roofing find increasing popularity in the construction of open workshops. When adequately treated against termites and properly constructed, such structures will be serviceable for many years. Because of their low cost, an artisan or entrepreneur can quickly and easily construct a workshop extension without resorting to outside financing.

In addition to the actual working area, provision should also be made for a spacious veranda - six to eight feet in width - on the frontage side, which will not only provide additional space for storage of raw materials and packing of finished goods, but afford protection against the weather in

all seasons. If veranda is required at the back of the building since the open shed is likely to be constructed there.

Corrugated asbestos sheet is preferable for roofing, but, since this material is likely to be costly, galvanized iron sheet is generally used. This is a poor substitute since much heat is absorbed and radiated into the interior of the building, and a ceiling is made necessary. High walls will help, and a cover of thatch over the roof will lower the inside temperature.

If the cost of construction can be kept low and within the means of the rural artisan or entrepreneur, and the idea of open work-sheds finds general acceptance, new entrepreneurs might be interested in just leasing land. They would undertake the construction of their own buildings or work-sheds on the basis of approved designs supplied by the estate authorities.

Administration and Servicing

Administration

A rural estate will not be able to afford a large administrative and managerial staff. A staff of two to three persons selected with great care should suffice. The manager should be a graduate in economics or commerce with some practical experience and interest in rural development. He should be personable and have tact and patience in dealing with people. He would have one or two persons to assist him in carrying out the following duties:

- (i) act as secretary of the estate management committee;
- (ii) establish and maintain contact with rural artisans and small industrialists;
- (iii) assist individuals in setting up their business: introduce office procedures, bookkeeping and accounting systems;
- (iv) assist individuals in preparing applications for credit;
- (v) assist financing institutions in processing loan applications and act as their local agent when required;
- (vi) contact government departments to obtain contracts for store purchases; assist in ensuring that contracts are fulfilled on time and to specifications;

- (vii) assist in establishing contacts with raw material sources and finished goods markets; assist in obtaining from government sources rationed raw materials; ensure that such scarce raw materials are used for productive purposes as intended;
- (viii) obtain and disseminate technical and market information;
- (ix) conduct classes in business and management; and
- (x) perform other duties in connexion with the administration of the estate.

For a small rural estate, separate administrative buildings are not required. A small office of 20 by 30 feet should be adequate.

For :
Technical advisory services

As a rule, it is not possible to provide a wide variety of specialized services to a rural industrial estate. An engineer or mechanical foreman might be made available to a general services workshop to assist in developing engineering, maintenance, and repair services for workshops in the estate and in the area. An institution such as a small industries organization should provide specialized assistance by sending experts on short visits or providing short-term training to artisans. Special technological problems could be referred to the small industries organization. Such services should be provided by the Government free of all costs.

General mechanical service workshop

Some hesitancy may be encountered on the part of an individual invited to set up a general mechanical service workshop on a rural estate and it may be necessary to consider the establishment and operation of such a workshop as a pilot project, with special arrangements. For instance, if after a two to three year period of conscientious and intensive effort, the shop was still not succeeding, the individual might be freed of all financial obligations.

To give the shop every opportunity to succeed as a business proposition, all operations should be conducted strictly along commercial lines from the very outset. The shop-owner would continue his normal village blacksmithy activities, while undertaking his modernization programme. In the beginning, his small machine shop would be equipped with a few very essential items such as a small lathe, drill, double-ended grinder, gas welding set, and various bench tools. Other equipment would be added only when service has been well developed, and the volume of work warrants it.

As regards ownership of the equipment, it is advisable that the individual assume this responsibility. A hire-purchase arrangement with liberal terms and conditions will help. However, the owner should pay interest in the usual manner.

The maintenance and repair services undertaken on behalf of the estate itself would provide a small but steady source of income. Arrangements might also be made to provide on a retaining fee basis regular maintenance and equipment inspection services to workshops in the estate, and in nearby villages and towns. However, if it is government policy to provide such services free of charge as a promotional measure, the costs would be defrayed by the Government.

Similarly, advisory services and assistance in drawing up plans and estimates might be made available free of charge to the artisan or would-be entrepreneur as a government promotional measure, and the workshop would bill the Government for such services. The cost of assistance to individual shops in installing their equipment and machines might be handled in a similar manner.

An equipment rental service could be another possible source of income to the general shop, though it may be years before it can be successfully developed in a rural area. Possibly, the Government might finance a pilot experiment as a promotional measure. It should be noted that the idea of equipment rental is not new in many rural areas of the region. Farmers often rent their implements to others, especially items such as plough and thresher which can service the needs of more than one small farmer.

The general workshop might also undertake the re-training of rural artisans on behalf of the Government on a special contract basis.

Common facilities are vital to industrial modernization programmes, since, without them, small industrialists would have no access to the type of services which they provide. Joint use of such facilities by large numbers of rural artisans provides the volume of business necessary for profitable operation.

Ideally, common facilities should be organized on a joint venture or co-operative basis. The Government would finance and manage a common facility service only when it is a new idea in the area and it is necessary to demonstrate its utility. Definite plans should be made to turn over its operation and management to a private concern through outright sale on easy terms, or rental on a three to five year lease.

In order to prepare for this transfer, it is necessary to conduct the business on an efficient basis from the very outset, to minimize unnecessary expenditures, employ a minimum of efficient staff, and to charge commercial but reasonable rates. A management firm would be helpful in ensuring that the service is conducted in a businesslike manner and with full satisfaction to the customers.

Credit facilities

In large and medium-sized estates, there may be a sufficient volume of business to induce a bank to open a small branch on the premises. This will not be the case in small rural estates. Yet, the needs of small units in a rural estate are no less urgent than those of similar units located in larger estates where such facilities are available.

A possible solution might be for the Government to conclude a working arrangement with a national bank, whereby the estate management would act as an agent for the branch of the bank located nearest to the estate. It would be responsible for processing loan applications, certifying creditworthiness, and reminding borrowers of due dates. Since this would be an innovation in many areas, a pilot project might be set up with, for instance, Government underwriting of defaults.

Loans within a certain limit might be granted unsecured to prospering businesses, backed up by the borrowers' integrity and good references. The estate management would maintain a list of names of villagers acceptable as character references. For larger cash loans personal sureties would be required. Some difficulties might be raised by the use of saleable goods stored in bonded warehouses as collateral. A bonded warehouse located on the premises of a rural estate would serve the purpose, but the expense involved in handling small quantities of goods from a number of small manufacturers, and the paper work involved in processing small loans may not justify the service. It is likely that the cost would be considerably higher than the income expected from it.

Warehousing

In medium and large industrial estates, central warehouses are useful in providing storage space to individual manufacturing units for their raw materials and finished goods, and facilitate the granting of credit by banks. In small rural estates, a central godown, able to meet the needs of all the units, may not be feasible and only limited service might be offered for items of high value and small bulk or temporary storage for materials coming into the estate. In general, however, it is likely that individual owners would prefer to keep their materials in their own workshops for ready access.

Should there be a demand for general storage services, individual owners might be encouraged to operate their own warehouse using a scheme, the authorities providing space on a minimal rental basis. A co-operatively managed scheme would be ideal, or a number of shop owners might organize the service as a joint venture.

Facilities for procurement and sales

While the estate management does not undertake the procurement of raw materials for, or make sales on behalf of, small industrialists, it can assist in making preliminary contacts, the final negotiation being the sole responsibility of the parties concerned. It can help industrialists in forwarding their applications for controlled raw materials to government agencies concerned with their allotment. It can certify that such materials will be used for industrial purposes as intended. It can also assist industrialists in preparing bids for contracts to supply government requirements, and expediting payments from government when orders are completed and goods delivered.

Governments should consider the licensing of certain items of manufacture for regional rural production only, so as to stimulate the development of rural enterprises, and open up new avenues of employment. Such items would be those that can be made efficiently on a very small scale, such as wire nails, door bolts, and other items of building hardware. Preference and priority would be given to the rural units in respect of controlled raw materials or import permits, where required.

Wholesale rates may be obtained for many raw materials on volume purchases above certain minimum quantities, which may be too high for the small-scale units on a rural estate, either because they do not have the financial resources to hold large stocks, or because their total requirements for the same raw material are too small. To take advantage of the cheaper bulk rates, orders might be pooled with other enterprises in nearby industrial estates, and procurement made jointly. The facilities of a national co-operative wholesale or a small industries commercial organization might be utilized for the purpose.

As regards sales, government agencies often maintain sales depots and display centres in large towns to promote the products of cottage and small industries. Retail shops and display rooms at an estate itself would stimulate rural buying. A practical approach to the problem would be to utilize the extensive facilities of a national co-operative consumer organization for domestic sales.

An industrial design service is required to provide small producers with new designs for which market research studies have revealed good possibilities. Advice is also needed on problems of packaging and advertising. Since small industrialists are not likely to be in a position to afford costly commercial design services, assistance should be provided by a government agency. Already such services are available from small industries service organizations in India and one or two other countries of the region.

To back up this design service, a research organization is needed to conduct studies and surveys on markets, and to determine consumer reaction to changes in styling and design. Since this type of service is relatively new to countries of the region, its development should be encouraged by Governments. Without such assistance, small producers would have no means of determining possibilities of expansion of markets for their products.

Training and demonstration facilities

Training. Training centres should be so located that they could serve the needs of a fairly wide area. Local training schemes serving small groups of villages have seldom been successful, because local opportunities for gainful employment after completion of training are very much limited in scope. However, local training in apprenticeship schemes, say, at a general mechanical services workshop in a rural estate, would be useful: the few persons trained would be absorbed easily.

The larger industrial estates would be the more logical locations for long-term training programmes. The needs of rural estates could be met by sending selected persons to these centres. In rare instances, training programmes might be set up in rural estates which cater to a highly specialized field of industry in which a modernization programme is taking place.

As a rule, established artisans would gain much from short-term intensive training programmes designed to upgrade their traditional skills, and should be given a high priority. Persons new to a trade would have a lower priority for training unless the skills which they are interested in acquiring are largely mechanical in nature and can be imparted in a short time.

In the newly developing countries, the expenses of training are usually defrayed by the Government.

Demonstration. Demonstrations of better industrial techniques and methods and more efficient equipment can be undertaken on the premises of rural estates, or in the nearby villages by peripatetic personnel. Light mobile demonstration units would be useful.

... of the rural estate should be able to show the utility and practicality of the improvements over the existing estate, in a side-by-side technical demonstration will be useful in rural areas. It will have much merit.

... have an institute to start in a rural area as a first step in feasibility, it would be desirable to arrange for groups of artisans working in the same field of industry in several rural centers, visits and observations of small factories similar in size to their own, in more developed areas.

Business management: facilities for training

Although it is increasingly realized that small industrial enterprises need to have a basic knowledge and understanding of modern business methods, management training courses for small entrepreneurs have thus far been rare in the countries of the region; attention is usually focused upon training programmes for executives of larger concerns. It seems that only India has made an organized effort to improve the management knowledge of the small businessman. That country's Small Industries Service Institutes conduct, as a regular feature of their training activities, evening courses in management.

Even less effort has been made to provide management training to the rural small industrialist. In East Pakistan, the Rural Industrial Service seems to have broken new ground in setting up, in December 1960-January 1961, a six-week pilot rural business management course for fifteen persons in the small town of Marsinghdi. By popular demand, a follow-up course of one month's duration in selected subjects was held there during November 1961.

A small entrepreneur needs to have a good working knowledge of book-keeping and cost accounting. It has been recommended earlier that managers of rural estates should be graduates in commerce or economics. As part of their regular duties, these officers would be required to give classroom training to entrepreneurs in the rudiments of good business management, and in particular in book-keeping, accounting and record systems.

Transport

As noted earlier, a rural industrial estate should be well-connected with a good all-weather road, since motor transport is the most satisfactory means of moving small quantities of goods directly from factory to market and consumer.

As regards rail freight services, such facilities are usually not too well developed to handle small quantities of goods for short distances.

Procedures are invariably tedious at both the booking and receiving ends, and there is no certainty as to when goods will be dispatched, or will reach destination. Pilferage is not uncommon. In addition, there is the added problem and extra charge of moving goods from rural estate to railway station, and from station to final destination.

On the other hand, pick-up and delivery services by commercial trucking concerns are becoming increasingly popular in many countries of the region. Procedures are simple, and arrangements can be concluded on the spot directly between truck driver and factory owner. Such services are available in many rural areas, are reliable, and provide for door-to-door deliveries in the same day for distances under 200 miles. In rural areas where such services are irregular and infrequent, or rates excessive, there may be a need for occupants to establish a co-operative transport service. Initially, a three-wheel light truck or pick-up van would be adequate for a small rural estate. A second vehicle similar or of larger hauling capacity might be added when required. In order to achieve economy of operation, it may be necessary for the service to be open to the general public so that there are full loads both ways.

Coastal or inland water transport offers little attraction to the small producer, largely because other means of transport must also be employed between factory and ultimate destination. This results in extra charges and possible damage to the goods. Launches and country boats are often not seaworthy; total loss of goods sometimes result, usually with no coverage by insurance. This mode of transport is therefore not used unless there is no other choice.

Basic utilities and other services

Power

Many rural areas will be without electric power for some time to come, because of the generally low power factor, and because Governments are not likely to spend large sums on power transmission in sparsely-populated areas where the demand for electricity is limited. In India, it is estimated that in rural areas the capital investment in power transmission is the equivalent of \$3,000 per mile.

Yet, the rural areas which possess conditions favourable to industrial growth, such as good skills, expanding markets, easy access to raw materials and good communications, should not be denied the use of power for modernization and expansion. This may be achieved by the use of small diesel generating plants.

The requirements in power for rural industrial estates will probably range from 15 to 40 kilowatts, depending upon the type of industrial units contemplated and the prospective rate of growth and expansion. Power generated locally is not likely to be more costly than line power. In a compact rural estate transmission costs will be low. The diesel plants would normally operate for ten to twelve hours a day, primarily for industrial use, and would be self-supporting. A stand-by unit would be required. Although the initial investment may appear to be high, it would be small in comparison with the expenditure involved in bringing transmission lines to the area from the nearest tappable power source. When a rural estate is situated close to villages, small amounts of power might be supplied to workshops in the latter.

Water

Potable water, and water for sanitation and fire fighting would be supplied by the estate without charge, while water for industrial purposes would be charged. Where small factories require large quantities for processing and washing purposes as is the case in food manufacture, textile finishing and dyeing, a separate storage tank should be provided. Tube-wells would be the preferred source of supply.

Sanitation and sewage

Few, if any, rural areas have a sewage disposal system, and it would not be economical or feasible to install elaborate sewage facilities for a small rural industrial estate. Industries generating large amounts of effluent, such as manufactures of chemicals, leather, and the like would be excluded, unless extensive soak pits were provided; these do not contaminate underground water used for drinking purposes.

Public toilet facilities are usually badly maintained and unsanitary. Separate facilities for each industrial unit would be preferred. Septic tanks would take care of waste disposal.

Since a rural estate is small in area, and likely to be located close to a village or town, it would be difficult to provide accommodation to industrial units whose by-products are likely to cause pollution to air or damage to vegetation.

Communications

Rural telephone and telegraph services are not too well developed in the rural areas of countries in the region, and their use for commercial purposes has been limited. A rural estate would not have a sufficient volume of incoming and outgoing mail to warrant the setting up of a

branch post office. Mail would be delivered as part of the usual rural service. However, it would be advisable for a rural estate to retain a postal box at the nearest town or village post office, and a special messenger engaged to make daily collection and dispatch.

Police and fire protection

The layout of a rural estate should afford maximum security and facilitate guarding. Night-watchmen would be employed by the estate for patrol duties. The owner of a workshop or a helper should be allowed to sleep on the premises if he so desires to protect his own property.

Fire protection would have to be the responsibility of the individual owner. He should be required to possess minimum fire-fighting equipment such as extinguishers, sand and water pails. A fire engine would be ideal, but its initial cost and upkeep might be too heavy for a small rural estate. However, if there is a fire protection unit in a nearby town, arrangements might be made to utilize its services, if a serious fire threatened the whole estate and nearby villages.

Insurance

In many countries of the region, the benefits of all forms of insurance are gradually being extended to cover rural areas. Insurance on property can usually be obtained without difficulty. However, insurance on goods in transit is sometimes not easily available. There is need to develop this aspect of insurance coverage, so that goods can be insured quickly without prolonged procedures. Also, when goods are damaged, claims should be processed quickly, and settlement made without delay.

Housing

As far as practicable, a rural estate should employ persons who are residents of the area. Workers would be able to commute to work daily, and there would be no need for providing worker housing. To live at home would help to preserve close kinship ties, which is a desirable characteristic of rural living.

An exception might be that quarters on the estate compound would be provided to the manager of the estate and the engineer. Other staff would be recruited locally and no housing would be required for them. The few entrepreneurs and skilled workers from outside would find accommodation in the nearby town or village.

The rural industrial estate and the worker

Working hours and minimum wages

In rural industrial estates, there may be, more so than in urban employment, a tendency to retain employed workers on the job for more than eight hours a day. For work beyond these hours, the worker may or may not be paid: when paid, he is usually not given overtime rates. Very often, especially for seasonal work or for peak months, he may be required to work an extra hour or two continuously for days on end. These practices are not to be encouraged.

As a rule, there is no standard for wages, and rural wages are usually lower than wages in the urban areas for factory type of work. A comparative study should be made of the wage pattern in cities and towns for the same type of employment, taking into consideration the factors of work performance and quality of work. On its basis, a schedule of fair wages would be prepared for workers of all levels in rural industries. An organization of workers would be helpful for better representation of their problems. It would be useful to include a workers' representative on the estate's board of management.

Worker training

In addition to the types of training discussed earlier, in-shop training should also be provided. This could be done under the supervision of the estate engineer. When a worker has upgraded his skill, he should receive an increase in wages commensurate with the improved quality of his work and his increased efficiency.

Leave

Festivals and holidays are more frequent and of longer duration in rural areas than in urban centres, a feature which is in keeping with the tempo of rural life. There is also a freer attitude towards work in village shops which have no set hours, but operate as convenient to the owner. In a rural estate, employment would be more disciplined, and some adjustment to the new requirements will have to be made.

The rural worker will use his leave entitlements to attend weddings, funerals and festivals, which will be good for his morale. During periods of intensive agricultural activity such as harvest time, he may be required to help his family with work on the farm. There is much urgency to harvest, thresh and store to save crops from damage by rain, theft, animals and rodents. There is no possibility of retaining the worker in the factory,

though incentives often are offered to him to stay. It may be necessary to close down work at this time due to shortage of labour. It may be noted that harvest labour is usually paid as much as two to three times more than the normal wages for industry and construction.

Factory safety

The rural estate may be outside the area of jurisdiction of a Factories Act. Factories located within the estate might take advantage of this fact and fail to provide adequate safety measures for the protection of the workers. The estate management should see that proper precautions are taken to ensure the workers' safety.

Insurance

The employer should take out accident insurance policies for all workers in his shop. He should be responsible for the payment of premia.

Health and first aid

Workers who suffer from an ailment or illness which is infectious or contagious should not be employed. Annual physical examinations should be required for all employees. A government health centre would provide clinic facilities. If this is not available locally, a small clinic might be set up, and a physician retained on a fee basis, for weekly consultations or as required. Families of workers would also be entitled to use his services.

A first aid station would be maintained on the estate premises, and persons trained to take care of the injured while awaiting a doctor.

Canteen and common rooms

A canteen convenient to all workshops in the estate is a definite need. Workers should not be permitted to lunch inside the factory premises. They should use the canteen for the purpose, or have their lunches outdoors. A room 20 by 30 feet with a long tea bar, though not spacious, should be adequate at the start.

One end can be used as a reading section with a bookcase of technical literature and material written in simple style in the local language. The walls of the canteen might be used for the display of posters. When not in use as a canteen, the room could serve as a common room, meeting hall, and for holding classes.

BURMA

Burma is primarily an agricultural country. Its economy depends greatly upon the export of rice, the production of which constitutes about 60 per cent of the gross domestic product. Forest and mineral products are the two other important export items which help to maintain the country's economy. Industrialization is one of the means by which Burma intends to develop its economy.

Since the attainment of independence in 1948, the Government of Burma has taken various steps to promote industrialization, such as providing adequate protection to the infant industries, giving loans in cash and in kind, facilitating the procurement of raw materials and machinery from abroad, facilitating the import of technicians, and so on. Many new industries have been set up since 1948. According to the 1957-58 Annual Survey of Manufactures, there were, in that year, 2,759 establishments employing ten or more workers and using mechanical and electrical power. In 1961, this number has increased to about 4,000. The number of persons employed in these establishments is about 250,000, and the total value of products and services is of about 1,000 million kyats.^{1/}

Although there has been a spectacular growth of industries, the growth has been mostly around the two big cities of Rangoon and Mandalay. In these two cities, the establishment of new industries has been rather unsystematic, as is suggested by the fact that most of the new factories were constructed in residential areas. It is therefore desirable that future industrial growth should be directed towards the smaller district towns and village areas. These are some of the reasons for which industrial estates are needed in the country.

In 1948, a proposal for setting up two model industrial estates, one near Rangoon and the other near Mandalay, was made to the Government by two industrial advisors from the Stanford Research Institute, in a report entitled Small Industries Corporation. Because of the considerable expenditure involved, the proposal was not accepted.

Land allocation scheme

When the Government started planning the Greater Rangoon, about ten years ago, the idea of providing certain selected areas exclusively for industrial use was conceived but no attempt was made to create an industrial estate. However, in 1953/54, a step was made in that direction by setting up a land allocation scheme for new industries. The tract chosen was about six miles from Rangoon, between the Rangoon-Frome road and the Government Jute Factory. It was originally utilized as paddy land and was acquired by the Government when the Government Jute Factory was established. A small Committee consisting

^{1/} One United States dollar = 4.76 kyats.

of the Director of Industries, a representative of the National Housing Board and a representative of the All Burma Peasants' Organization, was entrusted with the task of allocating suitable plots of land to the industries. Thirteen applications were approved and sites were granted along the road leading to the jute factory, ranging in area from about a half-acre to about two acres. The Burma Unilever Ltd. received the largest portion of land - about 5 acres - for the manufacture of soap. Factories producing biscuit, noodle and enamel-ware, oil and pulse mills, iron foundries, and aluminium hollow-ware industries were constructed on the other sites. Each applicant had to deposit with the Industrial Development Corporation - the authority which had acquired the land - 10,000 kyats per acre for site development. However, the only development work that could be done was the construction of the main access road and the drainage system. The industrialists did all the other work such as earth filling, installation of electric lighting and power lines, etc. Although this feeble attempt was quite successful, this type of projects was abandoned later on owing to a change in policy.

In 1959/60, two new towns - Okkalapa and Thaketa - were opened near Rangoon, and the Government considered granting industrial sites in these new towns to existing and new industries. The idea was to move out to these areas some of the industries established in Rangoon so as to reduce public nuisance and to improve the working conditions of labour. However, because of a change of Government in 1960, this project was held in abeyance, but certain areas in these new towns have been earmarked for industrial establishments. The desirability of shifting the oil milling industry from the city area to Okkalapa or Thaketa is still under consideration by the Government. Some existing enterprises and some new industries have been given suitable plots of land in these new towns. At Thaketa, 150 acres of land have already been developed for industry, but only a few applications have been received so far.

Industrial site scheme

An industrial site scheme has been included in the four-year plan 1961/62 to 1964/65. The scheme aims at carrying out development measures such as constructing roads, installing electric light and power lines, reclaiming land by earth filling, and the like, on a site of about 367 acres.

The site is situated near the Government Jute Factory and the Burma Unilever Soap Factory. It is easily accessible by the Hleing River and the Rangoon-Prome railway and also by road from Rangoon.

The initial site development work has been assigned to the National Housing Board and the following expenditures have been allocated to it under the Four Year Plan:

	<u>Kyats</u>
1961/62	1,000,000
1962/63	1,000,000
1963/64	500,000
1964/65	500,000
	<hr/>
Total	3,000,000

At present the intention is only to lease out the sites according to the requirements of each factory, after all necessary facilities have been developed. There are already many new entrepreneurs and existing industrialists who are interested in receiving such developed sites. The buildings will be erected by the industrialists at their own cost. The question of providing other facilities such as post office, common mechanical workshop with training facilities, bank, and so on, is under consideration.

In order to find out the best method of implementing this scheme, an Industrial Study Mission was sent to India in October 1961 to study the industrial estates at Calcutta, Kanpur, Delhi, Ludhiana and Bombay.

Industrial financing

At the moment, the commercial banks, including the State Commercial Bank, constitute the main source of finance for industry. These institutions provide short-term loans on raw materials and finished goods. In view of the fact that most of the commercial banks are foreign owned, they could not, until October 1961, give loans on immovable properties. Recently the Government relaxed this rule and industries can now obtain loans from foreign banks on the pledge of immovable properties.

An industrial development bank has been opened late in 1961 with a total initial capital of 30 million kyats. It will provide loans to industries on a short, medium or long-term basis and will also make available machinery and equipment on hire-purchase.

Training programme and technical assistance

Technical assistance is given by the Industrial Aid and Services Division of the Directorate of Industries by providing technical information, helping entrepreneurs to draw up project proposals, advising industrialists on procurement of better machinery and equipment, improvement of layout and labour and machine efficiency. The Industrial Management and Productivity Centre under the Industrial Development Corporation is giving training courses on industrial management and productivity to the industrialists. Two experts of the International Labour Organisation are attached to this centre. The Directorate of Industries is also being provided by the United Nations Technical Assistance Board with experts on industrial economy and marketing, respectively.

Conclusion

The establishment of an industrial estate during the current four-year plan period will be a major event in the development of small industries in Burma. Small-scale industries play a very important part in the country's economy since the local market is limited and it is not possible to have many large-scale industries at this stage. The industries developed so far have been mostly of the small-scale and cottage industries type. The industrial estate will be particularly welcome by new entrepreneurs and existing industrialists because it is becoming increasingly difficult to acquire land for industrial purpose near Rangoon. If the industrial estate scheme near Rangoon were successful, another estate might be developed near Mandalay and more estates could be opened up in other district towns.

CHINA

Two-thirds of the total area of Taiwan consist of mountains and rugged foothills, and only 3,600,000 hectares (9,000,000 acres) may be used as arable and pastoral land. The land is intensively cultivated. In 1960, its yield accounted for 68 per cent of the island's exports, besides feeding a population of 11 million. The annual per capita income is of about US\$100, but living costs are low and the distribution of wealth is relatively even. Compared with the world's economically advanced countries, Taiwan has a long way to go, particularly in the way of industrial development.

Post-war industrial development

Since agricultural resources are exploited nearly to the full, there is not much prospect for further substantial development in this sector. To continue to provide means of subsistence to a population growing by 3.5 per cent per year, recourse must be had to industrialization, a task to which the Republic of China has devoted itself.

The industries established during the Japanese occupation of the island (1895-1945) were mainly those for the processing of farm products. Only a few manufacturing and mining industries existed. In the latter part of World War II, all of these facilities were either bombed out or rendered unserviceable for lack of proper maintenance. The first thing the Chinese Government did after the war to rehabilitate the economy of Taiwan was to restore the war-damaged industries. This work was largely completed in 1951, and emphasis was then shifted to the establishment of basic industries and the increase in production of goods of everyday need. It was in pursuance of this policy that such important industries as power, fertilizers, and textiles were enlarged rapidly in the course of the past decade.

In 1952, the Republic of China entered upon a new phase of economic development with United States financial and technical assistance. The First Four-Year Economic Development Plan of Taiwan, fundamentally an industrialization programme, was successfully carried out by the end of 1956, the island's over-all industrial production being increased by 55.4 per cent and real national income by 34.2 per cent. The Second Four-Year Plan, launched in January 1957, aimed at enlarging the national income, increasing employment and expanding export trade through an extensive exploration of natural resources, acceleration of mining and industrial development and further increase in agricultural production. Its result was a net increase of 5.6 per cent in over-all industrial production and 50 per cent in national income.

The Third Four-Year Plan, 1961 to 1964, is again focused on industrial development. It is projected that after its implementation, industry's share

in gross domestic product will be 27.5 per cent. as against 25.3 per cent. in 1957, and the share of agriculture 27.4 per cent. against 31.3 per cent. As to the requirements of funds, the Third Plan calls for an estimated NT 45 billion (US\$1.1 billion). Of this total, about NT 20 billion (US\$500 million) will be channeled into industry, with the remaining NT 25 billion (US\$625 million) to be distributed among agriculture, commerce, transportation and communications, housing, and a host of other activities.

Industrial location policy

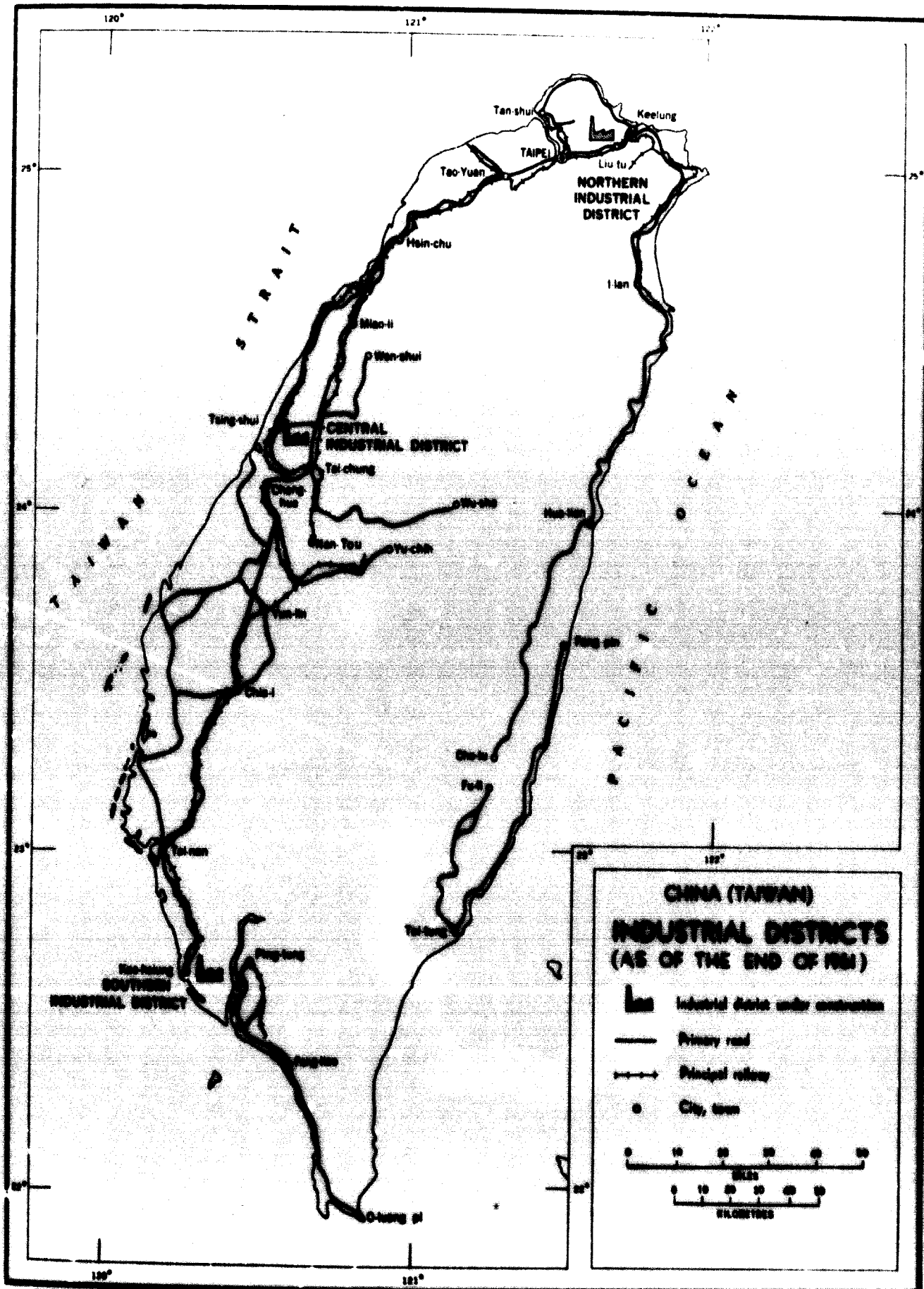
In the northern part of the island, particularly in and around cities and towns within easy reach of Taipei, industries developed rapidly in recent years in response to a growing demand for consumer goods. In this part of the country, the need for additional industrial land has become increasingly urgent.

The central part of west Taiwan is a fertile area devoted principally to agriculture. In this region, the processing of agricultural products is a promising line of business, which may be encouraged by the establishment of industrial estates.

In the south, a large number of factories are established in the port of Keelung. These include cement, steel, aluminium, machinery, ammonium sulphate, alkali and oil refining plants, and further development is in prospect. More industrial land is needed in this area, in particular for locating export industries which will be benefited by easy access to the sea.

The eastern coast land is separated from the rest of the island by high mountain ranges. The difficulty in land communication with the west has retarded its development. However, this area is rich in natural resources such as timber, limestone and marble and the climate is suitable for planting pineapple and tea. The establishment of industries using or processing these resources is contingent upon the availability of suitable industrial land.

In 1958, the Industrial Planning and Co-ordination Group of the Ministry of Economic Affairs initiated an island-wide survey of suitable locations for new industries. Besides such basic requirements as the availability of essential facilities, adequate labour supply and proximity to markets and sources of supply of raw materials, special consideration was given to the possibility of flooding; the presence of high-value rice fields, and the nearness of towns or villages to minimize the necessity of housing projects for workers during the initial stage of site development.



Eighty-eight locations in fifteen counties (prefectures), with an area totalling about 2,000 hectares (7,000 acres), were marked out as suitable for industrial use. In addition, projects to set up industrial zones at twenty-one locations, with a total area of about 3,500 hectares (9,500 acres), were embodied in various city development plans. The projects currently under way include three planned industrial districts, at Liutu in the north, Keelung harbour in the south, and Tsing-shui in central Taiwan.

In view of the fact that industrial districts were new to Taiwan and that large outlays were required for site improvement, the first two industrial districts were started as pilot projects; the construction of the third one is scheduled for a later date.

The Northern Industrial District is located about 8 kilometres (5 miles) to the southwest of the port of Keelung and 22 kilometres (14 miles) to the northeast of Taipei. It is bounded by the Keelung River on the east, north and west and by the Keelung-Taipei highway on the south. A railroad spur about 4 kilometres (2.5 miles) in length will connect the district with a nearby station. Raw water is available from the Keelung River, which will also receive treated sanitary and industrial wastes as well as storm water at the downstream end. The nearest power sub-station is some 3 kilometres (2 miles) away with an available capacity of 20,000 KVA. There is an adequate supply of labour in the immediate neighbourhood. This district, covering an area of approximately 56 hectares (140 acres) of low value paddy field, will yield about 41 hectares (100 acres) of salable land. Lots will be assigned preferably to small or medium-sized industries. The development of this industrial district includes grading and the construction of roads, dikes and sewerage system, the expenses of which will be borne by the users of the land. Investment in public utilities and other services will be financed separately, the users of the land paying only rates. The master plan has already been drawn up. The division of the estate is to be completed later to meet the individual needs of incoming industries. The construction programme was started in May 1961 and is to be completed by the end of 1962. The project is under the sponsorship of the Northern Taiwan Industrial District Development Committee, whose members are drawn from central and local governmental organizations and the Land Bank. The project is financed with a United States Aid loan and will be operated on a non-profit basis.

The Southern Industrial District is located in the harbour area of Keelung. In order to meet the increasing demand of harbour facilities for the growing export and import trade of the island, a project for extending the Keelung Harbour was set afoot in 1958, to be completed in twelve years. Under this project, some 750 hectares (about 1,900 acres) of tidal

land will be reclaimed. Including neighbouring areas to be improved over the years, the land available for industrial use will add up to about 1,300 hectares (3,250 acres). A master plan of land utilization of this district has been worked out in co-ordination with the plan for Metropolitan Kaohsiung. The Southern Taiwan Industrial District Development Committee was organized in July 1961 to do the detailed planning and to provide the district with transportation facilities and public utilities. The allocation of land will be given by priority to manufacturers of export products and those using imported raw materials. Land will be for lease on a monthly rental basis. In case of need, a part of the industrial district may be designated as a foreign trade zone.

The Central Industrial District located near a proposed harbour and a proposed water power and irrigation project has been blue-printed. Preliminary drafts have been prepared for roads, railroads, utilities and a service centre, with 78 hectares (200 acres) of land reserved for these purposes. Actual development will, however, await completion of the Northern Industrial District.

Each of these organized industrial districts will be provided with a service centre comprising a post office, a telecommunications station, a clinic, a fire brigade, an assembly hall and a canteen for the convenience of the tenants.

The promotion of industrial productivity and industrial training will be entrusted to the China Productivity and Trade Center, an organization which has been very successful in promoting medium-sized and small-scale industries.

Government policy in acquisition and development of industrial land

Rice grows best on flat land, and so do the manufacturing industries. Since flat land is scarce in Taiwan, a controversy always arises when another tract of the island's best crop land is taken away for an industrial site. Under the city ordinances in the days of the Japanese occupation, there were no restrictions as to the construction of buildings in industrial zones. As a result, residential and commercial buildings have occupied the greater part of industrial zones, and small industries are usually huddled in congested areas where no vacant space is available for proper planning and expansion. Furthermore, a large part of the land is in the hands of real estate investors who count on profitable returns in anticipation of a rapid development of cities and towns; as a result, there is a steady rise in land prices which discourages private entrepreneurs in need of plant sites.

In such cases, it is even more difficult to obtain land for industrial purposes. Following the new land reform of 1949, most farm land is now privately owned by farmers. Article 30 of the Land Law provides that "the transfer of ownership of private farm land shall be limited to cases where the transferee is able to till the land by himself." This provision hampers the procurement of industrial land.

In the course of the last few years, business activities have increased and the need for a more favourable climate for investment has become more keenly felt. Many of the existing laws and regulations have proved to inhibit rather than encourage investment. It is now realized that to induce domestic savings and to attract foreign capital, more incentives have to be offered. To that effect, a Statute for Encouragement of Investment was enacted on 31 August 1960. The Statute deals mainly with tax reduction or exemption, and facilities for acquiring plant sites.

Provisions for facilitating the acquisition of land are incorporated in the Statute to remove the serious obstacles encountered by industrialists in locating their plants. These obstacles stem from the existing land legislation which tends to "over-protect tenant-tillers and owner-tillers and makes it very difficult to acquire land for industrial use. The Statute authorizes the Government to zone and requisition private land, wherever necessary, for conversion to industrial use, to construct the necessary facilities thereon, subdivide the land into lots, and sell these to industry. Article 25 of the Statute provides that "in order to meet the needs of economic development, the Executive Yuan shall first allocate public land to be designated as industrial land. Where public land is insufficient for such purpose, private farmland may be converted for and designated as industrial land." As a result, the restrictions to the acquisition of industrial land provided for by the above-mentioned article 30 of the Land Law are no longer in force.

The Statute also contains regulations concerning the registration of industrial land prices and the levy of a land tax and a land appreciation tax on industrial land, both in urban and rural areas, to facilitate the assembly of land for industrial use.

The Statute further forbids the use of land in the industrial zones of city plans for purposes other than for industries, and limits the transfer of ownership or lease of industrial land to cases where the transferee or lessee intends to use the land for industrial purpose. This provision precludes the possibility of further misuse of land in industrial zones.

In a number of cases, city plans are undergoing an over-all revision, involving a relocation or an extension of the industrial zone either because much of the area is occupied by residences and stores or is too congested.

The development of industrial lands is entrusted to municipalities. Master plans aimed at achieving maximum efficiency in the use of the land, water supply and sewer mains are in preparation. Some of the industrial lands may be developed into organized industrial districts, if necessary.

As already stated, during the early stage of the establishment of industrial districts, the government initiative has played an important role and all three pilot industrial districts are largely financed with United States Aid loans. Construction work, including grading and laying of roads and installation of sewers and water mains, is undertaken by the Public Works Bureau of the Provincial Department of Construction, whose director serves as one of the members of the committee responsible for the industrial district projects.

Because of the rapid increase in population, the existing water and sewerage systems of various cities and towns are becoming inadequate. Additional water works and sewerage disposal plants will have to be built for the industrial districts. These are being designed by the Public Works Bureau. Two other public agencies actively participating in the work are the Taiwan Power Company and the Taiwan Railway Administration, which will provide the districts with power and rail services.

A lease-back factory construction programme is under consideration. Under this programme the industrial district developer will construct factory buildings with all necessary utilities and will lease these buildings to the industrialists.

Four commercial banks have been authorized by the Government to extend loans to small-scale industries.

In each organized industrial district, a committee of representatives from the central and local governments has been appointed to deal with the over-all problems of development planning and to prepare the general provisions for sale, lease, management and operation of plants and properties in the districts. Each committee has three divisions in charge of engineering, management and accounting, respectively. Regulations have been adopted for the management of the districts to fit in with the circumstances of the respective districts as well as the nature of the industries. Restrictive covenants are drafted accordingly. After the complete occupation of the industrial district by tenants, the management will be turned over to local authorities.

In the Federation of Malaya, active thought has been given to the establishment of industrial estates since 1957, when the Federal Government set forth an industrial development policy in which it recognized that provision of industrial land and suitably serviced sites was a prerequisite to attracting industries towards urban areas.

In the past, local authorities had not made any systematic attempt to encourage the establishment of secondary industries by offering the inducement of generous and uniform terms in respect of land tenure. This was due to the absence of any industrial development policy, and to the constitutional position whereby alienation of land rests with the state governments. The question of land for industrial development had been approached mainly from the angle of revenue and decisions on applications for such land were largely based on an assessment of the amount likely to be paid by the industry. This approach is explained by the fact that land revenue has been for a long time the principal source of state revenue. Under the circumstances, a wide range still exists in terms such as premium, quit rent and length of lease in tenure of state land for industrial purposes in various parts of the country, which is not altogether explained by location.

Premia for state land in or near towns are usually fixed by auction, and rents on state land vary from nominal amounts of a few Malayan dollars $\frac{1}{2}$ to as much as 2500 per acre per annum. The rates of premia and rent vary in accordance with the period of the title. In most parts of the country, leases vary from 25 years to 99 years; in some areas, grants in perpetuity are also given. Prices asked for privately owned land in or near urban areas for residential, industrial, and, sometimes, speculative purposes are often considerably inflated. The price of state and private land in or near urban areas is usually much too high to make such land attractive for industrial development. On the other hand, the much cheaper land in rural areas is too remote from labour and market and lacking in essential services (roads, railways, water, electricity, etc.) to make it sufficiently attractive for such development.

The principle that urban development plans should provide for zoning for industrial as well as residential, commercial and agricultural use has long been accepted in the Federation. In each zone, the permitted and prohibited uses are described and classified and form part of the plan. Local authorities have power to prevent, abate, and if necessary, prohibit dangerous, unhealthy or offensive trades, and building by-laws include powers to regulate and licence such trades. In urban sectors where zoning plans have not yet been prepared, industry is directed to areas considered

1/ One US = Malayan 3.05.

most suitable on account of proximity to existing related services and facilities, including housing and commerce, or where it is anticipated that these will become available. During the Japanese occupation, a good deal of non-conforming use of land was done, including use of land zoned for industry for other purposes, and it has been difficult subsequently for local authorities to remove the occupants. Furthermore, much of the zoned industrial land in towns is under mining or held on mining lease, which has also adversely affected the amount of land available for industry in urban areas.

Federal Government policy

With a view to formulating a policy for industrial development, the Federal Government set up an Industrial Development Working Party, which published its report in January 1957. The main recommendation of the Working Party in respect of industrial land was that the Federal Government should assume responsibility, after negotiations with state Governments, for acquiring and improving land for industrial enterprises; the layout of industrial areas or estates would be undertaken by some specialized agency. On the basis of this report, the Federal Government formulated its industrial development policy, which was set out in White Paper No. 30 of 1957 and accepted by the Legislative Council in June 1957. In it, the Federal Government accepted the broad conclusion that an increased rate of industrial development in the Federation was necessary as a means of strengthening the economy and providing productive employment, and that it should be an object of public policy to create conditions conducive to such a development. These conditions included services for industry, financial inducements to investment and protection of the market for local manufacturers.

That part of the White Paper relating to development of land for industry read as follows:

"The [Federal] Government accepts that the provision of developed sites is an important means of assisting the establishment of new industries. The extent to which the Federal Government can undertake such development is limited not only by the finance, town planning and works capacity which may be available at any one time, but also by the necessity to secure the participation of state governments and of local planning authorities. The Federal Government will, however, invite state governments to consider this proposal and the extent to which they would be prepared to collaborate with the Federal Government in its implementation. The means by which such development might be undertaken in selected areas will be considered in the light of these consultations and of the financial resources available."

In 1958, the Government appointed a working party on problems of land development for secondary industries, which noted the success of Petaling Jaya, a satellite industrial town set up in 1954 seven miles

from Kuala Lumpur, and recommended that state authorities be encouraged to establish a few low scale industrial parks around the country. The working party noted that industry in the lowlands in urban areas had a number of disadvantages, i.e. power, water and other facilities are readily available. The population of lowland areas tends to increase on account of both the birth rate and immigration from rural areas. The most important single factor influencing industrial location in urban areas is the availability of land. The working party recommended that land in such areas should be made available for industrial development in order to provide employment opportunities for an expanding population. At the same time, state governments should establish industrial estates in other areas to relieve congestion in the main urban centres and achieve a balanced industrial development.

On the basis of the working party's recommendations, the Government decided:

(i) to advance funds to the Ministry of Commerce and Industry for the development of Federal lands;

(ii) to establish a Trust Account operated by the Ministry of Commerce and Industry to give financial assistance in the form of loans at reasonable rates of interest to state governments offering development schemes acceptable to the Ministry and the Treasury. However, the Treasury would expect states to make use of their existing resources before seeking Treasury aid. The funds could also be used to finance a Federal scheme where such scheme was acceptable to the Treasury;

(iii) to consider the establishment of a statutory body whose object would be to develop industrial estates.

Under the second Five Year Development Plan (1961 to 1965) a sum of 7,500,000 and another one of 2,000,000 in a Federal Trust Account were allotted to provide for loans to State Governments for the development of industrial estates. The funds were to be used as follows, over the period 1961 to 1963: 1961: 4,500,000; 1962: 3,000,000; 1963: 2,000,000. The phasing was based on the expected financial requirements of the states, corresponding to the progress to be made in their industrial estate development programmes.

In 1961, 1.75 million of the 4.5 million allocation was lent to the Ipoh Town Council; the balance of 2.75 million was set aside in anticipation of applications for loans from Selangor, Penang, Negri Sembilan and Johore. The 3 million set aside for 1962 are in anticipation of developments in Malacca and Pahang. The funds for 1963 will provide additional finance which may be needed for projects already started and the financing of any new projects which may be started in that year. Under the Plan, no new project is to be started in 1964 and 1965 as it is expected that the projects begun in the first three years of the plan would be well under way to completion by 1964.

Industrial Development

Ipoh Town Council

Under the state land reclamation process in 1960, with the assistance of the Government of Malaya to borrow federal funds for the development of industrial estates, the Ipoh Town Council applied for a loan of 1.75 million to develop a site of about 370 acres at Kemaman Besek. It was felt that factors such as highly developed communications and local service and a local market for many consumer goods should contribute such to encourage industrial development in this area. Ipoh is approximately 140 miles north of Kuala Lumpur.

The proposed site lies within the Ipoh Town Council boundary, between the main north-south road and rail axes and adjacent to the future Ipoh by-pass. The land is flat and unmined. This is an important factor in attracting industrialists, because it will result in low site preparation costs and will avoid waste of time in factory construction. The site is the only suitable area in the Ipoh locality, as all other potential sites contain unfilled holes resulting from mining operations. The land is at present alienated and acquisition is necessary. Application has already been made to gazette the area under Section 4 of the Land Acquisition Act, 1960 in order to freeze the land at current values. It is considered that the whole area should be acquired in one stage; otherwise, the value of any unacquired portion will inevitably rise as the remainder is developed. Preliminary inquiries reveal that the greater part of the area will be available at an average price of 4,000 per acre and purchase by private treaty should be feasible; a few isolated areas may have to be compulsorily acquired under the provision of the Act. The estimated total cost of the land is in the region of 1,512,000. There is a high tension electric supply line along the southern boundary of the site and it is understood that any reasonable increase in power requirements can be met providing adequate notice is given. It is anticipated that the water supply problem will be solved by the end of 1961 when there will be more than adequate supply for all needs, including industrial use.

Following acquisition of the site, it is proposed that a 99-year lease over the whole area be issued to the superintending authority, with provision to enable it to assign and transfer lots for industrial use.

It is considered that developed lots could be sold to approved industrial concerns at a cost not exceeding 28,000 per acre. The difference of 24,000 between the estimated acquisition and sale costs per acre is considered to be adequate to cover development, survey, loan charge and administrative costs. It is not intended that a profit should be made since the main purpose of the scheme is to encourage industrial investment. Preliminary estimates indicate that a sum of 1,100,000 will be required for complete development of the site, including roads, drains, and water mains. However, the whole area will not be developed at once,

and an initial expenditure of \$250,000 will be adequate.

Port Dickson

Five pioneer companies undertaking very large projects in oil refining, manufacture of chemicals and fertilizers have proposed to site their projects at the Port Dickson area in Negri Sembilan, and the Federal Government considered that an industrial site should be planned in the area to attract additional industries. The Negri Sembilan Government is at present investigating the availability and suitability of sites.

Tampoi - Johore Bahru

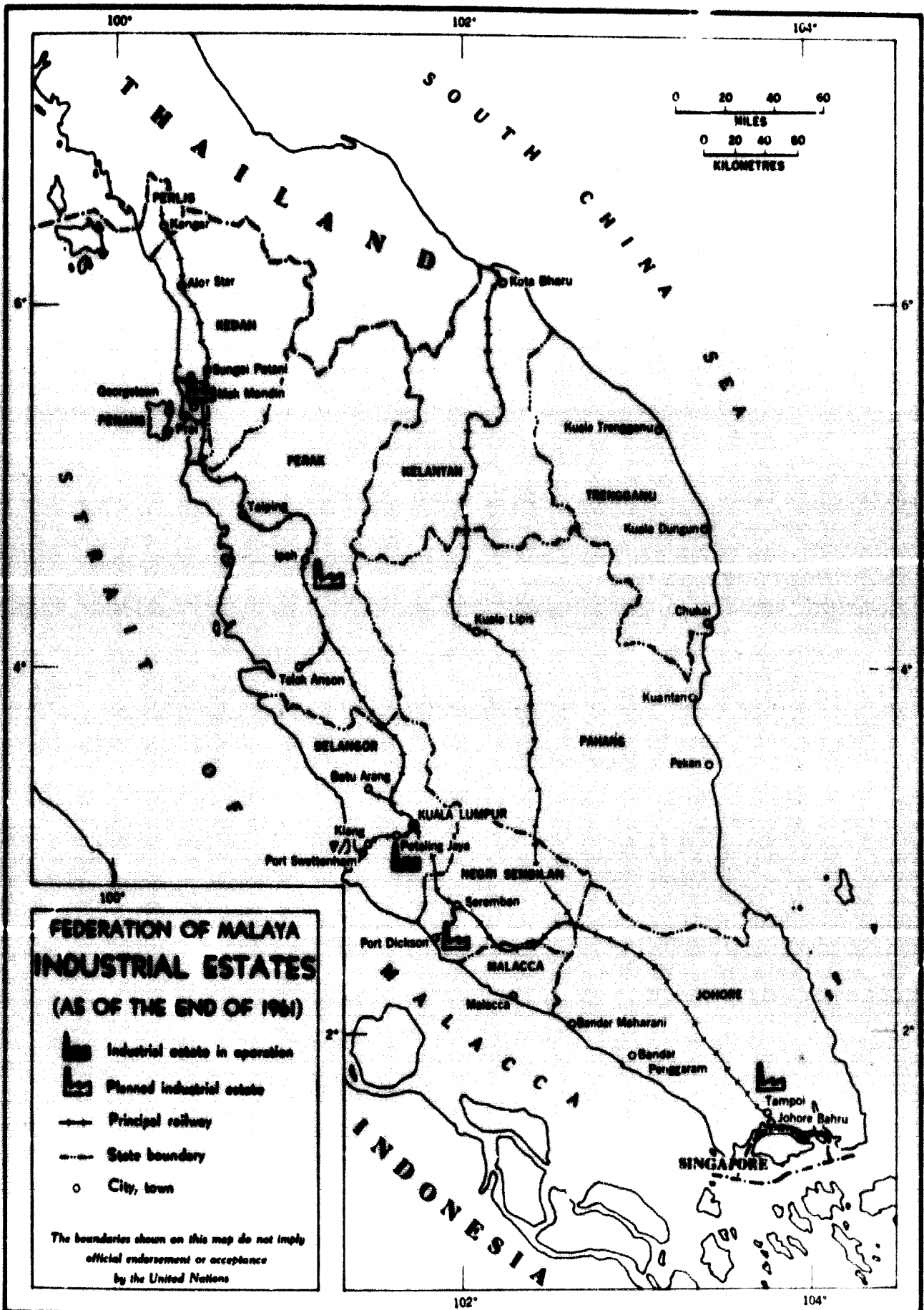
At the beginning of 1961, the Johore Government drew up a "master plan" for the development of Johore Bahru into an industrial town with a prospective population of 200,000. Seven industrial areas comprising 1,099 acres of land are included in the master plan.

Of these areas, Tampoi appears to be most advanced as far as development is concerned. The following characteristics are representative of those of the other areas in the town.

The Tampoi area includes 137 acres. It is situated three miles from the Johore-Singapore causeway near the village of Tampoi on the main Singapore - Kuala Lumpur railway line, along the north-south trunk road.

This area has been surveyed and divided into 55 lots including 5 lots falling within the adjoining Malay reservation which has been earmarked especially for Malay industrial development. The Public Works Department has already built the main and subsidiary roads connecting all these lots. The Department is building water supply facilities for the area and access by rail through a railway siding adjoining the area is planned. The Central Electricity Board's \$18 million power station under construction at Johore Bahru will be able to meet all power requirements in the area when it is completed in 1963.

The Johore Government has approved very favourable terms of alienation in order to encourage industrial development: Each lot will be leased for 60 years on payment of a premium of 5 cents per square foot plus a development charge of 5 cents per square foot. Annual rent is only about 1/2 cent per square foot. The title to the land is subject to imposition of special conditions: (a) erection of factory is required within 18 months of occupation; (b) use of land is restricted to factory buildings and watchmen's quarters; (c) transfer of land is prohibited until the factory has been erected; (d) payment of rates, taxes and assessments may be made by instalments; (e) ninety per cent of the factory workers (other than technical and administrative) should be Federal citizens.



The Federal State Government has selected a site at Tak Mandin for development as an industrial area. The area lies to the east of the town of Butterworth, bounded on the south by the main south road and on the east by the Perai River along the pontoon bridge at Perantang Pauh. The total area of the site is 652 acres, most of which belongs to the State.

Water will be provided by an extension from the twenty-four inch main line from Bukit Tuh Allang to Butterworth, now under construction. Power is supplied to the whole of the Butterworth area from the newly installed piston engines plant at Butterworth, at a comparatively high price.

Plans have been made recommending that work should begin on 52 acres of the site. The cost of filling, building roads and supplying water will be between 75,000 and 765,000. The filling costs form a large portion of the development costs and even with filling any factory erected at the site would have to be erected on piles.

The site at Tak Mandin has been chosen in spite of the high filling costs, because there was no comparable site in Province Wellesley of Penang State suitable for development for industry.

Petaling Jaya

Petaling Jaya, situated seven miles from Kuala Lumpur adjoining the highway to Klang and Port Swettenham, was started early in 1954, with a view to relieving the pressure of population on Kuala Lumpur, and at the same time providing homes and employment for the residents of the new town. To this end an area of some 350 acres has been set aside for industry. This area is well served by roads and rail and has a good power and water supply. It is in a particularly favourable position to attract industry because of its proximity to the centre of commercial life in the Federal Capital, and to Port Swettenham.

Today, Petaling Jaya is a sprawling town of 32,000 people. Its 3,900 acres lie on both sides of the main dual carriage highway. There are more than 4,500 houses and the number is rapidly increasing. In the zone set aside for industry, more than 150 factory lots have been sold and more than 80 factories, 20 of which "pioneer" factories have been constructed and are in the production of many types of goods. Examples of such products are paints, chemicals, processed food, pharmaceuticals, batteries, cement products and so on. The Selangor State Government is considering the possibility of extending the present site by 1,000 acres westwards towards Batu Tiga. Two serious problems that would arise from such an extension are the high cost of providing water for the area and the flow of traffic to and from Kuala Lumpur. It is also investigating the possibility of developing other sites for industry elsewhere in the state.

One of the important factors that has in the past retarded the industrial development of Petaling Jaya has been the lack of land for the same. Industrialists have been able to obtain industrial services with a minimum of trouble and delay. Land is obtained at a low cost and state land being leased for 99 years. An annual rent of 2% of the value here is charged.

Petaling Jaya is administered by a town committee consisting of elected members and of officials. The committee is under the chairmanship of the administrator who is an official and it is responsible to the Petaling Jaya Authority. The Committee is also responsible for urban development, housing, industrial sites, water supplies, roads and sewerage within the boundaries under its jurisdiction.

The costs of developing the town are estimated at about \$12 million, financed mainly by loans from the Federal Government. Of these costs, about \$500,000 cover expenditure for the improvements of the industrial sites.

INDIA

Role of small industries

The role of village and small industries in the development of the national economy has been stressed in the Industrial Policy Resolution of the Government of India of 30 April 1956 and in the Second and Third Five-Year Plan documents. The main advantage of small industries is that they provide large-scale employment at relatively small capital cost. Small industries are expected to meet a substantial part of the increased demand for consumer goods and simple producers' goods. They facilitate the mobilization of resources and skills which might otherwise remain unutilized and permit to ensure a more equitable distribution of the national income. The policy of the Government in the development programmes for small-scale industries has been principally to remove the handicaps and sources of weakness of small industries so that they can play the role assigned to them with strength and vitality.

The absence of suitable factory accommodations has been one of the major handicaps of small industries in India. A large number of small industries are spread all over the country in both large and small towns, and many new ones are coming up almost every day. The old ones are generally situated in congested areas with no space for expansion. The new ones experience difficulties in obtaining land in proper areas, power, water, transport and other facilities. Besides, the installation of such facilities consumes a very large slice of the limited finances of small entrepreneurs. The establishment of industrial estates has been adopted as an effective means of combating these difficulties and developing small industries.

Objectives of industrial estates

The principal objective of the programme of industrial estates is to provide factory accommodations to small industries at suitable sites with all necessary facilities such as water, electricity, steam, transport, bank, post office, canteen, watch and ward, first aid, etc., and thereby create a proper environment for the advancement of industries. Besides, the fact that industrial estates bring together a number of different industrial units facilitates the establishment of common servicing centres, introduction of modern techniques, collective purchase of raw materials and sale of finished goods. Being located on a common site, the units in industrial estates are better able to use the goods and services of one another, and their activities can become interdependent and complementary. Industrial estates also help to shift industries from congested areas and facilitate the dispersal of industries. In backward regions, they serve as centres of industrial activities and area development.

Programme and achievements in the first five-year plan period

The idea of establishing industrial estates as a medium for the development of small-scale industries was first adopted in India by the Small Scale Industries Board at its meeting held in January 1955. During the last year of the first five-year plan, ten industrial estates to be constructed by the state governments were sanctioned. They were: Najkot, Guindy, Virudhunagar, Hampur, Kara, Jalihat, Wilson, Shivendram, Attumanoor, and Trichur.

A loan of Rs.57.89 lakhs^{1/} and a grant of Rs.0.495 lakh were given to the state governments for this purpose. In addition to the above, construction of two estates -- one at Okhla and the other at Maini (Allahabad) -- was undertaken by the National Small Industries Corporation. These estates were to be transferred to the respective state governments after they had started functioning.

Programme and achievements in the second plan period

In the second five-year plan period, the programme received a great impetus. A provision of Rs.11.12 crores was made for the industrial estates programme in the plan and 110 industrial estates in different parts of the country were sanctioned during this period. At the end of the second plan, sixty-seven industrial estates had been completed, of which 53 were functioning and 53 others were under various stages of construction. The expenditure incurred on industrial estates as reported up to the end of the second plan was Rs.10.98 crores.

Programmes during the third five-year plan

The programme of industrial estates has already caught the imagination of the people, and there is an increasing demand for more and more estates from small entrepreneurs all over the country. The usefulness of industrial estates as a scheme for rapid development of small-scale industries has been recognized in the Third Plan and a provision of Rs.30.20 crores has been made for this scheme in the Plan as against Rs.11.12 crores in the Second Plan. This is only for schemes of industrial estates to be set up by government agencies. In addition, it is expected that a substantial amount will be spent by private agencies, including industrial estates co-operatives, during the Third Plan, for the setting up of industrial estates.

In urban and industrially advanced areas, the state governments may not meet the entire expenditure for the setting up of industrial estates, as they did in the Second Plan period. Instead, they may only develop the land and provide the common services and leave the actual work of construction of buildings to the entrepreneurs. The latter will, of course, be asked to conform to certain approved norms and standards in the construction of buildings.

^{1/} One lakh = 100,000; 1 crore = 10 million; one rupee = US \$ 0.21

The full responsibility for construction and management of industrial estates in rural and industrially backward areas may have to be borne by the state governments during the Third Plan period. The promotion of industries in rural areas and small towns is one of the important objectives of the small industries programme in the Third Plan and the scheme of industrial estates will be an important agency for ensuring this objective. Industrial estates in rural areas need not necessarily have a large number of factories, or factories of large sizes, as in industrially advanced areas. Very often there may be need for only small work-sheds to begin with.

The over-all programme for the Third Plan period provides for the construction of 300 medium-sized and large-scale industrial estates, and 500 to 1,000 small rural estates.

By 31 March 1962, a total of 212 industrial estates had been sanctioned, of which 68 were functioning, 21 completed but not functioning, 16 under construction, and 107 at different stages of planning. Progress in terms of factory sheds was as follows:

Number of sheds completed:	2,947
Number of sheds allotted:	2,756
Number of sheds occupied:	2,279
Number of sheds functioning:	1,595
Number of sheds under construction:	696

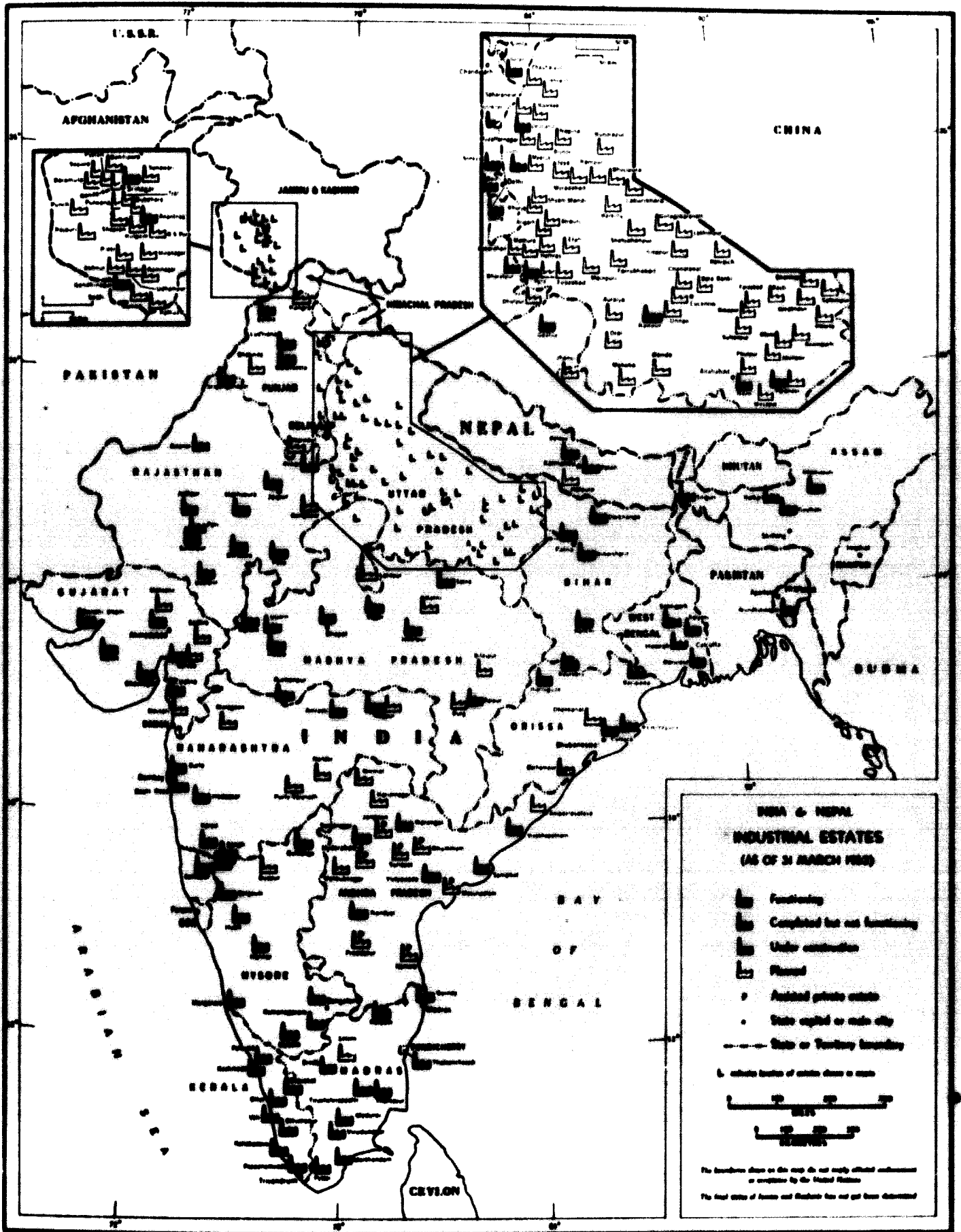
By the same date, 1,227 industrial enterprises were operating, with a total employment of 16,709 and an annual production value of 159.3 million rupees. The expenditure incurred on industrial estates was Rs.11.59 crores.

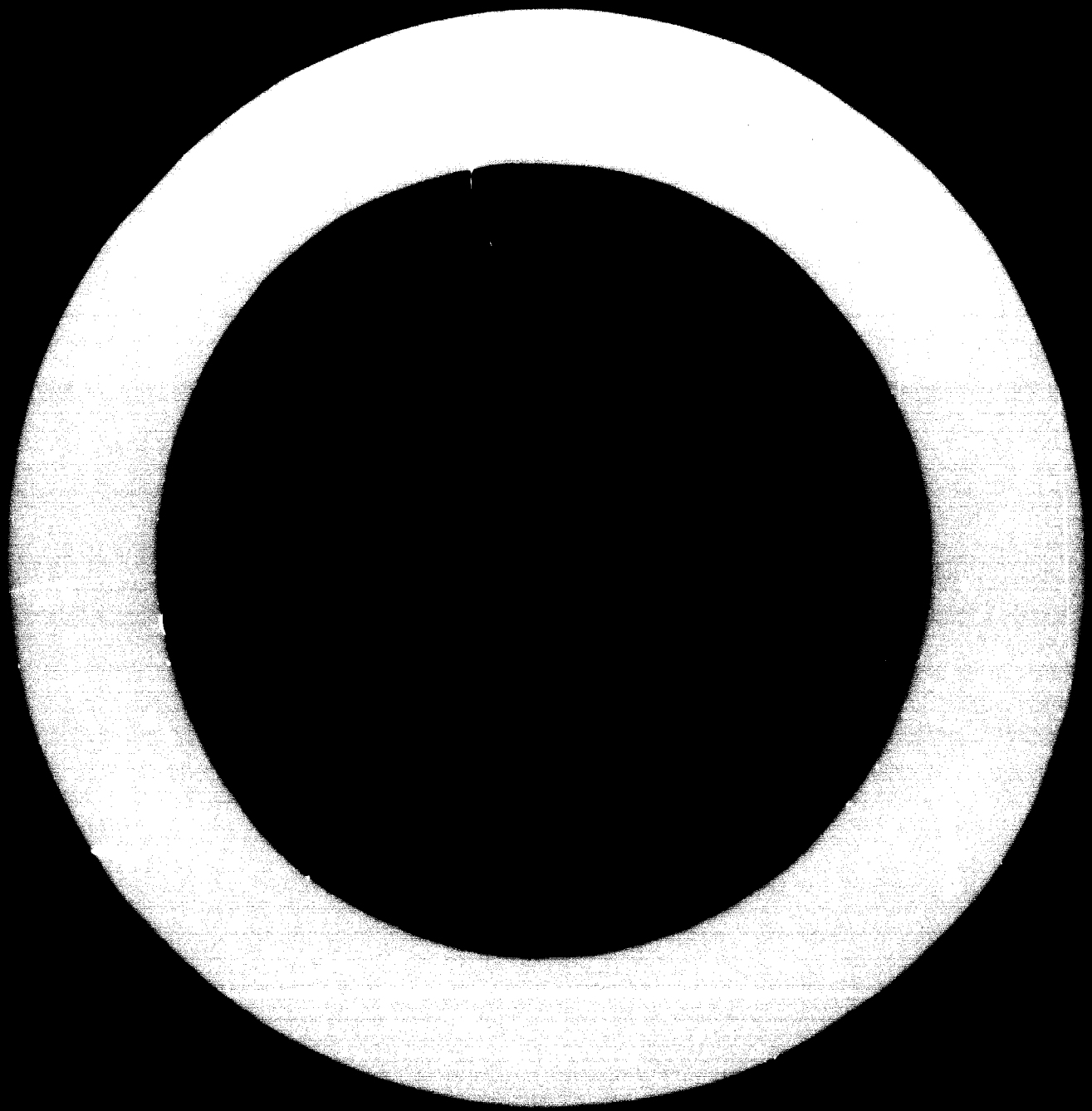
Location of estates

Most of the industrial estates sanctioned during the first and second plan periods are located in places with a population of less than 100,000:

		Number of estates
Places with population of less than 20,000	...	25
Places with population ranging from 20,000 to 50,000	...	25
Places with population ranging from 50,000 to 100,000	...	21
Places with population over 100,000	...	48
		119
Total	...	119 ^{a/}

^{a/} Excluding one scheme for factory accommodations sanctioned for Punjab.





Size of the estates

More than 50 per cent of the estates sanctioned during the first and second plan periods were medium-sized or small estates costing below Rs.10 lakhs. At the end of the second plan period, there were 9 estates costing less than Rs.3 lakhs, 61 costing Rs.3 lakhs to Rs.10 lakhs, 22 costing Rs.10 lakhs to 15 lakhs and 27 costing over Rs.15 lakhs.

Size of factories

No uniform standards have been prescribed for the size of factories in the industrial estates. Most of the industrial estates provide factories in over three sizes to meet the requirements of different classes of entrepreneurs. A statement showing the size of factory sheds in a few representative industrial estates is given in the appendix. It will be seen that the factories in different estates range from 660 to 14,130 square feet in covered area.

Planning and layout

In the planning and layout of an industrial estate, the first consideration is the choice of a suitable site. The factors which are taken into account in the selection of a proper site are the physical features of the site; easy availability of water and power; and proximity to railways and other means of transport.

In the actual planning of the estates, emphasis is laid on the most economical and efficient utilization of the land available. To achieve maximum space economy and to reduce the rent to be paid by the entrepreneurs hiring the factory sheds, action is taken to bring as large a portion of the area as possible under factory plots. To ensure this objective, the following norms have been recommended by the Selected Buildings Projects Team on Industrial Estates:

	Percentage
Area under factory plot	60 to 65
Area under roads (up to)	20
Area under open space (up to)	10
Area under administrative and other buildings	10 to 5

These norms have been recommended to the state governments for adoption to the extent possible, since variations have to be made to suit the needs of particular sites and localities.

Considerations of economy are also kept in view in planning the work-sheds. Adoption of a large number of different sizes of sheds has been discouraged and standard spans, generally of 20, 30, and 40 feet which suit the functional requirements of small-scale industries, are adopted.

Standard spans permit to adopt trusses of standard design which in turn reduces the cost and increases the speed of construction. Adequate ventilation and lighting of sheds are provided by north-light or monitor trusses and windows of sufficient area.

Communications within the industrial estate are important to ensure an easy flow of raw materials and finished goods. As indicated above, up to 20 per cent of the total estate area is reserved for roads. The overall width of roads for double lane traffic is 45 feet and for single lane traffic, 33 feet.

Facilities in the industrial estates

The main facility provided to small units in an industrial estate is a suitable factory accommodation in a healthy environment with water, electricity and other utilities, in conformity with the rules and regulations prescribed under the Factory Act. In addition, common service facilities such as tool rooms, forging shops, foundries, electroplating units, heat treatment centres, and so on, are made available in many industrial estates. The policy of the central and state governments is to locate their own facility centres and workshops as far as possible in or near the industrial estates. Facilities such as railway sidings, canteen, first-aid dispensaries, banks, post and telegraph office, telephones, etc. are provided in most of the estates. Space is provided in most of the industrial estates for exhibiting the products of small undertakings including those produced for railways and other large industrial establishments.

Loans from state governments and institutional credit agencies and supply of machinery on hire-purchase are available to all small industries in the country, but special attention is often given to units in industrial estates.

The industrial estates are not to be merely a collection of workshops, but are meant to foster a co-operative spirit among the occupants. Gradually, the tenants are expected to provide for themselves services such as common transport, maintenance and repair shops, depots for raw materials and finished products and the like.

Agency for construction and management

During the second plan period, the construction and management of most of the industrial estates have been undertaken by the state governments. Only two estates, Okhla (near Delhi) and Naini (near Allahabad), have been constructed by agencies of the central Government. Even in these cases, the Government's intention was to transfer the estates to the concerned state governments after the completion of the construction work. The Okhla estate has already been transferred to the Delhi Administration.

The entire cost of construction of the estates is advanced in the

form of loans by the centre to the state governments. The cost of land and buildings is advanced as a 20-year loan and of other items like power transmission, water supply, etc., as a 30-year loan. The cost of preparing the plans and estimates is covered by grants to the state governments.

Allotment of factories to tenants

The allotment of factory sheds in the industrial estates is done by the state governments after inviting applications from the prospective entrepreneurs in which these are asked to indicate their requirements. The industries using modern techniques and manufacturing items which have an importance in the national economy are given special preference. Preference is also given to technically trained youngmen who desire to set up small industries.

In most of the estates, the factories are allotted on a rental basis, but the state governments have the discretion to make allotments of factories on a hire-purchase basis or even on outright sale. Such sales are, however, subject to the condition that the purchasers comply with the rules and regulations of the estate and pay their share of maintenance of common services, such as roads, canteens, electricity, water, etc.

Subsidy on rent

As a special measure of assistance to small industrialists occupying factory accommodations in industrial estates rent subsidies are given up to a period of five years. The economic rent may prove to be too high for small industrialists in the early years and the state governments levy only a "concessional" rent, the rate of which may vary from estate to estate, even within the same state. The losses consequent on the levy of concessional rent are borne in equal proportions by the central and state governments.

Private industrial estates

The financial resources of the government agencies being limited, ways and means have been evolved to meet the increasing demand for new industrial estates throughout the country. A scheme has been devised for assisting private agencies including co-operative societies of entrepreneurs and individual entrepreneurs forming themselves into companies or associations to set up industrial estates. Under this scheme, the commercial banks may advance to a limited extent long-term loans to companies and co-operative industrial estate societies against security on land and factory sheds and the guarantee of the state government concerned. Co-operative central banks may also advance loans to industrial co-operative societies against state government's guarantee for setting up industrial estates provided such societies are registered under the Co-operative Society's Act. The entrepreneurs are required to raise by way of share capital one-sixth to one-fifth of the total amount needed for the industrial estate co-operative and one-fourth to one-third of the amount for industrial estate companies.

The balance is to be advanced by the credit institutions. The period of repayment of the loan might extend from seven to ten years. Loans by banks will be at normal rates. Steps have already been taken by some state governments for the formation of such co-operatives and companies. The question of giving more liberal assistance to such ventures by private agencies is now engaging the attention of the Government of India.

Functional industrial estates

The need for setting up industrial estates for a particular industry as opposed to normal industrial estates which provide accommodation to a wide variety and range of small-scale industries, has also been recognized. It is proposed to set up such functional industrial estates for automobile ancillaries, light machine tools, radio components and parts, clocks, time-pieces and watches.

Ancillary industrial estates

The Government of India has taken various measures for the promotion of small industries as ancillaries to large industries. One of them is the setting up of ancillary units in industrial estates near large factories. The large units will give technical guidance and assistance, and also raw materials where necessary. In this manner, a smooth flow of production of the large-scale industries and a guarantee of precision and quality of products supplied by the feeder small units will be ensured.

A good beginning in this direction has already been made by the Hindustan Machine Tools of Bangalore, which has set up fifty factory sheds in an industrial estate within its premises at a cost of Rs.20 lakhs. The average investment for each of these industries in the industrial estate is of the order of Rs.1 lakh, out of which the entrepreneurs are required to provide between Rs.20,000 to Rs.30,000. The rest of the requirement is met by the Hindustan Machine Tools and from schemes of assistance from other agencies like the National Small Industries Corporation and the State Bank of India.

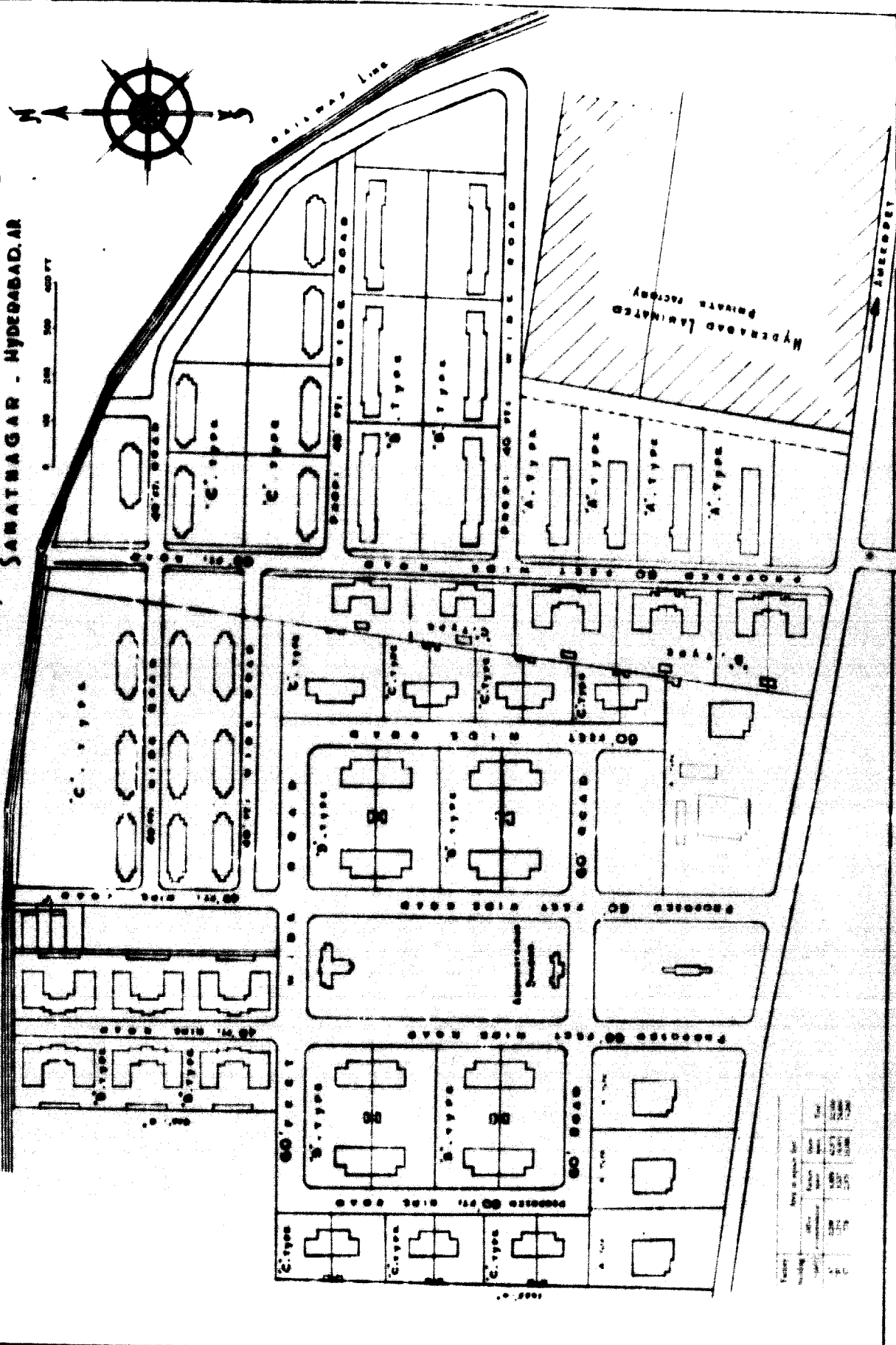
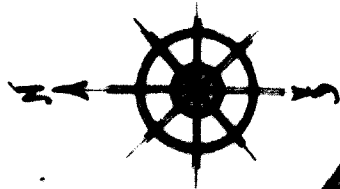
Recently, the Heavy Electricals (India) Ltd., Bhopal, has also decided to set up an ancillary industrial estate in its premises. Initially, twenty small units will be housed in this estate.

The establishment of ancillary industrial estates has been recommended to other public industrial enterprises and substantial progress in this field is expected to be achieved in the third plan period.

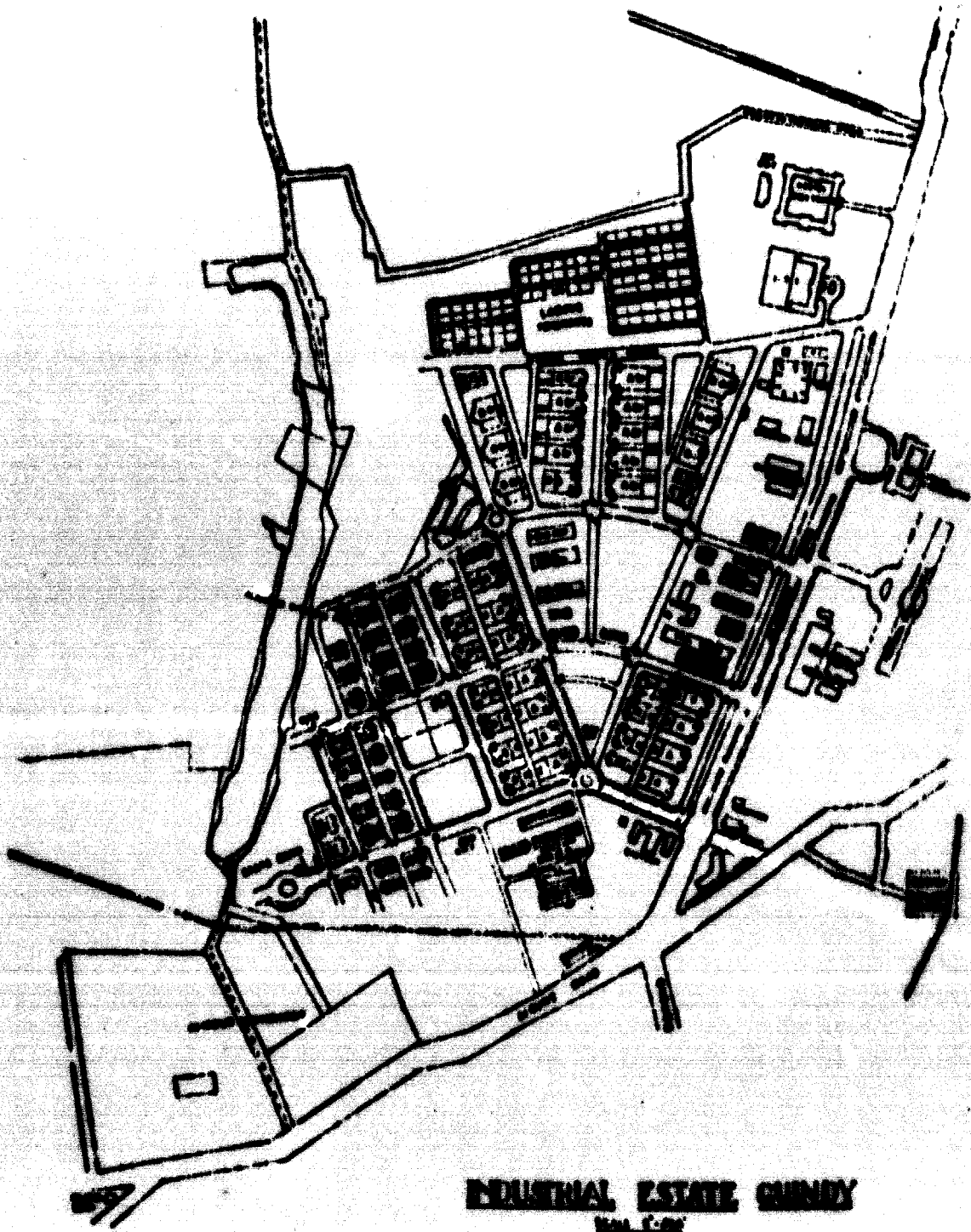
University industrial estates

It is proposed to set up industrial estates near institutions of higher education with a view to enabling students to gain practical factory experience and providing them with means of "earning while learning". It has now been decided to set up such estates on a pilot basis in the Universities of Jadavpur, Osmania, Rajasthan, Baroda and Allahabad. The details of the scheme are now being worked out.

LAY OUT PLAN OF INDUSTRIAL ESTATE.
SARATNAGAR - HYDERABAD, A.P.



Factory Building	Area in square feet		Total
	Area	Volume	
A. Type	1,00,000	1,00,000	1,00,000
B. Type	2,00,000	2,00,000	2,00,000
C. Type	3,00,000	3,00,000	3,00,000
Hyderabad Laminated Private Factory	4,00,000	4,00,000	4,00,000
Total	10,00,000	10,00,000	10,00,000



INDUSTRIAL ESTATE GUNBY
VAL. 1-50

Appendix

Sizes of factory sheds in a few industrial estates

	<u>Type of shed</u>	<u>Covered area (square feet)</u>
1. Large estates		
(a) Guindy	(1)	14,130
	(2)	7,200
	(3)	10,530
	(4)	5,400
	(5)	7,440
	(6)	3,600
(b) Sanatnagar	A type	6,889
	B type	3,537
	C type	2,376
(c) Okhla	Varying sizes from 2,000 square feet to 10,000 square feet	
(d) Agra	Type I	7,300
	Type II	3,046
	Type III	660
(e) Raipur	Type I	8,350
	Type II	3,660
	Type III	3,050
	Type IV	1,350
2. Medium estates		
(a) Bangalore	A type	4,750
	B type	2,480
	C type	1,500
(b) Ludhiana	Type I	4,000
	Type II	2,000
	Type III	1,000
(c) Rajkot		1,800
(d) Howrah	J type	6,000
	K type	5,400
	L type	3,075
	Y type	3,250
	Z type	1,750

(e) Papanarcode	A type	3,200
	B type	3,600
	C type	1,000
3. <u>Small and rural estates</u>		
(a) Bikaner	A type	2,480
	B type	1,800
(b) Sonepat	Type I	2,300
	Type II	4,800
(c) Bijnor	Type I	5,400
	Type II	2,400

ROLE OF INDUSTRIAL ESTATES IN INDIAN PLANNING

by D. K. Malhotra, Joint Secretary, Planning Commission, Government of India, United Nations Consultant

Industrial estates were not an integral part of Indian planning from its commencement; no concrete programme of industrial estates was worked out for the First Five-Year Plan which started in April 1951. Nevertheless, the need for and usefulness of this tool of development were being appreciated and the first estate was set up at Rajkot in 1955.

The concept of the industrial estate in India was largely derived from that of the trading estates in the United Kingdom, whose role was recognized in the report on the First Five-Year Plan in the following words:

"Trading estates in the United Kingdom provide factory sites or built up factory premises, with such facilities as transport and supply of electricity, water and gas laid on, to small amateur manufacturers on a rental basis. These facilities, which individuals could not have been able to provide except at very high cost, have made possible the establishment of small and medium-sized factories in selected areas. In the United Kingdom, the Government took initiative in encouraging private capital to provide building up these estates after the great depression to reduce unemployment and to bring about better distribution of industries. While the objective of dispersal of industries is only a long-term process, the idea of trading estates can be experimented upon if it can help to some extent solve the unemployment problem of the educated classes. The built-up factory accommodation with all the other ancillary facilities (like electricity, water, etc.) will provide the right type of incentive for persons who want to work hard and have small amounts to invest or can be given a measure of assistance".^{1/}

A properly worked out programme of industrial estates dates from the beginning of the Second Plan. The object of the estates, as stated in the Plan, was to provide conditions favourable to working efficiency, maintenance of uniform standards in production and economic utilization of materials and

^{1/} Government of India, Planning Commission, The First Five Year Plan, Chapter XXXIX, Para.14(b) (New Delhi, 1952).

equipment. The principal aim was to enable a number of small-scale units to have the advantage of common services and other facilities such as a good site, electricity, water, gas, steam, compressed air, railway siding, watch and ward, and so on. The program soon gathered momentum and the demand for setting up estates throughout the country expanded rapidly. In the Third Five-Year Plan, the programme is to be substantially enlarged and directed increasingly towards medium-sized towns and selected rural areas.

The following table summarizes the over-all scope and achievements of the programme:

	<u>First Plan</u>	<u>Second Plan</u>	<u>Third Plan</u>
Estates approved (Number)	10	120	300 (target)
Estates constructed (Number)	1	66	
Financial provision (Rs. million) ^{a/}	6	111	302
Actual expenditure (Rs. million) ^{a/}	1.2	110	

^{a/} One rupee = U.S. \$0.21.

Before referring to the main features of the programme it may be worthwhile to explain the connotation of the term "industrial estates" as it has come to be used in India. In physical terms an industrial estate is a developed area provided with various basic facilities and services including electricity, water supply and roads, and with a number of factories available for rent to prospective industrialists. The purpose is to enable the entrepreneur to instal his machines and start operations without spending money and time on the construction of a factory building.

An industrial estate in this sense is to be distinguished from an "industrial area". The main difference is that while all the basic facilities and services are supplied in an industrial area, factory accommodation is not provided by government authorities, but is to be constructed by the entrepreneurs. Broadly speaking, industrial estates are intended primarily for small entrepreneurs while the industrial areas are developed mainly for the large and medium entrepreneurs who can, and would like to, invest themselves in the construction of factories according to their individual requirements.

A third term currently in use is "industrial townships". These are similar to industrial areas in regard to provision of basic facilities and services but an additional feature is the inclusion of housing accommodation

and other amenities associated with a town.

There are thus variations in regard to the physical planning and to the categories of entrepreneurs and persons whom these three types of schemes are intended to serve.

In absolute terms, a very large expansion of the programme of industrial estates has been planned for the next five years: there will be, by the end of the Third Plan, about 400 industrial estates. Since there are about 320 districts in India with an average population of one to 1.5 million inhabitants, there will be, on a rough average, one industrial estate per district. As compared with the total outlay from public funds provided in the Plan for village and small industries as a whole or for small-scale industries alone, (that is, small mechanized power-driven units), the outlay on industrial estates is relatively small, as indicated by the figures in the following table:

Relative size of outlay on industrial estates

	<u>Second Plan</u>	<u>Third Plan</u>
(1) Outlay on industrial estates (Rs.million)	111.2	302.0
(2) Outlay on small-scale industries (Rs.million)	444.0	846.0
(3) (1) as a percentage of (2)	25.0	35.7
(4) Outlay on village and small-scale industries (Rs.million)	1,800.0	2,640.0
(5) (1) as a percentage of (4)	6.2	11.4

By 31 March 1962, 89 industrial estates were completed, of which 68 with 1,595 factory sheds employing about 17,000 persons were actually functioning. The number of small-scale industries which have found accommodation on the estates is thus very small as compared to the number of small entrepreneurs operating outside industrial estates. Taking into account the rapid rate of growth of small-scale industries in recent years, it would be reasonable to say that for many years to come the facilities which industrial estates provide will not be available to a majority of the small-scale units. Similarly, the employment generated in industries located on the industrial estates is at present only a fraction of the total employment provided by village and small industries as a whole or the small-scale industry sector alone. This situation is likely to continue for many years. Viewed in these terms, the role of industrial

estates will remain limited unless a massive programme is adopted.

It is, however, arguable that the importance of industrial estates in the plan for the development of small industries should not be judged in the above terms. It should be considered that industrial estates serve primarily as heralds or spear-heads of a new way of organizing production in small units under conditions favourable to working efficiency. They function as nuclei from which inspiration and encouragement will spread to small entrepreneurs all around. They will not only spread an awareness of what can be achieved in regard to levels of technical efficiency and volume and quality of production, but will also give rise to private initiatives for setting up similar organizational facilities.

A reference to some of the main features of the programme for industrial estates may be appropriate at this point. Mention may be made in the first instance of the role of various authorities in the programme. The entire cost of the programme is borne by the central Government which provides loans for construction and grants for meeting the preliminary costs of preparing the blue-prints, estimates, etc.. The management and construction of the industrial estates is the responsibility of the state governments; these manage the estates directly or through corporations or other suitable agencies. Except in a few cases in which the establishment of industrial estates was entrusted either to the National Small Industries Corporation or to certain local bodies and co-operative organizations, planning and construction have been undertaken directly by the state governments. Local administrations, that is, municipalities or their counterparts in the rural areas, have not as yet participated in the programme or found any resources for it. Another feature of the Indian industrial estates programme is that factory buildings on the estates are given for rent, in most cases on a subsidized basis for a specified period, and not sold outright or given on long lease. A third notable feature is the provision by the Government of common facility services, such as tool-rooms, heat-treatment shops, and the like.

In a large measure, the achievement of the Government's target of setting up 300 estates during the Third Plan will depend on the extent to which resources of private capital can be mobilized through the formation of co-operatives and joint stock companies for the establishment of industrial estates. It also depends on the type, size and location of the estates planned by the state governments. If the state governments prefer smaller estates and private effort is forthcoming in ample measure, the number of estates set up could well exceed 300. It might be pointed out in this connexion that construction of estates does not necessarily lead to an immediate expansion of industrial activity because, besides the factory accommodation provided on the estate, the entrepreneur still needs machines and tools,

to secure supply of raw materials, credit, training, etc. and to provide a means of existence in rural areas.

In the Third Five-Year Plan, one of the main objectives is to provide for villages and small industrial estates to be set up in rural areas, so that the benefits in terms of income and employment are spread more widely to small towns and rural areas. The extent to which this can be achieved depends a great deal on the progress made in the provision of economic and social overheads, including electricity, means of transport, training facilities, extension facilities, etc.. Because of the overall shortage of resources, the pace at which this revision can be carried out in the country cannot be accelerated beyond a certain point. Where such facilities become available, the programme for the provision of small industries—including provision of training centres, credit, extension facility workshops and industrial estates—will be undertaken.

A good deal of attention has been focused in recent years on the need for setting up rural industrial estates. The concept of the rural industrial estate, however, still needs to be clarified. In the strict sense of the term, such an estate should be located in a rural area at a fair distance from a city or a large town; as far as possible, it should provide accommodations to rural entrepreneurs and artisans and should benefit primarily the rural population. In this sense, only a limited number of rural industrial estates could be started with any chance of success; these estates would have to be located in places where there is a concentration of rural artisans, availability of basic facilities, likelihood of entrepreneurial initiative and willingness to occupy factory accommodations, and scope for remunerative industries to be started.

It seems therefore desirable to approach the question of location of industrial estates in rural areas without too much rigidity. As a first stage, dispersal may be thought of in terms of development of urban-rural complexes, that is, of an interconnected development of small towns and associated rural areas and to locate industrial estates in small towns and the most promising rural areas. Industrial estates set up in such locations should be effectively linked up with training centres, extension centres and extension facility workshops

MAJOR PROBLEMS IN SETTING UP PRODUCTION UNITS IN INDUSTRIAL ESTATES

Prepared by the Indian Investment Centre

In his opening address to the seminar, the Minister of Industry of the Government of India stressed the importance of an integrated approach in studying the various problems of industrial estates. He emphasized that while discussion of areas, dimensions, construction details and so on was essential, the basic problems of setting up production units in the estates should not be forgotten. Any entrepreneur who has to set up a production unit in the estates comes across a large number of problems. A well organized industrial estate will provide him with land, building, water, power, transport facilities, etc. In such matters as choice of industry, the entrepreneur has to exercise his individual judgment.

Many entrepreneurs approach this problem from the market survey standpoint. They know that in the market a particular product, say a portable tool, an electric light switch or a fluorescent tube, is in short supply and sells at a high cost. The idea of putting up a unit for manufacturing this particular item may then be taken up by a large number of entrepreneurs. High selling price may be the only criterion used; in fact, it may be a temporary price and be misleading. Other criteria such as progressive demand, availability of raw materials, technical skill should also be taken into account.

In many cases, an entrepreneur going to an industrial estate will engage, for the first time, in an industrial occupation. In some cases, he may be shifting an existing establishment to an industrial estate or setting up an additional plant there. In any event, since it is desired to promote industrial development on a large scale in under-developed countries, the settlement on industrial estates of large numbers of fresh recruits is to be encouraged.

The next problem is to give adequate assistance to the new entrepreneurs. Setting up an industrial enterprise in India involves a large number of legal and procedural formalities under state and central government regulations. It is true that a licence under the Industrial Development and Regulation Act is not necessary if the production is less than Rs. 1,000,000¹ in value or employs less than 100 persons. Nevertheless, the small entrepreneur has to go to central government authorities to obtain a licence for the import of plant and machinery. He has to seek the assistance of the state and central Governments for the import of raw materials. If he incorporates his enterprise into a company, he is subject to the provisions of the Indian Companies

¹/ One rupee = U.S. \$0.21

act which is a far from ideal situation. In order to find the ideal a venture capitalist. In this connection, a detailed knowledge of the taxation position would enable the entrepreneur to take advantage of a large number of concessions that the taxation authorities are giving to newly-established enterprises. These are the administrative and legal aspects of the problem of financing the entrepreneur.

Over and above these administrative and legal problems is the question of the technical aspects of an entrepreneur's project. He has to decide upon the process. Then he has to decide upon the plant and machinery that is required and, in particular, choose between single-purpose and multi-purpose machines and consider their productivity and cost in terms of value of product. He has to obtain tenders for the plant and machinery, apply for import licences, order plant and machinery, then install and erect it and begin producing. He will need workers with adequate technical qualifications and skills. At this juncture, he may need technological assistance for installing and operating his equipment.

The need for technological assistance from abroad is increasingly felt in many under-developed countries. Obtaining such assistance may involve locating a firm abroad with the necessary knowledge, inducing this firm to part with the knowledge for a reasonable consideration, obtaining foreign technicians and sending skilled men to the foreign firm for training. When the size of the project is large, there is little difficulty in obtaining such assistance. Any entrepreneur who puts up a large project involving a substantial expenditure can easily spend for technological assistance a percentage of the total cost of the project. Purchase agreements providing for such services are frequently drawn up. In the case of a small entrepreneur, the cost of technological assistance is usually prohibitive and other practical difficulties in securing it arise. Moreover, when a foreign firm is induced to give help to an Indian firm, it generally wants to assure itself that the Indian firm has the necessary business skill and competence. Small entrepreneurs setting up units in industrial estates for the first time would naturally find it difficult to convince the foreign firms that they have the necessary business capacity.

The Indian Investment Centre has been set up to help in solving such administrative and technical problems. The Centre was inaugurated in February 1961 by the Finance Minister. It has a team of officers, including engineers, chartered accountants, taxation officers from the Central Bureau of Revenue, Officers of the Ministry of Commerce and Industry, the Ministry of Finance and the Organization of the Economic Adviser to the Government of India, all of whom have been deputed to the Centre.

is a function of the Centre or staff. It invites inquiries both from Indian and foreign businessmen in regard to the administrative, legal, or technical problems facing them in setting up joint ventures. When there are differences of opinion or apprehension between the two parties, it advises them to mutually accept the compromise solution.

The main function of the Centre is to keep ill the both foreign and Indian businessmen informed in the various aspects of setting up industrial units in the country. The Centre publishes a comprehensive set of booklets outlining briefly the laws and rules applying to industrial units and the procedures and formalities that have to be observed.

There is no floor or ceiling in regard to the size of the industrial enterprise which can seek advice from the Centre. Whether the problem or unit is big or small, each issue is studied and, wherever necessary, appropriate authorities are consulted, and the party given the information and advice requested.

A large number of inquiries are coming up to the Centre from would-be entrepreneurs desiring information on products, techniques, requirements and costs, and from established entrepreneurs with problems in technology, standards, markets, and so on. Inquiries are also received from foreign firms interested in setting up smaller enterprises in the country. The assistance extended by the Centre complements that given by the Directorate of Industries and Small Industries service institutes at the state level, and the Development Commissioner for Small-Scale Industries at the central level.

INDUSTRIALIZATION AND THE CHANGING
PATTERNS OF RURAL OCCUPATION IN INDIA

A case study of a shift from
agricultural to factory work

Prepared by the participant from the United Nations
Educational, Scientific and Cultural Organization (UNESCO)

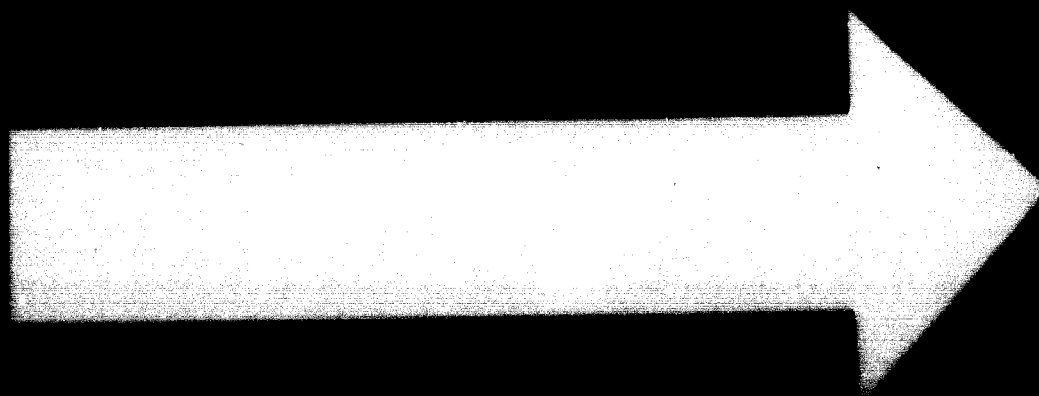
One of the many questions raised by industrialization is that of the peasant's attitude with regard to industrial occupations, a question of special importance in view of the shift from agricultural to industrial employment which accompanies industrial development. This question, which has economic, social and psychological aspects, acquires a particular dimension in India since, in that country, agricultural pursuits are traditionally reserved to particular castes, a fact which would seem to operate as a restraint against the free movement of peasants towards industries. It also has a special importance in India in view of this country's industrialization programme, in particular, that relating to the establishment of industrial estates.

A study of small-scale engineering industries in Howrah, India, undertaken in 1959 by the UNESCO Research Centre on Social and Economic Development in Southern Asia, sheds some light upon this problem. The study, which concerns an actual case of transition from rural to industrial occupation involving a large section of a strictly agricultural caste, definitely shows that the above mentioned checks do not always operate, at least under certain circumstances.

Situated in the outskirts of Calcutta, Howrah presents a remarkable aggregation of small engineering establishments located within an area of about 10 square miles, which produce or process a wide range of products. Some of the small turning shops and other manufacturing units operate independently, others serve as feeders and ancillaries of the giant industrial plants in Howrah, and both thus form a vital part of the town's industrial organization.

The UNESCO study concerned 40 establishments employing 182 workers. All employers and employees studied were Hindus, a fact broadly in accordance with the population composition of the Howrah district, which, according to the last census (1951) was 83 per cent Hindu, 16 per cent Muslim and 1 per cent of other faiths. A majority of the entrepreneurs as well as workers were Shisyas, a caste traditionally associated in Bengal with agriculture and marginal fishing and notably concentrated in the urban environment of Howrah district in recent years. Of the Howrah employers that were studied, 26 out of 40, that is, 65 per cent, were Shisyas and 15 per cent Brahmins and Kayasthas; about 70 per cent

This study will be published in full by the Centre in 1962.



15.7.74

6 OF 9

DO

3736



of the workers studied also belonged to the 'ahisya' caste. The fact that a traditionally agricultural caste has saturated into a mechanical trade is a feature in keeping with the general loosening in recent times of the formerly rigid correlation between caste and occupation in India. The trend towards the adoption of new professions, or absorption in parallel trades within an economy that is spreading out of the village into a centralized industrially-based system, has been recorded in recent census data. In Howrah, the noted preponderance of the 'ahisyas' appears to reflect the sheer numbers of this caste rather than the prevalence of a special flair for entrepreneurship or aptitude within it. Caste-affinity was not a determining factor in the recruitment of labour in the industries: not one employer placed caste as the first preferred basis for hiring a worker. Out of the 26 'ahisya' employers, only one acknowledged fishing as his traditional occupation, which, in the caste scale, ranks particularly low; 16 mentioned agriculture, one referred to business, and the remaining 8 cited no particular caste trade, possibly out of ignorance or perhaps because of reluctance to admit to a low status occupation.

As far as the workers were concerned, 152 of the 182 studied, or 83 per cent, claimed agriculture or agriculture combined with business or salaried employment as their caste or traditional occupation. Brahmins and Kayasthas made up 12 per cent of the total number of workers.

The dissociation of occupation from caste, which appears to be characteristic of the present generation, first became noticeable during the lifetime of the grandfathers of both the employers and the workers. In 29 out of 40 cases, the main source of income of the older generation was agriculture and related business, such as rice-dealing or boat construction. Even then, there were a few break-aways from the traditional trades. This pattern became more pronounced in the next generation, that of the fathers of the present-day employers and workers. The fathers of only 9 employers were engaged in agriculture; business and factory employment were the parental occupations of 11 and 8 employers, respectively. Again, about 58 per cent of the fathers of workers adhered to the occupation of their grandfathers while the remaining 42 per cent departed from their grandfather's calling, a majority of them having taken to salaried employment.

Another feature illustrates further the relative unimportance of the link between the traditional and the present occupations in the case of employers as well as employees - the fact that only 2 employers out of 40 belonged to castes connected with metal-working, namely, blacksmithy and goldsmithy (the latter being, of course, a more refined craft). An even more significant fact is that only 2 workers out of 182 did not reflect any continuing traditional occupation, agricultural or industrial; it was based on work experience, rather than on hereditary skill.

The role of experience as a factor influencing the establishment of turning shops is shown by a study of the job history of the 40 entrepreneurs. More than half of them - 21, to be exact - claimed practical knowledge as workers in turning shops. Of the 19 who had no previous experience of work in turning shops, 10 had an indirect familiarity by virtue of their former positions as order suppliers, pattern shop owners, etc.; two had inherited turning factories. The previous occupation of the 7 others had no relation to turning shops. It

would appear, therefore, that the entrepreneurs had entered the engineering industry largely upon the strength of their practical experience.

The workers' employment in the small engineering industry in Howrah was largely due to the fact that they were living in the vicinity: 91 per cent of the workers were from the Howrah district and adjoining areas. It is probable that the agricultural classes of these areas who took to factory work are, in common with other Bengalis, a preference for mechanical work involving some mental effort as against other types of work involving purely physical exertion. With the exception of one man who had professional training as a motor mechanic and driver, none of the workers had had any vocational education. When pressed hard by the economic circumstances, and forced to seek a job, they gravitated towards the small engineering establishments in Howrah, probably because they had a large number of relatives and co-villagers already working in the Howrah factories who would give them a helping hand. Eighty-one per cent of the workers stated that they had obtained their present employment through relatives, co-villagers and neighbours; in most cases, they had no previous workshop experience.

Caste also appeared to be slowly losing ground in the field of human relationships. Eighty-five per cent of the total number of workers did not follow all or most of the restrictions based on caste differences and about 8 per cent did not follow any restrictions at all. About one-third of them said that they observed sanctions of the caste structure in daily social intercourse, though nearly all would obey marriage restrictions with non-caste people. Caste appeared to be a neutral influence so far as it affected factory work. It did not figure independently as a factor restraining social relationships between the employers and the workers. It was, of course, true that both the employer and the employee generally belonged to a homogenous group, with the same language, caste and often social background. That social disparity there appeared to be was more a consequence of the economic inequality between employers and workers, since in most cases there already existed a caste affiliation. The employers' working class background might have influenced their attitude towards the workers, either in making them identify themselves with the latter in acknowledgment of their past, or in turning them away from the workers so as to emphasize their uplifted social status. Economic inequality was also reflected in a feeling of social inferiority on the part of a large number of workers even though they maintained a caste affiliation with the employers.

The range of expectations and career goals for the workers appeared to be limited. There was little vertical mobility within the workshop and workers moved from factory to factory in search of better prospects, which meant in fact a higher cash salary. As a result of frequent transfers from one factory to another, the workers got a chance to learn the know-how of the business, and in the heart of many of them arose a desire to start a similar business of their own. About 16 per cent of the workers stated that they thought of establishing such businesses on their own, preferably turning shops, and of repeating the career pattern of a large number of the present employers who too had started as workers. Thus, they seemed primarily to wish for a consolidation in the new profession they had adopted, rather than to return to their traditional occupation. When asked if they would prefer some other occupation

if they could earn the same wages as at present, almost all the workers stated that they wished to continue in the same or similar work, either as small entrepreneurs or workers in a large factory; less than two per cent of them stated that they would rather choose agriculture. The employers - traditionally agriculturalists, subsequently workers and now relatively successful entrepreneurs - likewise showed indications of a similar desire to consolidate themselves - and their descendants - in their present trade. More than half of those employers who had children and formulated career plans for them wanted to see their sons established in their existing workshops; others wished to set them going in this or a similar trade or in independent businesses.

Thus, in a traditional society, the forces of stability again tended to reassert themselves. The generation of the fathers, and in some cases that of the grandfathers had to bear the impact of technological change by taking to another occupation. Once the transition had been made and a stabilizing anchor found, traditionalism again favoured the passing on of the acquired vocation from one generation to another. In no way was the agricultural background of their ancestors an obstacle to the stabilizing of Mahisya employers and workers as servants of industry.

In its first five-year plan, the Government has set a goal of developing a diversified industrial base. The Government's policy is to encourage the establishment of small-scale industries, particularly in the rural areas. The Government's policy is to encourage the establishment of small-scale industries, particularly in the rural areas. The Government's policy is to encourage the establishment of small-scale industries, particularly in the rural areas.

The importance of small-scale industries in the Indonesian economy is indicated by the fact that there are over 2,000,000 small-scale enterprises of this type, scattered all over the country. It is considered that small industries fit well into the economic and social conditions of the country. They provide employment to labour, which is abundant, and economize on capital and supervisory managerial skills, which are generally scarce. Their establishment throughout the country tends to distribute income and economic power more equally and thereby contribute to the growth of a balanced, politically stable and democratic society. Small-scale industries are particularly useful where the size of the market is limited by inadequate transportation at high costs, a consideration of special importance in Indonesia, a country composed of thousands of islands.

Until recently, the Government's efforts to promote and develop small-scale industries have been concentrated on three sets of measures:

- (1) Establishment, strengthening and expansion of technological institutes. These are the Institute of Industrial Research in Djakarta, Institute of Chemistry Research in Bogor, the Institute for Testing Materials, the Textile Institute and the Ceramic Institute in Bandung, the Leather Institute and the Tannery Experimental Station in Djokjakarta.
- (2) Financial assistance to home industries and small factories to strengthen their economic position and give their owners the opportunity to mechanize their enterprises on a hire-purchase basis (mechanization aid scheme). Machinery is procured on a hire-purchase basis to replace manual operation or operations using animal energy, with mechanical operation; to replace unproductive machinery with new one; to increase production by providing machinery of the same type, and to increase production by providing power, diesel or diesel-electric generators.

1/ It may be noted in this connexion that very few shipbuilding and transport vehicle industries are in existence, and that many roads, especially in areas outside Java, are in bad condition.

- (3) establishment of "induks" (central production units) to provide cottage and small-scale industries with technical and commercial services. The induks assist small entrepreneurs in organizing their production system, improving the quality of their products, introducing standardization, new techniques and modern equipment, providing better designs of manufactured products, improving management organization and training managers, and organizing the sale of their products.

Induks are set up for small industries producing urgently needed goods, such as textiles, leather, ceramics, wood-work, brass wares, umbrellas, rubber goods and iron works. When necessary, their establishment is undertaken by the Government.

The first induks were set up in 1951. In 1961, twenty-five were in operation. ^{As of} the end of 1958, total investment was 312.9 million rupiahs.^{2/}

In 1960, the Government considered the establishment of industrial estates as a tool for promoting small-scale and medium-sized industries, for the following purposes: to enable small-scale industries to have the advantage of common services and facilities; to increase their productivity and the quality of their products; to stimulate the development of small-scale industries in villages and small towns and encourage the use of improved techniques and better tools; to discourage the concentration of industries and population in large urban centres; to make available improved land and building at reasonable costs; and to make easier training and supervision.

Consideration was given to combining an industrial estate programme with the induk and mechanization aid programmes. The prevailing opinion was that this was possible, but not in every area. The areas where all three programmes could be implemented simultaneously had to meet the following requirements: industries had to be already established, and an induk to be set up on an extensive tract of land, not far from a fairly large town, with adequate transport facilities between it and the town.

This was possible in the following locations:

1. Klender Village, with a woodworking induk, 10 kilometres from Djakarta;
2. Tjiwidej Village, with an ironworking induk, 30 kilometres from Bandung;
3. Madjalaja Village, with a textile induk, 25 kilometres from Bandung;
4. Sokaradja Village, with a metal-working induk, 20 kilometres from Furwokerto;
5. Tjeper Village, with a textile induk, 30 kilometres from Solo;
6. Mojong Village, with a ceramic induk, 40 kilometres from Semarang;
7. Batur Village, with a metal-working induk, 30 kilometres from Solo;
8. Pasuruan Town, with a wood-working induk, 40 kilometres from Surabaya.

^{2/} One United States dollar = 45 rupiahs.

In 1961, an expert sent by the United Nations Bureau of Technical Assistance Operations, at the Government's request, made an exploratory investigation with a view to selecting one or a few alternative locations for an industrial estate. He recommended the establishment of an estate near Djakarta and justified his choice of location by the following considerations:

- (a) The estate would use a considerable amount of power, water and other supporting services and facilities which, at the moment, are available only in a few places outside of Djakarta.
- (b) The limited staff resources at the disposal of the Ministry of People's Industry could be used more intensively if the first industrial estate were located as near as possible to the central office.
- (c) The first estate would serve as a training ground for the numerous personnel, both technical and administrative, that would be needed for an expanded programme of industrial estates.
- (d) Private capital for investment and entrepreneurial talent and initiative are usually found more easily near the bigger cities and, in particular, in the capital.
- (e) If proper planning practices are adopted and the estate develops as expected, it would have the effect of stimulating the interest of industrialists and leading institutions and provide guidance for the development of estates in other areas.
- (f) The estate will be a pilot project and will show the Government what to do and what not to do in the development of other estates.
- (g) The integration and co-ordination of an industrial estates programme with the over-all programme of development would be easier if the first estate were developed in Djakarta. It would serve as a demonstration project for top government officials, members of Parliament and other persons responsible for the development of the economic programme, such as officials from universities and vocational schools, police and health services, who could judge how an industrial estate would affect their own programmes and would be given the opportunity of co-ordinating their programmes from the earliest stages.
- (h) It would facilitate the assessment by government agencies of the considerable amount of investment that would be needed if an expanded programme of industrial estates were set up.

A program for the development of small-scale industries is contained in the final program submitted to the Government of Iran in the plan organization. Only because of the lack of trained administrative and technical staff and of well-organized institutions, the program is of modest scope. It provides for: (1) a financial scheme to meet all the credit needs of small industry from a single source. The Industrial Credit Fund, which will administer the scheme, will provide machinery and equipment on hire-purchase, and loans for the purchase of raw materials and supplies and for carrying inventories until products are sold and paid for, at a cost roughly one half of the current one. (2) a survey of small-scale industries - the first to be undertaken in the country - to identify the main problems confronting small industries and make proposals for future assistance programmes. (3) Technical assistance to be extended by a Productivity Centre and the Industrial Development Centre of the Ministry of Industries and Mines. (4) a trade promotion programme for the Persian carpet industry. (5) a programme of industrial estates.

Except for the Persian carpet project, the above programme is devised for small-scale industries as distinct from cottage industries. In small-scale industries, activities are conducted outside the home in small workshops or factories. Employment is usually full-time and labour is paid a cash wage. Production is usually for sale. Small industries may be rural or urban. Rural small industries often depend on locally-produced raw materials, usually agricultural.

For credit purposes, a small industry is defined as any firm seeking a single loan of 4 million rials^{1/} or less, while its total fixed assets do not exceed 10 million rials. All firms seeking loans of more than 4 million rials will apply to the Industrial and Mining Development Bank of Iran, which is the development bank serving large industry.

For employment purposes, a small industry is defined as any firm having fewer than 100 employees, regular and seasonal. The main use of this criterion will be to establish eligibility for admission in an industrial estate.

These definitions are not necessarily incompatible. For example, a firm with 60 employees could qualify for admission in an industrial estate, and might at the same time seek a loan for more than 4 million rials from the Industry and Mining Development Bank of Iran. For the former purpose, it would be classified as a small industry, and, for the latter, as a large industry.

^{1/} One U.S. = 75 rials.

The Industrial Estate Program

The first attempt to establish an industrial estate at Karaj, near Tehran, in 1954, met with failure, which was due to several principal reasons, some of which are now experienced in the organization and operation of industrial estates.

The site near Karaj had been reserved years before for the establishment of a steel mill. The Ministry of Industry and Mines was given the assignment of developing it as an industrial estate. Electricity and water were to be provided for prospective industrial occupants.

The only industry which applies for a site was a match factory. The site was rented to it for twenty-five years on a progressive scale ranging from 1 riel per square metre during the first five years to 3 riels per square metre during the fifth five-year period.

The factory met with many difficulties. It could not fully operate until two years after its completion, mainly because of delays in the supply of water and electricity. It now produces 1,500 match boxes per day, employing 140 workers.

This first experience discouraged further industries from coming to the estate. Another reason was the fact that, in the past few years, a tremendous land speculation developed in Teheran and its surrounding areas. Industries preferred to buy their own land and sell part of it a few years later at a great profit, than to establish their factory on rented government land.

The pilot plan for the establishment of industrial estates in the third development Plan, 1962 to 1967, is designed to reduce the over-concentration of industries in certain areas, and to attract investment there if it is needed.

Since Teheran is one of the most heavily industrialized areas, industrial estates should not be established there. On the other hand, estates cannot be located at isolated sites. They must be near good roads and railways and within easy access of a good labour supply. A good water supply must be available and climatic conditions must not be so bad as to make living conditions unacceptable. They must be near enough to a city or town to provide reasonable recreation and housing opportunities for workers and staff.

Three industrial estates will be started early in the Plan period. Additional estates will be started as soon as the Government can evaluate the effectiveness and success of the first three.

There are two general regions where additional employment opportunities are especially needed - Khuzestan and the Caspian. Both regions have several towns accessible to good transportation, have surplus labour, and have already made some progress toward industrialization. There is a possibility that one private industrial estate will be established at Khorramshahr. In Khuzestan, a site at Ahwaz or possibly Andimeshk or Dezful would seem suitable. In the north, the most promising sites would be Rasht, Tatol, Shahi, Sari, Behshahr

or Gorgan. Other possibilities are Tabriz, Mashad, Kerman, Shiraz, and Yazd. A major consideration in selecting sites should be the degree of interest shown by local officials and industrialists.

The central administrative unit in charge of industrial estates would select sites, work with engineering consultants to plan the development of the sites, arrange the design and construction of facilities, select the tenants and negotiate their terms of occupancy, and administer the finances of the estate. The site office would be primarily a maintenance unit; it would need one head who would recruit and supervise a small staff of maintenance personnel, who would be necessary to service the installations of the estate and its tenants.

Certain capital costs, for instance, land, initial design costs, and roads, may be borne entirely by the Government. Other costs, such as those for electricity, water, and certain services, would be recovered from tenants through rents and fees. Operating costs for services provided by the estate would also be covered by reasonable charges. However, until an estate has several tenants, its expenses will exceed its revenues and a subsidy will be required. The Government should be satisfied if the estates reach the break-even point by the end of the period.

In June 1962, at the Government's request, an expert was sent by the United Nations on a short-term mission to select a site for a first industrial estate and estimate its costs. The expert's recommendations for a site on the Caspian Sea are now being studied by the Government.

Objectives and policies

Although industrial estates have been established for a long time in the United States and the United Kingdom, it is only since the end of the Second World War that a rapid increase has taken place in their development in these and other countries, in particular in India, and that the attention of governments has been attracted by their possibilities, especially as regards the promotion of small-scale industries. In Japan, growing interest has been evinced for industrial estates in the last two years, and plans for the establishment of a sizable number of estates are now being made throughout the country.

This interest is stimulated by the fact that most of the small factories in Japan are scattered in the commercial districts or the residential areas of urban centres, and that, as industry develops, the very location of small enterprises in these areas becomes an obstacle to their performance and development. Moreover, increasing difficulties are encountered in finding suitable sites for factories and their establishment often gives rise to public nuisances.

In Japan, the objective in promoting industrial estates is to help small business to improve its productivity and operations by encouraging it to move in groups to certain sites fit for factories, and located far from the established city areas; small industry is thus spared the locational difficulties mentioned above. This contributes not only to its modernization but also to the dispersion of factories and the development of under-developed regions.

The policy of grouping small industries is expected to have the following effects:

- (1) Achievement of external economies;
- (2) Economies of scale in development of site and construction;
- (3) Establishment of new factories with consequent modernization of equipment and improvement in management;
- (4) Rational disposition and layout of factories;
- (5) Effective use of co-operative facilities in production, processing, transportation, storage, inspection, and advantage of collective procurement of raw materials and marketing of finished products;

... ..

- a.
- b.
- c.

To fulfill all these conditions constitutes a difficult order and the industrial estates established for industrialists should have satisfied all the requirements as well as all the objectives mentioned above.

The role of the Government

If industrial estates are to meet the above requirements, their establishment cannot be left entirely to the initiative and efforts of small business owners. Consequently, the Government would have to take the following measures for furthering and guiding the efforts of small industrialists under its general development policy:

(1) Basic Policy

The Government's policy is to promote industrial estates set up and managed by co-operative associations of small industrialists. The Government encourages the formation of co-operative associations which would take the initiative in briefing the idea of an industrial estate and would carry out the project as a whole. In order to give assistance in the implementation of the project and to strengthen the co-operative association itself, it is considered desirable for the co-operative association to acquire the land, to improve and subdivide it, and to hold the property title at least until a certain period of time after the completion of the project.

To be subsidized as described below, an industrial estate should fulfill certain conditions prescribed by the Government relating to the number and type of enterprises to be set up in the estate, the location of the site, the amount of the investment, the provision of co-operative facilities, the supply of utilities, the construction of buildings and the results expected

from the industrial estate. The success of the estate depends largely on the contribution it makes to the creation of small industry.

(2) Financial assistance

To facilitate the formation of an industrial estate, the Ministry grants a subsidy to the local government to enable the latter to make an interest-free loan to the co-operative to cover part of the cost of land purchase and, in relevant, construction of the factory buildings and other facilities, and modernization of the equipment.

The loan and the corresponding subsidy may cover no half or less of the total cost of the project. The redemption periods of the loan are three years for the land, seven years for the sewerage and five years for the rest.

In the fiscal year 1961/62, the subsidy amounts to 300 million yen; ^{1/} for machinery and other equipment, the subsidy is to be allocated out of the 2.5 billion yen equipment modernization subsidy fund. In the fiscal year 1962/63, the total subsidy is scheduled to amount to 2 billion yen.

Long-term financing is also to be provided by the Central Bank for Commercial and Industrial Co-operatives, the Small Business Finance Corporation and other governmental banking institutions.

(3) Fiscal assistance

It is planned to grant an exemption of the capital gains tax on the land owned or leased by factories which move into an industrial estate where they acquire new land. This measure would facilitate the transfers of property attendant upon the formation of an industrial estate.

(4) Other measures of assistance

(a) Consultations for the establishment and operation of industrial estates

The system of "small business consultation" whereby the Ministry of International Trade and Industry keeps a register of persons who are willing to assist small business, to be drawn upon by the local governments and the five largest cities, has been extended in 1961 to cover consultations in the field of industrial estates.

^{1/} One US dollar = 360 yen.

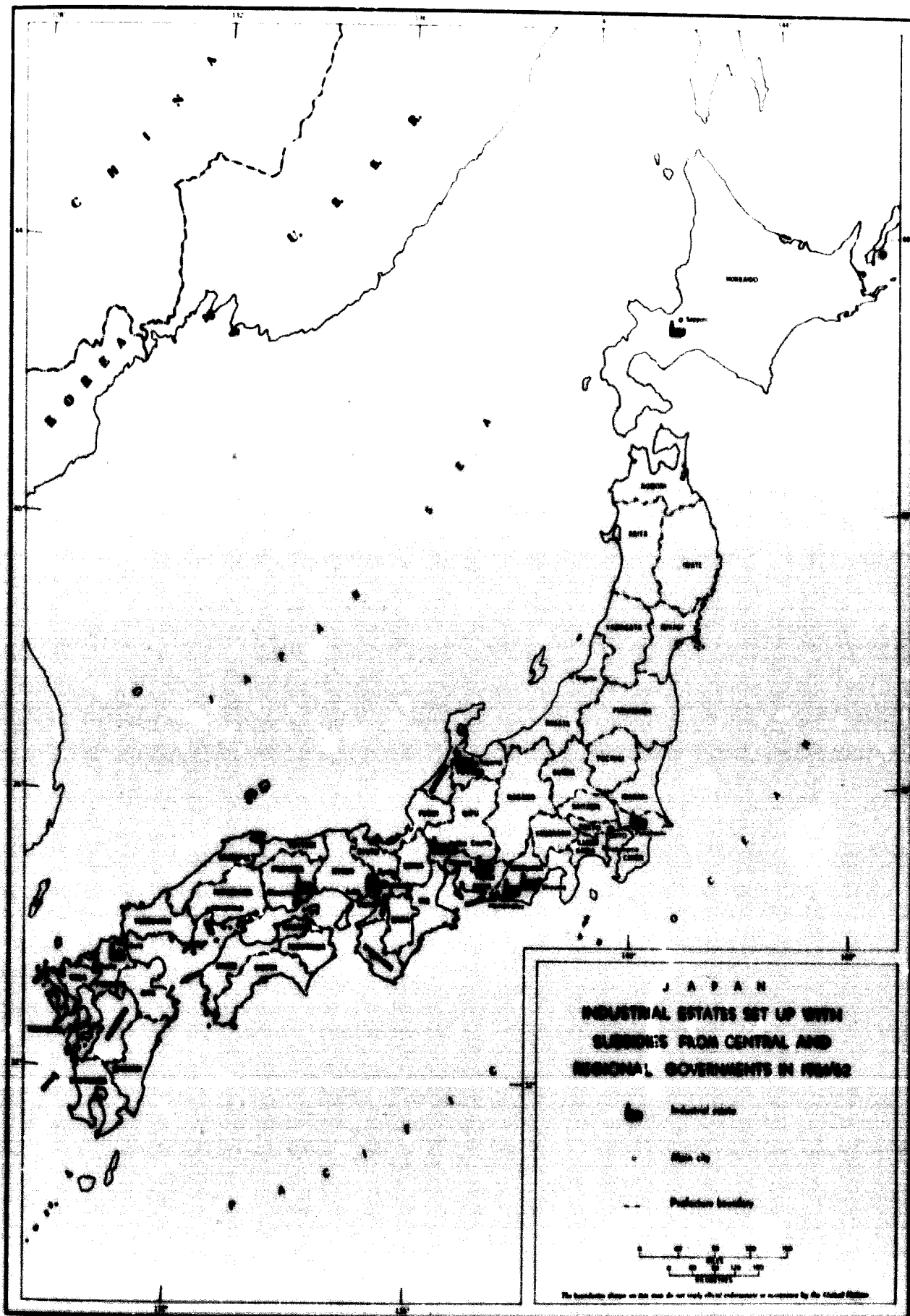
The purpose of the consultations is as follows:

- (i) at the planning stage, to improve the plans as regards lay out of the estate, interrelations between factories, type, scale and techniques of joint undertakings, construction of roads and other common facilities;
- (ii) at the construction stage, to provide advice on the erection of the factories of individual entrepreneurs;
- (iii) to extend advice on their financing problems;
- (iv) at the operation stage, to improve the over-all administration of the industrial estate and to assist the small industrialists in solving their problems and improving their performance.




(b) Housing loans

Long-term, low-interest credit for housing and welfare facilities within the premises of an industrial estate is made available through the Industrial Labourers Housing Fund and the Fund of Welfare Pension.

(c) Provision would be made of the facilities closely connected with the development of an industrial estate project, including roads, sewerage and water supply (domestic and industrial), electricity, gas, telephone, etc.



JAPAN
INDUSTRIAL ESTATES SET UP WITH
SUBSIDIES FROM CENTRAL AND
REGIONAL GOVERNMENTS IN 1952

-  Industrial estate
-  Main city
-  Prefecture boundary



The boundaries shown on this map do not imply official endorsement or acceptance by the United States.

Existing industrial estates in Japan

Table 1. gives some data on the existing industrial estates in Japan.

Table 1. Japan: Industrial estates

Number	Prefecture	Location	Main industries	Number of enterprises	Area (hectares)	Total floor area required for establishments (1961-1963) (thousands of sq. m.)	Number of employees (1963) (thousands)
1	Hokkaido	Sapporo	Wooden furniture	44	51,305	549,714	1,000
2	Chiba	Funabashi	Machinery, metal, chemical, textile, wooden, furniture and foodstuff	93	42,500	1,511,525	7,000
3	Shizuoka	Hama Matsuyama	Machinery for transportation	22	26,300	645,270	1,000
4	Shizuoka	Shizuoka	Machinery and metal	47	50,600	1,032,029	1,000
5	Gifu	Iraba County	Machinery and metal	74	90,000	2,521,949	1,000
6	Aichi	Toyota	Machinery for transportation	22	71,606	1,361,092	1,000
7	Toyama	Toyama	Machinery and metal	39	37,514	7,3309	1,000
8	Osaka	Hirakata	Ready-made dresses, suits and coats	52	130,000	1,311,330	1,000

Existing industrial estates in Japan

Table 1. Japan: Industrial Estates (cont'd)

Prefecture	Location	Main industries	Number of enterprises	Area (tsubos) ^{a/}	Total funds required for establishment (1961-1963) (Thousands of yen)	Amount of interest-free loans granted by the Ministry of Economic Affairs (Thousands of yen)
9	Okayama	Machinery	32	37,320	19,165	5,000
10	Fukuoka	Machinery and metal	22	58,017	1,163,900	1,163,900

^{a/} One tsubo = 3.3 square metres.

^{b/} The interest-free loans are made possible by a 50 per cent subsidy of the Treasury to the participating companies.

Table 2 shows the industrial composition and other data relating to the Hamamatsu industrial estate. It will be seen that most of the occupants manufacture and process motorbicycle parts.

Table 2. Industrial enterprises in the Hamamatsu Industrial Estate

Number of employees	Production (thousands of yen per year)	Main industries	Site area (tsubos)		Floor space (tsubos)
			present	after completion	
1	220	Parts of motorbicycles	1,150	4,000	720
2	35	Break drums	50	1,000	50
3	70	Connecting rods	200	1,000	120
4	45	Engine parts, crankshafts	212	1,000	170
5	42	Tool boxes, battery boxes	370	1,000	340
6	180	Fuel tanks	406	3,000	306
7	71	Painting and plating of motor bicycles	1,400	1,500	260
8	163	Bolts, pins	1,590	1,000	68
9	45	Painting of parts of motor bicycles	200	1,150	120
10	30	Cylinder heads	68	500	70
11	38	Gears, cranks	326	1,000	178
12	25	Parts of motor-bicycles	1,000	1,000	460
13	33	Knuckles	300	700	100

Table 2. Industrial Enterprises in the Hamamatsu Industrial Estate (cont'd)

Number of employees	Production (thousands of yen per year)	Main industries	Site area (tsubos)		Floor space (tsubos)
			present status	after completion	
14	24,000	Kick levers, brake pedals	408	500	156
15	116,330	Front grilles	2,000	1,000	443
16	192,000	Carrier saddles, front forks	489	1,000	248
17	62,000	Mufflers, exhaust pipes	300	1,000	1,035
18	195,000	Swing arms, main stands	1,207	1,000	370
19	30,000	Painting	80	400	80
20	13,300	Painting	150	500	120
21	5,000	Parts of motor-bicycles	120	500	30
22	5,000	Welding	108	800	40

KOREA

Until the end of the thirty-six years of Japanese occupation, Korea was an agricultural country which served as a source of supply of raw materials for the Japanese economy and a consumer market for Japanese industrial products.

In 1945, the liberation from the Japanese occupation marked the beginning of the industrialization of the country. After only a few years, however, a catastrophe occurred which cancelled out all progress made thus far: the Korean War which began on 25 June 1950. The devastation left by the war and the inherited economic weakness of the country are the causes of the crippled industrial structure of today's Korea, which can hardly be remedied by the country's own means. Because of its innate weakness, industry cannot sustain the country's economy. The gross national product is still low and exports are dwindling. Increasing reliance is made on imports and balance of payments difficulties inevitably follow.

Upon the establishment of the Government of the Republic of Korea in 1948, an over-all re-appraisal was made of the industrial structure, and long-range economic plans were prepared by the Government with particular emphasis on the growth of key and heavy industries. The development of light consumer goods industries is also considered. The implementation of the economic plans largely depends on foreign aid, mostly from the United States.

Since the military coup of 16 May 1961, the nation's economy has been further re-appraised. The revolutionary Government set itself a task of economic stabilization and national reconstruction. Encouragement is to be given not only to the establishment of key industries, such as iron and steel, fertilizers, cement and glass, machinery and textiles, but also of small-scale and medium-sized industries, in particular those manufacturing for export and producing goods hitherto imported. An industrial production registration system has been set up, which will facilitate the orientation of the national industry in accordance with the Government's policy, for example, for encouraging certain types of industries, and providing the basis for a system of incentives, such as grants, loans, and provision of raw materials and electric power. At the same time, the registration will provide the statistical data necessary for the formulation and further implementation of over-all industrial policies.

Promotion of medium-sized and small-scale industries

In Korea, medium-sized and small-scale industries constitute 97.5 per cent of the total number of manufacturing enterprises, and employ about 67 per cent of all workers in manufacturing. The value added by small and medium-sized industries amounts to 56 per cent of the total value added in the industrial sector. As compared with the larger industries, productivity is very low and management and technical operations are backward in the small-scale sector. This dual structure of the Korean industrial economy hinders the country's economic development.

The first steps taken by the revolutionary Government to promote and protect small-scale and medium-sized industries have been to strengthen the administrative system. The Ministry of Commerce and Industry has set up a medium and small industry section within its organization. It has also established Medium and Small Industry Centres in each and all provinces throughout the country to provide guidance to small industrialists. In addition, the Government has recently created a Medium and Small Industry Council and a Small Industry Bank.

The Government is currently contemplating a series of measures aimed at the rapid development of the medium and small industries. These measures include a strengthened organizational set-up to protect the social and economic position of these industries, the modernization of management and technical standards, and more efficient financial facilities.

Strengthened organization for the medium and small industries

In order to be protected against such threats as pressures from large industries, undue competition among themselves, and tendency to partition into very small units, the medium and small industries must unite in strong organizations. By forming co-operative associations, these industries will be able to strengthen their social and economic position, to promote their productivity and to prevent possible economic losses.

A Law for the Co-operative Associations of Medium and Small Industries will help these enterprises to organize themselves so as to overcome the various shortcomings in their business management and to provide better and more equal opportunities through mutual help and co-operative endeavour.

The Law will encourage medium and small industries to organize incorporated associations in each specific district. The associations will be classified into unit co-operative associations, a federation of co-operative associations, and a central council of co-operative associations. The unit associations and the federation of associations will be formed and maintained with funds shared by their members, and their activities will include joint undertakings in production, processing, sales and purchases, product inspection, technical and managerial guidance, personnel training and exchange of information, fund supply, welfare facilities for the members, and collective contracts. The central council of co-operative associations will be an organization representing the interests of all the medium and small industries, its major activities being guidance on the organizational and managerial matters of associations, protection and promotion of the rights and interests of the members, and other undertakings aimed at the general development of the member enterprises.

The Government intends these co-operative associations to be the basic organization for the development of medium and small industries, and, in order to help them to achieve adequate growth, plans to take positive and vigorous measures of assistance in the field of financing and taxation. Besides, the Government will provide, wherever possible, subsidies for important projects that these associations may undertake.

Measures for the modernization of medium and small industries

In view of the fact that the medium and small industries generally present certain basic shortcomings, such as shortage of capital and limitation in the size of units, which tend to maintain them in a state of under-development, the Government plans to take the following series of measures aimed at modernizing their management, technical standards and installations, in order to improve their organization and productivity.

(i) Examination and diagnosis

A small businessman usually relies only on his experience and vague assumptions in operating his enterprise. He does not bother to keep accurate and precise accounts, nor does he figure out demand and marketability, and his financing methods are rather primitive. In short, his management is based upon "vague reckoning". Needless to say, such vagueness and lack of scientific methods are a major factor keeping the productivity of medium and small industries at a low level in Korea. In order to eliminate these factors of backwardness, management experts will make thorough studies of the actual performance of medium and small industries with a view to pinpointing and analysing their problems; they will make recommendations for improvement and provide guidance in implementing the improvement measures. In the advanced countries, business enterprises do such examination and diagnosis on their own initiative, but Korean entrepreneurs lack the ability to take such measures of their own accord. It is therefore necessary that the Government should help them in this regard.

The Government is now working on the draft of a Law for Expediting the Nationalization of Medium and Small Industries, which is expected to assist business enterprises in rationalizing their management and improving their performance.

(ii) Modernization of installations and equipment, and technical guidance

While large industries are able to modernize and expand considerably their installations and equipment, either with their own capital or owing to United States aid funds, the medium and small industries remain in their age-old stage of under-development mostly because of lack of sufficient funds. This prevents them from replacing and repairing obsolete installations and equipment and raising the level of technical standards. Consequently, the production costs incurred by the medium and small industries exceed that of the large industries by an unbelievable margin.

When enacted, the Law for Expediting the Nationalization of Medium and Small Industries will authorize the Government to provide substantial amounts of subsidies, tax privileges and other financial facilities for those medium and small entrepreneurs who are determined to modernize their installations and equipment. The recently established Medium and Small Industries Bank will consider the possibility of increasing loans for investment purposes. Meanwhile, close co-ordination will be maintained among the competent government offices to take the necessary measures for encouraging these enterprises to invite foreign technicians and send their own technicians for training abroad. Besides, a special system of payment will be put into effect for purchases of machinery by these enterprises.

One of the major factors that obstruct the development of small and medium industries in Korea is the difficulty of obtaining financing. Banking institutions are usually reluctant to provide loans to these enterprises, which they regard as vulnerable with respect to their capital assets, unable to present enough security for loans, and unstable with regard to management.

To make the matters worse, the large industries also depend heavily on the banks for financing, and drain the resources of the banks so that it becomes even more difficult for the medium and small industries to obtain loans. Moreover, political influences have often affected banking operations, and the medium and small enterprises, which were generally powerless in this respect too, could hardly hope to secure much benefit from the banks.

Since the May 16 military revolution, the revolutionary Government has resolved to alleviate the financing difficulties for these businessmen and to expedite adequate supplies of funds. A bank has been established for the sole purpose of helping these businesses, and a sum of 5 billion hwan^{1/} has already been released to help them. Another 3 billion is expected to be released shortly, bringing the total amount of loans for these businessmen to some 20 billion hwan.

A revision of taxation affecting small and medium-sized industries is under way.

^{1/} One US\$ = 1,300 hwan.

To date no industrial areas or estates have been established in any Laotian town. This is to be explained in part by the lack of town planning both in Vientiane, the capital, and the main provincial towns. It is also due to the fact that the low level of industrial development - Laos has little more than a few handicraft industries - has not raised thus far the pressing problems which confront most of the more industrialized countries. The small workshops which have sprung up are usually located to suit the convenience of the owners and craftsmen. Both in urban centres and their immediate neighbourhood, it is common practice for the workshops to be dispersed within the residential areas.

There are, however, regulations concerning industries which are a hazard to health and public safety. These are to be situated at some distance from neighbouring dwellings. Only one industry has so far been affected by these regulations - an ice manufacture, on account of the ammonia used.

Although at present there is still no question of a major industrialization programme, an expansion of light and medium industries can be expected in the coming years. Some cigarette factories have recently been opened, a sugar refinery is under construction and plants for processing foodstuffs and agricultural products are planned, as well as engineering workshops for the repair and maintenance of medium-sized plants. The largest industrial centre likely to emerge in the present circumstances will be in the vicinity of Vientiane.

A preliminary town-planning programme has been drafted for Vientiane and has received the approval of the competent authorities. The programme, which is now being formulated in detail, provides for an industrial area of about 300 hectares south-east of the town, two to five kilometres from residential centres, with easy access for passengers and goods by existing or planned roads; a new power station supplying medium and high tension power, to be situated on the fringe of the area; and a water supply system.

The area will be developed taking into consideration the technical characteristics of the industries to be set up, the availability of transport facilities for the workers, raw materials and finished products, the health of employees and neighbouring residents and any physical effect the industrial area might have on the city: air pollution, interference with radio communications, and the like.

These considerations involve the provision of installations to meet the requirements of both industry and public health. Simple but specific regulations and a suitable body for inspection and supervision will also be provided.

NEPAL

Industrial development in Nepal

In Nepal, the existing business group usually takes more interest in trade and commerce than in industrial ventures while the landed aristocracy has always maintained an attitude of indifference towards industrialization. In view of this, Nepal could hardly formulate a programme of industrial development. Industrialization in this country was set afloat just on the eve of the Second World War. Since then a number of industries have been set up but many of them have been liquidated, and others have not operated economically. Moreover, certain traditional cottage and village industries have also suffered severe declines in recent decades because of their inability to compete with imported products.

In Nepal, the average small-scale industrialist suffers from a variety of handicaps such as shortage of suitable factory premises and non-availability of the required accommodations at reasonable rent in urban areas. Power and water supply are not adequate and, when available, are costly. The existing small-scale units are not well equipped with the right type of machinery. Sanitation is deficient. There is no organized system for financing small-scale industries and loans, when available, carry very high rates of interest.

The industrial estates programme

Realizing the important role that small-scale industries can play in the industrialization of the country, the Government of Nepal has decided to carry out an industrial estates programme, with financial and technical assistance from India and the United States. The programme is intended to bring together a number of small-scale units on estates provided with common facility services, good sites, technical assistance, marketing and financing facilities, and adequate supplies of electricity, water, raw materials, etc. It is expected that by being located on a common site some units may be better able to use the goods and services of the others and become interdependent and complementary. Quality control can be effectively organized. The common facility services of the estate can benefit industries in the neighbourhood. Industrial estates could also be instrumental in putting an end to the haphazard and unplanned growth of industries in or around towns and cities.

In deciding the location of industries, the Government has taken into consideration the topographical conditions of Nepal. In the Terai plains where transport and communications are less difficult than elsewhere, the Government intends to establish large-scale industries; in the mountainous areas of the central and Himalayan regions, where transport and communications facilities are inadequate, it is planned to encourage and develop cottage and small-scale industries. This will help to achieve a balanced development of the economy in all the regions of the country.

Three industrial estates are now in the course of development: two - Patan and Palaju - are near Kathmandu, the capital and largest city, and the third at Betaura in the Terai region bordering India.

Patan industrial estate

On 31 August 1960, the Government signed an agreement with the Government of India for setting up a first industrial estate in Patan with the following aims:

- (a) providing facilities for the economic and efficient operation of small-scale industries;
- (b) providing uniform production standards;
- (c) providing common facility services on a co-operative basis for small-scale units;
- (d) providing technical knowledge and management guidance; and
- (e) providing credit facilities.

Under the agreement, the Government of Nepal will acquire land for all industrial estate projects and will arrange for the supply of raw materials that are available in the country. The entire expenditure on non-recurring items will be met out of the Indian aid. A large portion of recurring expenditure will also be met by the Government of India for the first five years; thereafter, the Government of India will no longer give contribution for recurring expenditures. It is envisaged that the estate will then be self-supporting.

To implement and execute this project, the Government has constituted an Industrial Estate Development Board under the chairmanship of the Minister for Industry and Commerce. The Board is autonomous and is formed under the Development Act of 1956. It makes decision on all matters for the proper functioning of the industrial estate in Patan. The Executive head of this estate is the Director of Industry who is also the Secretary of the Board.

There exist in Kathmandu and Patan large numbers of unorganized but skilled artisans. Patan is the traditional home of hand-weaving and metal-works. It lies about three miles south-east of Kathmandu and is well connected with other parts of the valley by motorable roads. Because of accessibility to the capital and the fact that a large portion of the population of the country resides in the valley, there is no difficulty in marketing the finished and semi-finished products produced at lower costs in the factories in the estate.

The Patan industrial estate will have a large common workshop facility under government management. The authorities will arrange for easy supply of raw materials, provide technical guidance for efficient and improved methods of production, and help in marketing and trade promotion. Artisans will be encouraged to form co-operative associations to set up units on the estate, and, eventually, the different units in the estate might also form co-operative organizations.

Thirty work-sheds will be built and given to individual industrialists on rent or hire-purchase. The sheds will be of the semi-open type, with requisite security arrangements. The layout of the units and the estate will be worked out so as to secure minimum expense and maximum efficiency. Each unit will have (i) a space for office and store, if necessary as a first floor or a mezzanine floor; (ii) the factory proper; (iii) an open yard if necessary for the industry; and (iv) a sanitary block. The planning of the internal layout in each factory will be left to the tenants, according to their respective requirements. Allied industries could be grouped together to facilitate complementary services.

Financing will be made available to the extent of 25 to 49 per cent of the requirements, at liberal loan conditions as regards security, interest and repayment, which will be on a long-term basis.

The services provided by the general workshop would be charged in full but proportionately to the services rendered. A nominal charge would be made for the general and technical services rendered by the Government's industrial estate organization.

Since power cannot be provided at the present time from the existing installations, a 100 kilowatt diesel plant will be installed on the estate. More power at lower cost will be available when the Fanauti and Trisuli schemes are completed.

It is expected that the following industries will be set up on the estate: building materials, furniture, sanitary wares, motor parts and repairs, electroplating, brassware and aluminium utensils, metal castings, bicycle parts, shoe-making, power looms, pottery wares, calendering of handloom products, plastic goods, etc.

The management will scrutinize the applications and allot the work-sheds according to the following rules:

1. Applicants should belong to Nepal.
2. Light industries will be preferred.
3. The employment of local personnel will be preferred.
4. The concentration of any industry will be discouraged.
5. Industries producing injurious or odorous gases or effluents as by-products or waste will not be admitted.
6. The applicants should be prepared to instal improved machinery and adopt modern techniques.
7. The applicants should be prepared to come in within a reasonable time, say two months from the date of allotment of the workshop.
8. The applicants should accept general watch and ward.
9. The establishment of competitive industries within the estate will be avoided.
10. All workshops will avail themselves of technical assistance.

As far as possible, the participants will work co-operatively in the technical services within the estate, and co-ordinate their purchase of raw materials and marketing of products.

Work-sheds will be leased on the following conditions:

1. Rent will be paid on covered and uncovered space actually used by the industrialist.
2. The buildings will be available on rent or hire-purchase.
3. Proper security will be furnished.
4. Electric supply will be used from the general pool and paid for at rates to be fixed by the estate; the same will apply to water charges, if any.
5. Government and municipal taxation will be paid according to law.
6. The estate, if insured, will charge proportionately each tenant. Each workshop may also be separately insured if collective insurance is not agreed to by the participants.
7. No additions or alterations will be permitted without previous written approval of the management.

The estate may be administered by a Board appointed by the Government, through a technical manager, with an adequate staff. The technical manager will be responsible for maintenance of buildings, upkeep of services, collection of rent and general management, including co-operative stores and marketing organization. The technical manager will also ensure proper maintenance of services, such as watch, electricity, transport, telephones, Post office and banking services.

In the initial period, say three to five years, the general workshop may be a responsibility of the estate. The workshop will be government-owned, but run on commercial lines; it will render services to all who need its facilities. It is desirable that the workshop should be eventually taken over by the co-operative organization, or by an independent industrialist. The workshop should produce goods which would not compete with those of any of the constituent units in the estate.

The total cost of the Fatan estate is likely to approximate Rs.3.8 million Nepalese currency (N.C.) or Rs.2,375,000 Indian currency (I.C.)^{1/}. Total non-recurring cost is likely to approximate Rs. 3,360,000 N.C. or Rs.2,100,000 I.C.. The total operating cost during the first two years may be approximately Rs.130,000 N.C. or Rs.30,000 I.C. per year; during the next three years it may be approximately Rs.60,000 N.C. or Rs.40,000 I.C. per year.

^{1/} One Indian rupee = US\$0.21.

Balaju industrial district

The Balaju industrial district is outside Kathmandu on the road to Binuli where a large hydroelectric station is being erected. From a dam on the Fatanandu valley and the industrial estate will be drawn.

The district is being developed by the Nepal Industrial Development Corporation, an autonomous agency jointly financed by the Government and the United States Agency for Industrial Development. At present, the district holds 8 acres of land to which a further 4 acres are being added immediately; adjoining it a total of 20 acres have been scheduled for industrial use in the future.

The policy at Balaju is to promote the development by private entrepreneurs of medium-sized factories using modern machines. The sites provide space for future expansion. A number of factories are already in production.

The management of the Balaju district is responsible for the erection of industrial buildings and for providing electricity, water, drainage, roads and approaches, the maintenance of the buildings, and the general development of the estate; the tenant company pays an inclusive rental based on the area occupied, plus electricity consumed, and the tenant supplies the machinery and other equipment and the cost of connecting the power to the machines.

The services afforded by the Balaju industrial district include a well equipped engineering workshop which can undertake repairs to machines and minor fabrications for tenant companies at economic rates.

The initiation of new industries using machinery creates a demand for trained operatives. Basic training for various industries is provided by the Cottage Industries Organization, with assistance from the Ford Foundation in the form of technical experts and equipment, after which some practical training is given in the factories.

Hetaura industrial estate

The third industrial estate to be developed is at Hetaura, in the Terai region. This is another project in the hands of the Nepal Industrial Development Corporation; it is planned for active development in the near future. At present only the preliminary layout for roads and drainage is being done, since the resources available must be conserved for the time being for the expansion of the Balaju industrial district.

PAKISTAN

Introduction

The Republic of Pakistan is composed of two wings, East Pakistan and West Pakistan, separated by about 1,200 air miles. There is a marked difference between the two parts of the country, East Pakistan receiving an abundant monsoon rainfall, while West Pakistan is arid. The area of East Pakistan is 54,885 square miles and its population about 51 million. The area of West Pakistan is 311,022 square miles with a population of about 43 million. The population ratio in East Pakistan is, therefore, 925 per square mile and that of West Pakistan 136 per square mile. The per capita income for 1959/60 has been estimated at Rs. 270^{1/2} for the whole of Pakistan. In 1959/60 the gross national product has been estimated at Rs. 25.4 billion distributed as follows:

		(Percentage)
Agriculture		55
Manufacturing		14
Large-scale	9	
Small-scale	5	
Wholesale and retail trade		9
Transport and communications		3
Government administration		6
Rental income		5
Other services		8

In the same year the gross national expenditure has been estimated at Rs. 26 billion composed of:

		(Percentage)
Public investment		6
Private investment		4
Public consumption		9
Private consumption		81

Industry is of very recent growth in Pakistan. Before Independence in 1947, there were virtually no industries in the territories which now comprise the two wings of the country. The whole history of industrialisation in Pakistan is, therefore, confined to the few years since Independence.

^{1/2} One rupee = US\$0.21.

The creation of industrial capacity as well as of industrial management and labour started from practically nothing. Moreover, the resource base was and still is slender. Few minerals have so far been found apart from coal and iron ore which are restricted to small quantities and are of indifferent quality. In West Pakistan natural gas is the only proven resource of considerable value. Natural gas has also been found in East Pakistan but has as yet to be exploited. Sustained prospecting for minerals is, however, in progress and it is hoped that the results will be known in the not too distant future.

Industry is predominantly in the hands of private enterprise. It is the basic policy of the Government to continue to leave the establishment and development of industry to private enterprise. On many occasions the Government explicitly stated its view that the entrepreneur has a key role to play in the industrialization of the country. On the other hand, the Government is prepared to undertake the development of essential industries itself if for one reason or another private initiative does not come forward. The leading cases where the State has felt compelled to do so are in the fertilizer, shipbuilding, jute, sugar and the paper and board industries. Even in these industries it has been the aim of the Government to transfer the enterprises to private hands as soon as possible, and this is already being done. The instrument for government promotion of industry is the Pakistan Industrial Development Corporation (PIDC).

The second five-year plan

Pakistan embarked upon its Second Five-Year Plan in July 1960. The Plan envisages for the period a total fixed investment in industry of Rs. 3,390 million, the foreign exchange component being equivalent to Rs. 1,855 million. The private sector is to invest Rs. 2,220 million and the public sector, Rs. 1,170 million. In addition the Plan provides for Rs. 660 million as working capital which brings the industrial programme to a total of Rs. 4,050 million. The Plan has recently been revised and the total allocation for industry is now Rs. 5,120 million.

The Plan aims at an increase in production of over 60 per cent in large and medium-scale industry, and of 25 per cent in small-scale and cottage industry. This represents a rise in the contribution to gross national product from 8 to 12 per cent for large-scale industry alone and from 14 to 17 per cent for manufacturing as a whole. Furthermore, manufactured goods are expected to play an increasingly important part in the growth and diversification of exports. During the Plan period, about three-fourths of the projected increase in export receipts are to come from such goods.

A set of criteria has been set forth in the Plan for the development of industry. In general the Government intends to let the industrial pattern respond to market prices and not to make it adhere to a rigid plan. Nevertheless, through the apparatus of public sanctioning for the setting up of industrial units, and import licensing, the Government exercises an important degree of control over the direction of industrialization. It is intended to give priority to those industries which make the largest net contribution to national income per unit of investment. Preference will also be given to those industries which result in a net increase of foreign exchange earnings, use indigenous raw materials, make certain types of producer goods which will reduce the import component of future development expenditures and produce essential consumer goods instead of non-essentials. Fuller utilization of existing industrial capacity is to be given general priority over the creation of new capacity. Medium-sized and small-scale industries are to be especially encouraged. While the Government recognizes that limitations are imposed on their expansion by market considerations and the shortage of technical and managerial skills, that investment per unit of output may be as high as or higher than in large-scale industry, and that working conditions are on the whole inferior, it takes the view that there are countervailing social advantages in providing employment and spreading industrialization through small units.

No industry is exclusively reserved for the public sector, and in some branches both public and private investments are envisaged. The Plan introduces the concept of the semi-public sector which includes government-sponsored corporations drawing their finance from both the public and the private sector, such as the Pakistan Industrial Development Corporation (PIDC) and the Small Industries Corporations (SIC).

In the allocations made in the Plan for industry, a sum of Rs. 75 million has been specifically allocated for industrial areas for large industries and a sum of Rs. 36 million has been earmarked for industrial estates for small industries. Before examining this programme in detail, brief information will be given on existing industrial estates in Pakistan.

Existing industrial estates in Pakistan

There are no industrial estates for small industries functioning in Pakistan at present. There are, however, two sizeable industrial trading estates functioning in Karachi and Hyderabad (West Pakistan) and one "industrial area" operating in Tejgaon (East Pakistan). Both the estates and the area are occupied mainly by large industrial units.

The estates were established by means of loans given by the Government and are administered by Boards of Directors representing both the Government and the industrialists. The land has been given on long leases and the industrialists have built the factories themselves. The estate authorities have confined themselves to developing the land and providing the utilities necessary for the operation of industry.

The salient features of the two trading estates in West Pakistan are given below:

Particulars	Karachi Trading Estate	Hyderabad Trading Estate
1. Gross area of the estate	4,000 acres	1,264 acres
2. Area under industry	1,500 acres	600 acres
3. Area under roads, railways and public amenities	700 acres	215 acres
4. Area under labour colony	900 acres	300 acres
5. Length of roads	53.5 miles	15 miles
6. Water supply	2 million gallons per day, being increased to 5 million gallons per day	500,000 gallons per day, being increased to 2 million gallons per day
7. Railway siding	4.2 miles	2 furlongs
8. Model shell factories	50,600 square feet	--
9. Godown space	200,000 square feet	53,000 square feet
10. Number of industrial plots	500	150
11. Factories under production	350	16
12. Factories under construction	150	40

13. Power supplied by Karachi Electric Supply Company and Hyderabad Electric Supply Under- taking	17,000 kilowatts	1,500 kilowatts
14. Labour employed	50,000	10,000
15. Present lease rental per acre per annum	Rs. 1,053	Rs. 1,310

As regards the industrial area in East Pakistan, the total area is 474 acres with about 457 plots of various sizes, a few of which still remain to be occupied. The types of industries that have already started functioning in the industrial area are aluminium, general engineering, cycle assembly, metal products, pharmaceutical, chemical, woodworks, general hardware, printing press, oil mills, glassworks, rubber, fruit canning, biscuits and bakery units.

Role played by the existing industrial estates and industrial area

The Karachi Trading Estate in West Pakistan has played a vital role in the economic development not only of Karachi but of Pakistan as a whole. Its role in the economy of the country can be judged from the following data:

Industry	Number of factories already in production	Production
1. Textile and allied mills	128	Yarn: 24,000 lbs. per day Cotton cloth: 600,000 yards per day Artistic silk cloth: 70,000 yards per day Woolen cloth: 30,000 yards per day
2. Steel re-rolling mills	5	80 tons of steel per day

3. Chemical and pharmaceutical industries	35	About 25 per cent of the country's requirements
4. Oil and soap	18	60 tons of oil and 4,000 maunds of soap per day
5. Foodstuffs	15	Sufficient for home consumption and also being exported
6. Heavy and light engineering	101	Containers: 15,000 per day Crown corks: 210,000 per day Collapsible tubes: 10,000 per day Drums and kegs: 1,000 per day Hurricane lanterns: 750 per day Machines: 50 per day
7. Paints and varnishes	12	Paints and varnishes: 30 tons per day
8. Plastics	14	Sufficient for home consumption and also being exported
9. Leather and rubber	10	Shoes and suitcases: sufficient for home consumption and also being exported
10. Cigarette manufacturing	5	10 million per day
11. Assembly plants (cars, trucks, gramophones, radios, etc.)	8	Cars and trucks: a good number daily Radios: 50 sets per day Gramophone records: 1,250 per day
12. Optical goods	4	Frames: 2,500 per day Lenses: 6,000 per day
13. Cosmetics	8	Talcum powder, hair oils, tooth pastes, brushes, etc.: sufficient for home consumption and also being exported
14. Glass	7	Glass articles: 10 tons daily Shoots: 3,000 square foot per day

The role played by the Tajawal Industrial Area in East Pakistan has not been so impressive in terms of financial gains but it has definitely demonstrated to the private industrialists the usefulness of working in better environment with consequential rise in production. The provision of land with overhead facilities such as electricity and water, which was so difficult to get at reasonable rates, has definitely caught the imagination of the people of East Pakistan and this fact by itself is a big gain and will be of tremendous importance in the rapid industrialization of that part of the country. Heretofore, East Pakistan was industrially backward and capital was shy. Now that the psychological barrier has been broken, there is a clamour for rapid industrialization through the medium of industrial areas and industrial estates.

Industrial estates and areas in the Second Five-Year Plan

The Planning Commission of Pakistan has made the following statements in the Second Five-Year Plan:

"During the past few years, establishment of industries in Karachi has been severely restricted, and expansion has not been welcomed in certain districts of West Pakistan. The effort has been to establish industries in areas where little or no industry exists. The effect of these limitations has been to discourage industrialization in these areas of the country, notably the large industrial centres, where new investments will become most fruitful, at least in the short run. These limitations will need to be relaxed, and location of new capacity encouraged in all suitable areas. In this context it will be of advantage to provide the establishment of industrial estates in centres where the transport system, water and power resources, and availability of raw materials and potential markets offer suitable opportunities. Apart from the large centres, an effort will be made, notably through the small-scale industry programme, to encourage smaller centres for industries which mainly supply local markets. Close co-operation will be necessary between authorities responsible for industrial planning and those dealing with urban and regional physical planning in order to promote the dispersal of industries in suitable locations."

Industrial estates for small-scale industries

By establishing industrial estates for small-scale industries, it is expected to achieve the following results:

- (a) Economic development of comparatively backward areas by encouraging the establishment of new industries by small investors with all the economic benefits of a planned unit, including roads, water, power

and sewerage facilities; and social services such as club, post office and dispensary for the care of industrial and the needs of its workers.

- (b) Modernization of existing industries by advice and example through the provision of technical advisory services.
- (c) Slum clearance with the ultimate possibility of appropriate town planning and prevention of haphazard mushroom growth.
- (d) Employment and training possibilities for the labour force in a healthy environment.
- (e) Adequate common facilities to equip the industrial units for achieving specialization and modernization.
- (f) Testing facilities to enforce and maintain standards.
- (g) Greater ease in the provision of technical, managerial, counselling and training services as well as central processing and servicing facilities.
- (h) Provision of conditions favourable to a healthy development of internal and foreign markets.
- (i) Provision of necessary supporting industries for production of spares, as well as repair facilities.
- (j) Creation of new industries for which the necessary skill and know-how are not available by making entry into business easier through reduced capital requirements and provision of technical guidance.

The Government of Pakistan is most anxious that industrial estates for small-scale industries should be established as early as possible and operated with the utmost efficiency. For this purpose, it has laid down the following directions and pattern of assistance:

Directions:

- (a) The Provincial Small Industries Corporations should be responsible for the construction and management of the estates. The types of factory buildings should be in consonance with the needs of the industrialists and may be constructed by them with the approval of the industrial estate authority. The Provincial Small Industries Corporations may permit an industrial co-operative society or an industrial association to build an industrial estate;

- (b) the construction of estates should be confined to the needs of the small industries and should not be made to bear unnecessary overheads in the form of expensive buildings, roads and other facilities;
- (c) all precautions will be taken to ensure that only middle and lower middle class investors are brought into the estates so that the middle class is expanded; big capitalists should not be allowed to gain a foothold in these estates.

Pattern of assistance:

- (a) The central Government will advance as loan to the provincial governments a part or the whole of the cost of the estates. The expenditure incurred on buildings and land should be recovered in varying periods in accordance with the paying capacity of each individual, but the period of recovery should in no case exceed 20 years. The rest of the expenditure on layout, roads, power transmission, water supply, etc. should also be recovered in the same manner, but within 30 years at the maximum. The loans for building industrial estates shall carry interest at the rate of 4-1/2 per cent. The provincial governments should be asked to share the cost of building the estates to the extent of 25 per cent;
- (b) the cost of preparing blueprints, estimates, etc., should be given by the central Government as a grant to the National Small Industries Corporation;
- (c) option should be given to the intending users for purchase on (i) hire-purchase, or (ii) rental basis, or (iii) outright purchase. The intending users may, however, change their option later. In case of hire-purchase, a lump sum advance payment of 20 per cent should be collected and the remainder spread over a maximum period of 20 years;
- (d) each estate authority should be authorized to levy a charge for the provision of general services such as roads, sewerage, supply of water and electricity, etc.;
- (e) in case the factories have to be rented out on a subsidized basis, the subsidy should be shared equally by the central and provincial Governments concerned, subject to the prior approval of the central Government.

In respect of large industries, the thinking is that "industrial areas" rather than industrial estates in the literal sense of the word should be selected and located in accordance with the overall policies of the Government. The procedure for setting up such industrial areas would be, in its mainlines, as follows:

- (a) Provincial governments would set apart and notify areas to be known as "industrial areas" for the setting up of industries. Before issuing the notification, a public notice intimating that this is proposed to be done should be issued, objections invited and a decision taken;
- (b) a site plan demarcating plots, roads, etc. would be prepared for the area;
- (c) on receipt of an application, the provincial government would acquire a plot for the entrepreneur and along with that plot acquire the pro rata share of the land required for common services. The plot would then be sold to the entrepreneur at a price which would include the estimated development charges;
- (d) the authority responsible for the area would then spend the money recovered by it for payment of compensation and for developing the area; and
- (e) as soon as feasible, the management of the area would be handed over to an autonomous body which would have the right of taxation for purposes of maintaining common services. This body could be the adjoining Municipal Committee, if there is one, or a new body created for the purpose.

Government investment in industrial areas and estates

As already mentioned, an ambitious programme for the establishment of industrial estates has been laid down in the Second Five-Year Plan. For the large industries, a sum of Rs. 75 million (60 million for East Pakistan and Rs. 15 million for West Pakistan) has been allocated for public investment in industrial areas, and a sum of Rs. 36 million (24 million for East Pakistan and 12 million for West Pakistan) for industrial estates for small industries. The Plan's allocations will be increased somewhat, mainly because of the rising world prices for machinery and equipment. Thus, in East Pakistan, the cost of the projected five industrial areas for large industries will be about Rs. 69 million. Plans for West Pakistan are still under consideration. It is, however, obvious from the figures above that

the bulk of the expenditure has been allocated to East Pakistan with a view to balancing as far as possible the industrialization of the two wings of the country.

A total of 24 small industrial estates, 16 for East Pakistan and 8 for West Pakistan, at a total cost of Rs. 36 million, have been included in the Second Five-Year Plan. This cost represents the expenditure in the public sector only and is, therefore, exclusive of the large investment that will be put in by the small industrialists themselves. Of these 24 estates, eight have already been sanctioned for East Pakistan and eight for West Pakistan. The establishment of these industrial estates, which will be made in accordance with the principles of the Government's policy for the development of small-scale industries, will be the first experiment undertaken by the Government of Pakistan in the field of small industries. The line of action proposed to be taken in the establishment of small industrial estates is described in the following paragraphs.

Location of small industrial estates

In order to relieve further industrial congestion in cities and big towns and also to help in diversifying and decentralizing industries, small industrial estates are being located in or near small and medium-sized towns. Another object is to promote industrialization in less developed areas, where, in many cases, important labour skills, resources and markets are available. In decentralizing industry, it is desired to spread industrial employment and production. Several of the communities selected as sites for these estates are at present severely suffering from congestion and slum conditions. They are centres of considerable industrial potential where a fresh start needs to be made towards the modernization of industries and improving urban planning and layout. Some of the estates are being located in backward areas with a view to encouraging and promoting the establishment of industries and thus raising the living standard of the rural populations.

With regard to the actual siting of the estates, care has been taken to select compact tracts of land where provision of necessary facilities such as electricity, water and roads will not entail heavy expenditure. Most of the sites are located in areas already earmarked for industrial purposes and are within reasonable distances from the nearby towns. Thus the problem of establishing housing colonies for the workers will not arise.

Physical planning of industrial estates

No firm layout plans have been drawn up as yet but the idea is that the layout should be such as to ensure the maximum utilization of space in order to cut down the development expenditure.

Size and number of industrial estates

Size	East Pakistan (Number)	West Pakistan (Number)
Below 20 acres	Nil	2
20 to 50 acres	1	4
50 to 100 acres ^{a/}	7	2

^{a/} About 50 per cent of the area will be utilized initially; the other 50 per cent has been requisitioned for the time being to prevent any private construction.

Utilization of area

In a 100-acre estate gross area is expected to be utilized as follows:

	(Percentage)
Area under factory plots	69
Area under roads	23.5
Area under utility buildings	6
Area under open plots (lawns and gardens)	1.5

Size of the plots

In the industrial estates being set up in West Pakistan the size of plots in the 100-acre estates will normally be of 5,000 square feet and 10,000 square feet with a few odd plots of 18,000 square feet. On the other hand, in the East Pakistan industrial estates, the sizes of the plots will range between 3,000 and 18,000 square feet with a sprinkling of a few plots of 25,000 and 27,000 square feet. It is also possible that a few plots of smaller area would be provided for very small units and artisans.

Needs

In a 100-acre industrial estate, the width of the roads will be approximately as follows:

Type of road	East Pakistan		West Pakistan	
	Formation width	Metalled width	Formation width	Metalled width
	(in feet)			
Main road serving the project	40	20	32	16
Sub-roads serving factory sites	30	16	32	16

The formation width of the main road leading into the estate may be of about 52 feet and the metalled width, 24 feet.

Administrative and ancillary buildings

In each of the industrial estates, the following buildings will be provided either by the estate authority or by the departments concerned: administrative office; canteen; fire station; dispensary; quarters for essential staff such as pumping station and power house attendants, bank guards, electricians, etc.; Post and Telegraph office; banks.

Electricity, water, sewerage and drainage

It is envisaged that the above mentioned installations will be provided by the estate authority itself instead of depending upon the Municipal Committees or the Electric Supply Companies concerned. In the case of electricity, it is proposed to obtain bulk supply from the Electricity Department of the Government and to establish a sub-station in the estate. As for the sewerage system, it will have its outlet in the outfall sewer of the municipality if there is one functioning; otherwise, the estate authority will make arrangements of its own.

Common facilities and other ancillary services

Each of the industrial estates will provide the following facilities:

Advisory services: In large-sized estates, Service Centres are to be established. In small estates, advisory services will be provided on an ad hoc basis through the various experts of the Small Industries Corporations.

Common facility centres: Private enterprise will be encouraged to set up common facility services in the estates. Failing that, the estate authority will establish them. These will include: supply and marketing depots; repair workshops; godown facilities for storing raw materials and finished goods; and display centres for exhibiting the finished products.

Land

It has been decided that the land in the industrial estates should be acquired and developed by the Small Industries Corporations and given on lease to industrialists for a period of 99 years. A nominal sum - maybe one rupee per 1,000 square feet per annum - would be charged annually for securing the leasehold rights, but the investment in land and development would be recovered over a period of time, preferably over 20 years, on an amortized basis. The 99-year lease system has been preferred to outright sale because it allows more control to the Corporation over the use of the land and results in a capitalized rental value approximating the sale value. A lessee will be given the right to transfer his lease with the approval of the Corporation subject to such terms and conditions as may be imposed by the Corporation.

Construction of factory sheds

As a general principle, the Government would prefer to allow industrialists to construct their own buildings. There are many arguments on either side of such a policy. It is believed that industrialists would prefer to build their own factories and that they would be more satisfied if they did so. However, many firms might be severely handicapped financially if required to construct their own buildings. Moreover, this might have to be done at the expense of a successful production effort. Provision of buildings is, therefore, a convenient way of providing financial help in kind rather than in cash, and letting the industrialist use his own money for working capital rather than for investment capital. It is probable that a large construction effort by the Small Industries Corporations would entail lower construction costs than those that would obtain for private individuals, and that quality of construction and appearance of the estate would be better.

On the other hand, firms having the means to construct their own buildings should be allowed to do so in accordance with norms approved by the Corporation, or to request construction by the Corporation at cost. In any event, it is consistent with sound national development objectives to draw as much private capital into such investments as can be done without hamstringing new establishments on the estate.

For these reasons, the Government recognizes the need to take a flexible approach, despite its preference for private construction, in order to meet the many different situations in which industrialists may find themselves. Thus, the Corporation will be ready to do the following, if requested:

- (i) construct buildings for rental or long-term hire-purchase;
- (ii) construct buildings on request and for sale at cost to industrialists;
- (iii) provide loans for private construction on a long term basis.

In order to accelerate the development of the estates and to provide as much assistance as possible to industrialists, the Corporation will follow the policy of building some factories in advance of actual demand. Industrialists will thus have the opportunity of moving into ready accommodations and beginning operations with a minimum of delay. Otherwise, perhaps a year might be involved before the factory could be constructed, and an even longer period before manufacturing could begin. Such speculative construction would go on all the time so that there will always be some factories on hand to move into. These factories will be available for outright sale, hire-purchase or long-term rental.

To prevent haphazard construction of unsatisfactory buildings in the case of private construction, the Corporations will specify the type of construction and the general principles of design that would apply, in order to produce buildings well designed from the standpoint of appearance and industrial productivity. Building plans would be approved before construction is permitted and the Corporations will supervise the actual construction.

Engineering consultants

The Small Industries Corporations have engaged engineering consultant firms to draw up layout plans, prepare estimates and in general advise the Corporations on all engineering matters. The consultants will prepare standard architectural plans for several styles of buildings for the various sizes of plots available on the estates. This will assist small firms which want to erect their own buildings but cannot afford the services of an architect. If the firms do not consider these standard designs to be suitable, they may secure any outside architectural advice, but the eventual designs would need to conform to the general principles laid down by the consulting firm on behalf of the Corporation. The consulting firms will approve building plans for the Corporations.

The engineering consultants will also undertake the following additional functions at the request of the Corporations:

- (i) certify loans on instalments related to progress in construction;
- (ii) issue a completion certificate to the effect that construction has been carried out according to the by-laws applicable to the estate;
- (iii) supervise construction of factories built on a speculative basis by the Corporation.

Phased development of industrial estates

Since there is some uncertainty about the extent to which industrialists may demand space on the estate, it seems necessary to develop the property on a phased basis, at least in respect of the bigger estates. Should there be insufficient demand to develop the entire tract at one time, the estates would have the advantage of sufficient space for protection from uncontrolled haphazard growth. Moreover, since land values will undoubtedly rise due to industrial development, the Corporations will be able to take advantage of the capital gains thus likely to accrue, and will be spared the cost of buying land at higher values in the future in the event the demand for industrial space turns out to be very strong.

To avoid over-investment and the recurrent costs of under-utilized investment, it is proposed to develop the bigger estates on a phased basis in accordance with a clearly visible demand. Such a policy seems to be the wisest course to follow for economic reasons. Since construction will be done largely through the use of manual labour, it is not likely that there will be important economies of large-scale construction. At any one time the amount of construction should be sufficiently large to obtain all possible economies. There should be sufficient advance construction in anticipation of demand, so that industrialists would not be long delayed in gaining access to premises on the estates. One procedure might be to invite applications at different times as new sections of the estates are to be opened up.

Phased construction will be planned so as to economize in laying the public utility lines and ensuring convenient communications through an adequate internal road system. Some redistribution of various sizes of plots may be needed in order to produce a better distribution consistent with phased development. Even more caution will need to be used in building factories in advance of demand, but it is planned to have always several

factories on hand ready for industrialists who may wish to get into production on short notice.

In a first phase, about 40 acres may be developed, depending upon the number of suitable candidates requesting space. The balance would be developed in the next stages. Such a procedure would enable the Corporations to delay development investment until such time as properties are actually required by the industrialists.

Phased development may have some effect in raising the economic rent since the investment in overhead facilities will need to be spread over a smaller area of rentable plots. However, some phasing can also be done in the provision of overhead facilities. As a whole, a phased approach should result in an overall improvement in the revenue and cost position of the project since it permits postponement of heavy development investments which otherwise would be recoverable only after a long time.

A certain amount of zoning will also be undertaken on the estates. All factories whose operation would be incompatible with the activities of their neighbours would be segregated in a separate portion of the estate. Another type of zoning will be on the basis of plot size and, therefore, of factory size. Zoning on an industry basis may be more difficult to maintain.

Financial assistance to industrialists

Loans will be granted to occupants of the estates in rupees and foreign exchange mainly for the construction of buildings and for the purchase of machinery and equipment. If need be, short-term loans for working capital purposes will also be granted. The Small Industries Corporations have entered into agreements with the Industrial Development Bank of Pakistan under which the Bank would advance loans to small industrialists on the recommendations of the Small Industries Corporations. The agreement provides that 75 per cent of the bad debts, if any, will be borne by the Government and 25 per cent by the Development Bank. Negotiations are in progress with certain other Scheduled Banks of the country and it is expected that they will join in on the same terms and conditions as agreed upon with the Industrial Development Bank. The Small Industries Corporations will examine the loan applications from the technical angle whereas the Banks will determine the credit-worthiness of the applicants. The Banks will, however, have the right to vote any loan applications, subject to the satisfaction of the Small Industries Corporations. The interest on all types of rupee loans will be at the rate of 7 per cent, which is considered to be very reasonable under the present circumstances. The distribution of the interest payments will be in the ratio of 6 per cent to the Banks and one per cent to the Small Industries Corporations. The State Bank of Pakistan will provide the necessary

rediscouinting and reimbursement facilities to the Banks. The Banks will establish their branches in most of the bigger estates in order to avoid delay in the granting of loans.

For the time being, the foreign currency loans will be administered by the Industrial Development Bank of Pakistan. For this purpose, the Government of Pakistan will place sufficient funds at the disposal of the Bank. The terms and conditions of these loans are being worked out.

Payments to be made by occupants

The occupants of the estates will be required to pay the following charges:

(a) Cost of land plus a nominal lease charge since the land will be given on long lease.

(b) Cost of development: This cost will include the expenditure on provision of site, roads, sidewalks, water supply, sewerage, street lighting, non-rentable community buildings and consultants' fees, plus a small contingency charge to cover variations in expenditure. Every effort is being made to reduce the development charges and one of the important means adopted for that purpose is the utilization of a higher percentage of area for building factory plots.

A lessee will have the right to pay the aforesaid cost either in cash or in monthly instalments extending over a period not exceeding 20 years. In the latter case, a lessee will be required to pay a 20 per cent down payment and the balance in instalments. Interest at the rate of 7 per cent will be charged on the amount payable in instalments. A grace period of three years will be allowed for the payment of instalments except for the interest charges, the payment of which will start from the very first year.

Management of estates

The estates will be administered by managers appointed by the Small Industries Corporations. They will operate through Boards which will give them policy guidance. The Boards will consist of representatives of the Small Industries Corporations, some representatives of the industrialists and some members of the public. The tenants will be encouraged to form associations to be represented on the Boards.

Financially, a separate accounting will be maintained of all receipts and disbursements devolving on the property. The estates will be operated

on a strict commercial basis and the finances handled in such a way that it will be possible to evaluate clearly the financial success of the enterprise.

Compatibility between industrial enterprises will need to be emphasized. The provisions of the Factories Act will be enforced strictly to ensure proper working conditions and several additional measures may need to be introduced. The estate management will maintain its own staff to keep the estate in a clean and tidy condition. In short, the estate management will ensure that the estate functions as a unit of high quality and pleasant environment.

THAILAND

In recent years, the Government of Thailand has adopted a number of important measures to promote the development of essential industries in the country which, even in 1960, was predominantly agricultural, 85 per cent of its population of 25 million being engaged in agriculture and only about 2 per cent in industry. The latest measure relates to the establishment of industrial estates. Before examining it, some information will be given on industrial development policies and on industrial zoning in the Greater Bangkok area.

Industrial development policies

In 1954, the first "Act on Promotion of Industries" was promulgated. Although this Act was one of the most important stepping stones - the development of industry in the country, it was considered inadequate in many respects. In October 1960, in order to improve and widen the scope of assistance to industries, this Act was revised and superseded by the "Promotion of Industrial Investment Act".

Under this Act, all promoted industries receive important privileges such as exemption from import duties on machinery and equipment; exemption from profit tax for a certain period of time from the commencement of commercial operation; permission to remit abroad in foreign currency the capital invested and the profit derived from such capital; permission to import the necessary foreign industrial experts and skilled workers; permission to own land necessary for the specific industry in excess of the limit permissible under the existing land law; and permission to export the industrial products. In certain cases, other special privileges are granted, such as reduction of or exemption from import duties on raw materials for a certain period of time, reduction of or exemption from export duties on the export products for a certain period of time and protection by means of import tariff and import control and restriction. The Act also guarantees that the State will not set up new industrial enterprises to compete with private business and will not transfer any private industrial enterprises to state ownership. A Board of Investment was established to implement the Act.

Since the promulgation of the 1954 Act, 123 categories of industries have been designated as promoted industries. The list covers a very wide field, such as smelting, rolling, plating, galvanizing, machine tool, hand tool, agricultural tool and implement, motor vehicle, tractor, bicycle and motorcycle, shipbuilding, spinning and weaving, rubber products, plywood and allied wood products, cement, gypsum, ceramic and firebrick, paper, sugar and other food products, chemicals and pharmaceutical products, paint and ink, glass and glasswares, electrical appliances and electrical accessories, electronic products, hotel industry, etc. New industries are still being added to the list of promoted industries.

Since 1954, over 116 industrial enterprises with a total capital investment of over 2,100 million bahts ^{1/} - 65 per cent of which private foreign investment - have received promotional benefits. It is estimated that these investments have helped to create at least 20,000 employment opportunities. Applications for privileges are still being considered by the Board of Investment.

In 1961, the Six-Year Development Plan (1961-1966) was adopted. The plan aims at increasing the contribution of the industrial sector to the national income from 10 per cent in 1961 to 12 per cent in 1966. The Government will exert the utmost efforts to promote private investment in different fields of industry, with emphasis on those using local raw materials and those producing import substitutes. To facilitate private industrial investment, the industrial promotion programme has been made a joint responsibility of the Ministries of Industry, Agriculture, Economic Affairs, Communications, Interior and Finance, and of the Board of Investment.

The Government will also assist industrial development by setting up financial institutions for industrial development (e.g., the Industrial Finance Corporation), making surveys of natural resources, and establishing training programmes for skilled labour. A Management Development and Productivity Centre has been set up with the assistance of the United Nations Special Fund with ILO as the executing agency. Assistance will be given to cottage and small-scale industries in the fields of technology and marketing. The establishment of an Industrial Design Centre is being considered.

Industrial zoning of the Greater Bangkok

Industrial zoning is part of the Greater Bangkok Planning undertaken as a joint project by the Government of Thailand and the United States Operations Mission. The following excerpts from the report submitted to the Government of Thailand relate to industrial zoning.

"The existing industrial structure of Bangkok and Thonburi, Bangkok's twin town on the opposite bank of the Choa Phya River, can be divided into two major groups: (1) numerous small and medium-sized establishments operating mainly in shophouses, particularly in the Sempeng district (a very busy commercial centre) and other densely populated areas and (2) a few large manufacturing establishments located in various outlying areas of the city.

"The estimate of 25,000 rai (about 10,000 acres) for the future industrial land requirements for large establishments within the next thirty years has been distributed in the proposed plan in sixteen locations, of which nine are proposed as completely new industrial areas, and the remaining seven as expansions or consolidations of existing industrial or manufacturing concentrations.

^{1/} One US\$ = 20.80 bahts.

"The industrial areas proposed have been selected on the basis of the following criteria:

"1. Transportation. All lands adjacent to either major roads, major waterways or railways have potential for industrial use; however, the prime sites are those which combine at least two of the above criteria. With the increasing use of air freight, proximity to air facilities becomes a consideration for certain types of industries. The same is true of proximity to ports serving as transshipment points.

"2. Labour. Industrial land should be reasonably accessible to an adequate pool of labour. Unless existing residential areas are close, or connected to the industries by convenient public transit, provision of housing for workers must be considered.

"3. Materials handling. Plants which require frequent or high-volume importing or exporting of materials or finished products will find it more economical to operate near the port.

"4. Water resources. Industrial land should possess, or have a potential of, adequate water resources. Water for employees and processing can be supplied either from the public system or by drilling wells, and klong (canal) or river water can often be used for cooling purposes.

"5. Water-borne waste disposal. Industrial land should offer economical and non-detrimental means of disposing of non-organic water-borne wastes of a polluttional character unless such wastes can be eliminated by treatment within the plants. Plants with large volumes of such wastes, or wastes which cannot be treated, should locate in areas adjacent to major waterways, principally on the river near the Gulf.

"Organic water-borne wastes of normal volumes can also be handled by the plants themselves. However, this is not desirable and such wastes should be discharged through a sewerage system. The availability, existing or potential, of a public sewerage system is thus also important in an evaluation of industrial lands.

"6. Electrical power. Industrial plants will require considerable quantities of electrical power; this need can readily be met within the area to be served by the Metropolitan Electrical Authority.

"7. Fuel. If large quantities of fuel, such as oil or lignite, are to be utilized either for manufacturing or power generation, the availability of economical and reliable fuel transport is essential. Compliance with the transport item above will generally satisfy this requirement.

"8. Proximity to supporting industries. Many industries desire to be easily accessible to other firms for repairs, sub-contract work and supporting services.

"9. Communications and banking services. Telephone and telegraph, and the sending and receiving of mail are necessary adjuncts to any industrial or business operation and should be readily available.

"It is recommended that several of the proposed new industrial areas be developed as industrial parks. These should be established under a single sponsorship. In Thailand, the Government is the logical agency to undertake such efforts. It alone possesses the potential resources and necessary powers which are needed to acquire and lay out sites, install improvements and dispose of plant sites in accordance with its policies regarding industrial development."

The industrial areas of the Greater Bangkok have been classified into four groups: (1) obnoxious industries which require isolation from residential areas; (2) manufacturing or assembly industries which do not require complete isolation from residential areas; (3) light manufacturing or assembly industries which may be located in fairly close proximity to residential areas; and (4) light industries which may be located anywhere subject to conformance to special conditions covering site size, location of buildings on site, and methods of operation.

Small industrial establishments will for many years contribute significantly to the industrial base of Greater Bangkok. Their relative importance will decrease in the future, but care should be taken to insure their continued contribution to the economy.








These establishments, located in shophouses and small houses, provide substantial employment which does not require a daily journey to work, and does not tax the inadequate public transportation facilities.

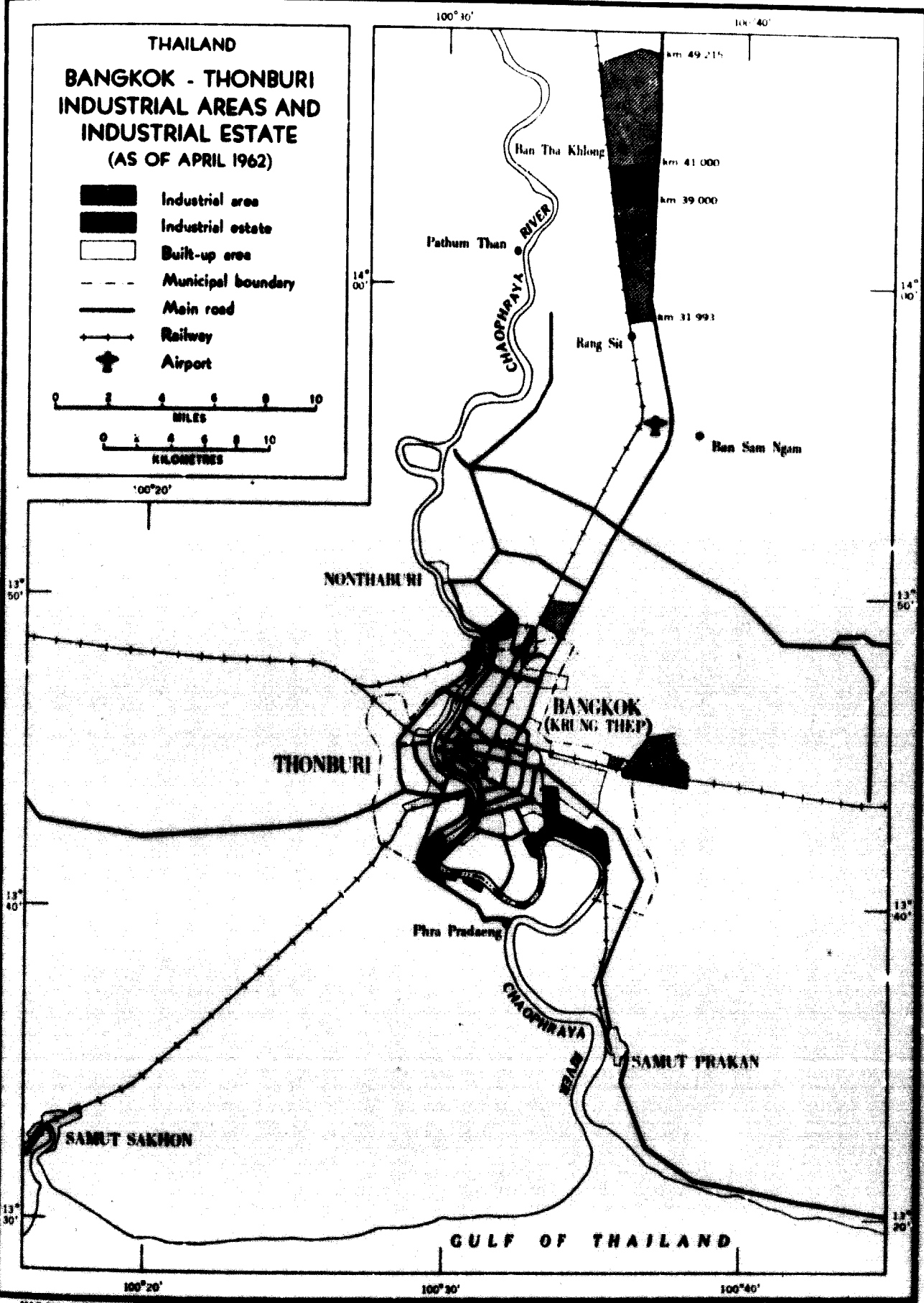
In view of these considerations, the following recommendations are made for these industries: (i) existing small industries located in residential or commercial areas which are neither obnoxious nor a danger to public health should be permitted to remain. (ii) Future small industries should be permitted in commercial areas primarily, with special permission given to completely non-noisy and otherwise non-objectionable home-type industries to locate in high-density residential areas.

Industrial estates programme

It is evident that investors in the industrial sector will be confronted with increasing difficulties of finding suitable premises at a reasonable price. There have been cases of prospective investors to whom promotional privileges had been promised who had to withdraw from the venture because of failure to obtain suitable land. The pressing need for land area and worksheds is one of the reasons for which the Government of Thailand has adopted a programme of establishment of industrial estates.

THAILAND
BANGKOK - THONBURI
INDUSTRIAL AREAS AND
INDUSTRIAL ESTATE
(AS OF APRIL 1962)

-  Industrial area
-  Industrial estate
-  Built-up area
-  Municipal boundary
-  Main road
-  Railway
-  Airport



It is also considered that industrial estates will be playing a leading role in inducing, encouraging and stimulating industrial investors, both domestic and foreign, to take an active part in the industrial development programmes. An industrial estate will be created near Bangkok with all the basic facilities such as water and power supply as well as social overheads such as housing, schools and hospitals. Within the proposed estate, a part of the land will be set aside and developed as an "industrial area" in which industrialists with special requirements will set up their own factory buildings. Early in 1962, the Ministry of Industry took the first steps towards the acquisition of suitable land for this purpose.

In addition, the Economic Development Project for the north-east of Thailand provides for the establishment of an industrial estate in the Province of Khon Khaen, where a hydroelectric scheme is to be set up under the Development Project. The estate will be designed for existing small industries, in particular, jute baling factories, and a certain number of prospective industries whose establishment will be made possible by the availability of power. It is proposed to attach to the estate a Prototype Production and Training Centre and a Design Centre.

Introduction

In order to appreciate the role which Hong Kong's first venture in the field of industrial estates has played and, as development continues, is expected to play in the Colony's over-all industrial progress, it is necessary, briefly, to review the growth of Hong Kong as an industrial centre.

Hong Kong is one of the very few remaining territories, if not now the only one, which has remained completely faithful to liberal economic policies of free enterprise and free trade. It is a modern counterpart of the free cities of Venice and Hamburg during the heyday of European mercantile sovereignty. It came into existence as a British Colony to overcome the restrictionism of China 120 years ago: it succeeded and today its existence as a prosperous, self-supporting community is mainly due to a strict adherence to the vital principles of economic freedom in a world which seems to be determined on restrictive policies.

The Colony has virtually no natural resources other than the sheltered deep-water harbour, and a geographical position favouring trade with South China and reasonably suited to the role of a commercial centre serving the whole of the Far East. Entrepot trade in goods moving to and from China was its traditional livelihood. To serve that trade, banks, insurance and shipping companies, dockyards, warehousing and stevedoring companies have been built up and flourish. Fluctuation in trading conditions which occurred during the nineteen thirties and nineteen forties was balanced by an ebb and flow of population to and from China, the population adjusting itself to the prosperity of the times. This convenient arrangement was suddenly upset by the advent of political changes in China. These changes brought upwards of one million immigrants into the Colony in the period 1948 to 1950 and at the same time, the Korean War resulted in an embargo on trade with China to the great disadvantage of the Colony's economic position.

These two facts, the influx of a great number of hard-working, adaptable people with a determination to live and work and the serious fall in entrepot trade, formed the base and provided the stimulus from which Hong Kong's industry has sprung.

Industry was a somewhat late starter in Hong Kong. The nineteenth century saw the construction of dockyards and sugar refineries while the development of electric power in 1903 and the construction of the Kowloon-Canton Railway in the same decade provided a foundation for industrial development. Little industrial expansion took place, however, until the introduction of imperial preference in 1932 which encouraged the development of small manufacturing industries producing rubber footwear, textiles, torches and metalware, the

economy of the Colony up to 1941 being maintained very largely on its trading activities based on the harbour and free port. Agriculture and fishing have always played and continue to play a part.

The growth of industry to replace a reduced entrepot trade with China is a conspicuous example of the versatility which continues to be an essential and all-important characteristic of Hong Kong's commerce, particularly when it is recalled that industry has grown up in generally adverse circumstances. The Government's policy of non-interference with the play of economic forces has precluded subsidies or protection of any kind, whereas abroad protectionist policies block or restrict one market after another.

In considering the importance of industry in relation to the general trade of the Colony, it must be borne in mind that every dollar's worth of domestic products exported is worth many times the same value of re-exported products in terms of employment and national income. Increasing the national income and raising employment levels and the standards of living are now of paramount importance in view of the growth in the Colony's population and the strong desire for expanded social services, a need which no modern Government can neglect to satisfy.

Land utilization

To explain the motivation for the type of plan formulated, it is necessary first to look at the geographical nature of Hong Kong as a whole. Its total area is roughly 398 square miles of which 82 per cent is marginal land, 13 per cent arable and only the remaining 5 per cent built up. The Colony may conveniently be divided into three parts, the island of Hong Kong (29 square miles), Kowloon and New Kowloon (35 square miles) and the New Territories including some 235 islands (334 square miles).

The island of Hong Kong is steep and rugged with a spine of hills whose highest point, Victoria Peak, is 1,809 feet high. Victoria, the name given to its trading post when the Colony was first founded, is still the main business centre and in the sprawling city which clusters around the foot of the Peak are the great banks, merchant houses and hongts which have helped to make the Colony prosperous. Because of the sharply rising ground, much of Victoria is built on reclaimed land. Many of its side streets are stepped.

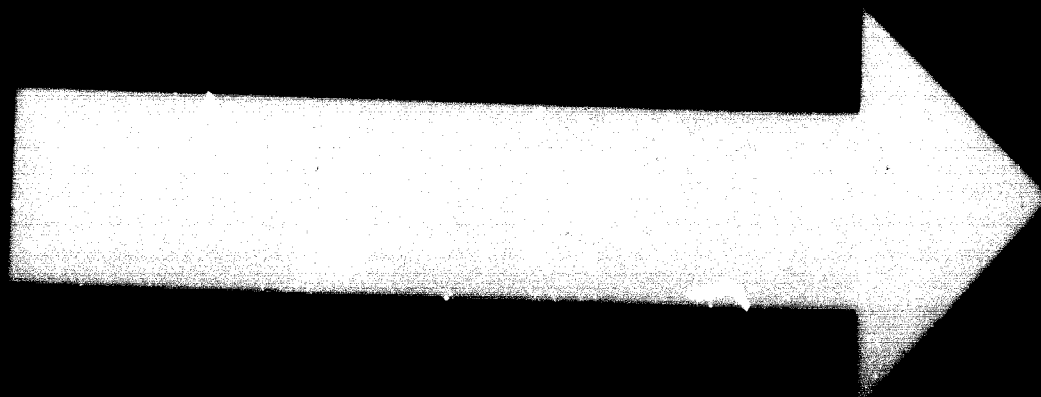
Between the island and the mainland of Kowloon lies Hong Kong's famous natural harbour. Almost land-locked, it extends for nearly seventeen square miles and is from one to three miles wide. Its main entrance is a deep-water channel through Lyemun Pass, five hundred yards wide at the narrowest point, and capable of taking vessels drawing up to thirty-six feet of water. It is one of the busiest, and certainly one of the most magnificent, harbours in the world.

The ceded territory of Kowloon and part of New Kowloon up to the foothills, which is now mostly flat, is the Colony's main industrial centre. Here too are the wharves for ocean-going ships, the railway terminus and the Colony's airport. And here and on the northern coastal strip of the island, that is, in the 13 square miles around the harbour, live 80 per cent of the population, some 2.6 million people at a gross density of 200,000 persons per square mile.

Behind Kowloon, a range of steep hills divides the bustling urban area from the placid New Territories. The greater part of the New Territories, both islands and mainland, is steep and barren, the highest point, Taimoshan, being 3,142 feet, but a Government afforestation scheme is changing the face of many hillsides. Wherever flat land and sufficient water make cultivation possible, there are villages, and rice and vegetables are raised. Chinese farmers get the maximum from their land and hillsides are often covered with intricately terraced fields. While industry is creeping in slowly, for the most part, the area remains unspoiled and the lives of the inhabitants of the small isolated villages are serenely rural.

The existing water works system embraces a large part of the land surface of the Colony, particularly the New Territories, and comprises 14 reservoirs with a capacity of 10,500 million gallons. In the absence of large rivers and due to the uneven distribution of rainfall this storage capacity has to be husbanded over some seven months of the dry season from October to April to provide a supply of 50 million gallons a day. A further scheme is under construction on Lantau Island, the largest island in the Colony, which will increase the minimum supply to 78 million gallons a day, while another scheme is being investigated which might double this figure. Industry at present draws some 10 million gallons a day from the public supply mains.

Industrial development in Hong Kong is handicapped by a lack of level land suitable for industry, keen competition for such land as is available, and the high cost of site formation in the Colony's predominantly hilly terrain. Shortage of fresh water is a constant problem and the supply of electrical power is dependent on imported fuel. Virtually all raw materials have also to be imported and there are no protective tariffs behind which local industry can shelter and develop on a firm basis of internal consumption. Offsetting these fundamental disadvantages, is a large working population, industrious, thrifty, intelligent, and adaptable, allied with the traditionally far-ranging interests and connexions of the merchant community. With these assets industry has contrived to develop and flourish at a remarkable rate, and it was to help overcome the first of the two main handicaps and in order to capitalize fully on these assets that the Colony's first industrial estate was planned.



15. 7. 74

7 OF 9

DO

3736

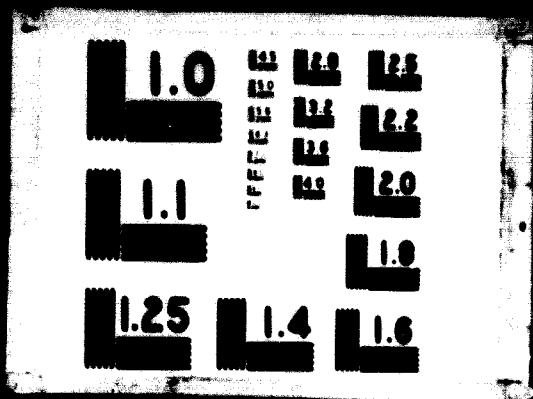
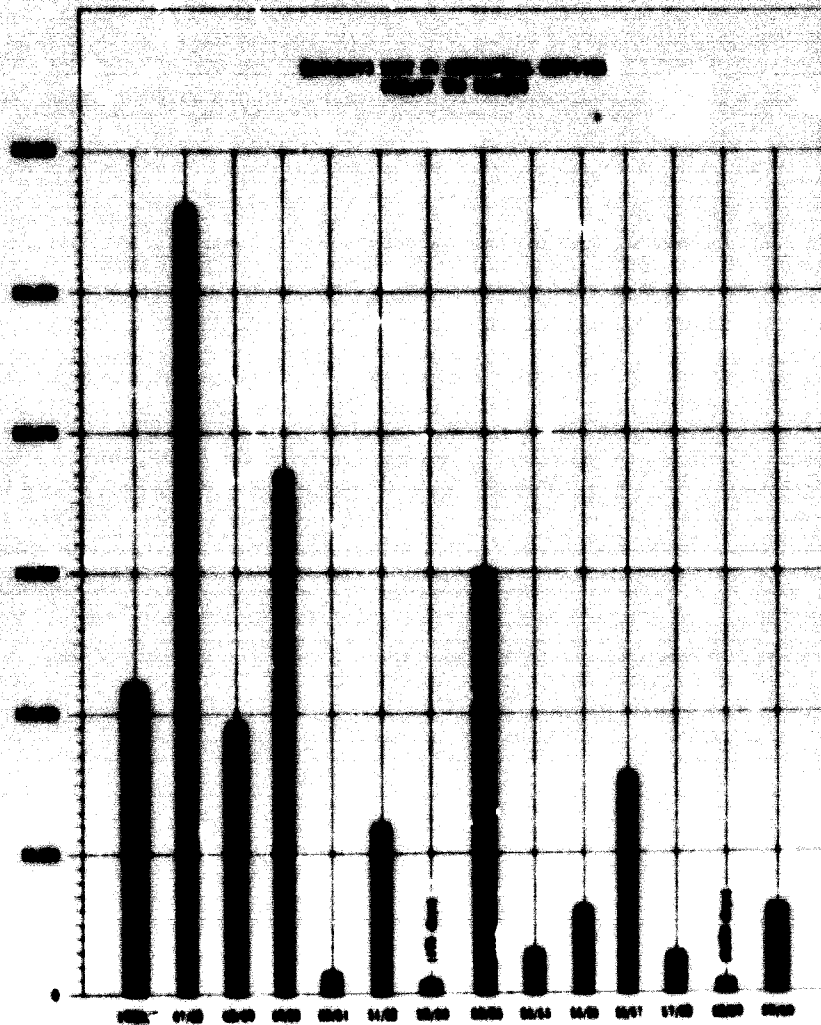


TABLE 3

REGISTERED AND REGISTERED INDUSTRIAL ESTABLISHMENTS CLASSIFIED BY LOCATION AND NUMBER OF WORKERS EMPLOYED AS AT THE 31ST MARCH, 1955

Number of workers employed	Number of industrial establishments				Number of workers		
	Total	Manufacturing	Construction	New Establishments	Men	Women	Total
1-9	1,200	1,100	100	100	100	100	200
10-49	1,500	1,400	100	100	100	100	200
50-99	1,000	900	100	100	100	100	200
100-499	1,000	900	100	100	100	100	200
500-999	1,000	900	100	100	100	100	200
1,000 and over	1,000	900	100	100	100	100	200
Total	6,000	5,600	400	400	400	400	800

TABLE 4



Urbanization in Hong Kong has historically been based on the harbour; sea communication is, and will remain, vital. The physical barriers to development presented by ranges of hills running east-west across the centre of the island and along the north side of the Kowloon peninsula have until recently limited industrial expansion beyond these limits. There are also strong, though possibly short-term, economic reasons for the intensive development of existing urban sites rather than the opening up of more remote areas. Thus the tendency was for individual industrialists to try and establish themselves in the existing urban area. However, this desire was often frustrated by the presence of squatters on what little suitable land existed and the only alternative open to individual industrialists was to acquire agricultural land outside the built-up area and convert it to factory use.

The Government was thus presented in the early nineteen fifties with the problem of finding suitable areas in which industrial expansion could take place. At the time, there were three possible lines of action:

- (i) Extending the existing urban centres (particularly on the mainland) mainly by reclamation and encouraging re-development to greater densities;
- (ii) permitting development to take place haphazardly over the Colony by conversion of agricultural land to urban uses;
- (iii) the decentralization of population by the deliberate construction of new towns and the control of density in existing areas.

Eventually, sheer expedience determined the adoption of a combination of all these with official preference for (i) in the short term and (iii) as the long term solution.

In 1954, a decision was taken to reclaim some 90 acres at Kwun Tong - a district fronting the eastern harbour basin about three miles from the then existing built-up area. At about the same time, a multi-storey resettlement programme was initiated with a view to clearing urban Crown land for redevelopment and in 1958, the Government commissioned consultants to examine the engineering feasibility of establishing a number of new industrial towns in various parts of the New Territories. Each of these steps was aimed at providing more land for development while avoiding or reducing the impact of urbanization on the limited resources of arable land.

The areas selected for investigation by the engineering consultants were all bays and inlets on various parts of the coast line since the only existing unsettled land is, generally speaking, inaccessible broken hill country difficult and expensive to develop for urban purposes and quite unsuitable for industry. Selection of these areas, some in relatively remote parts of the New Territories, raised questions of location policy such as:

Is the reclamation of new land in remoter areas preferable to additional reclamations adjoining the existing urban centres? Will new industrial townships be economic in the earlier stages?

What part must the Government play in the establishment of these towns? Will the provision of land be sufficient or should the Government also carry out development, e.g., housing and industrial buildings?

Prima facie, there was much to be said in favour of establishment of new towns; the decentralization which would result would help to reduce congestion in the present overcrowded urban districts, facilitate slum clearance schemes and lessen administrative, health and police problems. The new town or towns could, theoretically, be planned and developed to much higher standards of civic design and social amenity; population densities could be kept down to more satisfactory levels; roads could be built to meet future traffic requirements; community services such as schools, hospitals, parks, and the like could be provided to meet the scheduled final population of the township; administration could be simplified and made more efficient.

On the other hand, new towns require large capital expenditure at the outset, both on reclamation and formation of land and the provision of a completely new infrastructure, i.e., the sewers, roads, and water supplies which are essential. In addition, the maintenance of a balance between industry and housing, the movement of a large number of people to a new environment and the provision of adequate community facilities in a new town, particularly in the first few years, involves detailed advance planning; the rate of expansion cannot be adjusted rapidly to changing circumstances as can the expansion of an existing area and it demands a much more positive governmental economic direction, control and expenditure than has been customary in Hong Kong.

It is relevant to record at this point the words used in the report of the United Nations Seminar on Regional Planning held in Tokyo in 1958 where it is stated:

"Many of the aspects of the large metropolis which are considered as 'problems' by physical planners such as great size, density,

congestion, surplus labour and the like may actually be prerequisites to, or reflect the cost of, division of labour, specialization and general forms of economic organization which effect increased productivity and permit higher levels of living. The large concentration of population represented by the metropolis, despite the problems which it creates, is a pool of resources - of space, inventories and labour - permitting the promotion of economic development and is especially helpful to the encouragement of small or riskful enterprise. The metropolis offers 'external economies' of scale and permits effective communication of a type essential to economic growth."^{1/}

As mentioned above, the eventual outcome was a compromise. Kwun Tong, Hong Kong's main post-war industrial estate, has certain aspects of a new town without the disadvantage of isolation; it has been planned ab initio and built from bare hillsides and reclaimed land but, being situated only two to three miles from the limit of the then existing urban area, it was able to rely on the urban area for facilities, labour supply and services not immediately available in the new town itself. The fact that today, seven years after work started, it still has to place considerable reliance on the urban area, which has now extended to join the new town, indicates the wisdom of not attempting to develop a more remote area at that time.

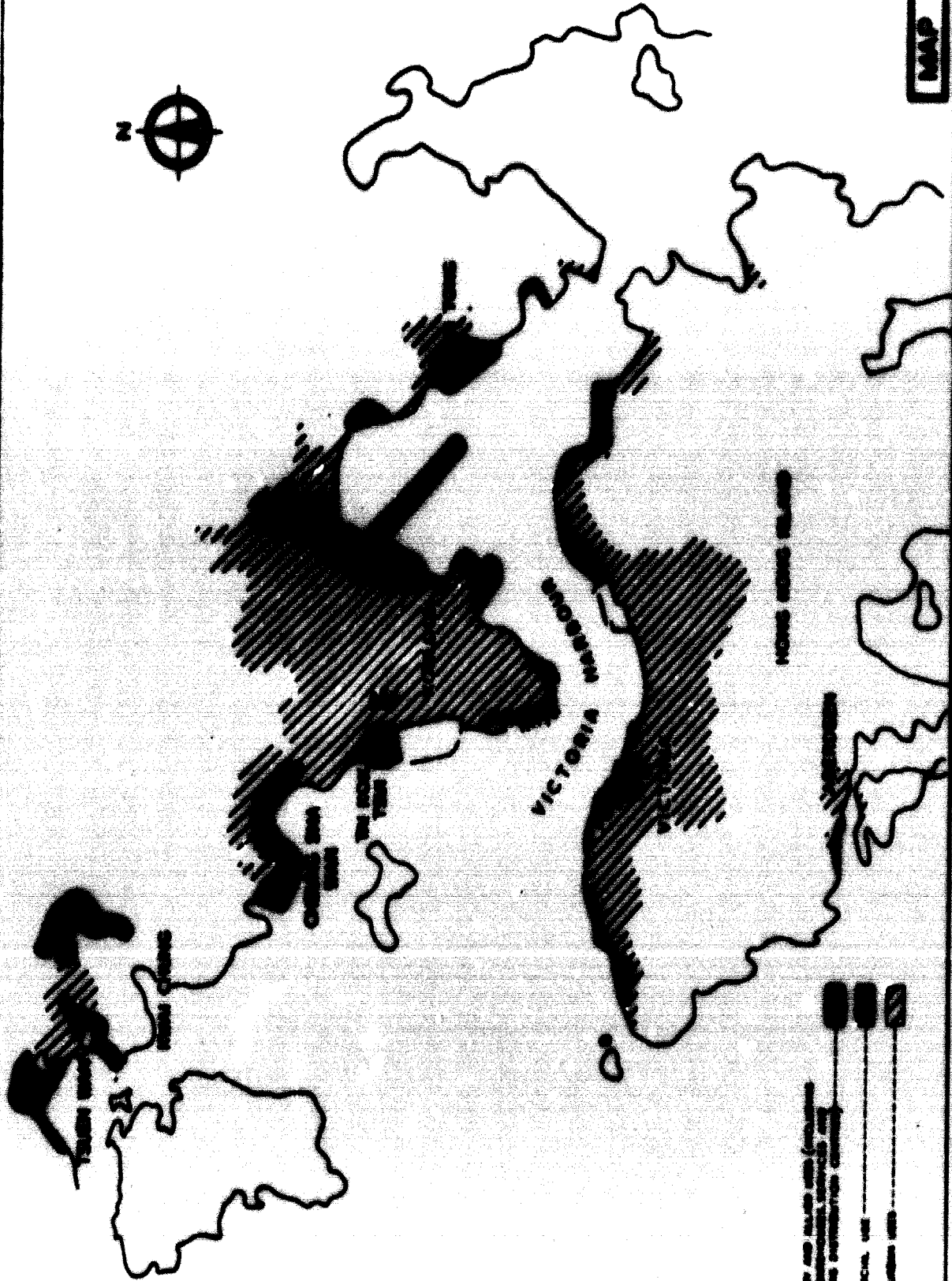
In addition to Kwun Tong, the Government has continued to press forward the development and redevelopment of industrial areas in the existing urban parts of the mainland and these areas still contribute by far the greater part of the Colony's industrial output. A new area of some 70 acres has been released for industrial development as a result of the construction of the new airport runway. Of the areas examined by the engineering consultants, one, Kwai Chung (Gin Drinker's Bay), that nearest to the built-up area on the west, has been selected for reclamation and development in the next five to seven years. A nucleus of industrial development already exists there and nearby at Tsuen Wan; Thus, here again, many of the advantages of a new town development will obtain while the disadvantages will be offset by availability of labour and other facilities in adjoining urban areas. Meanwhile the consultants' reports on the remaining areas in more remote districts have been put aside for the present.

Role of industrial estates - plans and policies

Hong Kong, having a wholly free enterprise economy, there is no national industrialization programme as such. Nor is there a master plan to which urban and rural industrial development may be related. In 1947, the Government

^{1/} Document UN/TA/Ser. C/35.

MAP 1



SCALE

COLONY OF MONGS HONGS - EXISTING DISTRIBUTION OF INDUSTRY

MONGS HONGS WITH OTHER INDUSTRIES
COMMERCIAL USE
OTHER MONGS HONGS

invited Professor Sir Patrick Abercrombie to prepare a preliminary planning report, with a view to providing a land use pattern for future development. His recommendations, which included the preparation of a master plan for the Colony, arrived at a time when the Government was fully extended in facing the immediate problems of housing and new industry. In these circumstances, it was hardly practical to carry out comprehensive surveys and planning studies necessary for the preparation of such a master plan; such action had to await more stable economic and social conditions. These conditions may now have been established and the time be opportune for the preparation of the plan which Abercrombie recommended. However, this paper on industrial estates must be considered without reference to a master plan since, in fact, none has been prepared, although the basis for such a plan exists.

As has been mentioned, industrial development is largely concentrated in a few square miles of the Colony adjoining the harbour - Map No. 1 illustrates this - and this appears likely to remain the pattern for many years. Industry in rural areas is established either to absorb a pool of relatively cheap labour existing in a small town or village or in order to take advantage of a particular natural facility such as an untapped water supply (e.g., textile finishing and processing) or a shallow water inlet (e.g., shipbreaking or a timber and plywood factory). Otherwise, rural industries are traditional small cottage crafts, food preserving, embroidery and carving of wood and ivory.

Certain specialized industries such as offensive trades and those producing large quantities of smoke have proved difficult to locate in the built-up areas. Usually, however, a suitable site can be found and in this respect, the government ownership of all undeveloped land has been of major importance. There is no freehold tenure of land in Hong Kong. All land is Crown land (i.e., the property of the State as represented by the Crown), either leased or unleased. Leased Crown land is held on various terms according to date of grant, purpose and location. Unleased Crown land is either unoccupied or held under permit or licence for short periods which do not normally exceed one year.

The underlying principle today is that all leases of Crown land are disposed of in the first instance by public auction. Land is, however, granted by private treaty at approximately one-third of the market value to factory operators for construction of staff or workers' housing on a non-profit making basis; private treaty sales, at the full market value, are made to public utility companies. Industrialists occupy their factory sites in one of four ways: they hold the Crown lease; they rent from the holder of such a lease; they hold a temporary permit; they "squat" on land to which they have no title.

It follows therefore that the initial financing of planned industrial estates or industrial areas, insofar as site formation, layout and provision of basic amenities are concerned, comes entirely from government funds. With

the exception of one special set of circumstances, namely the resettlement of squatter factories which will be dealt with later, the Government does not undertake the construction of industrial buildings; this is left to private enterprise.

It is here perhaps that the greatest difference lies in the meaning of the term "industrial estates" when applied in Hong Kong as opposed to most other countries. Furthermore, although an "industrial estate" in Hong Kong may be planned as an entity, it is not managed and operated as such. Because Hong Kong is virtually a "city state", the Government as a whole fulfils those functions which an urban or regional administration would carry out. In relation to industrial estates, this means that such functions as water supply, medical facilities, health and sanitation, road maintenance, etc. are provided by the responsible departments of Government as they would be elsewhere in the Colony. Electricity, gas and telephones are provided by privately-owned public utility companies.

Before dealing with the Hong Kong concept of an industrial estate by illustrating it with a description of the development of Hong Kong's only complete project of this nature, some explanation must be made of the exception mentioned above where the Government actually constructs the industrial buildings.

Resettlement flattened factories

In order to meet the needs of small-scale industrialists whose premises have to be moved from demolished buildings or Crown land which they occupy on temporary permit or on which they are squatting, the Government has undertaken the construction of a number of five-storey factory buildings subdivided into flats. The weight of the building is borne on columns spaced at twelve feet intervals. Each floor of each wing consists of 9,000 square feet of open space separated by a staircase and a ramp in the centre, and with additional staircase access at each end of the wings. Each floor is divisible into units of 198 square feet - the clear space between each of the bearing members - and each of these units is the minimum area which can be allocated to any one concern. A verandah running round the building provides access to all units. The connecting link between the wings is used to house communal latrines and washrooms. The roofs of each of the wings provide drying space, a proportion of which is covered over, for the use of the industries housed in the building.

The rentals payable vary according to the floor, ranging from HK\$75 a month^{2/} (37 cents per square foot) for a ground floor unit to HK\$45 a month (22 cents per square foot) for a unit on the top floor. Rents have been assessed so as to cover all recurrent costs and to recover the original capital expenditure, including all engineering works plus the value of the land, in

^{2/} One US \$ = HK \$5.73.

Table 1

Elder urban districts Newer multiple districts

Location	Industrial	Industrial	Industrial	Industrial
Area of street block	71,045 sq. ft. (1.77 acres)	72,362 sq. ft. (1.63 acres)	476,522 sq. ft. (10.74 acres)	164,300 sq. ft. (3.77 acres)
Area of building sites	44,971 sq. ft. (1.03 acres) (i.e., 56 per cent of street block)	60,250 sq. ft. (1.38 acres) (i.e., 65 per cent of street block)	395,144 sq. ft. (9.07 acres) (i.e., 83 per cent of street block)	123,800 sq. ft. (2.87 acres) (i.e., 81 per cent of street block)
Building coverage	38,663 sq. ft. (i.e., 86 per cent of site coverage)	52,183 sq. ft. (i.e., 87 per cent of site coverage)	277,834 sq. ft. (i.e., 70 per cent of site coverage)	108,564 sq. ft. (i.e., 81 per cent of site coverage)
Total floor area	179,414 sq. ft. (of which 37,200 sq. ft. not occupied)	158,463 sq. ft.	623,773 sq. ft.	186,446 sq. ft.
Average building height	5 storys	3 storys	2 storys	1.7 storys
Total number of floors	96 floors	38 floors	63 floors	17 floors
Building accommodation density	Plot ratio = 4.0 F.S.I.B. = 2.3	Plot ratio = 2.62 F.S.I.B. = 1.70	Plot ratio = 1.58 F.S.I.B. = 1.31	Plot ratio = 1.39 F.S.I.B. = 1.13
Estimated population	Total workers = 2,538 persons Daily workers = 92 per cent Residential workers = 8 per cent	Total workers = 2,540 persons Daily workers = 97 per cent Residential workers = 3 per cent	Total workers = 5,341 persons Daily workers = 98 per cent Residential workers = 2 per cent	Total workers = 1,635 persons Daily workers = 91 per cent Residential workers = 1,070 persons 9 per cent

Older urban districts

Never outlying districts

Location

TAI KOK TSWI

CHUNG SHE MAN

LOU TONG

TSLIN MAN

Predominant use	Industrial	Industrial	Industrial	Industrial
Net industrial population density				
(i) Block density	1,430 persons/acre	1,107 persons/acre	486 persons/acre	434 persons/acre
(ii) Site density	2,500 persons/acre	1,709 persons/acre	586 persons/acre	532 persons/acre
(iii) Housing density	70.8 sq.ft./person	67 sq.ft./person	117 sq.ft./person	114 sq.ft./person
(iv) Occupancy rate	26.4 workers/floor	67 workers/floor	84.5 workers/floor	96 workers/floor

a) Ratio of total floor area to area of building sites.

b) Ratio of total floor area to area of street block.

twenty-one years with interest at 5 per cent. The allocation of space is based on the floor area previously occupied by the concern for manufacturing purposes, computed as a multiple of the basic unit of 198 square feet. Thus a factory formerly occupying 1,200 square feet would be considered eligible for six units, while one occupying 390 square feet would be allocated only two units. The maximum allocation to any one factory has been set at ten units, and since it is intended to provide accommodation for small concerns only, any factory that occupied more than 2,000 square feet of space is normally not accommodated. The space is only available to persons displaced from Crown land or demolished buildings.

After taking up accommodation in the factory the individual tenants have to provide their own partition walls and front walls facing on to the verandahs. The internal layout of each factory is subject to the approval of the Labour Department and the Fire Brigade, and each concern has to make its own arrangements for the installation of water, electric light and power or gas supplies from a central supply point on the ground floor.

The design of the building and the fact that a large number of concerns are accommodated in close proximity to each other has made it necessary to exclude certain trades. These trades fall into four main categories; those that require more storage space than could be provided, for example, timber yards and waste or scrap metal dealers; foundries and the like for which adequate ventilation and flues cannot be provided; waste cotton refiners and bedding manufacturers because of the noxious processes involved and because they generally require more space than could be made available; and all food factories, since it was considered that the facilities available were not sufficient to provide hygienic accommodation for the processing of food.

Though a higher rent is charged for ground floor units, their ease of access has made them very much more popular than those on the upper floors. However, certain trades such as metalware manufacturers, weaving factories or small sawmills, because of the size and weight of the machinery used or the nature of the work carried on, are given priority for ground floor rooms. Any process which might constitute a fire risk, as for example plastic work, is accommodated on the top floor.

As of September 1961, four buildings of this nature were constructed and largely occupied, two others were to be completed shortly. The four occupied buildings comprise a total of 1,642 units (approx. 320,000 square feet of floor area) of which 1,293 units have been occupied by 354 individual factories and work shops. A modified form of building has now been designed giving greater floor area and providing for a greater variety of users and it is planned roughly to double the existing floor space available within the next five years. The buildings are situated mainly in existing urban areas near resettlement housing estates.

Kwun Tong industrial estate

Construction and land sales

In 1954, Government decided to reclaim some 87 acres of land at Kwun Tong, an area then used as a refuse dump and situated on the north-eastern side of Victoria Harbour, in order to provide land for industrial development. The dumping site was at that time some two to three miles distant from the existing urban area and cut-off from it by the airport and a ridge of hills.

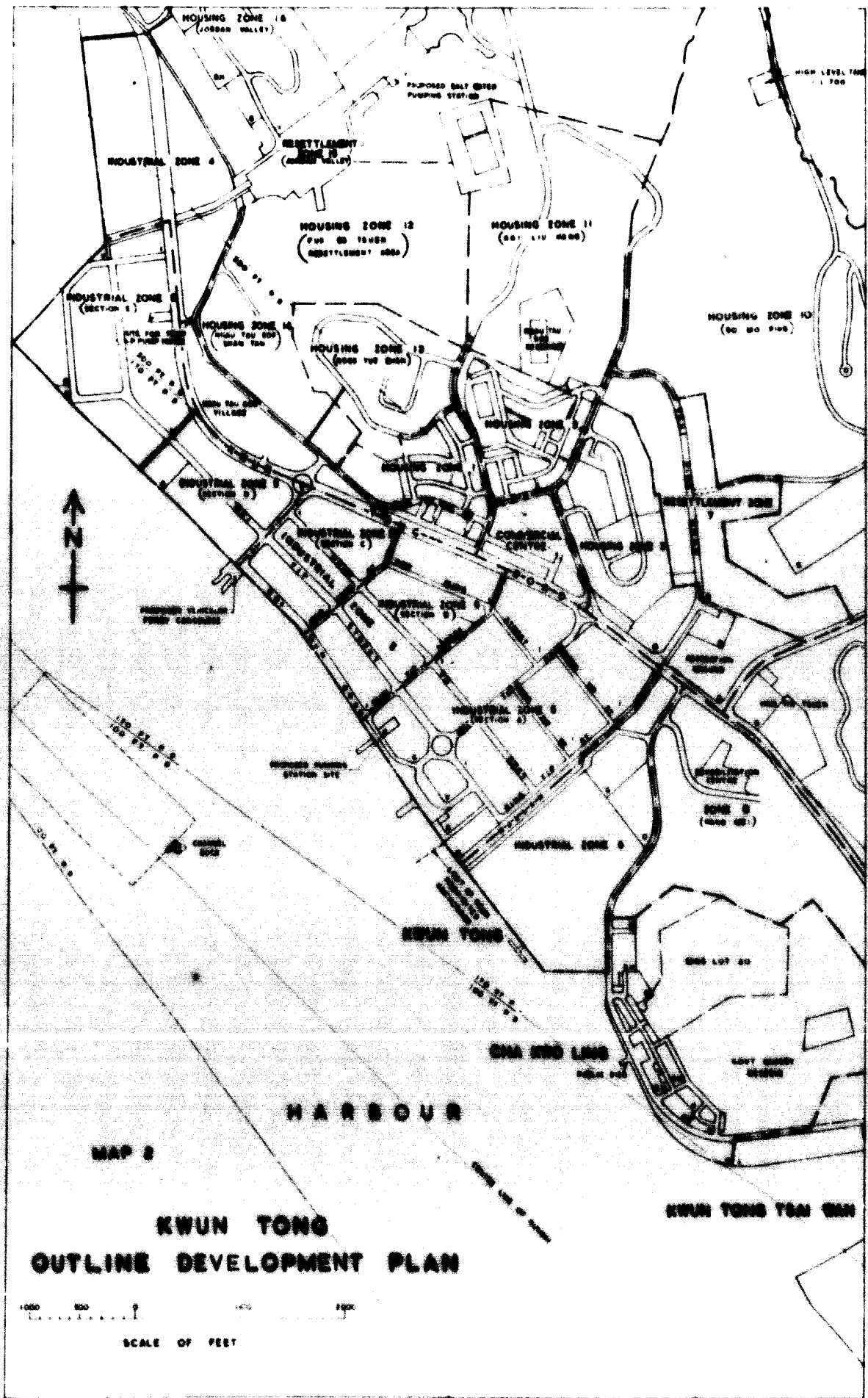
Work started in February 1955 and, to protect the seaward end of the reclamation, the construction of 1,200 feet of seawall was put in hand. The first main contract was for the excavation of parts of adjacent hills to form sections of housing zones I, II, and III. The spoil so obtained was used to reclaim the industrial zone.

The work of reclaiming land for industrial development continued throughout 1956 and land sales started in September of that year. Sales were by public auction but purchasers were allowed to pay by instalments over twenty years in respect of these lots. This practice no doubt encouraged sales, since almost all purchasers availed themselves of the opportunity to pay in this way.

With a view to catering to the needs of the smaller industrialists requiring only a few thousand square feet of floor area, two sites totalling 53,000 square feet were sold restricted specifically to the erection of buildings not less than five storeys in height, to be let out in floors or parts of floors as flatted factories, no one industrialist, including the purchaser, being allowed to occupy more than one floor.

In July 1957, work started on a contract for a further 1,000,000 cubic yards of filling to complete the reclamation of the 87 acres authorized in 1954. This contract differed from earlier ones in that in addition to the excavation of soft material, rock was also removed to form sites for residential purposes. The excavated rock was dumped in sites for open spaces and other areas where no piled foundations would be required.

The filling of the commercial centre was completed in August 1959 and the reclamation of industrial zone 5, section A, was nearing completion by the end of the year. Work on a further 1,277 foot extension of the seawall to protect the reclamation of industrial zone 5, section B, commenced in September 1959 and was completed in April 1960. At the end of August 1961, a total of 115 industrial lots comprising 2,394,920 square feet (55 acres) and 29 other lots comprising 248,069 square feet (5.7 acres) had been sold by public auction for HK\$51,685,000 and HK\$10,890,100 respectively. Eighteen lots had been granted by private treaty (mainly for workers' housing, welfare purposes and



public utilities) covering an area of 496,025 square feet (11.3 acres) at a premium of HK\$1,648,200. In all 162 lots have been sold covering 3,139,014 square feet (72 acres) for a sum of HK\$64,323,300.

The full Kwun Tong development scheme involves the formation of some 514 acres of useful land at an over-all estimated cost of around HK\$100,000,000, i.e., approximately HK\$4.5 per square foot, gross, but in view of rising construction costs, these estimates may have to be amended. This area subdivides into 275 acres of industrial land and 239 acres of housing and commercial land, all areas being gross. The return from land sales is expected to exceed cost after making full allowance for areas required for public use, areas used for institutional purposes and areas sold at nominal figures by private treaty.

Physical planning and layout:

The general arrangements of the various zones comprising the Kwun Tong Township are shown on Map 2. A major trunk road 120 feet in width provides access from the urban area; to the seaward of this road is the industrial zone on reclaimed land while to the north on the formed hill areas stand the housing zones and commercial centre.

The layout of the industrial area makes maximum use of the available land, the breakdown of the 130 acres at present formed is:

	<u>Acres</u>	<u>Percentage</u>
Factory sites	84	65
Government and community uses	7	5.5
Open space	3	2.5
Roads, lanes	35	27
	<u>129</u>	<u>100.0</u>

The land utilization in the central parts of the town including three housing zones, resettlement area and industrial zone is:

	<u>Acres</u>	<u>Percentage</u>
Industry	84	28
Housing	78	27

Commercial	4	1
Government and community uses	19	7
Open space	27	9
Roads, lanes	<u>84</u>	<u>28</u>
	296	100

Kwun Tong has not been designed as a self-contained town but to provide excess industrial land to balance shortage in existing built-up areas nearby. Maximum use is to be made of the water frontage, public piers, and warehouses being sited along the seawall.

Industrial and social development

At the end of August 1961, the state of industrial development in Kwun Tong was:

Factories operating	67
Buildings completed	5
Construction in progress	11
Sites sold but no work started	<u>32</u>
	<u>115</u>

Factories already operating are producing cotton yarn and piecegoods, cosmetics, pharmaceutical products, furniture, garments, electrical equipment, paint and lacquer, plasticware, paper products, printed matter, metal products, precision instruments and machine parts, and racketware.

The number of persons employed in industrial undertakings is 15,250 which is roughly 6 per cent of the total working force in registered and recorded factories and industrial undertakings in the Colony; the population of the town includes some 40,000 persons in the Kwun Tong resettlement estate (there are also 20,000 in a neighbouring estate) 7,000 in a government-aided low-cost housing scheme and an estimated 7,000 in buildings erected under government-sponsored workers housing scheme. Further government housing is in various stages of construction and planning.

T A B L E 6

AWAN TONG Township

Expenditures and Revenue, 1954 to 1963

Y-R	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63
1. Expenditure (millions of HK\$)	Annual	0.1	1.4	1.9	3.3	3.7	7.1	6.3	18.0
	Total	0.1	1.5	3.4	6.7	10.4	17.5	25.8	43.9
2. Gross area of useful land farmed (acres)	Annual	7	18	37	30	45	40	66	40
	Total	7	25	62	92	117	157	223	262
3. Net area of land sold (acres)	Annual		13.6	30.1	2.7	0.7	17.2	9	9
	Total		13.6	43.7	46.4	47.1	64.3	73.1	73.1
4. Value of profit farmland sold (millions of HK\$)	Annual		5.5	17.0	1.6	0.2	34.3	1.1	1.1
	Total		5.5	22.5	24.1	24.3	56.6	25.7	26.2
5. Net cash return to Government (millions of HK\$)	Annual		0.5	4.8	4.7	3.8	14.4	1.4	1.4
	Total		0.5	3.3	6.0	9.8	44.2	33.1	46.0

Note: This table was compiled in August 1960 and the figures for the individual years (April to March) 1962/63 onwards are estimates.

T A B L E 7

Number of Permanent Factory Buildings Completed
in Various Districts

Y E A R	Number of permanent factory buildings completed			
	Hong Kong Island	Kowloon	New Kowloon (excluding Kwun Tong)	Kwun Tong
1957	4	20	3	0
1958	7	16	9	8
1959	9	5	10	21
1960	4	5	7	25
1961 (to Aug. 31)	10	6	13	19

Note Above figures exclude factory buildings erected temporarily on Crown land and factories erected in the New Territories (other than New Kowloon). Some buildings include a number of individual factories.

It will be noted that so far private enterprise has contributed very little to the housing of workers in the area. It is expected, however, that a considerable part of the ultimate population of some 250,000 to 300,000 persons will be accommodated in private enterprise buildings; sites for this purpose are now being sold weekly.

Social amenities have not been overlooked although they have naturally taken second place to the urgent needs of industry. Electric power has been provided to meet all requirements; a telephone service has been established; water is available from government mains to the extent of 2 million gallons a day; roads have been surfaced and drains laid; land is reserved for primary treatment of sewage. A fire station, clinic and post office are under construction; shops exist and banks, more shops, markets and cinemas are in the planning stage.

Steps are also in hand to introduce a cross harbour ferry service from Hong Kong Island for passengers, and provision is made in the planning for a vehicular ferry terminal should it be found desirable in the future.

Further industrial estates

It is not possible to cover in similar detail other industrial estates now planned or under development. Suffice it to say that fairly firm plans exist for the provision of about 500 acres of industrial land within the next ten to twelve years in some 24 different estates. The pattern of development is expected to follow that which has taken place at Kwun Tong in the last five years. Work on the Kwai Chung scheme has begun.

It is the policy of the Government of Sarawak to encourage industrial development. This policy is being implemented by two series of measures. On the one hand, a Pioneer Industries (Encouragement) Ordinance has been adopted which provides tax and customs reliefs for pioneer manufacturers. On the other hand, the Government has taken the initiative in the development of small factory sites for industry, both directly and through the Sarawak Development Finance Corporation Limited, a Government-sponsored body. Borneo Development Corporation Limited and Borneo Housing Development Limited - both subsidiaries of the Colonial Development Corporation - also play their part in encouraging industrial growth.

Zones for factories and small industrial undertakings have been established in preliminary zoning plans for the major towns of Sarawak, and new industrial development in these towns will be permitted by the local authority in the appropriate zone. These preliminary zones will be incorporated when development plans are drawn up under the Town and Country Planning Ordinance.

In June 1959, a scheme for industrial development at Padungen, Kuching, was approved by the Government. This scheme is designed to assist persons who wish to build small industrial factories. Crown land is to be alienated at an economic rent and premium for the establishment of twenty-nine small factories. The construction and management of this scheme are under the control of the Borneo Development Corporation Limited. The Government has advanced funds for the construction of internal roads.

The purchasers of lots are required to deposit with Borneo Development Corporation Limited not less than 20 per cent of the total estimated cost of the developed land and buildings; the balance is to be advanced by Borneo Development Corporation Limited and Sarawak Development Finance Corporation Limited. The purchasers will make monthly repayment of capital and interest at 8 per cent per annum over a period of not more than ten years and will give a first charge over the land and buildings to Sarawak Development Finance Corporation Limited and the Borneo Development Corporation Limited. Ten factory lots have been taken up on which six small factories are planned, making furniture, broom handles, chain links, fencing and printing. Measures are being taken to accelerate the occupation of the sites.

In 1962, 45 acres of land have been acquired by the Government at Sibuan, a town about 150 air miles north east of Kuching, for subdivision into industrial lots. It is envisaged that the sites will be used for the resettlement of existing small industries rather than for the establishment of new ones, at least for the present.

Similar development of land is planned at Miri, a town about 320 air miles north east of Kuching, when suitable land is released by the Sarawak Shell Oilfields Limited. It would seem that the Miri-Lutong-Kuala Baram area offers

the greatest possibility of industrial development in Sarawak. The decline of the Liri oilfield will release labour from the oil industry. Natural gas in the area may eventually be used as a source of cheap power for industry.

Generally, it is the intention to encourage the establishment of industry in conjunction with normal urban development. Sarawak is as yet hardly concerned with a national industrialization programme involving policies of industrial location, industrialization of rural areas, and major industrial development.

SINGAPORE

Singapore, an island of 220 square miles with a population of 1,700,000 growing at the rate of about 4 per cent per annum, has been traditionally an outward looking trading centre. The well-being of Singapore, however, cannot rest on the development of its entrepot trade which is unlikely to increase appreciably in the future. The Government of Singapore has, therefore, embarked on a policy of active sponsorship of industry to provide employment for its young population and to place the economy of the State on a sound basis.

Manufacturing industry now accounts for about 18 per cent of the gross national product. In the past there was no attempt to guide the development of industry and to demarcate specific areas for factories to be established. Of late a few industrial estates, none of them exceeding 80 acres in area, have been developed for light industries. For the Government's industrialization policy to succeed, and also to relieve much of the overcrowding and slum conditions in the built-up areas of the city of Singapore, the physical infrastructure for a massive effort at industrialization had to be provided. What was required was in fact a self-contained new town of about 15 square miles, not very far from the city, served by a deep water harbour with adequate provision of land for heavy, light and waterfront industries.

Jurong in the south-west of the island was chosen as the site of this new town. Before examining this project in detail, some information will be given on existing industrial estates in Singapore.

Existing industrial estates

Bukit Timah industrial estate

This project, undertaken in 1951, was sponsored by the Colonial Development Corporation, a United Kingdom public corporation, with the object of stimulating the growth of small-scale and medium-sized industries by providing prepared sites with common services and facilities such as roads, electricity, water, sewerage, banking, and so on. The estate is located within a zone where a shopping centre, a school and housing development were being planned by the Government and where two medium-sized industries were already in existence. Located eight miles from the core of the city, and outside the city limits, this estate has the advantages of lower property tax rates, cheaper cost of land and excellent road linkage via the main Singapore-Federation of Malaya trunk road.

The development of this project was undertaken in two phases. In the first phase, 36 acres of land were subdivided into 9 lots ranging in size from one acre to 7 acres which could be further subdivided or amalgamated to suit the needs of industrialists. This was successfully completed with the establishment of seven factories manufacturing rope, shoe polish, pharmaceutical products,

cotton yarn and fertilizers, an edible oil refinery and a sawmill. In the second phase, 10 lots of one to 2 acres were developed. A rubber-plant factory is already in production and the development of a neon light and a chemical factory is proposed.

The sites at the estate can be purchased outright for private development. If the purchaser requires financial assistance for the purchase of land and construction of factory, subject to approval of plans and commercial soundness of projects, is available from the Corporation. Generally, the maximum loan granted varies from 80 per cent where the cost of land and building does not exceed M\$60,000, to 60 per cent where the cost rises above M\$100,000. ^{1/} The more specialized the factory, the lower the percentage of loan granted. Loans plus interest at the Corporation's current rate, calculated on the reducing balance basis, are repayable over a period of 10 years.

Over-all planning control is exercised by the state planning authorities but the sponsoring Corporation reserves the right to approve all architectural plans and specifications and to approve the placement of factories on the lots. No basic stipulation is considered essential on the ratio of plant size to size of lot. The design of the factories is left to the industrialists themselves but, in cases where financial assistance is required, the advice of the Corporation's consulting engineers and architects is made available.

Alexandra industrial estate

A second industrial estate of 56 acres, aimed at encouraging the establishment of industries smaller than those at the Bukit Timah industrial estate, and within easy reach of the city labour supply and market, was established in the Alexandra suburb by Singapore Improvement Trust and its successor, the Housing and Development Board, acting as agent for the State Government. The site selected lies within two miles of the city centre, in an area adjacent to a State housing project and community services.

In the first section of the estate, 58 sites ranging between 15,000 and 30,000 square feet in area and covering 50 acres, provided with supporting services and facilities, are made available to manufacturing industries for individual development according to the needs of the industrialists. As in the case of the Bukit Timah industrial estate, financial assistance up to a certain percentage of the cost of land and building is made available by Singapore Factory Development Limited, a subsidiary of the Colonial Development Corporation. Subject to planning approval, the lots may be amalgamated to suit the requirements of each industrialist. Twenty-seven factories have been established by private investors in this section.

In the second section of this estate, 26 small lots of 6,000 to 12,000 square feet were provided for the construction of standard factory units. The buildings are simple in design, consisting of cement-block walls, steel roof trusses and asbestos sheet roofing. Each unit, with an average floor space of 3,500 square feet, was built and sold on deferred payment over a period of 10 years. These buildings were readily taken by local manufacturers and the success of this experiment led to the establishment of the more ambitious Redhill industrial estate.

^{1/} One US dollar = 3.05 Malayan dollars.

Redhill industrial estate

Redhill industrial estate is another government-sponsored project, covering an area of 66 acres, for small and medium industries. The site is located within two miles of the city commercial centre, again adjacent to a government housing scheme and community services. The Government made the land available, cleared it of squatters and is financing the cost of the site preparation and installation of public utilities and services. A first phase providing for the development of 25 acres was under development in 1961; the second phase will be undertaken in 1962.

As in the Alexandra industrial estate, one section is reserved for standard factory units of simple design and another for the construction of factories to individual specifications. Twelve standard factory units, each containing a floor area of 3,750 square feet, have been constructed and work on a further 18 is about to commence. These factories are sold on deferred payment over 15 years. The lot areas for standard units range in size from 7,000 to 13,000 square feet, while the lots for private development are between 15,000 and 110,000 square feet.

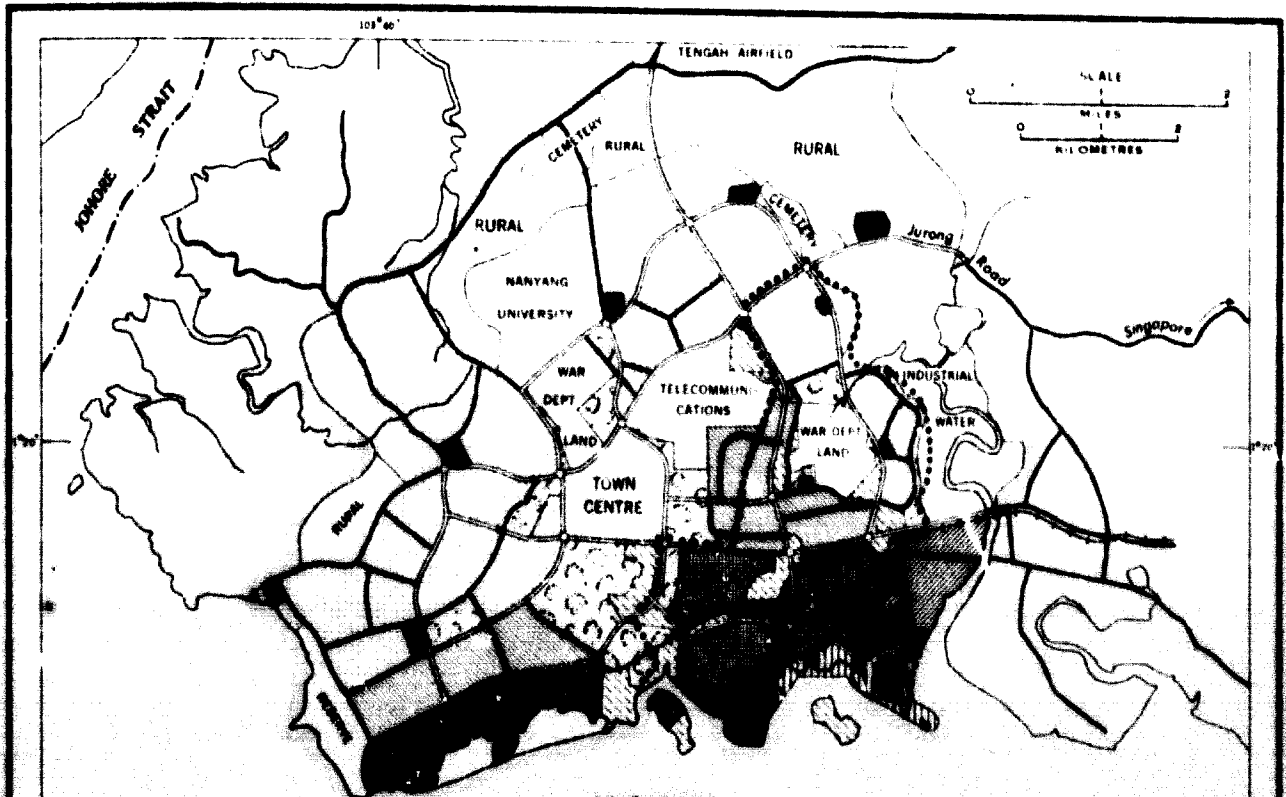
Other estates for small industries

Two other small industrial estates are being developed by the State Government through the agency of the Housing and Development Board. At the forty-acre Tanglin Halt industrial estate, the site has been planned and levelled. Common public utilities and railway facilities are being provided. The site is subdivided into 62 lots, each averaging 20,000 square feet in area, which may be amalgamated as required by industrialists. The object is to attract small industrial concerns into this suburb where labour is readily available in view of the intensive housing schemes carried out by the Government in the locality, and where the cost of land, at \$1.20 per square foot, is relatively inexpensive.

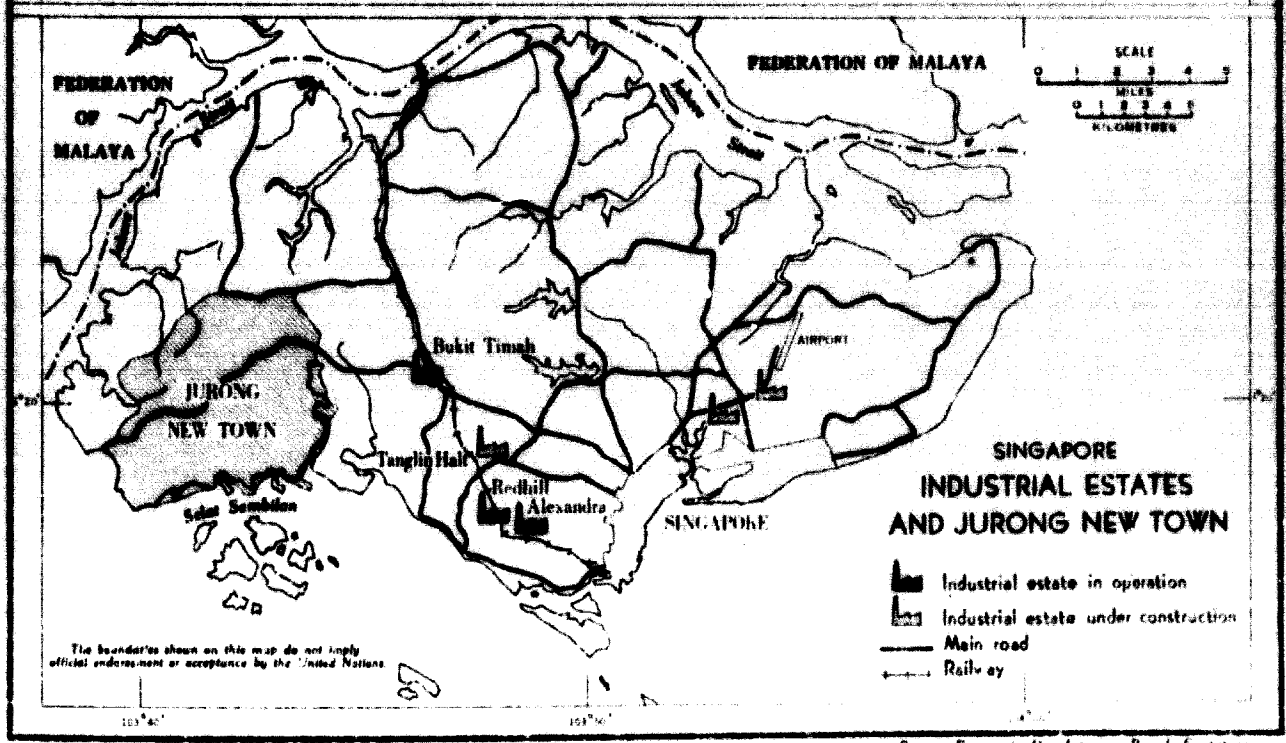
In addition, two sites of three and half acres each have been developed for the improvement of cottage industries along the road between the city and Singapore airport. Nineteen standard factory units - single, double and terrace - will be constructed and sold on deferred terms over 15 years. Each unit comprises a workshop ground floor area of 2,800 square feet (40 feet frontage x 70 feet depth) and living accommodation on the first floor. The areas of these lots vary from 4,400 to 9,600 square feet. For private factory construction, 15 prepared sites varying from 7,500 to 21,000 square feet have been provided to suit the particular requirements of small entrepreneurs.

The Jurong New Town and industrial estate

In 1961, a United Nations Industrial Survey Team made a detailed survey and report on an industrialization policy for the State of Singapore, which included, among other things, recommendations for the establishment of industrial sites and estates. The most important project is the development of the Jurong New Town, which has been entrusted to the Economic Development Board. Work on the project started in 1961, and it is expected that the full



- SINGAPORE
PRELIMINARY PLAN OF JURONG NEW TOWN**
- | | |
|--|--|
| Shopping centres and service industry | Reserved for special use |
| Residential area | Open space |
| Light industry | Main road |
| Heavy, semi-heavy and general industry | Secondary road |
| Special industry | Railway |
| Wharf and lighter area | New Town boundary |
| | Proposed extent of first phase development (1962-1967) |



development of the area, as now planned, will take 10 to 20 years. The first factories at Jurong will, however, be in a position to start functioning by late 1962. It is expected that Jurong will eventually accommodate a few hundred thousand people, of whom about 80,000 will be able to find employment in industries therein.

Why Jurong was selected

The selection of the Jurong site was made after many years of consideration and completion of topographic survey and examination of aerial photographs. It is the more favoured of two sites chosen for development as industrial towns, having a deep water approach to a natural harbour capable of providing 6,000 feet wharfage for large ocean-going vessels of up to 38 feet draught. Although most of the coastal and estuarine fringe is tidal swamp, the cutting of the adjacent low hills provides suitable spoil for reclamation. The area as a whole is now partially in use for scattered agriculture. Most families in occupation can be gradually absorbed into industry and rehoused nearby. The costs of land acquisition have not been high, and much of the land was already state land. Tidal and wave movements are such that marine structures will not be uneconomic.

Existing roads permit rapid initial development. Some public utilities are available now; these can be expanded and others provided quickly. Singapore main sewerage works lie a few miles eastward. Industrial water can be provided in quantities of more than 50 million gallons per day. The new port on the south side of the island, lies about 7 miles from the Singapore harbour, and once the new access road is completed, about 13 miles by road from the present city.

Layout of the Jurong town and estate

The broad zoning of the whole town of 10,000 acres is approximately as follows:

	<u>Percentage</u>
Residential (including services)	38
Light industry	8
Heavy industry	22
Town centre	3
Special use reserves	3
Unclassified reserves	4
Open spaces (generally hilly)	8
Industrial reserves	3
Existing Nanyang University	3
Existing telecommunications	3
Existing War Department lands	5
Total	100

A regional road pattern linking all the major zones has been prepared and approved by the Government Master Plan Committee. A trial route for railway access from the existing tracks to the Jurong New Town has been selected. From a detailed hydrographic survey and boring tests, the line of the main wharves has been chosen. The regional drainage pattern has been worked out. The whole pattern of communications, drainage, services, and zoning has been correlated on a single plan covering the whole New Town.

For the next five years developmental work will be confined to the eastern half of the New Town. Part of this half has become known as the Jurong industrial estate or "phase one" of the Jurong project. The estate's boundaries cannot be exactly defined, but the following areas are included:

	<u>Acres</u>
Residential area	386
Light industries	140
Light industry centre	21
Special utilities	8
Core industries	350
Heavy industries	280
Semi-heavy, general and special industries	197
Wharf and dock estate, lighter area and centre .	98
Boat and ship building	83
Storage and storage/processing	72
Railway lands	40
Marine services	30
Open spaces	135
Reservoirs (on hills)	58
Total	<u>1,898</u>

The figures quoted are not fixed. Initial development will be confined to the eastern half of the New Town, radiating from the "phase one" area of about 1,900 acres up to the limits imposed by the marginal open spaces which form buffers between the industrial area and the residential area and town centre. Thus the residential area can expand from 386 acres to about 1,650 acres. The light industrial area can grow from its phase one size of 140 acres to 400 acres. Marginal open spaces total some 240 acres. An industrial reserve towards the east, now swamp, contains some 190 acres. Such an area is particularly suitable for gradual reclamation by selected waste disposal and for sawmills.

Extensive earthworks, roadworks and drainage projects are now in progress in the Jurong industrial estate. With the completion of essential roads, wharves, drains and factory sites and on provision of adequate services of water, electricity, sewerage, telephone and gas, the area will be physically available for industrial development. At this stage the supply of social services and amenities will be intensified. It is considered, however, that an industrial estate is primarily an economic venture on a large scale which must pay for itself directly or indirectly.

Financial aspects

The price of land for lease to industry will be computed on an annual basis; it will be calculated approximately as the sum of the interest on the unimproved value of the land plus the interest on the capital outlay of all items that concern industry. Such a calculation gives an average lease price per unit of area per annum. This average price does not apply to any particular parcel, since each parcel will be valued separately bearing in mind the following factors: (i) proximity to wharves, railway and main roads; (ii) nature of foundations and topography; and (iii) location relative to zones. The size and shape of lots will also affect the price. Land valuation maps for Jurong are in course of preparation. Detailed figures are not yet available, but broadly, the developed land value is expected to average about 40 cents per square foot, and the lease price 4 cents per square foot per annum.

The costs of maintenance, overheads, and the capital repayment can be met from a variety of charges. Amongst these will be: (i) a variable premium payment on leases of 5, 10 and up to 100 years; (ii) service charges; (iii) harbour and port dues; and (iv) transport charges.

It is convenient, but not always possible, to combine many of these charges. Prices for services have been estimated as follows:

Electricity	5 cents per kilowatt-hour
Water: Domestic	60 cents per 1,000 gallons
Water: Industrial	20 cents per 1,000 gallons
Transportation - per ton/mile road/rail	not available
per passenger/mile	5 cents

The Board is prepared to arrange loans of up to 80 per cent of value on approved buildings, for periods of up to 15 years, interest at 7 per cent with an annual repayment of principal plus interest.

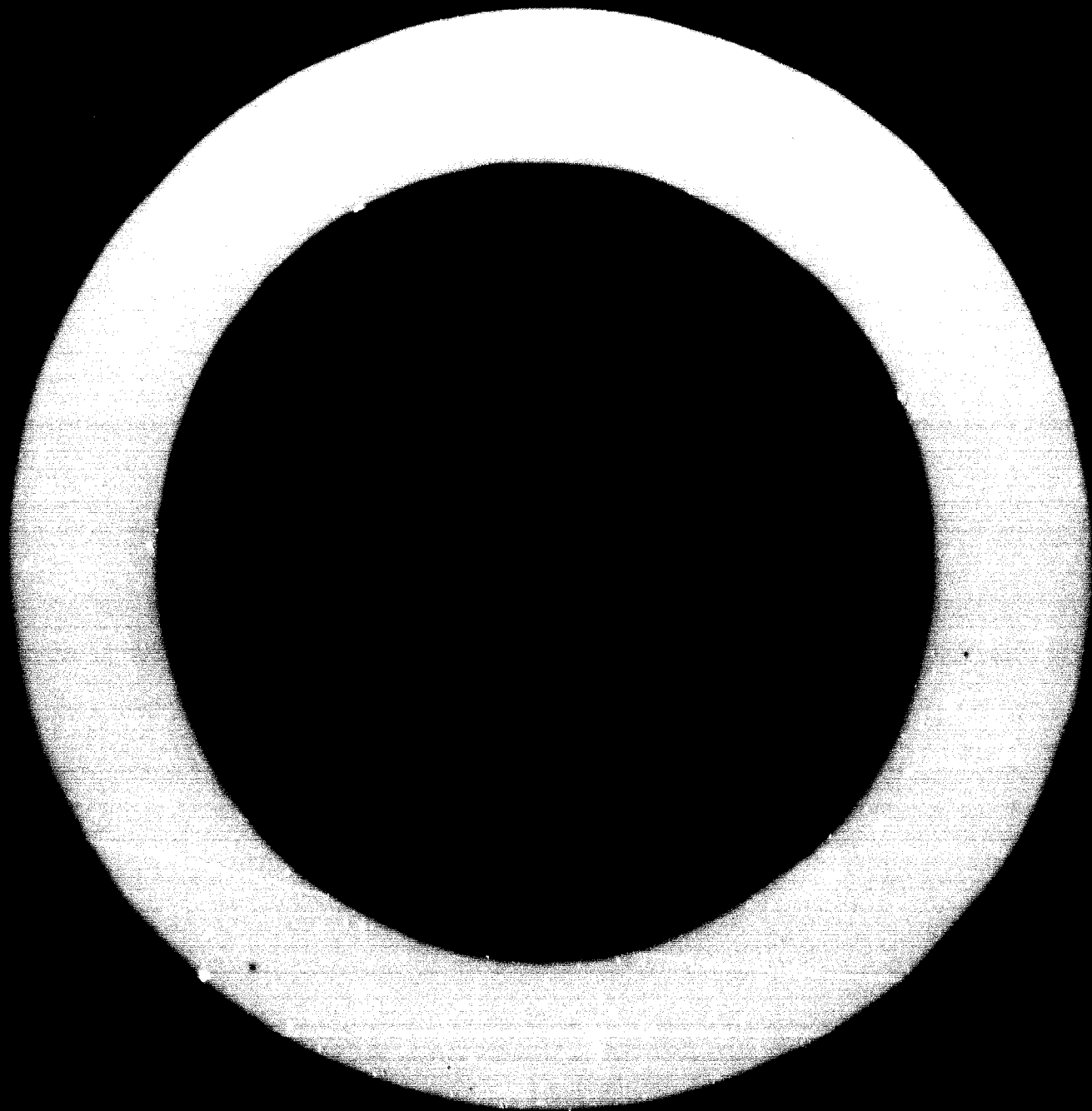
Industrial projects at Jurong

In the first five years, the following industries are expected to establish themselves in the various zones in the Jurong area.

In the light industry area (lots from one quarter of an acre up to 10 acres): industries concerned with bakery products, food confectionery and beverages, pharmaceuticals, cigarettes, stationery, publishing and printing, packing and filling, electrical and radio products, leather products, textiles, furniture, plastics, paints, preservatives, inks, etc. plus sundry service industries.

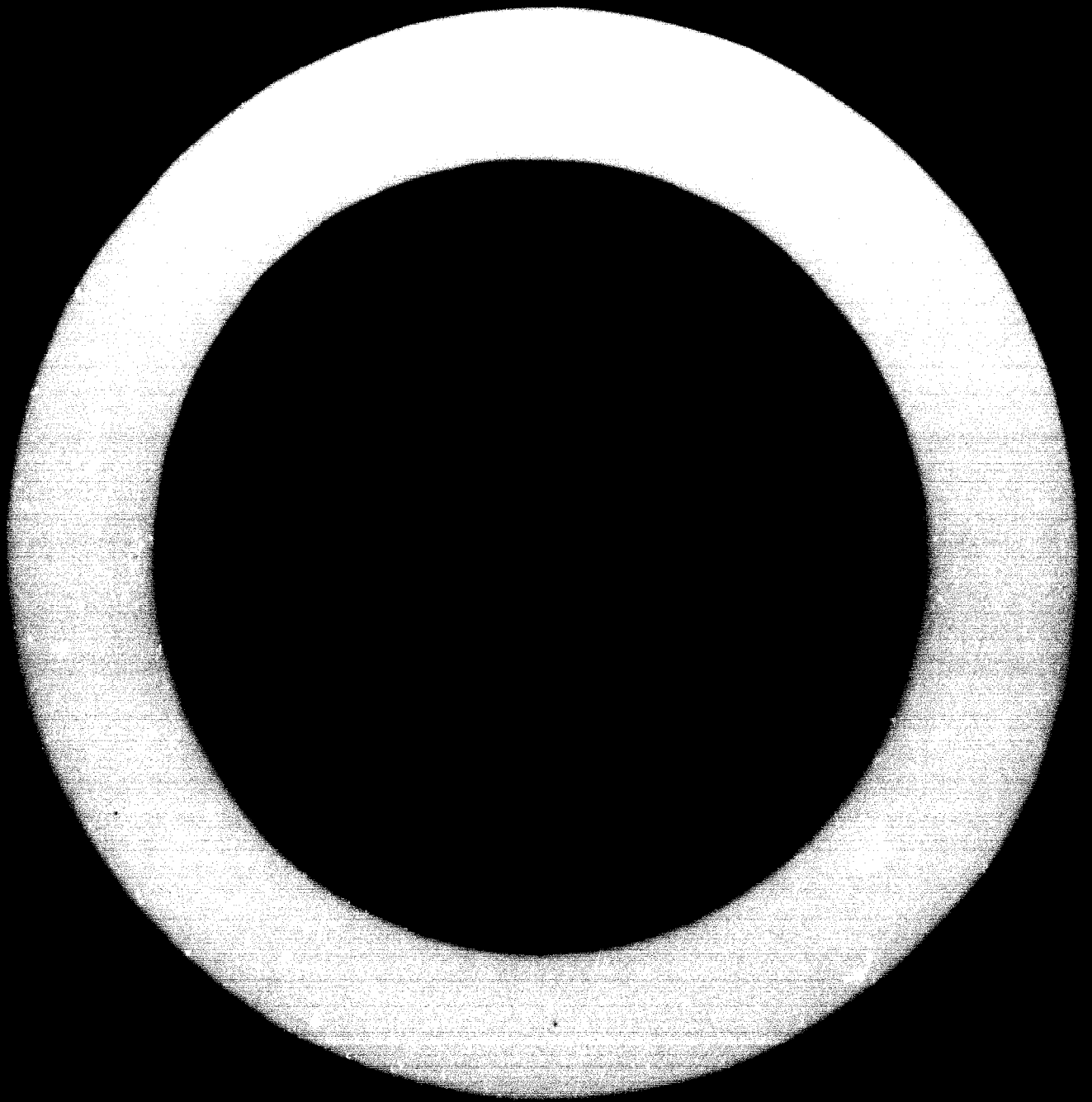
In the heavy, general and special zones: industries concerned with iron and steel production, ship-breaking, shipbuilding and repair, boat building, timber processing, rubber and latex processing, mineral and vegetable oil processing, grain milling, metal part manufacture, wire-drawing, coir fabrics, paints, paper milling, chemical acids and gases, fuels, phosphates and cement, glass, tins and cartons, distilling insecticides, fungicides and fertilizers, fruit processing, animal feeds, fish processing and packing, machine assembly.

Industrialists will be attracted to Jurong primarily for economic reasons. Singapore offers at Jurong adequate supplies of skilled, hardworking and adaptable labour; ample supply of essential utilities and services; technical aids; a good local market; excellent port facilities; ready access to raw materials; well-developed communications and commercial facilities; a healthy climate; and adequate industrial sites on developed land.



Part III

INDUSTRIAL ESTATES IN CERTAIN
DEVELOPED COUNTRIES OUTSIDE THE REGION



THE PORT AND INDUSTRIAL ZONE OF MARGHERA

by Giovanni Giavi

Director, Council of the Industrial
Zone of Porto Marghera

1. BACKGROUND

The Po Valley is the most favoured region for human settlement in all Italy. It is not only the largest flatland area of the country, but the largest in all southern Europe. Geologically, it is the result of the immense levelling work performed by the Po and its numerous tributaries on the Alpino and Apennine mountain systems that surround it. The terrain is alluvial, and extensive irrigation is possible. These factors have long provided the conditions for vigorous agricultural development and population growth. This area, a seventh of Italy, today has about 18,000,000 inhabitants, over a third of the population of the country.

Geographically, this plain extends from West to East, slowly sloping downward along the forty-fifth parallel, with a maximum length of 400 kilometres and a width varying around 100 kilometres until, following the course of its orographic flanks, it rapidly fans out and reaches the Adriatic Sea on a front of about 300 kilometres.

The advantages of so long a coast line, however, are largely offset by the peculiar configuration of the shore. Here the alluvial nature of the terrain, slowly pressed towards the sea by gently sloping rivers, has been responsible for a coast where relief has almost been obliterated, dominated by morphological instability and marked by extensive tracts of marsh or lagoon, subject to unceasing topographic remodelling. These factors have sharply restricted the number of coastal settlements, limited their size, and even out short their existence. The recession of the water has put the ancient port city of Adria, which gave its name in classical times to the Adriatic Sea, far inland today, twenty kilometres from the sea. Ravenna, in the early Middle Ages the most important commercial and military port of the Adriatic, met a similar fate, and is now ten kilometres from the coast. Little rural hamlets, here and there a solitary cathedral, amid fields made fertile by recent reclamation, recall the sites of bustling maritime cities like Braccia or Aquileia. This is why, in spite of the considerable length of the coast, the only maritime ports of call able to meet the demands of modern traffic, that is, able to handle ships of large

displacement, are Venice and Marghera, located respectively at the centre and the edge of the lagoon of Venice. Here the destructive work of nature was countered by the timely and vigorous work of man. The progressive silting of the lagoon was prevented by diversion, beyond its northern and southern boundaries, of the numerous rivers flowing into it: a large branch of the Po, and the Brenta, Sile and Piave rivers. The narrow coastal strip between lagoon and sea was reinforced and supplemented by strong dikes, protecting it from erosion by the currents and the tides. These great operations long made it possible for Venice to play a dominant role in the maritime trade between Europe and the Orient, and enable it today to participate actively, through the construction of the new port of Marghera, in the process of industrialization of the Po Valley.

It should be noted in this connexion that, when this process first began, not only the inhospitable coast of the Po delta but the urban-port complex of Venice itself seemed to be excluded for all time from the natural area of development of the Po Valley. Venice, indeed, has preserved through the centuries the imprint of its origin in the agglomeration, largely built on pilings, that sprang up, during the great barbarian invasions, on the tiny archipelago that occupied the centre of the lagoon of that far day. And the successive phases of its architectural development, so rich in world-famed monumental structures, inevitably reflected the history of a people compelled to wage a hand-to-hand struggle with the waters for the sites of their temples and their very homes. Even today, Venice still relies for its internal communications and transportation on the exceedingly dense network of canals that criss-cross it in every direction. Even today, the wheeled vehicle is unknown there. It therefore appeared utterly improbable that modern industries, avid for ample room and ready communications, would ever be able to break into the circle of this peculiar urbanistic structure without compromising its unmistakable features and the very integrity of its immense artistic heritage.

But these were not the only difficulties in the way of the incorporation of Venice in the industrial revolution that was subverting the traditional foundations of the economy of the Po Valley. It was also necessary to meet the competition, or rather the great attractive force, of the so-called "industrial triangle" of Italy, that vast concentration of industries that had developed in the western Po basin, in the area having the cities of Milan, Turin and Genoa as its approximate vertices. The driving force emanating from Milan, the greatest financial centre of all Italy, and from Genoa, the most important port of the Mediterranean Sea, was here complemented by a set of conditions particularly favourable to the location of industry. It will suffice to mention the dense network of highway and railway communications that efficiently link it to the main Alpine passes, and the existence,

in the adjacent mountain basins, of hydro-electric power plants with over two-thirds the entire installed capacity of Italy.

In the short space of only a few decades, the "industrial triangle" had confirmed its position of primacy, with prospects of unlimited development. By the outbreak of the first World War Milan had become the principal centre of the engineering industry. Turin occupied a similar position in automobile manufacturing, and Genoa in shipbuilding and metallurgy. Major centres of the textile industry had located along the strip of the Alpine foothills, and calculations of the time indicated that over 70 per cent of the industrial potential of the whole country was concentrated inside the exiguous perimeter of the "triangle".

Obviously, under these conditions, Venice could compete only if it acquired new sites for industrial construction. It was also necessary to create particularly attractive conditions, to counteract the tendency of entrepreneurs and capital - both of which Venice lacked - to concentrate in the western Po basin and on the Tyrrhenian coast.

It was above all on this need of attractive conditions that Count Giuseppe Volpi, that thinker of genius and great founder of the port and industrial zone of Marghera, focused his attention.

A thorough and detailed analysis of the condition of Italian industrialization at that time, and of its prospects for future development, had led him to concentrate his thinking on the situation in certain fields, notably the metallurgical, chemical and petroleum industries, etc., which had to import huge amounts of raw materials by sea. For the most part, these materials are of the so-called "poor" type, that is, of low original cost, but relatively great weight or bulk, so that transportation charges exert a marked influence on their delivered cost. This explains the marked tendency of firms in these branches of industry to locate in the neighbourhood of a port, in order to diminish the amount of land transportation, substantially more expensive than sea carriage.

In their progress toward the sea, however, these firms encountered serious obstacles. Sites within the perimeter of the port zones were unavailable, and behind the ports were immense urban agglomerations, pressing against the rear of the factories, and halting them at the extreme limits of the urban periphery.

Count Volpi realized the powerful attraction for industries of this type that would be exerted by the construction of a port designed exclusively for their service, and laid out in accordance with their own specific needs,

that is, a port occupied primarily not by warehouses but by industrial plants, and so arranged that each plant should have its own quay space corresponding to the industrial area occupied by it. "Bring the ships to the factory gates, just as the railroads bring their goods wagons". In these words he summarized the peculiar features of this project, and its absolute novelty, at least for Italy.

We shall now briefly illustrate the phases of its realization and the results attained.

2. THE CONSTRUCTION OF PORTO MARGHERA

We have already mentioned the special situation of Venice, where the acquisition of new building sites is the result of a perennial contest with the water of the sea. The same situation also obtained at Marghera, located at the centre of a marshy tract that marked the boundary between the lagoon and the mainland. This plan to reclaim the marshes and to install port facilities and factories did not involve merely a problem of reclamation and canal-building. It was also necessary to provide for the connexion of the port with the main canals of the lagoon, which linked the city of Venice with the sea, and to create, out of nothing, the infrastructures and services essential to the life of a great industrial zone.

For the preliminary examination of all these questions, a "Study group for the electrometallurgical and shipbuilding undertakings to be developed in the neighbourhood of the Port of Marghera" (Sindacato di studio per le imprese elettrometallurgiche e navali da svilupparsi intorno al porto di Marghera) was established in February 1917, with Count Volpi as chairman. His attention was fixed primarily on the metallurgical industries, large importers of raw materials by sea, and on the shipbuilding industries, naturally located by the sea. At that time the Italian chemical and oil-refining industries were newly established, and their contribution to the total industrial production of the country was insignificant.

On the other hand, the mention of the "electrometallurgical" industries was of profound significance, emphasizing the great reserves of electric power that existed, and were already under partial exploitation, in the basins of the Venetian Alps.

The group was also to study a campaign to interest and convince the industrial circles of northern Italy, and to deal with the public authorities. Count Volpi at once took care to establish alongside of this study group, a technical and financial agency capable of drawing the final plans of the works and, eventually, of carrying them out. Thus the "Company for the Industrial Port of Venice" (Società Porto Industriale di Venezia), with

a capital of 6 million lire (equivalent in value to 70 million lire of today)^{1/} to be raised by public subscription, was organized. The number and the standing of the subscribers demonstrated the great public response to this initiative.

The phase of planning, governed by the directives suggested by the Study Group and by a master plan drawn by an outstanding specialist, Engineer Enrico Coen Cagli, drew rapidly to a close. The Company then offered, under a State concession, subject to the supervision of public authorities, to undertake the construction of the port and of the industrial zone.

This offer permitted a single body, capable of making rapid decisions and adopting unencumbered procedures, to handle all details of the execution of a complex of works demanding unified vision and close synchronization, which would otherwise have come under the jurisdiction of various public agencies on the national and communal provincial levels, whose deliberations would have been subject to separate and often tedious procedures, and would have been trammled by the conflicting demands of the respective budgets.

Italy, and especially Venetia, a frontier region, was bitterly involved in the First World War. The offer of the Industrial Port Company, which was an act of faith in victory, and was designed to create the conditions for the rapid economic recovery of Venice and its hinterland, was soon accepted. On 23 July 1917, an "Agreement relating to the concession for the construction of the new port of Venice in the Marghera area" was signed at Rome between the Italian State, the City of Venice, and the Industrial Port Company. This agreement entrusted the Industrial Port Company with the execution of a first and important group of works included in the above master plan, which, in the meantime, had been approved by the technical agencies of the Italian State.

The following provisions were made for financing these works:

- (1) The State undertook to reimburse the Industrial Port Company in twenty annual payments for the construction costs of the port works, up to a specified lump-sum maximum fixed at 18 million lire (equivalent to 2,500 million lire of today), the Company to bear any costs in excess of this amount;

^{1/} The current rate of exchange is of about 620 lire to the dollar.

- (2) The City undertook to build, at its own expense, the public roads, sewers, water mains and other amenities within the zone intended for the industries. It also undertook to construct an urban residential district behind the industrial zone;
- (3) The Industrial Port Company assumed the obligation to reclaim, lay out, and develop for industrial construction, the areas not required by harbour works and public services, compensating itself for the cost of such work from the proceeds from the sale of the developed sites to the individual industrial concerns making application for them.

In this connexion, it was provided that these sites should be assigned to individual industrial concerns after having been subdivided into classes, according to the location of the individual plots, the access requirements and the types of industry to be located there, and that the sales prices should be so calculated that the total proceeds from land sales should not exceed the total expense sustained by the Industrial Port Company for acquisition, layout and development of the respective sites. The only right reserved to the Company was to receive interest at the rate of 5 per cent on the amounts advanced by it, and to reimbursement of its administrative expenses.

Subsequently, by decree of 26 July 1917, all the land within the perimeter of the port, of the industrial zone, and of the adjacent urban district, was declared subject to expropriation for public benefit. The Company was required to perform the necessary operations for the land needed for the construction of the port and the industrial zone, while the City was required to perform the same operations for the land on which the urban district was to be erected.

Subsequent agreements, relating to the execution of works supplemental to those provided by the Agreement of 23 July 1917, left this system of rights, duties and contributions unchanged.

It is estimated that the State and the City together contributed the equivalent of about 14,000 million lire of today to the construction of the harbour and industrial zone. However, it should be noted that their participation was confined solely to the cost of excavating and laying out the canals and constructing roads and other amenities. The development costs for the industrial building sites were borne by the Industrial Port Company, which reimbursed itself from the proceeds of land sales to the individual industrial firms. Moreover, the Italian State had no expense at all for the port facilities. All the equipment necessary for handling ships, and for the harbour operations - wharves and moorings, cranes, unloading bridges,

belt conveyors, pipelines for liquid cargo, etc., was installed by, and at the expense of, the individual industrial concerns. It is thus difficult to determine whether the contribution of the Italian State and the City of Venice to the construction of the port and industrial zone of Marghera was greater than that made by the industries. On the other hand, it is certain that the amounts spent for this purpose were very well employed. Indeed, the capital investment in the establishment of Marghera is calculated to have been at least the equivalent of 700,000 million lire of today.

The execution of the works provided by the Agreement of 23 July 1917 and the subsequent agreements proceeded very rapidly. Commenced in the summer of 1919, immediately after the end of the First World War, the main navigation channel linking the port of Marghera to the commercial port of Venice, and the first access canal, the Northern Industrial Canal, had been completed as early as 1922. Shortly thereafter a second main access canal was put into service, the Western Industrial Canal.

It should be noted that the routes of these canals had been chosen to encourage the rational utilization of the industrial areas, that is, their subdivision into numerous regular plots of varying length, all provided with direct access to the mainland, and with appropriate frontage on a canal. A public basin of great capacity was provided to meet the needs of the maritime traffic of the industries, usually of small size, which were not in direct contact with the waterfront.

A commercial maritime station, subsidiary to the basins of the commercial port of Venice, was also constructed at a location between the Northern and Western Industrial Canals, but entirely distinct from the organization of the industrial port itself.

Today, the access canals in the industrial port, that is, the two main canals just mentioned, together with several minor branches, have a total length of about 13 kilometres. They are usually 100 metres wide at the surface, and their depth is of 10 metres below the average sea level. They are provided with docks and basins to permit ship movement, and can handle steamers of 20,000 ton displacement.

Construction of these works required the excavation of over 12 million cubic metres of earth, which was used for fill, and the raising to a level of 2.50 metres above average sea level of 550 hectares of marshy ground for industrial building purposes.

Parallel to the construction of the canals, work was done on roads, railroad connexions, sewers, a drinking water main and an industrial water main. The total length of the road system today is 36 kilometres. The

railway connexions now have a total track length of 25 kilometres excluding internal facilities inside company grounds.

The industrial aqueduct, together with the private facilities, can now deliver two cubic metres of fresh water per second. The abundant aquiferous field underlying the zone has also permitted drilling of numerous artesian wells by the individual industrial plants.

Electric power is provided by the connexion of Marghera to the distribution net of the Adriatic Electric Company, which controls the output of an imposing group of hydroelectric and thermal stations. To ensure meeting the industrial zone demand even under the most unfavourable circumstances, the Adriatic Company has also built a 230,000 kilowatt thermal power station at the centre of the zone, with an annual generating capacity of over 1,000 million kilowatt hours.

Since the Second World War, Marghera has also been connected to the net of natural-gas pipelines of the Po Basin, which transports the output of methane gas extracted from deposits in Lombardy and Romagna. The Marghera distribution net has already reached a total length of 20 kilometres.

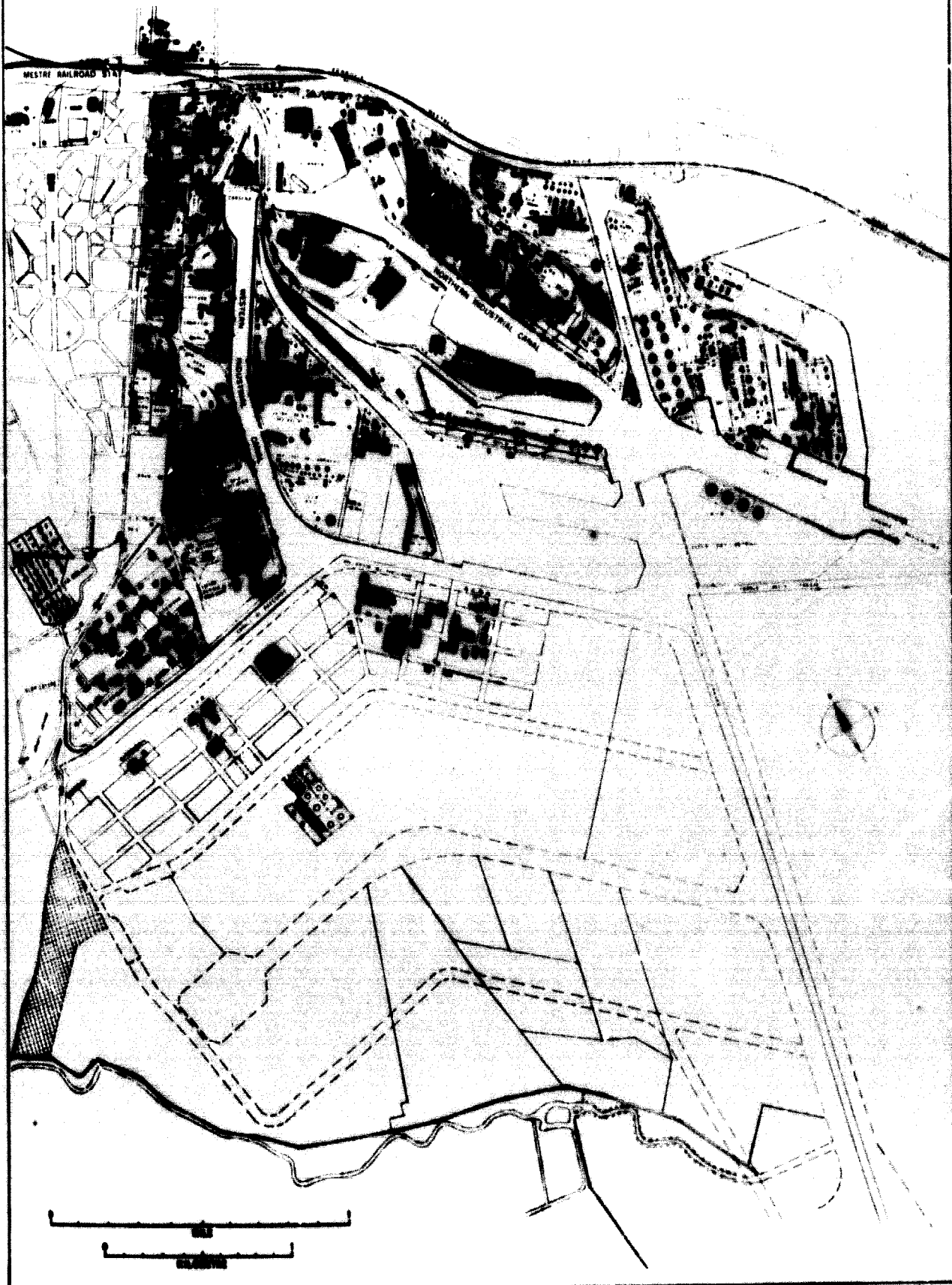
The area occupied by industrial concerns, excluding that taken up by water and the road and railroad system, is now 800 hectares. Part of this area (about 250 hectares) results from the irresistible expansion of the industrial concerns beyond the original limits of the industrial zone, toward's the marshes, which still extend beyond the Western Canal along the edge of the lagoon. Here the battle against water and mud for the conquest of new lobonaraum has, up to now, been conducted exclusively by private initiative, more specifically, by the concerns of the Edison group. We shall revert later to the provisions now being made for extensive collateral intervention of the Italian State and other public agencies.

3. DEVELOPMENT AND CHARACTERISTICS OF THE INDUSTRIAL SETTLEMENT

The influx of industrial concerns into the area of the new part of Marghera commenced even before the completion of its main structures, and subsequently proceeded at an increasing rate, almost without interruption, in spite of the phases of acute depression that affected Italian industry in the interval between the two wars.

The action by the "Study Group for the electrometallurgical and shipbuilding enterprises to be developed in the neighbourhood of the Port of Marghera" was very soon complemented by the spontaneous action of numerous other branches of industry, so that the spectrum of industries now in operation at Marghera is extremely diversified, and often characterized by those relations of interdependence in the development of various branches of production which are the most eloquent indication of the vitality and expansive power of an area of industrial concentration.

MARGHERA, VENICE
THE PORT AND INDUSTRIAL ZONE OF MARGHERA, VENICE



We shall now present certain information on the development and present position of the principal branches of industry, considered as a whole, and with special reference to the features and size of the principal establishments.

(a) Ferrous and non-ferrous metallurgy

There are now eighteen plants of varying size, occupying a total area of 1,500,000 square metres, employing over 8,000 persons. The vast range of its production, almost entirely absorbed by the domestic market, makes Marghera one of the major metallurgical centres of Italy. From the brief description of the characteristics of the largest plants, the phases of development of this important industrial branch will also be seen.

In 1923, the Ilva plant for steel production and fabrication, occupying an area of 500,000 square metres, went into operation. It now consists of an electric steel mill and an electric foundry, with an annual production of 40,000 metric tons of steel ingots and 5,000 metric tons of steel castings. It also has a rolling-mill department with an annual capacity of about 100,000 metric tons of rolled products and sectional steel, and a structural steel department, one of the largest in Italy, equipped to fabricate and erect 30,000 metric tons of metal structures a year. Part of the structural steel is exported.

In 1927, the S.A.V.A. plant for the electrolytic production of alumina and aluminium was constructed with Swiss capital. It occupies an area of 400,000 square metres. Its annual production today is 100,000 metric tons of alumina and 27,000 metric tons of aluminium. The excess alumina production is used in part to supply the affiliated establishment of Borgo Franco, in Piedmont, while the remainder is exported to Switzerland. This establishment is now being expanded.

Almost at the same time, the I.N.A. establishment, producing electrolytic alumina, ferro-alloys and aluminium salts, and occupying an area of 100,000 square metres, was put into operation. Its annual capacity is 150,000 metric tons of alumina, 20,000 metric tons of ferro-alloys, and 20,000 metric tons of aluminium sulfate. The excess alumina produced is used to supply the affiliated establishments at Mori and Bolzano, in the Trentino, producing aluminium. All these plants are now being expanded.

In 1929, the L.L.L. plant for the fabrication of aluminium and alloys of aluminium was established jointly by S.A.V.A. and I.N.A. This plant occupies an area of 100,000 square metres, and has an annual capacity of 20,000 metric tons of semi-fabricated products, sheets, pressings and wires

of aluminium, and the aluminium alloys anticordal, paraluman, aluman, avional, and ergal.

This group of establishments has made Marghera the major Italian complex of alumina production, and one of the most important European centres. The expansion now in progress will give it a similar position in the production of aluminium and its derivatives.

In 1935, the Montevecchio establishment, producing and rolling zinc and other metals, settled at Marghera on an area of 110,000 square metres. Its annual production today is over 30,000 metric tons of sulfuric acid, 20,000 metric tons of zinc, 9,000 metric tons of zamak alloys, 140 metric tons of cadmium, and minor quantities of cobalt, copper and germanium. This is one of the most important plants of this kind in Italy, and the only one that produces germanium (30 metric quintals a year), which is much used in electronic devices.

The Montecatini Coneri and the Edison San Marco plants belong in part to this branch of industry. The former is the only plant in Italy that recovers copper from pyrite ash. It extracts 6,000 metric tons of copper a year from this material, and uses it in the production of copper sulfate. The latter, in addition to fertilizers (see below, chemical industry), also produces substantial amounts of ferro-alloys and silicon.

The other smaller plants of this branch of industry do work complementary to that enumerated above.

(b) Engineering industry

The principal plants engaged in this branch of industry are the following:

(1) The Breda shipyards, which went into operation in 1923, on an area of 380,000 square metres, for shipbuilding and fabricating industrial structural steel. The shipyards have two large shipways, the first for the simultaneous building of two ships of up to 25,000 metric tons gross displacement, and the second for smaller ships. The structural steel department turns out an extremely broad range of products: highway bridges, refineries, reservoirs, cranes, industrial sheds, railway tracks, etc. A large part of the output of the shipyard and structural steel department is absorbed by the foreign market.

(2) The Sarteri plant, which went into operation in 1950 on an area of 60,000 square metres, producing a very broad assortment of apparatus and fabrications in steel, aluminium and other metals for large industrial

plants, or plans drawn by themselves or by the customer, such as thermal power plants, refineries, steel mills, coke plants, rolling mills, oil and gas pipelines, etc. It does a large volume of domestic and export business.

Besides these two large undertakings there are also twenty-four other firms operating in the perimeter of the industrial zone, which belong to the categories of medium and small industries, with diversified production lines connected with the activity and the production of the larger firms.

The number of workmen employed in this branch of industry varies from 3,000 to 5,000 depending on the fluctuations of production by the individual concerns, primarily in the two large establishments.

(c) Foodstuffs

This branch is mainly represented by three plants, each of them the most important in its field in the whole country. There are the Italian Rice Works, which began to operate in 1928 on an area of 23,000 square metres for processing rice and oil-seeds, and refining vegetable oils, with a daily output of 1,500 metric quintals of refined seed oils; the Chiari & Forti mill, which started operation in 1930 on an area of 35,000 square metres for milling grains, and has a daily milling capacity of 2,000 metric quintals of grain; and the Adriatic Malt Works, which started production in 1938 for processing barley and producing beer malt, and is now being expanded. Its daily processing capacity is about 500 metric quintals of barley.

Of substantial importance is also the salt plant, belonging to the State Monopoly, established in 1927 on an area of 25,000 square metres to supply salt to the provinces of the Eastern Po Basin and the Trentino. It receives and processes 80,000 metric tons of sea salt a year, 40,000 metric tons of which are refined.

Besides these plants, there are seven other firms in this branch of industry, classified as medium and small industries.

The total employment is around 800.

(d) Petroleum industry.

The interest manifested by this industrial branch as soon as the Port of Marghera was constructed led to the concentration of most of the oil facilities in an additional area called "Petroleum port", with an area of about 113 hectares, which have been increased by new and recent post-war reclamation work to about 152 hectares.

This settlement contains a number of coastal tank farms set up by the principal oil companies operating in Italy (Esso, Shell, Agip, Oso, Api, etc.) and a large refinery built and operated by the IRON (Italian State Oil Monopoly Administration). This refinery, which occupies an area of 101 hectares, can process annually 2,000,000 metric tons of crude oil. Its capacity is now being doubled. A total of 2,200 persons are employed in the storage and refinery operations.

A substantial maritime traffic (3,300,000 metric tons of crude and refined products in 1960) is associated with these operations. The entire industrial branch appears to be ready for substantial expansion, as soon as the projects now under study are implemented, new building sites made available, and solutions found to the problems connected with the present inadequacy of the canals, which do not permit the passage of tankers of over 20,000 tons.

(e) Chemical industry

While the first chemical plants were set up at Marghera a relatively long time ago (1924) and the industry had attained a position of importance in the period between the two wars, it is only in the last decade that it has developed to an extent that could not be foreseen, and has posed, in terms that admit of no delay, the problems of expansion of the port and industrial zone.

In this industry, more than in any other, interdependence is an outstanding feature which tends to multiply the number of production lines and plants. This has indeed taken place at Marghera, where enterprises and capital have been associated. Further stimulus was given to an appreciable extent by foreign investment.

The first example of this kind is provided by the Vetrococo complex, which has emerged from the Italian Glass and Crystal Company and the Italian Coko Company, both organized by Giovanni Agnelli, founder of the Fiat Works.

In 1925 the former company built at Marghera a plant for the mechanical production of sheet glass. Adjoining it, the latter company built a metallurgical coko plant. It was planned in advance to utilize the residual gas from the coko ovens to supply the kilns of the glass-making works. Subsequently the two companies were merged into a single entity, which undertook substantial expansion of the plants, primarily of the coko works, which were found to yield a surplus of gas with respect to the amount required by the glass-making works. This gave rise to the idea of

utilizing this gas as a source of thermal energy for a new plant of the Vetrocecke Azotati built in 1937 to produce synthetic ammonia and nitrogenous fertilizers, the plant was integrated with plants for the utilization of the petrochemicals and benzene derived from the coking gas, which were converted respectively into ethylene oxide and synthetic phenol.

After the Second World War, the favourable reception of composite fertilizers on the market led the Vetrocecke Company to undertake their manufacture, taking advantage of the availability of ammonia and other raw materials produced by the Azotati plant. Thus, with the participation of the Saint-Gobain Company of Paris, the Vego plant was established for the production of a wide range of composite fertilizers, phosphoric acid and sodium tri-polyphosphates.

The coke works can produce 800,000 metric tons of metallurgical coke a year, and is one of the largest plants of its kind in Italy.

The glass-works, with its annual capacity of 100,000 metric tons, supplies more than a third of the Italian demand for sheet glass.

In turn, the Azotati and Vego plants have an annual capacity of 500,000 metric tons of nitrogenous and composite fertilizers, some of which is exported.

The rational organization and compactness which characterize the structure of this great complex are indeed noteworthy. The complex occupies an area of 800,000 square metres between the Northern and Western Industrial Canals, so that, at the very moment of arrival of ships loaded with coal at the coking plant quay, one can witness, at the opposite quay of the Azotati and Vego concerns, the departure of ships loaded with fertilizers, the end-products of the long chain of processing to which this coal is subjected.

The complex has powerful port installations, able to unload a coal ship at the rate of 5,000 metric tons per twenty-four hours. In 1959, a 70,000 kilowatt thermal power plant was put into service.

The Vetrocecke Company is known throughout the world for the 197 patents covering its processing systems. They relate to twenty-one new industrial processes in the field of inorganic synthesis, and to five new processes in the field of the manufacture of coke and its products. The first group of patents, realized with the inventive contribution of the engineer Giannareo, are now being applied under licence in numerous plants recently constructed in many countries: three in Italy, seven in Germany, two in England, three in Belgium, four in France, six in Spain, Poland and the

Netherlands, three in the United States, five in Japan, two in India, etc.

Other significant examples of vertical production and vertically organized plants are found in the group formed by the Edison Company and its affiliates: Sicedison and A.C.S.A., both with participation of the United States capital, and I.C.P.H.

Thus, after the Second World War, the Edison Company acquired control of the San Marco Plant, built in 1927 for the production of ferro-silicon and calcium carbide, part of which was converted into calcium cyanamide. The availability of a substantial surplus of calcium carbide, not required by the cyanamide line, led the Sicedison Company, which began work in 1951, to build a large plant to utilize this calcium carbide to produce acetylene and its derivatives.

Another Edison plant, built in 1954, produces large amounts of ammonia (140,000 metric tons a year). This gave the Sicedison the opportunity of using it, together with methane, to produce hydrocyanic acid and acrylonitrile. The acrylonitrile in turn is supplied to the A.C.S.A. plant, where it is used as raw material in the production of acrylic fibres.

The Edison plants also produce very large amounts (about 120,000 metric tons annually) of sulfuric acid, used in part to supply the I.C.P.H. plant, built in 1955, which produces hydrofluoric acid and its derivatives from sulfuric acid and fluorapatite. These derivatives include cryolite and aluminium fluoride, which are conveyed in part, within Sarghara itself, to a large plant producing aluminium. Other examples could be given.

The products of this industrial complex are extremely diversified, and yet remarkably unified. We shall confine ourselves to enumerating a few.

The Edison and Sicedison plants produce up to 600,000 metric tons a year of fertilizers, 90,000 tons a year of synthetic resins, 35,000 tons of plasticizers, 40,000 tons of solvents, 40,000 tons of chlorine, 50,000 tons of sodium carbonate, etc. The I.C.P.H. plant produces 18,000 metric tons of hydrofluoric acid, technical and distilled, and 15,000 tons of cryolite. The A.C.S.A. plant can produce 9,000 metric tons of acrylic textile fibres.

Over a third of the entire production, and almost 90 per cent of that of I.C.P.H., is absorbed by the foreign market.

The organization of this great complex has likewise been inspired by the criterion of maximum rationality and efficiency. To ensure the contiguity of the various plants, it was necessary to reclaim and raise about

2,500,000 square metres of waterlogged ground, which still extended to the south of the industrial zone. An immense network of pipelines on the surface and underground provides transport of fluids to the various plants. In this connexion, and to give an idea of the problems that had to be solved in the matter of communications and other services, it will be enough to mention that the complex covers an area of over 4,000,000 square metres.

There are numerous other chemical plants operating at Marghera, besides these two great complexes. The most important of these is the Montecatini plant, occupying an area of 220,000 square metres. In addition to the annual extraction of 6,000 metric tons of copper from pyrite ash, already mentioned, it has an annual production of 150,000 metric tons of phosphate fertilizers, 120,000 metric tons of sulfuric acid, and sells 250,000 metric tons of waste ash to the metallurgical industry.

The Caffaro plant, occupying an area of about 30,000 square metres, produces composite fertilizers and decolourizing earths.

Other medium and small industrial plants perform operations subsidiary to those of the two great complexes: distilling tar, producing carbon black, bottling gas, etc. Two plants produce soap. Among these, the Vidal plant also produces a considerable amount of perfumes.

A total of about 9,000 workmen are employed in the chemical branch of industry (including the Vetrococo glassworks).

(f) Other industries

The industrial zone of Marghera is also active in numerous other industrial branches, for instance, in refractories, where the S.I.R.H.A. plant is among the largest in Italy; textiles, which include a spinning mill and a felt mill; construction, where fifteen firms have a total employment of over 3,500 persons; glass, ceramics and wood-working, where the Eraclit Venier plant has been operating since 1925, producing high quality compressed panels for light-weight construction and shoring, to which has recently been added the cutting and processing of highly-esteemed marbles.

All these branches of industry have a total employment of about 7,000 workers.

4. SUMMARY DATA - CAUSES OF THE RAPID DEVELOPMENT OF THE INDUSTRIAL ZONE AND ITS INFLUENCE ON THE ECONOMY OF THE ADJACENT AREAS

In the short space of a single generation, Marghera has assumed a position of first rank in the industrial production of the country.

The last of all the harbours of Italy to be established, it occupies today the first place among the Adriatic ports, and the third one among the ports of the entire Italian peninsula. Only Genoa and Naples are ahead of it now, and the latter might be overtaken shortly.

Marghera has also become the principal Italian centre of chemical production, one of the most important Italian metallurgical centres, and occupies an outstanding position in numerous other branches of the Italian industrial life.

Today there are more than 200 large, medium and small plants that face the banks of its canals, occupying a total area of not even four square kilometres. From that standpoint, Marghera is today the most densely populated industrial zone of Europe, and perhaps of the world.

An idea of the considerable amount of goods produced in this industrial centre is provided by the volume of its maritime traffic, which in 1961 exceeded 8,400,000 metric tons, discharged or loaded. This is particularly significant if it is considered that only goods consigned to Marghera plants, or processed by them, arrive at the industrial port of Marghera, or depart from it.

In the same year the railway traffic reached 2,133,000 metric tons of goods. Up-to-date statistics on highway traffic are not available, but it may be estimated to at least three times the railway traffic.

Just as eloquent are the data relating to the consumption of electric power. In 1961 the industrial zone consumed over 2,500 million kilowatt-hours, i.e. one twentieth of the total power generated in Italy. The consumption of natural methane gas (almost 500,000,000 cubic metres), was also very large and amounted to about 10 per cent of the total production of Italy.

The charts reproduced in the Annex, which show a continuous increase in the number of establishments, employment and maritime traffic, provide some data of interest to assess the vitality of Marghera and its capacity for development.

In 1927, five years after the opening of the main navigation channel linking it with Venice and with the sea, there were 51 plants at Marghera, employing a total of about 5,000 persons and generating a traffic of 400,000 tons of goods landed or loaded. Five years later, in 1932, the number of plants had risen to 75, giving employment to over 6,000 persons,

and by inland traffic of over 700,000 metric tons. By 1939, before the beginning of the Second World War, the number of industrial plants had increased to almost 200, employing over 15,000 workers, with a maritime traffic of 1.5 million metric tons. This indicates that Marghera had already at that time attained a considerable scale in its industrial and commercial development. In Italy's emergency, and in the period of the world-wide crisis of 1929-1930, she had succeeded in attaining a growth of activity within the framework of the policy of autarky imposed by Fascism after 1935, against the industries that imported raw materials from abroad.

After the Second World War, and the rapid healing of the wounds inflicted by the invasions and the Nazi occupation, Marghera resumed and accelerated its pace of activity, taking part with particular vigour in the general recovery of Italian economic life. By 1960 it had already reconquered its pre-war position. Since then it has doubled the number of its plants and the number of workmen employed, today over 33,000. Total production has been tripled, as will be seen from the increase in maritime traffic, which reached 5,400,000 metric tons in 1961.

A complete analysis of the causes responsible for the rapid rise of Marghera would lead us too far. It is certain that its geographical location has had a great influence, for it lies at a point, which, as the history of Venice over many centuries testifies, is the natural bridgehead for traffic with the Orient from the Po Valley and certain countries of central Europe. Contributing factors have been the almost total lack of other efficient maritime ports along the northwest coast of the Adriatic, the existence of a good railway and highway network connecting Marghera with the Po Valley hinterland and the countries beyond the Alps, and the availability of substantial reserves of hydroelectric energy in the nearby Venetian and Tridentine Alps. More recently, the availability of natural methane gas has become another factor, since natural gas is today consumed for thermal uses by most industries, and serves as raw material for some chemical industries.

Without any doubt, the predominant element of the success of Marghera has been the organization of the port and its services. Constructed for industries linked to the sea, the port has offered them conditions that could not be found in any other port of Italy; even today, similar conditions would be hard to find elsewhere.

It has already been stated that Marghera is not a transit port, but is reserved exclusively for the industries operating on or near its canals. These industries were offered the opportunity of acquiring their own waterside frontage, and of equipping it with their own plants and services, for all loading and unloading operations, using their own workmen. This has

permitted substantial economies in the cost of port operations, and of the delivery of goods within the plants. The main ships are docked at wharves belonging to their own, as is the case in commercial ports. They are given advance notice of arrival. They are not subject to port regulations, schedules, nor to special conditions for staying at the pier. Efficient unloading equipment, in conjunction with conveyor belts, conveyors, chutes and pipelines, etc. insure the direct transportation of solid or liquid goods from the ship to the site of utilization, avoiding the costly transfer from ship to wheeled vehicles. The ability to use their own workmen, instead of the personnel of the port company, enables the plants, most of which operate around the clock, to load and unload on a continuous basis, using new gangs, every hour in the day, and every day in the year. Thus, they are not bound by the constraints of time-tables, turns for service, high tariffs of the port companies, and the difficulties and additional costs involved, as is the case in Italy, by work performed outside normal working hours, holidays, rainy days, or at night.

These advantages have been summed up in a survey conducted in 1958 by the Council of the Industrial Zone of Porto Marghera, following up a similar inquiry made in 1949 by a government commission. The survey showed that the costs of port operations at Marghera bore a ratio of one to ten to the costs that would have been incurred at any other great Italian sea-port. Further benefits are entailed by the reduction in freight charges, owing to the minimum lay-up period of the ships.

It is unnecessary to stress the importance of such a marked reduction in the cost of the last and particularly sensitive stage of maritime transportation, especially when related to a type of goods - the so-called bulk commodities - in which the cost of transport is one of the principal components of total cost. This explains why the criteria on which rests the organization of the industrial port of Marghera, which may be summarized by the expression "functional autonomy", are the object of the greatest possible attention on the part of the Italian Government and industry, in view of the applications which they might have, and in part have already had, in other sea-ports.

The development of the industrial zone has had a marked influence on the economy of the surrounding areas. In this connexion, population growth, which has kept pace with the development of the industrial zone, provides the most significant indicator.

Marghera (urban district) which before 1921 was not included among the inhabited localities, was a village of 5,000 inhabitants ten years later, and today has a population over 29,000. The adjacent Mestre, which in 1921 numbered little more than 20,000, had grown ten years later to 32,000, and

is today a flourishing and bustling city of 90,000. Favaro, in the immediate vicinity of Marghera, which in 1921 was a modest village of 1,300, has today become a modern small town of 15,000. Chirignago and Zelarino, which in 1921 were negligible rural hamlets, have both passed the 10,000 mark today. Similar examples could be given concerning other localities in a twenty kilometre radius in the Marghera hinterland.

A comparison between the demographic changes in the Province of Venice and in the adjacent Provinces of Padua and Treviso, is instructive in this respect. The following data are taken from the 1921 census (i.e. before the industrialization of Marghera) and that of 1957.

In 1921, the Province of Venice had the largest urban centre of the region, but its population of 516,000 was the smallest. The Province of Padua had 592,000, the Province of Treviso 561,000. By 1957 the relative positions had been reversed. The Province of Venice had taken the first place, with a population of 748,000, against 702,000 for the Province of Padua and 615,000 for the Province of Treviso. During the same period, the population increase was 46 per cent in the Province of Venice, against 19 per cent in the Province of Padua and 10 per cent in the Province of Treviso. The decisive influence of Marghera is proved by the fact that, as compared with the total population increase of 232,000 in the entire Province of Venice, there was an increase of over 100,000 in the mainland parts of the City of Venice nearest the industrial zone.

It is hardly necessary to say that this exceptional population increase was accompanied by a profound transformation in the economy and the well-being of the population, due to the employment of workmen not only in the industrial zone, but also in the numerous local industries, medium-sized and small scale, which have spontaneously complemented the concentration at Marghera.

The Province of Venice today has the highest net per capita income of all the Provinces of Venetia. According to calculations by Professor Guglielmo Tagliacarne, published in the journal Moneta e Credito, No. 52, in 1959, the net per capita income was 300,573 lire in the Province of Venice against 230,000 lire in the Province of Padua and 194,318 lire in the Province of Treviso.

This higher income is reflected in data on non-subsistence consumption. To give a few examples, it may be mentioned that in 1959 the per capita consumption of electric energy for lighting was 97 kilowatt-hours against 65.4 kilowatt-hours in the Province of Padua and 55.5 in the Province of Treviso. The per capita expenditure for entertainment was 3,748 lire in the Province of Venice against 2,836 lire in the Province of Padua and 1,620 lire in the Province of Treviso.

Parallel to this economic progress has been the improvement in the average cultural level of the population, this has been very marked, and is also, for the most part, attributable to the establishment of the industrial zone of Marghera and to the consequent conveyance into factory hands of a large proportion of the agricultural workmen.

As late as 1931 the Province of Venice had the unhappy distinction of having the highest rate of illiteracy of all the provinces of Venetia. At that time this rate among persons over six years of age was 16.3 per cent. Twenty years later, in 1951, it had fallen to 5.5 per cent. It is significant that those employed in agriculture participated in this average of 5.5 per cent with an illiteracy rate of over 14 per cent, while the rate of those employed in industry was only slightly more than 4 per cent. These figures give an idea of the difficulties that had to be overcome at the beginning in hiring and training the workers for the industrial zone.

The efforts made jointly to this end by public and private groups would deserve a special study. It may suffice to mention here that the results attained in the course of a single generation have been more than satisfactory. Illiteracy has practically disappeared among the 30,000 workmen of the industrial zone of Marghera, and great strides have been made in general education and vocational training.

For want of official data, a survey was made by the author at the two largest industrial complexes of Marghera, the Edison group and the Vetrocco group.

The distribution of workers in the firms of the Edison group was as follows:

	(Percentage)
Employees and those of comparable status	25.49
Skilled workmen	20.42
Semi-skilled workmen	38.43
Unskilled workmen	9.81
Labourers	5.75

The distribution in the firms of the Vetrocco group was as follows:

	(Percentage)
Employees and those of comparable status	16
Skilled workmen	24
Semi-skilled workmen	44
Unskilled workmen	12
Labourers and miscellaneous	4

A substantial percentage of the employees hold university degrees or senior high school diplomas, while the great majority of the workmen in the various categories now hold certificates of junior high school education.

5. EXPANSION PROGRAMMES - PROSPECTS FOR THE FUTURE

During the interval between the two wars, the Industrial Port Company, in partial implementation of the master plan approved in 1917, and several times amended subsequently, built 13 kilometres of port canals and reclaimed 550 hectares of land for industrial settlement. At the end of the Second World War, when signs of an immediate and vigorous recovery were manifested at Marghera, it appeared that the area of the zone was inadequate, as it was almost completely covered by industrial establishments. In 1950, the Council of the Industrial Zone of Porto Marghera, of which all the firms operating at Marghera are members "for the study of the economic and technical problems concerning the zone and the industries of Marghera, and the supervision of their development", proceeded to interest the competent government agencies in drawing up a new master plan for canal building, layout and development of the marshy tracts that still extended to the south of the industrial zone to the edge of the Venice-Padua inland waterway, on an area of about 1,000 hectares.

This plan, completed in 1953 by the Office of Maritime Works of the Upper Adriatic (Ufficio Opere Marittime dell'Alto Adriatico), was approved in principle, in 1954, by the Commission for the study, drawing and revision of the master plans of the Italian seaports (Commissione per lo studio, la redazione e l'aggiornamento dei piani regolatori dei porti marittimi nazionali) and, with certain appropriate amendments, serves as the basis for the master plan approved on 19 July 1956 by the Supreme Council of Public Works (Consiglio Superiore dei Lavori Pubblici).

While the drafting of the master plan was in progress, the Council of the Industrial Zone was engaged in paving the way for the establishment of a local agency capable of co-ordinating the implementation of the master plan, at least for the part for which no direct provision had been made by the Italian State, and for the necessary financing. A proposal formulated by this Council to set up a "Citizens' Committee" for the study of these problems led to the establishment, in 1954, of the Consortium for the Expansion of the Port and Industrial Zone of Marghera (Consorzio per l'ampliamento del porto e zona industriale di Marghera), which took the place of the well-deserving Industrial Port Company (which thereafter confined its activities to the operation of the network of railway connexions). This consortium was joined by the Chamber of Commerce, the City of Venice, and the Provincial Administration, and, four years later, by the Port of Venice Authority (Provveditorato al Porto Commerciale di Venezia).

The State assumed the cost of the construction of the works within its competence, for a maximum expenditure of 2,000 million lire, to be paid during 1961.

In turn, the public bodies participating in the consortium undertook to pay the following contributions in thirty-five annual payments: the Chamber of Commerce, 2,100 million lire; the City of Venice, 1,050 million lire; the Province of Venice, 1,050 million lire; and the Port of Venice Authority, 350 million lire. It is calculated that about 2,000 million lire will be immediately available to the Consortium from the net proceeds of the discount of these annual payments.

This system of contributions was sanctioned by the law of 29 October 1960 which contained other important provisions, above all, on the expropriation of the areas forming the zone of expansion, and their sale, after reclamation, to industrial concerns applying for them.

The law declares that all the lands required for the execution of public works and the construction of industrial plants and utilities shall be subject to expropriation for public benefit. The price to be paid in condemnation shall be equal to the market value of the land on the basis of its condition and use at the time of the expropriation. No account shall be taken of the increment in value due to the contiguity of such lands to the present industrial zone, and to its inclusion in the programmes of expansion of the zone itself.

The law provides for the exemption from expropriation of areas already occupied by industrial plants and buildings and related services, and areas for which the owners present, within six months after the law goes into force, a plan of industrial utilization scheduled to be implemented within a time limit to be determined by the Consortium. The owners of the areas excluded from expropriation shall be obligated to contribute to the cost of the public works provided by the master plan to the maximum extent of 15 per cent of the increase in value of the property affected.

All the areas subject to expropriation, except those assigned to public works or installation of utilities, shall be sold by the Consortium to the industrial firms which apply for them. To this end, the Consortium shall make available, in good time, a general plan of the layout and subdivision of the land, indicating the selling prices. This plan shall require the approval of the Minister of Industry.

In assigning the areas to the various industrial firms, the Consortium may make a selection among applications according to criteria taking

account of: (a) the number of workmen to be employed; (b) the need to avoid hampering the further development of production activities already implanted in the industrial zone; (c) the opportunity of giving preference to firms that will make effective use of local economic resources, or which are set up owing to the initiative of medium or small entrepreneurs. Other things being equal, preference shall be given to State enterprises or to enterprises with State participation, to the maximum of 25 per cent of the area available.

As regards the prices at which areas are to be assigned to industrial firms, the already mentioned agreement of 23 July 1917 between the Italian State and the Industrial Port Company prescribed that they should be calculated so that the total proceeds from the sales would not exceed the total expense incurred for the acquisition, improvement, layout, and development of the land, the Company being entitled only to receiving interest at 5 per cent on the amounts advanced by it, and to the reimbursement of its administrative expenses.

In different terms, but on the basis of substantially identical criteria, the law of 20 October 1960 prohibits speculative action on the part of the Consortium in the resale of the expropriated areas, or through taxation of the plus value accruing to the owners of the areas excluded from expropriation; the law proscribes that the sums so collected shall be used exclusively for the works necessary to complete the expansion of the port and the industrial zone.

The price of the land reclaimed by the Industrial Port Company, gross of special taxes imposed in favour of the Italian State and the City of Venice to reimburse them for the costs incurred for purposes within their respective competences, did not in any case exceed 800 lire per square metre in present currency values.

The master plan provides for the widening to 200 metres on the surface, and the deepening to 12 metres below the average sea level, of the modest littoral canal which today runs for a distance of 3 kilometres along the boundary between the expansion zone and the lagoon, and the new construction of a canal (Southern Industrial Canal) 3.6 kilometres in length, 144 metres in width at the surface, and 10 metres in depth, parallel to the present Western Industrial Canal, and about 1,200 metres from it. Likewise, pursuant to the master plan, a total of 6.6 kilometres of new canals are to be opened hereafter to navigation; since the littoral canal has only a single bank, these new canals will offer the industries over 10 kilometres of additional water frontage.

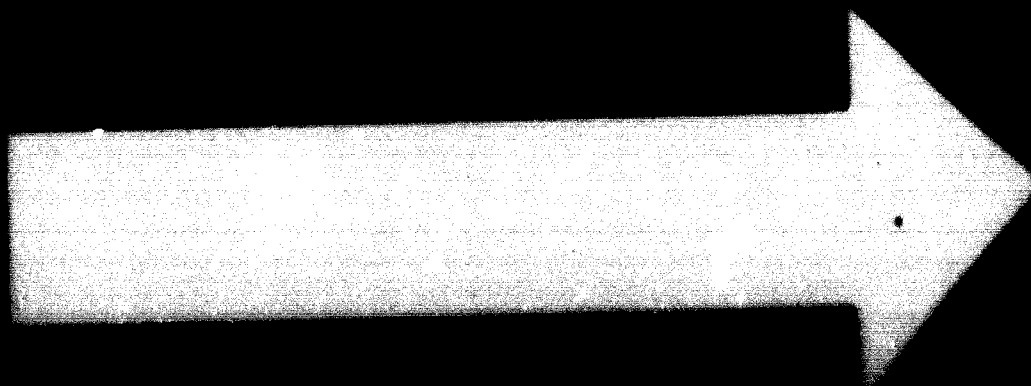
The master plan contemplates an adequate net of roads and services, including two main arterial highways with a total length of about 9 kilometres.

It cannot be determined now to what extent the cost of these works will be covered by the 4,000 million lire appropriated by the State and Consortium. It should be noted that private initiative has been operating for some time in the zone of expansion. The Edison Group, above all, has located several plants there, laid out and developed some 250 hectares, and built an asphalt road about 2.5 kilometres in length and 12 metres in width to connect with one of the arterial highways provided by the master plan. The Group has begun to excavate for its own account in the terminal area of the South Canal which serves areas owned by it, and will soon start industrial construction there.

It may thus be foreseen that, owing to the combined efforts of the State, the Consortium and private initiative, the zone of expansion will soon be able to meet the most pressing needs of industrial development. Enterprises already operating at Marghera, or recently located there, have announced that, in the very near future, they intend to build a number of plants, including a refinery, a cement works, a thermal power station, a new aluminium plant, and a group of chemical plants which will complement production processes already in operation.

During the final stages of elaboration of the master plan for the zone of expansion, the Council for the Industrial Zone advised the competent government agencies of the urgency of modernizing the Marghera installations to allow ships of over 20,000 tons to dock at Marghera or its immediate vicinity, an improvement which would be in line with present trends in maritime transportation of liquid cargo. It has already been noted that neither the port canals nor the main navigation channel linking Marghera to the commercial port of Venice and to the sea are at present wide enough and deep enough to permit the passage of fully loaded ships exceeding this tonnage. If this state of affairs were allowed to persist, the position of the oil installations located in the zone would be seriously compromised, and new settlement would be discouraged. To remedy this situation, the Council proposed the following alternative solutions: either to construct a new, broad, main navigation channel, which, avoiding the built-up part of Venice, would directly link Marghera with the sea via the lagoon inlet at Malamocco, or to construct an oil pipeline, following the general course of the main channel and terminating at an artificial island equipped to receive and discharge large tankers.

A preliminary project for the oil pipeline and its terminal was also drawn up. It was approved by the local authorities, and adopted by a large



15.7.74

8

OF

9

DO

3736



petroleum company, which offered to execute it at its own expense.

These proposals have given rise to a fruitful discussion which, during the last few months, has led the Office of Maritime Works of the Upper Adriatic to draw up a larger project combining both solutions. The project provides as follows:

- (a) Opposite the lagoon inlet at Alberoni, an artificial isle is to be constructed and equipped to receive and discharge tankers up to 65,000 tons. In order that the artificial isle would meet the developing needs of tankers' traffic, a project for the construction of additional port facilities at Motte di Volpago, allowing the simultaneous docking of eight tankers over 50,000 tons, has been prepared and the necessary tracts of land have been zoned;
- (b) This artificial isle is to be connected with the sea by a channel with a minimum of 140 metres in width and 14 metres in depth, and with Marghera by a pipeline across the lagoon;
- (c) The channel will then continue in the direction of Marghera, this section allowing the passage of ships up to 20,000 tons. It will reach the boundary between the lagoon and the mainland at Motte di Volpago, about 3 kilometres south of the zone of expansion of Marghera. Thence it will follow the shore to Marghera.

This plan affords a double advantage. It will give Marghera a new and more convenient route to the sea. It will also provide the necessary conditions for possible future expansion of the industrial zone on a lagoon frontage of about 3 kilometres, just to the south of Marghera.

The Italian State will participate in financing these works, by paying the amounts necessary for the construction of the channel and the artificial isle. The local public agencies or firms with state participation will share the cost of construction of the pipeline and terminal installations equally with the private concerns. An initial state appropriation of 3,000 million lire has already been made. A corporation entitled "Società per Oleodotti Adriatici" (Adriatic Oil Pipeline Company) has been organized by public and private bodies to raise the capital required for the pipeline construction.

There can be no doubt that the realization of this project will open prospects of unlimited expansion for Marghera in the petroleum industry as well. This will be consonant with its favourable geographical position in

regard to the sources of crude in the Near East and the immense markets for refined products in the Po basin and the countries of central Europe.

In closing these pages, mention should be made of the works and initiatives now developing in the field of communications between Marghera and its hinterland. The last sections of the great Po Valley automobile expressway, which will link Venice and Marghera with Milan and Turin will be completed in 1961. The superhighway "Romeo" from Marghera to Ravenna will expedite communications with central and southern Italy; it is also at an advanced stage of construction. Work is about to commence on the Brenner expressway, which, meeting the Po Valley expressway at Verona, will substantially shorten travel time between Marghera and the regions of eastern Austria and Bavaria. The construction of a superhighway to Munich is now in the planning stage, under the auspices of a consortium of the Chambers of Commerce of several provinces of Venetia. This complex of works will also contribute to strengthening the confidence and the tranquil knowledge with which the economic operators of Marghera face the tasks of the future.

Chart 1. NUMBER OF FIRMS AT MARGHERA 1900 to 1901

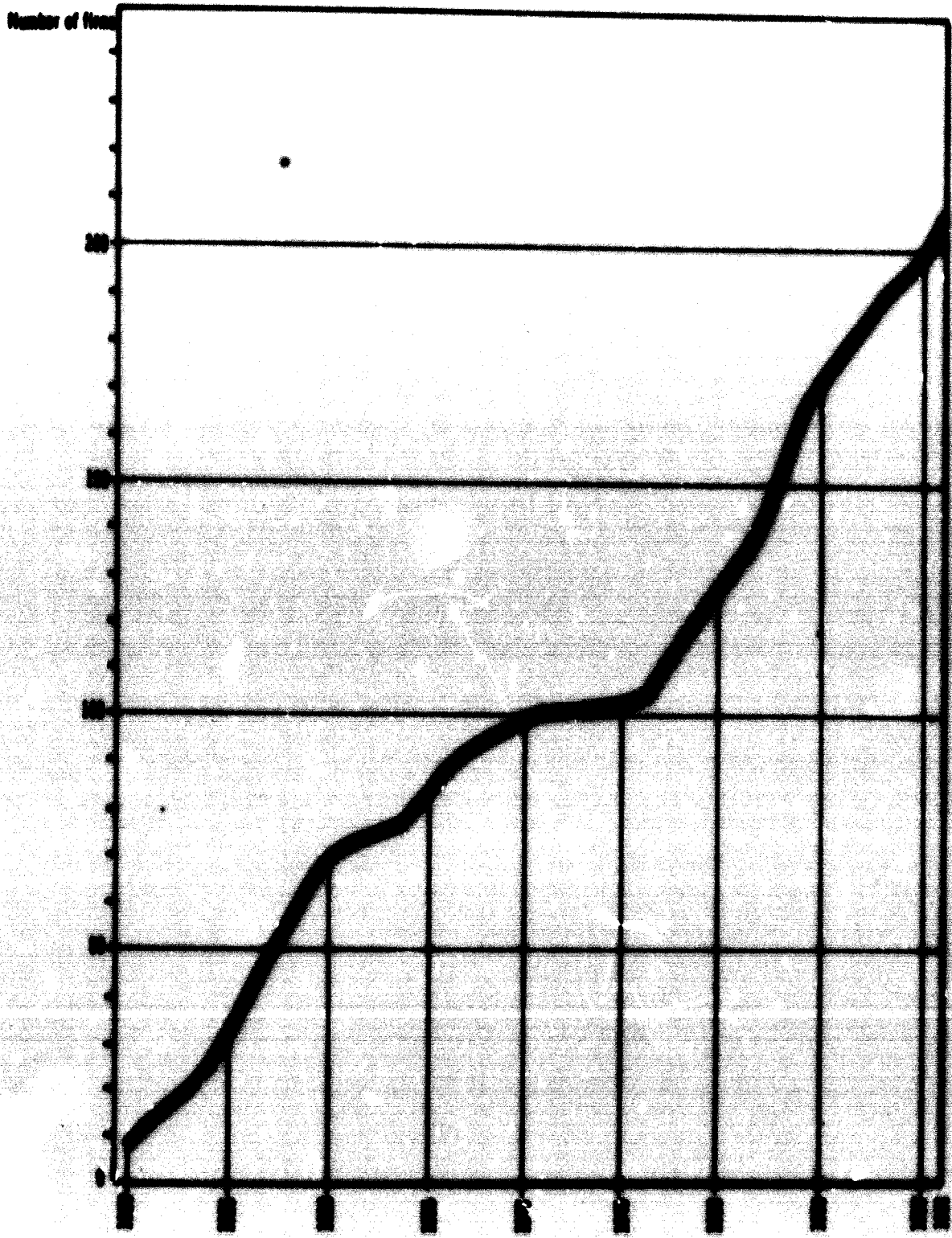


Chart 2 NUMBER OF WORKMEN EMPLOYED AT THE PORT OF MARGHERA, 1920 to 1961

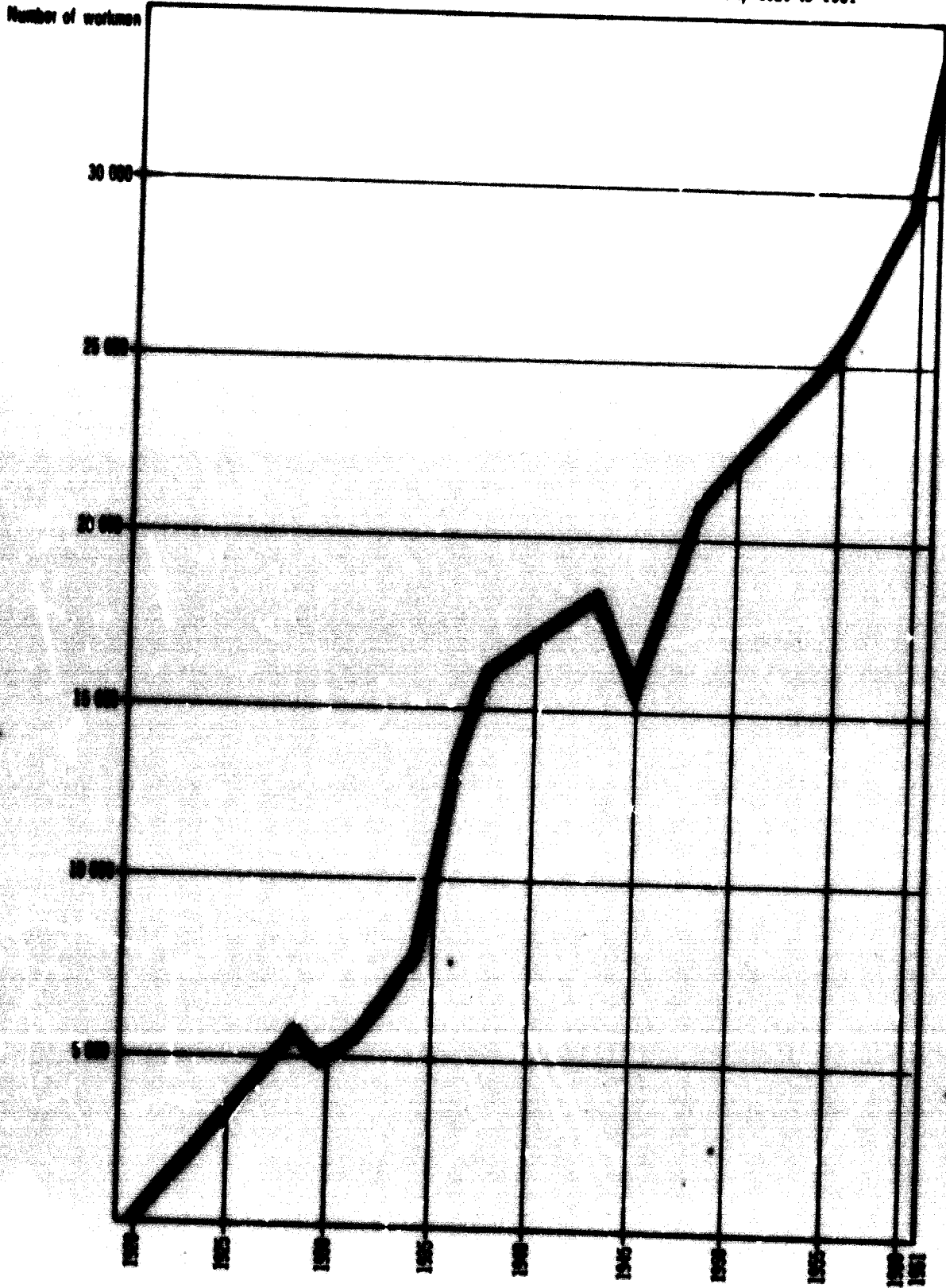


CHART 3. NUMBER OF FIRMS OPERATING AT WORKERS, BY BRANCHES OF INDUSTRY AND NUMBER OF WORKERS AND EMPLOYEES PERMANENTLY EMPLOYED, 1944

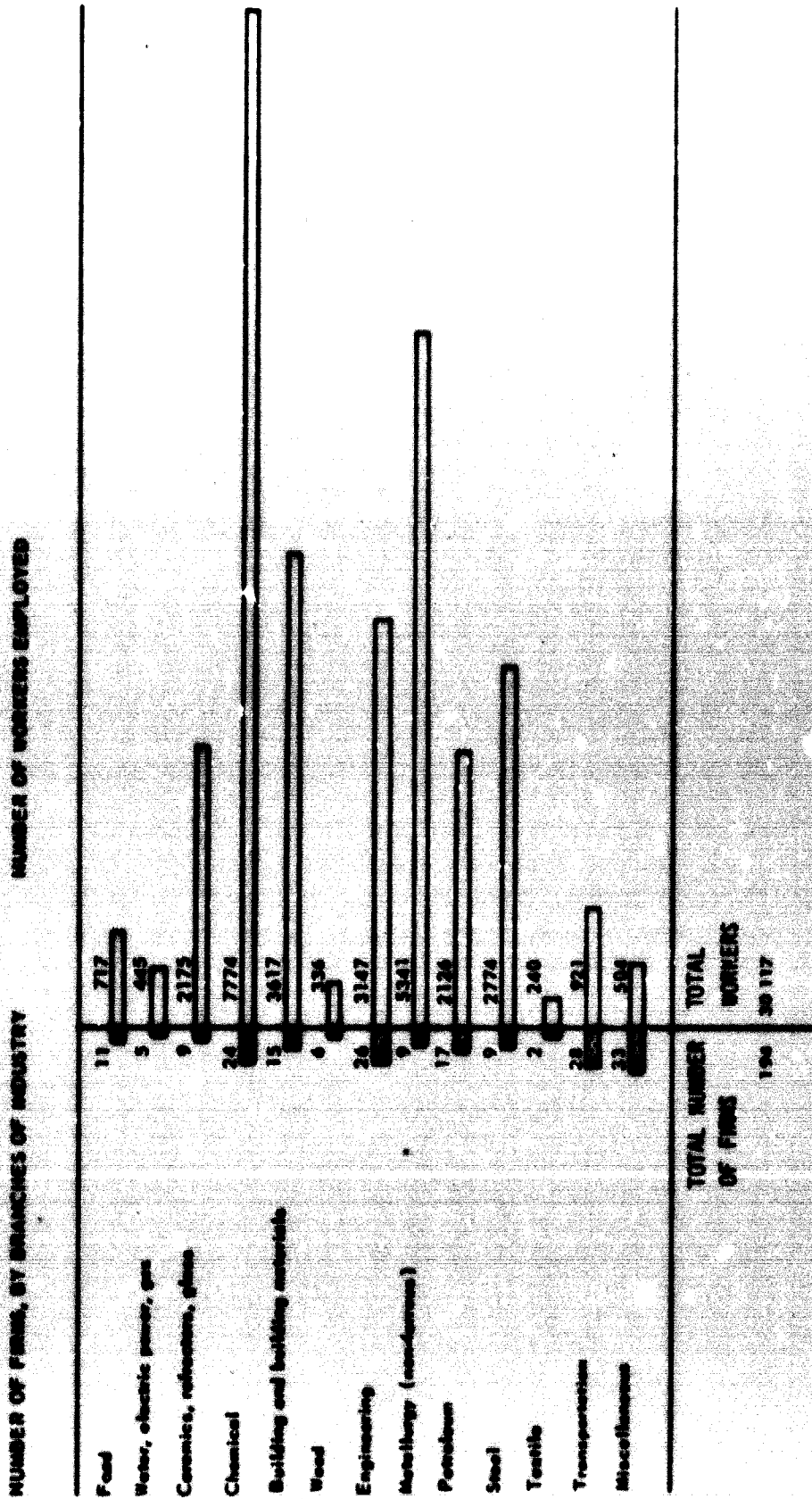


Chart 4. MARITIME TRAFFIC IN THE INDUSTRIAL PORT OF MARGHERA, BY GOODS LANDED AND LOADED, 1925 to 1961

Thousands of metric tons

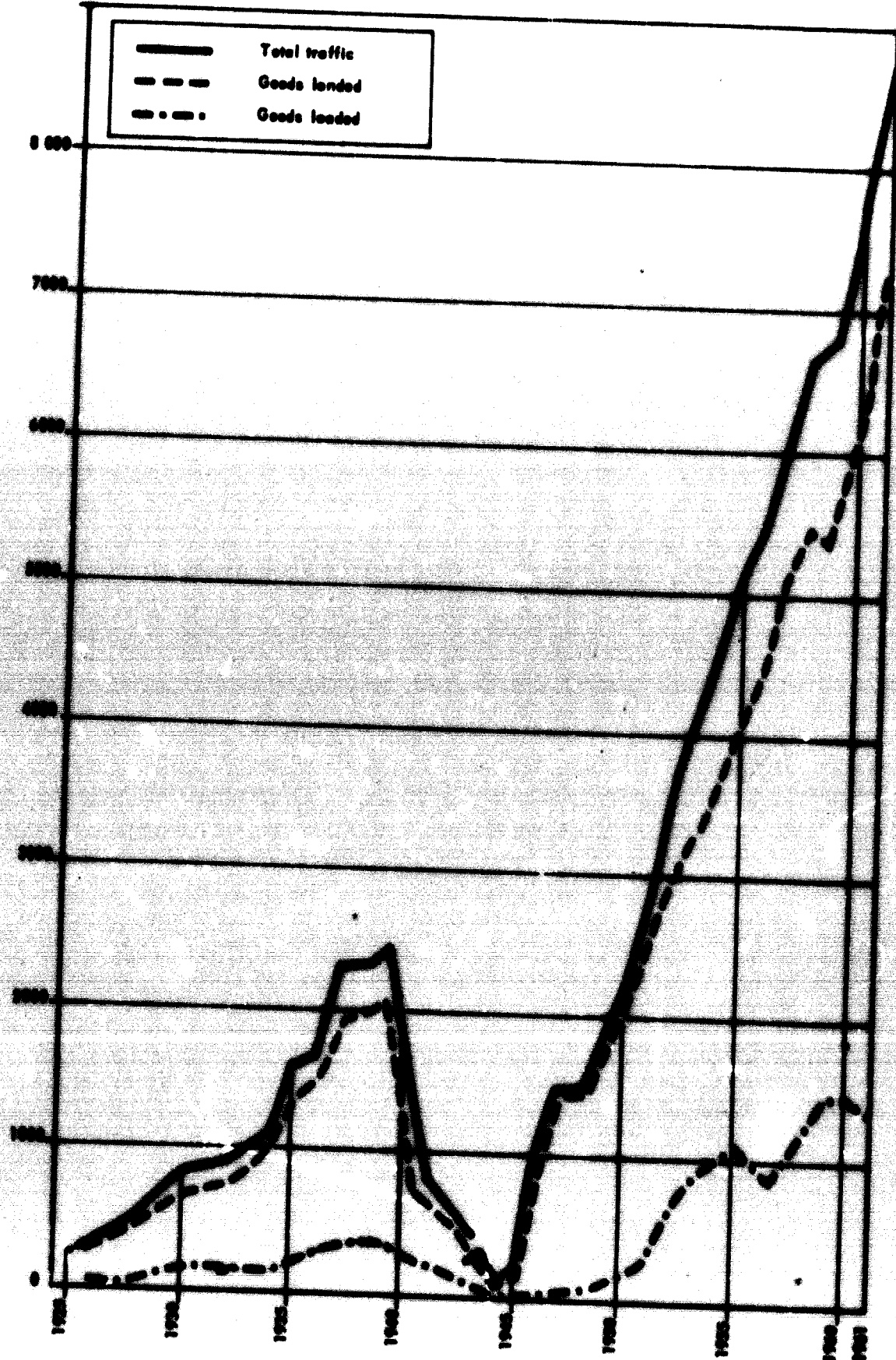


Chart 5. RAILWAY TRAFFIC IN THE INDUSTRIAL ZONE OF MARGHERA, 1923 to 1961

Thousands of metric tons

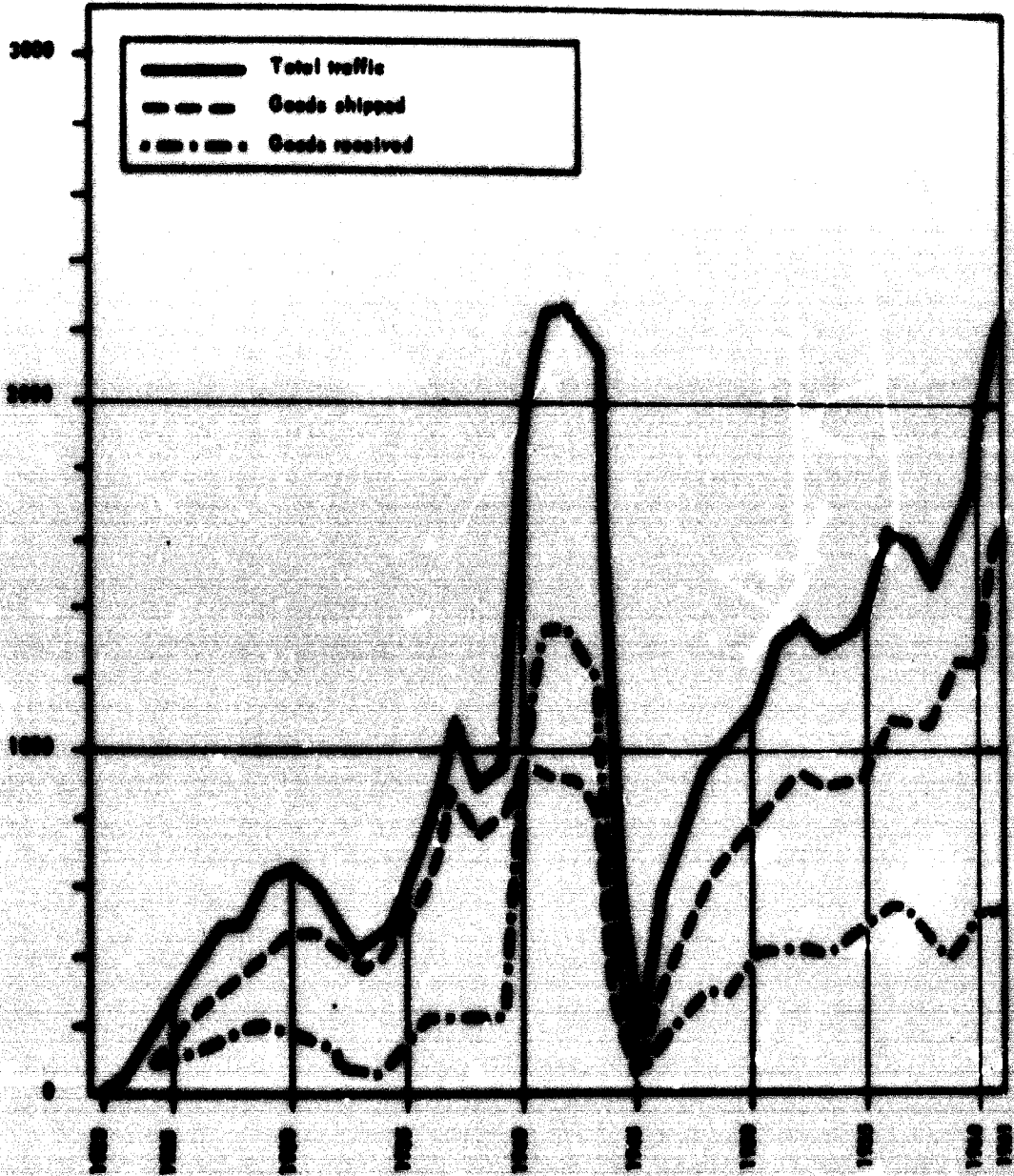


Chart 6. MOVEMENT OF SHIPS, TRUCKS AND RAILWAY WAGONS IN THE INDUSTRIAL PORT OF MARGHERA, 1961



PROBLEMS IN ESTABLISHMENT OF LARGE-SCALE INDUSTRIAL ESTATES

by G.G. Lanham, Design Inspector,
Imperial Chemical Industries Ltd.,
England

Introduction

One of the most significant developments in industrial organization in the present century is the increasing interest shown in many countries for industrial estates - a device which can take many forms but which, basically, refers to a tract of land developed in accordance with an overall plan designed to provide accommodation for a sufficiently large number of factories to make it economical to provide common services and special facilities to the industrial occupants.

An industrial estate can take many forms depending upon the range and type of industry involved and the particular requirements of the country or district in which it is situated. The benefits afforded by the availability of sites, factories and services on industrial estates are particularly important for small firms or new enterprises, especially those which can be accommodated in standard factory buildings offered for rent. The range of industries which can be so accommodated is surprisingly wide; it includes many branches of electrical and general engineering, food processing, furniture, clothing, textiles, plastics, and many others. Sites on industrial estates are also suitable for large organizations desirous of setting up branch factories, distribution depots and factory units producing special components.

Although the majority of industrial estates have been established with the object of encouraging as diverse a range of industries as possible, there are cases where estates have been designed to accommodate factories inter-related either because they all use some basic raw materials or process or finish each other's products. Such estates are usually developed by private enterprises with the objective of achieving economies in manufacture by close association.

This paper is primarily concerned with the establishment of large specialized estates of this kind. Since all estates make use of common services, this aspect of the problem will be discussed first.

The paper is based on the author's experience gained in the construction of the Wilton Works of Imperial Chemical Industries Ltd. (ICI), a composite chemical factory site where over £100 million has been invested during the last ten years.

In expressing his thanks to ICI for permission to use some material for preparing this paper, the author wishes to state that the opinions expressed are his own and not necessarily those of ICI.

The organization and provision of common services

By grouping a number of factories on one site, the common services and the facilities to be provided by public utilities can be designed with a view to meeting the requirements of the fully developed estate instead of being considered separately each time an individual factory is built.

Although it may take years to complete an estate, the existence of a comprehensive plan permits adoption of the most efficient and most economical arrangements both for initial installation and subsequent extension of common services and utilities. It is vital for the success of an estate that from the earliest stage such as the selection of a suitable site, it should be developed in accordance with an over-all plan. While allowing as much flexibility as possible, the plan should make proper provision for an orderly development of the essential services and such other facilities as it is intended to provide.

The range of services will vary from site to site and will depend to some extent on the type of industries likely to be established. Each service should be considered individually and provision for it made in the site layout.

The savings in capital cost which are possible on a well-planned site are very much greater than is often realized and the value of adequate planning cannot be over-emphasized.

Public utilities

Where water, gas and electricity are provided by public utilities, it is customary and in most cases economic to avail oneself of this source of supply and to use communal services for the disposal of sewage and factory waste. This will permit large economies in the cost of capital installations, and, as the estate will become a very large consumer, it will benefit accordingly. The large number of users will reduce fluctuations in demand and less provision for emergencies will be required.

The total requirements of the estate will usually be estimated in advance in the over-all plan. This will enable the supply authority to make suitable provisions for extension, where required.

Centralized services

The concentration of factories on an industrial estate makes it practicable and economical to provide a number of communal services to the tenants. These frequently include communal boilers to provide steam for process use and for space heating, facilities for the receipt of raw materials and the shipment of finished products by road or rail, central workshops and canteens. It is also often practicable to provide or arrange for special facilities such as a bank, a post office and education and welfare facilities.

On those sites where the estate management company provides factory buildings for rent or sale, it may be useful to set up an organization equipped to give advice on factory layout to the occupants and in some cases assistance in the design, construction, and modification of buildings to meet special needs.

On the specialized estates with inter-connected factories, in particular those where the various units are associated financially, the centralized services may be extended to include purchasing, storage, recruitment and training and possibly costing. Some of these services are dealt with in more detail below.

Steam and power

Many industrial plants are not only large consumers of electricity but also require steam as a source of heat for process work and space heating. Where the total demand for steam is high and continuous it is sometimes practicable to produce electricity as a by-product. Steam generated at high pressure may be let down to pressure suitable for process use by means of back-pressure turbines driving alternators. If the demand is sufficient and a satisfactory steam-power balance can be achieved, it may be economic to build a power station on the industrial site. These conditions are likely to be fulfilled only on an estate where the processes are integrated and where the individual plants are large. On most estates it will be preferable to purchase electricity from a public utility and either to install communal boilers or let steam-using factories make their own arrangements.

Water

The supply and distribution of water on an industrial estate requires careful planning to give the best and cheapest results. Large quantities of water are used in many manufacturing processes, for cooling purposes as well as for domestic use, and for fire-fighting needs. In some cases the

quality of water is important; for example, if a high-pressure boiler plant is to be installed, a purification plant is almost certainly needed. For certain purposes, for instance, for cooling, it may be convenient to provide a separate supply taken from a river or another source so as to reduce the need for potable water which in most cases will be purchased from a public utility. In some processes continuity of supply may be vital.

Centralized workshops

Every factory is faced with the problem of plant maintenance and repairs. Specialized workshop facilities are sometimes required, but, in many cases, maintenance and repairs facilities may be centralized to serve a group of industries.

On an industrial estate, it is possible to arrange at the design and planning stage for the erection of a central workshop where the repair and maintenance of plant items can be carried out under the best possible conditions and using the most modern equipment. By centralizing as much work as is practicable, maintenance costs can be kept at a minimum, greater continuity of employment for both men and machines can be achieved, and use can be made of specialized equipment, the purchase of which could not be justified on a plant or works basis.

The size and type of a central workshop will naturally vary with the type of machinery used in the factories on the estate, the frequency with which repairs and replacement are needed, the extent to which spare plant is either installed or kept available, and the existence of outside organizations such as a jobbing engineering works or machinery manufacturers depots in the surrounding area. Factories needing specialized maintenance may avail themselves to some extent of the central facilities provided, and may reduce their own facilities accordingly.

Centralized storage

The storage of raw materials and finished products usually requires separate facilities in each individual factory. Yet, there are many items which are in common use in all plants on any industrial site, such as cleaning materials, lubricating oils, nuts and bolts, cement, timber and so on. If these can be stocked in a central store instead of being carried in stock on each individual plant, economies are possible not only in storage space, but also in administrative costs and working capital.

On estates providing standard factories or on which inter-connected plants are located, a considerable degree of standardization may be achieved for a wide range of engineering materials such as pipes, valves, electrical equipment, etc. In such cases, substantial savings may be obtained by centralizing stocks and reducing the number of spares carried.

This may be frequently combined with central purchasing, which affords further savings in administrative costs and provides better service from suppliers.

Transport

Transport services on industrial estates may be organized in a particularly efficient way and may afford economies in capital costs and day-to-day administration. The factories requiring railway facilities may be given a direct connexion to the main line. Factories and connexions may be laid out in such a way that level crossings, culverts and bridges are reduced to a minimum, thus providing a free flow for road traffic and reducing the risk of accidents. The sorting of rail traffic can be organized on a suitably placed grid. In order to cope with the varying requirements of customers a central depot can be provided where transshipment from road to rail and vice versa can be carried out on both incoming and outgoing materials and products. On large estates an internal transport service may be needed.

Canteens

On an industrial estate or a composite factory site canteen arrangements can be planned as a central service. Here again, by siting the canteens strategically and building them to the most economical size, the best possible service can be provided at the least cost. Centralized purchasing of food is practicable where the canteens are operated by the estate company or are let to a catering contractor; centralized preparation of food makes it practicable to instal specialized equipment which could not otherwise be justified.

Medical and welfare facilities

Some medical facilities are a necessity in most factories but provision of a complete service with a fully qualified medical staff is possible only when the number of employees is sufficiently large to keep the unit busy. An industrial estate with a large population concentrated in a limited area provides an excellent opportunity for establishing a medical centre for the employees and their families, and certain other social and welfare facilities.

Labour policy

In some cases, for instance when factories on an industrial estate belong to the same group of companies, common employment policies can be devised. Hours of work, general conditions of service and sometimes basic rates of pay can be unified for the site as a whole and a great deal of friction between factories can be avoided.

A common labour policy may make it practicable to centralize recruitment, to offer better continuity of employment and to improve relationships between management and labour. This helps to improve efficiency and remove one of the most frequent causes of industrial disputes.

Education and training

On large estates, particularly on those with integrated or interdependent factories, a central training establishment with a permanent staff may be set up both efficiently and economically. Such a centre would train personnel in manufacturing processes and give instruction in specialized subjects such as safety or works study.

Design and construction facilities

The care and thought put in the initial layout and planning of an industrial estate should be continued in developing and arranging the individual factories. On the best estates, this is achieved by setting up a centralized service responsible for design and construction of factory buildings, under the direction of the estate management organization. This will maintain high engineering and architectural standards both for standard factories and special-purpose plants. Arrangements of this type have to be made at the earliest planning stage.

The central organization responsible for site development and building design should also supervise the site construction work. Sometimes, its services may be extended to cover assistance to tenants with respect to installation of manufacturing plant. This applies particularly to the specialized estate and is discussed in more detail later.

The composite factory or industrial complex

The benefits resulting from the concentration of industrial plants are maximized when a family of manufacturing plants supplying each other with raw materials and intermediate goods is located on a common site. A concentration of this type is often referred to as a composite factory or sometimes as an industrial complex.

Inasmuch as a composite factory can take full advantage of all the common services and facilities associated with size, it is an advanced form of industrial estate. It differs from the industrial estates described earlier by the fact that, instead of catering for a wide range of industries, it concentrates on a series of interrelated products.

An example of such association is to be found in the iron and steel industry where successive operations are carried out in the blast furnace and the rolling mill. The integration of these successive stages of manufacture on a single site provides economics in handling, storage, transport, administration and control. Close association between the technical and operating staffs is possible, which ensures that requirements at each stage are accurately known and action promptly taken.

In the petro-chemical industry, many of the basic products are produced in liquid or gaseous form. The storing, packaging and transporting operations may be very costly and, in some cases, involve strict safety requirements. In this industry, there is a strong economic case for siting some of the succeeding processes alongside the parent plant.

Some of the problems associated with the establishment of composite factories of this kind are discussed below and a case study concerning the Milton Works is described in the appendix.

Site selection

The selection of a site for a composite factory involves a number of economic and technical problems.

The project will in general be large enough to yield the economies of scale necessary for an efficient provision of common services, and a sufficiently large site should be secured. It is not possible to suggest an economic size as this will vary with the type of industry concerned. In some cases 100 acres may be sufficient and in other 1000 acres may be necessary. A site can be too large as well as too small; on a very large site, for instance, a problem of moving personnel about may be important. In any event, allowance should be made for natural expansion of factories. Space should be allowed for roads, streets, service ways, service buildings and plants, landscaping and parking.

The land should be reasonably flat and capable of being drained economically. The sub-soil should be capable of carrying a reasonable load without recourse to piling.

Good communications are essential and easy access by road and rail should be available. In some cases dock facilities may be required either for the receipt of raw material or the shipment of finished products; their availability may be a decisive factor in the selection of the site. In some cases the

availability of raw materials or fuel may be the deciding factor. In all cases the location of markets for the finished products should be taken into consideration.

Experience shows that in general it is much easier to move industry than it is to move people. Other things being equal, it is preferable to choose a site which is easily accessible to a settled population rather than to try to attract people to an isolated industrial site.

On a large site it is often practicable and economic to generate some of the common services such as steam and power on the site itself. In all cases it is essential to ensure that water is readily available for both industrial use and domestic purposes.

The problem of the disposal of waste, solid and liquid, is of major importance in many industries. Ground on which spoil and waste can be tipped must be available within easy reach of the site. In the same way the disposal of factory effluent must be considered as well as that of domestic sewage and surface water.

It is seldom possible to find a site which meets every possible need and priority should be given to those factors which are most important to the industry considered.

Site layout and development

As the full development of a large estate may take ten, twenty years or more, it is not possible to forecast the needs of some of the industrial plants that may eventually have to be accommodated. However, steam, power, water and drainage will be required by all industries and should be planned and installed at an early stage; their capacity should be determined taking into consideration probable future needs. A network of access roads should be built before the factories are erected.

The configuration of the ground, the shape of the site and the most suitable outlet for drainage will determine to some extent the route to be followed by the main drainage system. This, in conjunction with the most suitable positions for access to main roads and rail connexions, will limit the number of alternative schemes for the broad development of the site. Consideration should be given to prevailing winds, possible fire hazards and any difficulties that may arise from dust and dirt, smoke and other nuisances.

The size limits for individual plots should be determined at the time of laying out the site. It is usually found that the most economical way to lay out a large site is to use a rectangular grid pattern, the roads, drains and service ways forming the backbone of the grid.

The final plan should allow for economic and progressive development of the site, while maintaining as much flexibility as possible.

Design and construction

The development of a large industrial site requires a high degree of co-operation between the various authorities interested in the venture. Success will depend to a great extent on the way the activities of these authorities are co-ordinated by the estate management corporation. As this body is responsible for the layout and development of the site, it will have to conduct all negotiations with local, regional and other authorities and arrange with the public utilities for the supply of the essential services. It must also plan the distribution of services on the site and see that these are installed as and when required. To co-ordinate the work of consultants and contractors and organize the work on site, an adequate and competent staff organization should be set up.

The amount of capital required to develop a large site is considerable and thorough planning of design and construction is needed to employ it productively within a reasonable time. Design, procurement and construction should follow a strict time table. While each job has to be treated individually, experience has shown that all kinds of construction projects follow a somewhat similar pattern - a problem to which a great deal of attention has been devoted in recent years. It is now possible to make an accurate forecast of the time needed to complete a given job and the amount of labour required at any given time to keep work going at maximum speed.

There are many types of programmes in use in modern planning techniques. The bar type is the one most commonly employed. This is easily understood and can be varied in type and in detail to suit circumstances. A simple example is shown in figure 1.

The interval between design and construction depends, among other things, upon the time needed to procure materials - an important factor which is not always appreciated. Some overlapping of design and construction can be tolerated but ample materials must be available if construction is to proceed at full speed. Some operations can only follow a set sequence and design and erection must not be planned to meet this.

The bar programme, the estimates and past experience make it possible to estimate the personnel required for both design and construction. The build-up of labour tends to follow a fairly well defined pattern. This is illustrated in figure 2 which shows the estimated labour needed to complete entirely different jobs within the specified time. The first example relates to a small

chemical plant built in Britain on a developing site. The second, to a complete factory built on a new site in the United States. The third covers the over-all requirements of a number of separate plants forming a composite factory in Great Britain.

By using estimates of this kind for each job and building them up into a composite picture it is possible to co-ordinate the work on a large site and to plan both the design and construction of the different units so as to make the best use of men and materials. Regular checks on progress are necessary to ensure that work is proceeding in accordance with the programme. At the same time, a check should be made of the cumulative cost. By plotting it against an estimate, guidance is provided as to how the job is proceeding in relation to the estimated cost. Experience shows that the cumulative cost follows in general a well-defined trend. An example of a cost/time graph is shown in figure 3. Any substantial deviation from the line indicates the need for an investigation. As a rule, construction is completed and the plan ready for commissioning when 80 to 90 per cent of the money has been spent. The figure depends upon the time taken to clear accounts and the amount of retention monies involved.

The way in which the actual construction work is organized and supervised will vary with the circumstances and the description given in the appendix of the Wilton organization covers some of the possible alternatives.

The secondary effects associated with industrial development

The establishment of a large industrial complex or estate will affect the surrounding district in many ways, a factor which should be fully considered at the time the selection of the site is under consideration.

Apart from providing direct employment for several thousand people, the enterprise will have secondary effects on the surrounding area and might influence the siting of associated or subsidiary industries. The extent of this influence will depend upon the type and scale of the industry or industries being established, the degree of industrialization already achieved in the area and the location of the markets both for the basic materials and the finished products. Some of the ways in which this effect may be felt are discussed in this section.

Increased employment

Any new industrial development automatically improves the employment situation in the immediate vicinity of the factory and, unless the site has been chosen with a view to absorbing existing unemployed or under-employed labour, new labour will be attracted to the area and the local population will increase. This in turn will create a demand for housing and the domestic

services associated with family life. It will make demands upon public utilities such as water, gas and electricity and on services of all kinds from transport to entertainment.

In Britain it is estimated that approximately three persons are employed in the provision of services (including construction, public utilities, distribution, etc.) for every two employed in manufacturing industry. On this basis, the establishment of a new industry providing direct employment for, say, 5,000 people will indirectly influence the employment of a further 7,500. Taking into account the families and dependents of both the direct and indirect employees, it may be considered that the establishment of new industries providing direct employment for 5,000 persons would provide support for a total population of the order of 20,000 to 25,000. This may be a comparatively small matter in an area with an established population of, say, 500,000, but in a thinly populated area it would mean the establishment of a new town.

Public utilities

Any increase in industrial activity will, directly and indirectly, increase the demand for public utilities. Here again the effect will depend to a great extent on the size of the utilities at the time the factory is built. If they are large, they may be able to absorb some or all of the additional load with only minor modifications or extensions. If they are small in relation to the new demand, considerable expenditure may be necessary for new installations and some time may elapse before these can be brought in operation.

Some of the types of industry under consideration will be large consumers of water which, more often than not, is a public utility. The amount of water used by industry in relation to the total supply varies widely from place to place; in some of the industrial areas of Britain, as much as 60 to 70 per cent of the total water distributed is consumed by industry. Additional industrial demands in these cases invariably involve an extension of capacity. Construction of new reservoirs and associated plants is not only costly but usually requires several years of work. To give an example, the current consumption of water at the Wilton Works is 11,000,000 gallons per day which represents 40 per cent of the 27,000,000 gallons supplied by the public utilities concerned. To provide this amount, major extensions of the reservoirs and supply lines have been necessary.

Similar problems may arise in connexion with the supply of electricity and other utilities. Consideration should be given to these matters at an early stage and time allowed for any new work involved.

Transport

The addition of new industries in any area may involve alterations and additions to road and rail services to cope with the increased traffic. The increase in population will make additional demands on passenger service and the daily traffic between homes and workplaces.

Subsidiary industries

Large-scale establishment of industry in the form of an industrial estate or a composite factory together with the requisite public utilities and services, will tend to encourage other industries to settle in the vicinity. In particular, small-scale enterprises providing goods and services both to the main industries and the increasing population, will tend to develop. In some cases factories making use of some of the products produced on the estate will be set up.

In the case of the composite factory, the subsidiary developments will usually follow the latter pattern. The nucleus of a composite factory is usually a large unit producing a basic product. The subsidiary industries which follow are likely to be those which are closely associated with the particular basic industry. These will naturally vary with the industry and this is best illustrated by considering several different cases.

Chemical plants

Most basic chemicals are not simply sold as end-products of the chemical industry but are used extensively within the industry as intermediates in the manufacture of other chemical and allied products. For this reason the practice has developed to build some of the associated plants alongside the parent one so as to benefit, principally, from savings in handling, transport and storage costs.

The recent rapid development of a wide range of plastics and synthetic fibres based on chemical derivatives is broadening the range of industries closely associated with the chemical industry. This indicates the probability of increased concentration of industry around the chemical plants, to take full advantage of the benefits of close association and centralized services. It is reasonable to assume that the establishment of a basic chemical industry will attract a variety of associated plants whenever a diversified market exists for its products.

Thus, the chemical industry appears to be an important starting point for industrial development. It should be kept in mind, however, that many

technical, commercial, and financial problems are associated with its establishment. The solution of these problems may present considerable difficulties for certain under-developed countries.

Oil refineries

The modern oil refinery differs from the basic chemical plant in that its primary product is sold directly to the consumer without further processing. This has an important bearing on the choice of its site. While many of the technical considerations relating to site selection are similar to those of many other large-scale industrial plants, the commercial factors are of a very special nature and often of great importance. It may thus happen that a site suitable for an oil refinery would have little or no attraction for subsidiary industries.

It is now practicable to transport both liquids and gases by pipe-line over considerable distances and this can influence the siting both of a refinery and of industries associated with its products. Many of the by-products of oil refining are now the raw materials for a very wide range of petro-chemicals and there are many examples of oil refineries forming the nucleus of a composite factory site.

Iron and steel works

The iron and steel industry provides one of the earliest examples of industrial integration. Transport and handling costs form a substantial part of the cost of manufacture. This, combined with the high ratio of raw material to finished products, has resulted in the concentration of the industry in areas where either iron ore or coal are found. While pig-iron from the blast-furnace is an end-product in itself, it is also the basic raw material for steel production; steel furnaces are thus frequently sited alongside the blast-furnaces. As most of the steel produced is sold in a finished form, it is usual to associate rolling mills with steel-making. Thus, the iron and steel industry is usually grouped as a series of integrated plants making up a closely associated industrial complex.

In many cases, the area in which steel is produced is also suitable for industrial development. Industries using large tonnages of finished steel, such as construction engineering and shipbuilding may be desirous of settling near the source of their principal raw material. This in turn, may encourage the growth of associated industries, such as iron and steel foundries, and heavy engineering. The iron and steel industry is undoubtedly one of those which have a profound influence on the development of industry and other economic activities.

Power stations

Although a power station is not a manufacturing plant such as those considered in this paper, it is an essential service to any industrial community. It is also one of the essential pre-requisites to the industrial development of any under-developed country. The technical considerations which have to be met in selecting a site for a power station are very similar to those applying to most industries. As economic operation of a power plant requires a supply of pure water and good communications, the plant can often provide a nucleus for industrial development.

There are many cases where an industry which can make use of waste heat from a power station has been integrated with it; an example is a factory extracting salt from sea water. Since a power station can supply steam as well as power economically, there are obvious advantages in considering a new power station as a starting point for an industrial estate, whenever the other services needed by industry can be easily provided.

Conclusions

The industrial estate is a pattern of industrial development that has proved successful both in the highly industrialized countries of the West and in some of the less developed countries in the East.

It offers advantages to both industry and Governments and the principle can be adapted to meet widely different circumstances. In particular, it is an effective way of setting up large industries, especially when these are interconnected, and compounds of large and small industrial establishments.

To be economic, an industrial estate should be large enough to afford the advantages and economies that arise from size. On the one hand, the economic operation of some of the facilities that benefit the workers such as canteens and medical and welfare facilities, is a function of the number of employees; on the other hand, the economies that result from communal services such as tram and power and rail and transport arrangements are entirely dependent upon the scale of manufacturing activity.

On an average industrial estate of the type sponsored by the British Government - with relatively small factories for light industries - the concentration of personnel is forty to fifty persons per acre. At Wilton, which is sufficiently large and diverse to be representative of the modern chemical industry, the concentration of operating personnel is fifteen per acre. If we take 5,000 as the minimum number of employees for whom good welfare facilities can be economically provided, the minimum size for a fully developed industrial estate will lie somewhere between 100 and 250 acres.

The capital involved will vary widely and will depend entirely on the type of industry being considered. In the case of many small scale light industries it may be as low as £500 per person employed. On the other hand it may be nearer the figure of £12,000 obtaining at Wilton, in the case of a highly mechanized and complicated industry.

The economic advantages which result from the close association of factories on a common site are greatest when the manufacturing processes are dependent upon one another. On composite factory sites substantial savings are possible in handling, storage, transport and administration costs.

APPENDIX

The Wilton Works of Imperial Chemical Industries Ltd.

At the end of the war, Imperial Chemical Industries (ICI) developed an expansion programme based on the realization that the existing works could not accommodate all of the extensions and new plants that would be required.

Since many of the products under consideration were related, it was decided to look for a large site on which any of the firm's manufacturing Divisions could build plants and where common services such as steam, electricity, water and transport would be provided by a central organisation.

After examining sites in various parts of Britain and bearing in mind the wish of the Government that new industry should be located in the Development Areas, it was decided, in 1945, to purchase the Wilton site.

Reasons for the choice of the Wilton site

Size. The factory site extends to approximately 2,000 acres of reasonably flat land.

Suitability for industrial development. Geologically, the ground consists of about thirty feet of clay founded on shale; tests showed that the quality of the clay was such that all normal building foundations could be carried directly on it. The site has a natural fall from south to north, thus offering an economical drainage arrangement.

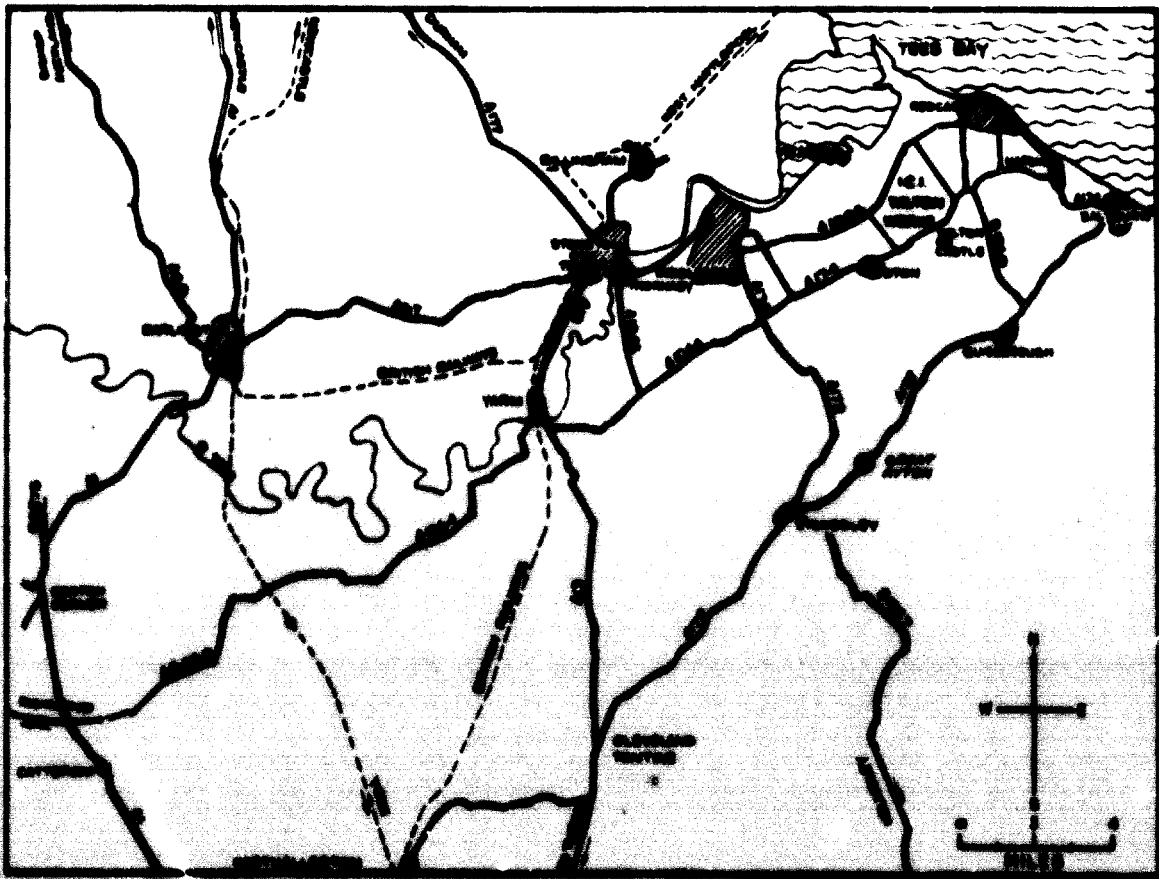
Access. The site is well situated for communications with the surrounding country. Main roads run along the north and south sides and a rail connexion gives access to the British Railways Saltburn-Darlington line. In addition, the Tees Conservancy Commission had developed the already extensive dock facilities in Middlesbrough by constructing an oil berth at Teesport, only 3 1/2 miles from Wilton. This is now linked with the factory by pipeline.

Fuel. The site is near to Durham coalfields.

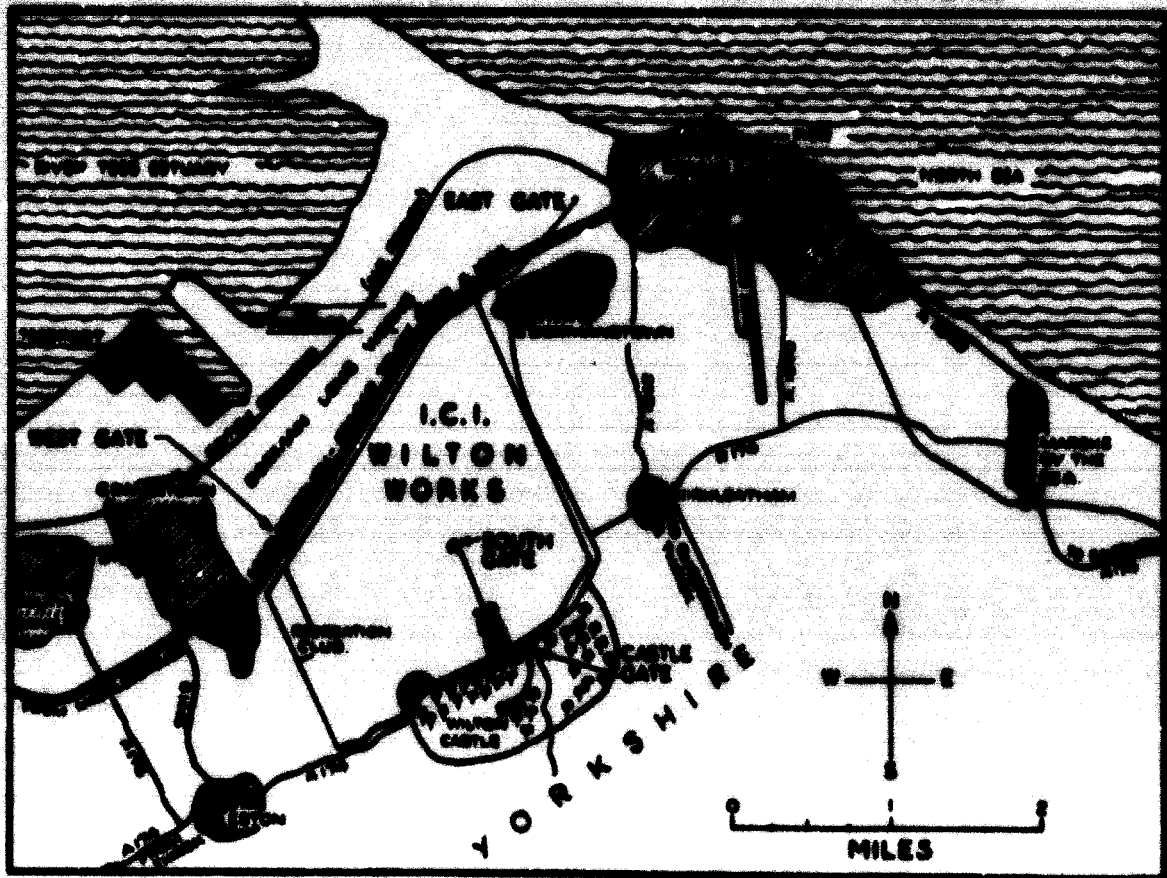
Water. An adequate supply of water is available in the Tees Valley. Potable water is taken from the reservoirs of the Tees Valley Water Board and second class water is pumped from the lower reaches of the river.

Labour. The site is within easy reach of a number of industrial towns where skilled and unskilled labour is available. The Government had been encouraging new industries to settle in the area.

LOCATION OF I.C.I. WILTON WORKS



ICI WILTON WORKS ROAD APPROACHES



Markets. The site is within reach of a number of industrial areas where many of the company's products are sold.

Proximity to Billingham. Wilton had the added advantage of proximity to ICI's existing large chemical works at Billingham on the opposite bank of the River Tees. This made possible the interconnexion of Billingham and Wilton by means of a ten-mile long pipe-link built by ICI. The link, which runs through a tunnel under the Tees, carries liquids and gases between the two works.

Organization

ICI's manufacturing capacity is divided into a number of semi-independent units called Divisions. Each Division manufactures a group of related products and enjoys a wide measure of autonomy. Responsibility for day-to-day management of each Division is entrusted to a Division Board responsible only to the main board of ICI on fundamental matters of finance and policy.

Wilton Works is a complete site on which any of the Divisions may erect plants. Each Division retains complete technical and commercial control of its plant. Wilton is directed by a Council a majority of whose members are the Chairmen of Division Boards with plants established there. The other members are the senior officials of the central organization at Wilton and the Council has the same status as a Division Board.

The functions of the central organization under the Council are:

- (1) to play the layout and the development of the site;
- (2) design, erect and operate all the common services;
- (3) design, in conjunction with the Divisions, the buildings to house their plants, and erect them;
- (4) erect mechanical plants to Division requirements;
- (5) keep capital and operating costs for manufacturing operations at Wilton and pay all operatives;
- (6) provide and operate all canteens, medical and welfare facilities and co-ordinate the company's labour policy throughout the site.

Layout and development

The initial layout of the Wilton Site was designed to accommodate ten plants which formed the first stage of development together with the common services needed for their operation. The design allowed for the extension of all these plants, should that be required at a later date, and made provision for the increase in services which might ultimately be required.

The plan for the first stage was part of a more comprehensive one covering a much larger area and contemplating development at minimum cost of further sections of the site. It made provision for all of the common services required including steam, electricity, water, gas, road and rail transport, workshops, canteens, stores, offices, medical facilities and the Billingham-Wilton "link". It set the pattern for the development of the industrial site whilst leaving a great deal of flexibility in the planning of future plants.

Development followed in stages, a number of division plants being added at each stage together with the necessary increase in common services.

At each stage the complete pattern of development was reviewed to ensure that utmost flexibility was maintained and, at the same time, that economical arrangement of plant and services was achieved.

Work on the site began in 1946 and the first manufacturing plant came into operation in 1949. Development has been continuous: about 600 acres have now been developed and twenty-five plants are in operation while others are being erected or are in the design stage.

Wilton is the largest single project in British chemical history and with the ICI Works at Billingham forms the largest concentration of chemical industry in the world. At the present time the total personnel (including contractors' labour) amounts to 11,700, of whom 75 per cent are concerned with the operation of completed plants and the remainder with the design and construction of new ones.

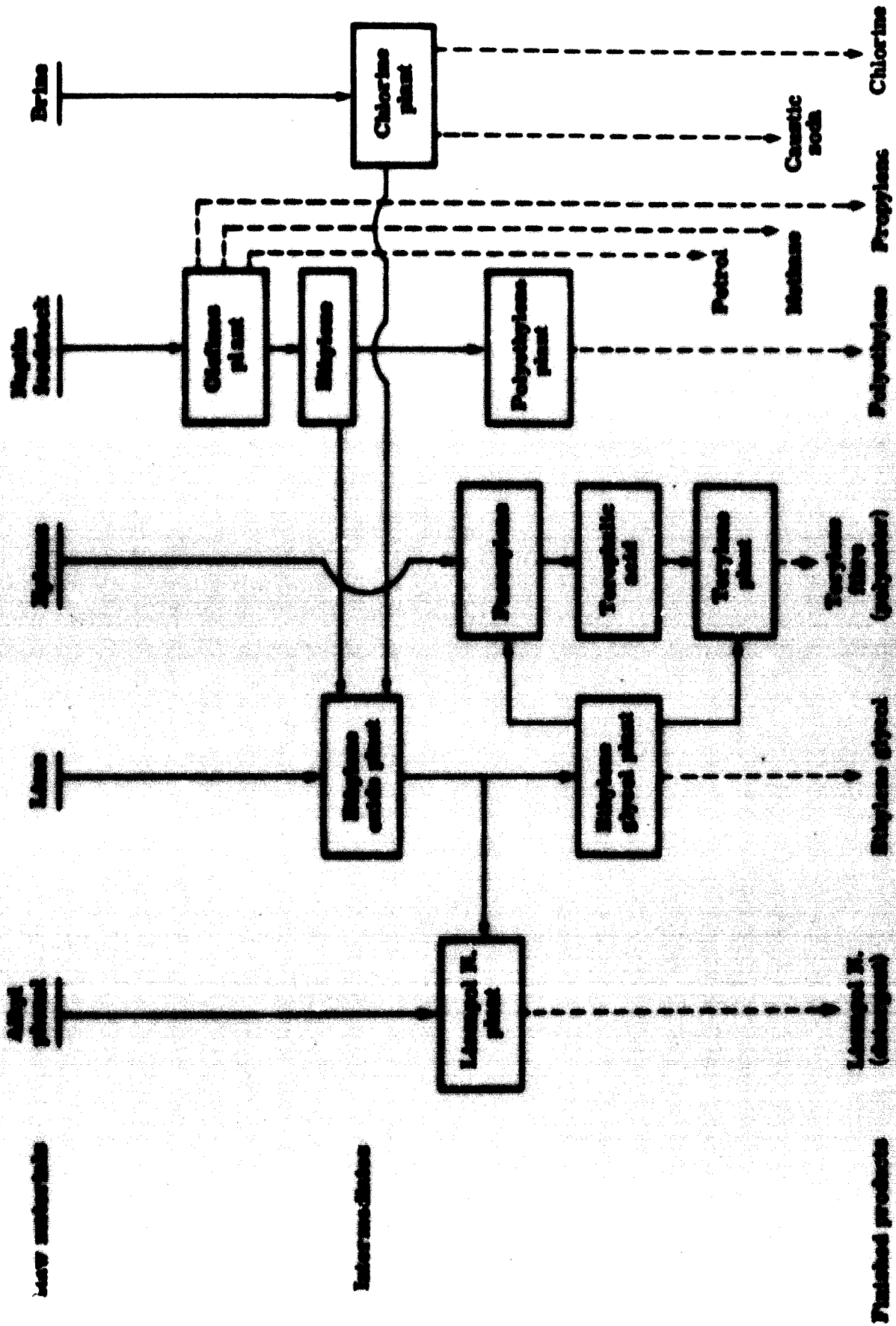
Over £130 million have now been sanctioned, of which £110 million have been spent. Expenditure on new capital works is currently going ahead at the rate of £10 million per year.

Complementary processes

Wilton provides several examples of plants which depend upon one another for some or all of their raw materials.

One of the most important raw materials at Wilton is naphtha, which is off-loaded from tankers at Teesport and transferred by pipeline to Wilton. This is "cracked" in the olefine plants to provide reactive hydrocarbon gases, the principal one of which is ethylene. The bulk of this ethylene forms the raw material for the manufacture of polythene. The remainder is converted into ethylene oxide by a process which used chlorine produced by another of the wilton plants. In turn, a portion of the ethylene oxide is used in the manu-

Figure 6. Typical Flowchart for Integrated Plant



fracture of "Lissapol N", a synthetic liquid detergent, and the remainder is converted into ethylene glycol. This latter is well known as a base for anti-freeze but it is also consumed at Wilton on an increasing scale in the manufacture of "Terylene" fibre.

This particular chain of processes is shown diagrammatically on the attached flowsheet (figure 4). It is a typical case of interdependence of processes and plants which indicates the value of siting associate processes facilities alongside one another.

Although many of the plants at Wilton are to some extent interconnected, some have been sited there to take advantage of the fact that common services are available or because a particular Division was able to make administration savings by siting them alongside one of their existing plants.

Common or centralized services

As all the individual factories at Wilton belong to ICI, it has been practicable to obtain the full advantages of centralization. For that reason, the range of common services is greater than that provided on any of the British industrial estates. Some of these are described below:

Power station

The Wilton power station generates steam in modern boilers operating at pressures of 950 p.s.i. and 1600 p.s.i. (pounds per square inch). The steam is passed through turbo-alternators and is distributed throughout the site at pressures of 250 p.s.i. and 20 p.s.i. Most of the electricity used on the site is obtained in this way and the current capacity is 116,000 kilowatts.

Water

Potable water for steam raising and for domestic purposes is drawn from the distribution system of the Tees Valley and Cleveland Water Board. A separate supply of unpurified water for process use and cooling has been provided by the Board which built a pumping plant on the Tees specifically for this purpose. The total quantity of water at present used by Wilton is about 80 million gallons a week.

Workshop

The bulk of work in connexion with plant maintenance and some of the work for new plant construction are carried out in the central workshops in which over 700 men are employed. There are separate workshops for the assembly, testing and maintenance of electrical equipment and instruments of all kinds.

Supply and stores

The Wilton Supply Department provides a service for the ordering, purchase and distribution of purchased materials for the site. The stores carry a range of some 80,000 items and issue 30,000 items a month by a delivery service to all parts of the site. The stores have 150,000 square feet of covered storage, and have special facilities and equipment for handling and storing many specialized items.

Transport

Transport arrangements within the Works are based primarily on the use of roads for the conveyance of raw materials and finished products. The main rail sidings have been kept to the northern boundary of the site to avoid railroad crossings and restriction of layout and meet special safety considerations which arise when trains are operated amongst buildings. Coal is conveyed from the rail sidings to the central power station by an overhead conveyor and a rail/road transit shed is provided to give a link between rail transport and individual parts of the Works.

Education and training

Most of the workpeople at Wilton had no previous experience in the chemical industry so that training schemes had to be introduced at an early stage. A well equipped training centre has been built where courses are provided for all grades from process workers to managers; workshops, laboratories and a drawing office are used for training young people as craft apprentices, student apprentices and laboratory assistants. The centre works in close collaboration with the local educational authorities and the annual intake of boys and girls is about 250.

Medical centre

A well-equipped medical centre with a full-time qualified staff provides medical treatment day and night throughout the factory and works in close collaboration with the local medical services.

Labour and welfare

A central labour organization deals with all the problems associated with the recruitment and payment of all the directly employed labour on the site. It maintains contact with the Ministry of Labour which has an office on the site, and with trade unions.

It operates the various welfare schemes and assists in the running of the many social activities. Wilton has a very fine sports ground with a clubhouse and gymnasium with facilities for football, cricket, bowls, tennis and golf amongst other sports.

Engineering Design

The engineering design work associated with the development of Wilton can conveniently be divided into three parts.

(1) The design work associated with the layout and development of the site; this was carried out in conjunction with the local authorities, public utilities and other interested parties.

(2) The design of common services within the factory site, including steam, power, road, railways, drainage and service buildings for workshops, canteens, offices, etc.

(3) The design of individual manufacturing plants.

The first two are the responsibility of the central organization and the whole of the work is carried out by the Wilton engineering department in conjunction with the Wilton technical department and the plans and estimates are submitted to the Council for approval.

The design of chemical plants is carried out by the particular Division concerned and may be done in the Division's own engineering department or jointly with specialist contractors. The layout of these plants is agreed with Wilton's central organization which arranges for the services to the plant and in many cases assists with the design of the buildings.

To carry out this work Wilton maintains a whole-time staff of qualified engineers and draughtsmen capable of dealing with the steady load. Peak efforts are met by using consultants and design contractors. This staff maintains close contact with the design staffs in the Divisions and regular meetings are held to discuss matters of common interest. This arrangement has worked well and a similar one will be used at the new composite site being developed near Bristol.

Construction

The construction work on the Wilton site has required a total labour force varying from 2,000 to 5,000 over the last ten years. The responsibility for co-ordinating the work of these men has been vested in the Wilton construction section of the engineering department. The work has included a

wide variety of civil engineering, the building of offices, canteens and workshops and the whole range of work connected with the erection of chemical plants, from foundations and structures to the installation of plant and pipework and the necessary electrical work and instrumentation.

The Wilton construction engineers have supervised the whole of the work connected with the site development and the installation of common services everywhere. In addition, they have, in many cases, undertaken the complete erection of Division plants and, in others have seconded engineers to assist Division engineers at Wilton.

Most of the civil engineering and building work has been let to contract, usually in large enough parcels to justify a national contractor setting up a complete site organization. Specialist contractors have been used for power station work, for pipework and for the installation of specialized equipment.

To provide a complete service and to deal with the numerous jobs where for one reason or another it was not practicable to arrange a contract, Wilton has provided a directly employed construction team varying from 500 to 1000 men. The team has included all the mechanical trades normally required for plant installation in addition to a small building and civil engineering section. In some cases this organization has undertaken complete plants and in others it has been used as a strategic unit available to step up the manpower on particular jobs and so maintain programme dates. This section has also proved to be invaluable, particularly in the early days, by providing a nucleus of skilled men to take over the maintenance of the new plants.

Full use has been made of all modern techniques in connexion with planning and the measurement of progress and extensive use of scale models has been made both in design and in construction.

Bulk purchasing of standard materials has helped to maintain continuity of work and detailed estimates of forward labour requirements has enabled both Wilton and its contractors to obtain the required men and to use them to the best advantage.

With 5,000 men working for fifty or more different employers, the problem of maintaining a happy labour force has perhaps been the most difficult task. There has been a surprisingly large number of minor differences in the conditions of service and payment of fringe benefits not only between districts but between different industries employing the same types of skilled craftsmen. When these practices come together, as is the case on a large construction site, a certain amount of friction arises and the ironing out of these differences has taken both time and patience. For this reason there is much

to be built for a system where all the labour on a major construction job is under one contract as was done, for example, when the Fawley Refinery near Southampton was built for the Esso Petroleum Company.

Effects upon the surrounding district

The area of Teeside in which the Wilton works are situated has a total population of about 600,000. In the past, the area has been dependent mainly on the coal and iron and steel and associated industries.

It was designated a Development Area by the Government and new industry has been attracted to the district since the war. Wilton is the largest of these new industries and has been built more quickly than most of the others. It probably represents 25 to 30 per cent of the post-war development in the area. In addition to the new developments, the basic industries of iron and steel have enjoyed boom conditions in recent years, as a result of which they have spent large sums on new works and extensions.

The combined effect of all this has been that Teeside has grown very rapidly during the last fifteen years. Evidence of the secondary effects is everywhere to be seen.

One indication of this is the rate of house building which, since 1945, has been about 15 per cent greater than the national average.

Another is the estimate of total water requirements for 1965 - 50 million gallons a day against the 1945 figure of 35 million. A large proportion of this will be needed for industry and will involve the building of new reservoirs and pipelines.

Extensions have been made to public utilities and to services of all kinds as a result of the rapid industrial development. Most of this is financed from public funds; although industry has been asked to give guarantees in certain cases, the services are neither owned nor subsidized by it.

As Wilton represents about 25 per cent of the new capital spent in the area since the war, it has had a profound effect on the prosperity and economy of the district. It has provided new jobs for the 11,700 people directly employed at Wilton and has indirectly affected the employment of many more.

SOLE CONTROVERSIAL QUESTIONS CONCERNING INDUSTRIAL ESTATES

By Alessandro Molinari, President, Institute
for Assistance to the Development of Southern
Italy (Istituto per l'assistenza allo sviluppo
del Mezzogiorno)

1. Introduction

Industrial estates, regarded principally as areas of industrial concentration (voluntary, induced or compulsory), are considered one of the most effective tools for accelerating rational industrialization, particularly in economically backward or under-developed countries. However, in view of the wide range of concepts, methods and forms of practical application disclosed by the studies undertaken in this field, it would be very rash to take a stand on the relative merits of the various approaches which have been tried. Only the results of the experiments which have been attempted might enable us to arrive at sound conclusions, but, since these experiments have been conducted by very diverse methods within vastly different societies and have been affected by laws of essentially national character, they do not provide a basis for direct comparisons between one country and another, or even between different areas

1/ The most thorough study to be published so far is Establishment of Industrial Estates in Under-Developed Countries, prepared by the United Nations, Department of Economic and Social Affairs, Division of Industrial Development, United Nations publication, Sales No.: 60.II.B.4. But a considerable amount of additional research remains to be done. In the writer's opinion, one of the first projects should be a synopsis of comparative legislation, covering as many countries as possible and arranged according to a well-planned outline of the subject. In this connexion, one should note the European Coal and Steel Community's publication "Disposizioni per la creazione de nuove attivita industriali" (Provisions for the creation of new industrial activities) in the six member States (Federal Republic of Germany, France, Belgium, the Netherlands, Italy, Luxembourg) and in the United Kingdom. This publication includes a special chapter entitled "Aid to enterprises", which sets out systematically the legal and financial provisions relating to the following subjects: equipping of industrial zones and estates; "pre-constructed" factories; assistance in the construction of industrial factories and artisan workshops. A publication of this type, accompanied by a group of studies on conditions in the various countries (along the lines of the United Nations study cited above) should be supplemented by statistical data gathered by means of an appropriate questionnaire.

within a State. Moreover, the necessary comparable statistics are lacking^{2/}. Again, many experiments are only in the initial phases and their results will not be known for at least a decade. And even then it may not be possible to make use of those results, not so much because of errors in method or principle as because of faults in application.^{3/} Thus it is difficult to isolate the causes of success or failure, and even harder to assign due weight to each cause.

In defining the general concept of "industrial estate" adopted in the present study, it should be specified that, apart from already existing industries which happen to be located in the estate, only "new" industries should be contained in it. As a general rule, there should be no compulsion upon existing industries to move into the estate. On the other hand, "new" industries may be compelled to settle in it (as in the United Kingdom). It is assumed, moreover, that newly-founded firms may be encouraged to establish themselves in the estate; and that thriving industries which are located in areas possibly distant from the estate but less susceptible of future development, but which must nevertheless increase their plant in order to keep pace with the natural expansion of the country's industrial system, may be encouraged to set up additional establishments in the estate. It should also be explained that the term "industrial estate", as used in this study, does not include estates built by private investors with a view to making a profit (a type commonly found in the United States of America).

2. The two contrasting concepts of industrial estates

On the basis of the assumptions made in the preceding section, we shall attempt to deal with those aspects of the problem of industrial estates in which the greatest contrast of ideas, concepts and practice is revealed.

One of the most striking of these contrasts is to be found between two concepts which may be described, in general terms and with considerable simplification, in the following way. On the one hand, there is the principle of favouring a large number of small estates, occupied wholly or predominantly by small-scale industries (including crafts, cottage industries and the like)

^{2/} For instance, it would be useful to have figures on the costs of identical industrial products manufactured within and without the estate, in factories which are not too different in size, use similar methods and maintain the same degree of efficiency in their organizational arrangements; but such figures are not available.

^{3/} In Italy, for example, many industrial zones have in the past failed mainly because of the lack of a special agency responsible for management of the zone and endowed with sufficient authority and resources. In other cases, the existence of a special autonomous agency was not enough to compensate for inadequacy of management. On other occasions, the causes of failure were to be found in the political principles determining the creation of the zone. See A. Molineri and C. Turco, Il problema delle zone industriali in Italia, Rome, December 1958.

with a high concentration of labour. On the other hand, there is the principle of bringing together, in a few vast areas, large or very large industrial combinations with a high concentration of capital, as "development poles" or "centres of gravity" around which would be created a thick network of medium-sized and small-scale and, if possible, highly labour-intensive, industries. The first concept finds considerable support, and has been widely applied in India and other, very under-developed and densely populated, countries of Asia; the second is representative of other under-developed countries and regions, e.g., Mexico, Brazil and southern Italy.

There are other, secondary elements which may be found in these two concepts but may be disregarded for the purpose of this first approach to the problem.

To simplify the terminology, the first type of estate will be designated hereafter as "small estate" and the second type as "large estate", although these terms do not accurately reflect the differences between the two types of estate.

3. Small- and large-scale industries

Before we examine the principles underlying the two contrasting concepts, we must study the meaning of some of the terms used in defining them.

With respect to the first concept, we must consider what is meant by "small-scale industries".

Ideas on this subject are rather confused, and no international statistical definition exists. In countries where there is an ancient and well-established tradition of small industries or even of medium-small industries, as in Japan, the terms "small-scale industries" and "medium-small industries" are regarded in practice as applying to industries employing less than 200 or 300 workers and having a capital investment not in excess, for example, of 10 million yen (approximately US\$28,000 or 17 million lire). In Italy, industries having not more than 500 permanent employees (workmen and clerks) and a capital investment not exceeding 3,000 million lire (approximately \$4.8 million) are considered medium-sized and small-scale industries for the purpose of granting loans to promote the industrialization of southern Italy, where medium-sized and small-scale industries are the rule. In India, where industrial estates are occupied exclusively by small-scale industries, the latter are defined as undertakings having a capital investment not in excess of 500,000 rupees (105,000 or 65 million lire). A few years ago, another element of the definition was that such undertakings employed fifty workers or less when power machinery was in use, or one hundred workers or less when power machinery was not used. In fact, the average factory located in an industrial estate in India has from ten to fifteen employees. ^{4/} In

^{4/} On the basis of the figures stated, the investment per employee would range, in approximate figures, from 500/800,000 lire in Japan to 1.3 million lire in India and 6 million lire in Italy!

statistical studies as well as in current speech, it is customary to regard as small-scale industries only those undertakings employing ten workers or less. The difference between ten, fifty, 200 and 500 employees is so great that the figures do not provide a sound basis for anything other than superficial conclusions.

It is difficult to find undertakings of optimum size among those employing fifty workers or less.^{5/} An for some manufacturing processes, optimum size can be reached only in plants employing 200 workers or more. However, it should be emphasized that although the number of employees is the figure most commonly used in statistics to measure the economic size of an undertaking, it is certainly not the most rational criterion of economic size, since it disregards many more meaningful factors such as the volume and value of total output and per capita output, per capita value added, investment per employee, and so forth. ^{6/} The

^{5/} With respect to the concept of optimum size, Joe S. Bain, in Barriers to New Competition, Harvard University Press (Cambridge, Massachusetts, 1956) page 53, observes:

"The scales of plant or firm (as measures in designed rates of output) at which the lowest attainable unit costs are attained are referred to as optimal scales. There may be a range of alternative optimal scales for a plant or firm in a particular industry if, after a critical size necessary for lowest costs has been reached, further increases in size will neither increase nor decrease unit costs. The smallest scale at which a plant or firm may achieve the lowest attainable unit cost may be referred to as the minimum optimal scale of the plant or firm.

"In these terms, significant economies of scale to the plant or firm exist if its minimum optimal scale is a significant fraction of the total scale or capacity of the industry, and if, in addition, unit costs are significantly elevated at much smaller than minimum optimal scales."

^{6/} Bain, op. cit., in his study of twenty typical United States industries, uses the following of many classifications of industries based on varied economic aspects:

- (A) Classification of industries according to the importance of scale economies: (1) Industries with very important aggregate scale economies (automobiles, typewriters, tractors); (2) Industries with moderately important aggregate scale economies (cement, rayon, steel, shoes, farm machinery, petroleum refinery, soap); (3) Industries with relatively unimportant aggregate scale economies (meat packing, flour, canned fruits and vegetables, tyres and tubes, liquor, cigarettes); (4) Unclassified industries (copper, gypsum products, metal containers, fountain pens) (see pages 140-141).

(B) (continued on following page)

economic size of two factories employing the same number of workers may differ greatly, according to the use that is made of power, modern machinery, etc.

Nevertheless, we may accept the antithesis between small-scale industries at the one extreme and large-scale industries at the other as providing a preliminary, rough practical basis for this study, particularly since this is merely a first attempt to define the problems in approximate terms. Naturally, in such an unrefined classification small-scale industries may be regarded as beginning with very small units, cottage industries and crafts, and ending with medium-sized undertakings employing 200, 300 or 500 workers, which may represent the manufacturing unit of optimum size in some branches of industry.

4. Survival and growth of small-scale industries

To secure a better understanding of the essential differences between the two contrasting concepts of industrial estates, it is necessary not only to make a thorough study of the concept of small-scale industry but also to trace the reasons why small-scale industry has survived and now coexists with large and very large industries not merely in Japan, which is considered the paradise of small-scale industry, but in the United States of America as well. In Japan, not only do small-scale and large-scale industries coexist, but the increase in the number of workers in small-scale industries has been greater than the increase in the number of workers in large-scale industries during the same period of time. 7/

6/ (B) (cont'd) Classification according to capital requirements for a single optimal plant: (1) very large capital requirements per plant (generally above 100 million); steel (from 265 to 665 million); automobiles (from 250 to 500 million); petroleum refining (from 225 to 250 million); tractors (4125 million); cigarettes (125 to 150 million); (2) large capital requirements per plant (generally 10 to 50 million): rayon, liquor, cement, tyres and tubes, soap, meat packing; (3) moderate capital requirements per plant (generally 2.5 to 10 million): fountain pens, metal containers, gypsum products, canned fruits and vegetables; (4) small capital (generally under 2 million): flour, shoes, meat packing; (5) non-classified industries (capital requirements not estimated): typewriters, farm machinery, copper (see page 158, table XVII).

7/ In Japan, the number of workers in small plants employing from four to forty-nine employees increased between 1950 to 1955 by 33.4 per cent, while the number of workers in plants having 200 or more employees increased by only 17.9 per cent during the same period (Tokutaro Yamataka, "Illogicality" in Japanese Small Business", in The Annals of the Hitotsubashi Academy, Vol. X, No.2, Tokyo, December 1959, p. 143, table 2). In Italy, fifty years ago the industrial census of 1911 had indicated that very small businesses (employing from two to ten workers) constituted an extremely high percentage - 90.8 per cent - of all industrial undertakings and accounted for 33.8 per cent of all employed persons. In subsequent censuses the percentages changed in the following way:

	<u>All industries</u>		<u>Manufacturing industries only</u>	
	Units	Employees	Units	Employees
1911	90.8	33.8	92.7	36.8
1938	28.4	26.3	28.1	29.8
1951	38.5	28.7	37.7	21.7

(continued on following page)

This report not being the place for an extensive study of the subject, we shall confine ourselves to stating, briefly, the reasons for the survival and growth of small-scale industry. We shall take Japan as an example, since that country is often regarded as a model by the under-developed and over-populated countries of Asia now on the threshold of industrial, economic and social development. In such countries the crafts, cottage industry, domestic industry and small-scale industries frequently constitute the only, or the predominant economic activity in the manufacturing sector. These industries are sanctioned by a powerful tradition, but they also meet a vital need by supplying an irreplaceable outlet for an expanding population which has long since saturated the agricultural labour market and has no other employment opportunities. The social aspect of the problem, therefore, has become predominant and has obscured the economic aspect, or has relegated it to a secondary position.

7/ (cont'd) The disastrous war interval (1940-1945) hindered any modernization of the manufacturing industry, so that in 1951, at the end of the period of reconstruction and repair of war damage, matters were in almost the same condition as before the war. Only in the following decade, with the rapid resumption of industrial development under the influence of a cycle of marked economic expansion, was there a noticeable trend towards larger industrial units, although exact statistics on this point are not available. About 1950, very small-scale undertakings employing one to ten workers (in the preceding figures, those for undertakings employing two to ten workers were used in order to permit of a comparison with the industrial census of 1911, which did not count units employing only one worker) gave the following percentages (for manufacturing industries only):

	ITALY (1951)	JAPAN (1953)	U.K. (1949)	U.S.A. (1947)
Percentage of businesses	95.2	77.8	77.1	48.6
Percentage of employees	32.1	19.9	9.6	3.3

We must however add the caveat that the data relating to the number of units are not meaningful because very diverse criteria have been used to define the basic unit of the industrial censuses (firms, plants, establishments, undertakings, technical units, local units, etc.). Nevertheless, when it is a question of small-scale units (for example, those employing fifty workers or less), differences in the definitions of the basic unit have less effect on the comparability of the data relating to the number of units.

For other details, see International Labour Organisation, "La grandeur des établissements industriels", Revue internationale du travail, June 1956.

The reasons for which small-scale industries have retained such remarkable vitality in competition with large-scale industries may be summarized as follows:

- (a) small-scale entrepreneurs often pay low salaries and earn poor income (sometimes less than the average worker's wage), despite aid and inducements provided by the State (loans on favourable terms; technical assistance; aid to co-operatives of small-scale entrepreneurs, etc.);
- (b) small-scale industries can produce under conditions more favourable than those of large-scale industries only in special or exceptional circumstances - for example, when demand is irregular and limited (and generally local); when raw materials and other elements are supplied in small and irregular quantities; when they can take advantage of a supply of local raw materials which is not sufficient to sustain a large-scale industry in continuous operation; when social insurance burdens are evaded (at least with respect to the entrepreneur and the members of his family who assist him);
- (c) small-scale industries are making increasing use of power and machinery.

This last point deserves further consideration. In the past thirty years a new, modern form of small-scale industry has grown up, which produces good tools in the shape of very small machines adapted to small-scale industries. In recent decades this gradual evolution in the technological standards of small-scale industry has brought about a noticeable change in the traditional structure of that industry; and the process is still going on. One of the main features of the new structure consists of continuing relations with large and medium-sized industries, through special arrangements and sub-contracting agreements for the production of machine parts and equipment mass-produced by large-scale industry. This practice is spreading and in many instances small-scale industries have become departments, as it were, of large-scale enterprises.

These changes are important because they foreshadow the future shape of small-scale industry. Contrary to the pessimistic predictions of the past, small-scale industry, provided that it is located close to the large and medium-sized industries which are its customers, is destined to become a permanent part of a more developed industrial system, spontaneously and without dependence on incentives or special aid. While of course this means a progressive reduction in the autonomy and independence of small-scale industry, the latter can continue to subsist for a long time on the power and energy generated by large-scale industry.

In other words, there is now a more active trend towards symbiosis between large and small-scale industries. It is therefore likely that a rational matching of very large, large, medium and small industries, within certain limits and subject to the requirements of a specific national structure, will become the cell in the connective tissue of modern industry. This means that

the deliberate separation of medium-sized and small-scale industries from large and very large industries would amount to dealing a severe blow at the regional or national industrial economy. In other terms, the viability of the small-scale industries of the future depends on the gradual transformation of these industries in the manner described above, and on their integration, in proportions not yet determined, with very large, large and medium-sized industries.

This is one of the decisive arguments against the creation of industrial estates occupied exclusively by small-scale and very small industries.

But, aside from prospects for the future, the present position of isolated small-scale industries is characterized by certain features which threaten the existence of such industries, even in Japan where they constitute the backbone of industry and export as a whole. A Japanese expert in this field has shown that small-scale industries, despite their vitality:

- (a) are exhausted by competition and exist to a large extent by social "dumping" - that is, by paying very low wages - thus perpetuating wretched living conditions;
- (b) generally produce goods of inferior quality;
- (c) save very little and consequently invest very little;
- (d) are equipped at a very low technical level;
- (e) even when united in co-operatives receiving state aid, are not able to free themselves from dependence on trading capital, obtained on unfavourable terms, for the sale and distribution of their products;

8/ Of course, this does not apply to artistic handicrafts, in which man's manual skill is applied, with varying degrees of imagination and artistic feeling, to a small output; the problem of their concentration in an industrial area does not arise.

There is also a fairly large group of activities in the field of non-artistic crafts, serving the village or city neighbourhood in which the craftsman and his family reside (carpenters, blacksmiths, tailors, tinsmiths, plumbers, small-repair mechanics and the like). Such activities involve but a few persons - often simply the master and the shop-boy or family member who assists him. They cater only for an irregular clientele, among the people of the village or neighbourhood; possibilities for expansion are limited. This group of activities is likewise not generally regarded as "industry", and there would be no point in making room for it in an industrial estate, even of small size.

9/ See Tokutaro Yamanaka, "Japanese Small Industries during the Industrial Revolution", in The Annals of the Hitotsubashi Academy, vol. II, No. 1, Tokyo, October 1951; "The Nature of Small Industries", in The Annals of the Hitotsubashi Academy, vol. IV, No. 1, October 1953; "'Illogicality' in Japanese Small Business", op. cit.

- (f) are rather poorly managed and administered, again because of financial weakness;
- (g) never act as leaders or innovators.

But the most interesting analysis made by this Japanese author bears on the amount by which per capita value added decreases as we go down the scale from large to small industries in Japan (1950), the United Kingdom (1949) and the United States of America (1947).

He finds, as might be expected, that in all three countries the per capita value added declines as the size of the plant decreases (the same would probably be true of any other country). Specifically, if per capita value added is calculated on the basis of 100 for plants with 1,000 or more employees, the per capita value added in small-scale businesses employing ten to twenty workers, and twenty to twenty-five workers, is as follows:

	<u>In businesses employing</u>	
	10 to 20 workers	20 to 25 workers
United States (1947)	89.0	93.3
United Kingdom (1949)	90.0	92.2
Japan (1952)	36.3	45.4
Japan (1955)	33.0	40.0

The substantial differences shown by these figures cannot be ascribed to the differing importance of the various branches of industry within the national structure, since the same author has made an analytical study, according to branches of industry in the three countries, which has confirmed the existence of these disparities.

Such comments are not intended as an argument for doing away with small-scale industries or for impeding their growth; as we have seen, there are social considerations and other good reasons to justify the existence and growth of small-scale industries, particularly in the more modern, advanced form described above in which they establish relationships of interdependence and complementarity with medium, large and very large industries. But it is irrational and uneconomic for a government programme, established with a view to extending and accelerating industrialization, to make use, as an instrument, of "small industrial estates" occupied exclusively by small and very small enterprises which have a low level of productivity, maintain low social, economic and technological standards, and are incapable, by definition, of setting an example in drive and growth.

The foregoing observations cast serious doubt on the prospects for success of industrialization policies which rely too heavily on small-scale industries 10/. And we have still greater doubts as to the effectiveness of plans to establish numerous small or very small industrial estates, occupied exclusively by small-scale production units, spread over extremely wide areas, and generally located near small inhabited and rural centres incapable of providing the "growth" economies peculiar to large urban communities. 11/ The application of these policies, in India for example, involves the creation of an extensive network of imposing economic and technical assistance facilities, and thus constitutes a heavy drain on an under-developed country's

10/ In this connexion, see the interesting and valuable article by Anjan Datta, of Calcutta University, "Some General Reflections on the Place of Small-Scale Enterprise in Industrial Development", in Athaniti, vol. II, No. 1, (Calcutta, November 1958), pages 23 to 39.

11/ In India, for example, in occupied factories on industrial estates established by the Government the average number of workers per factory is less than fifteen. The industries in question are therefore very small, and clearly below the minimum optimal scale. According to statistics covering more than fifty industrial estates, the average size of the smaller factories is a little more than 100 square metres (1,300 square feet), the smallest units being 28 square metres (300 square feet), while the average size of the larger factories is approximately 350 square metres (3,800 square feet); the largest factories have an area of less than 1,000 square metres (10,800 square feet), which a committee of experts nevertheless judged to be excessively large. In the recommendations received in 1960 from the Indian Small-scale Industries Board, industrial estates having an area of less than four hectares (ten acres) are considered small estates, while those covering an area of more than twelve hectares (thirty acres) are regarded as large estates. In Italy, on the other hand, the size of the old industrial zones in operation varies from a minimum of twenty hectares (fifty acres) to a maximum of 1,100 hectares (2,750 acres), and these zones have been deemed excessively small. The new industrial zones of southern Italy of the larger type may have an area of 200,000 hectares (500,000 acres), and the smaller nuclei may cover 100 hectares (250 acres) (see further section 6, footnote 13, and section 12). In India, the Government seeks to discourage the establishment of industrial estates in the larger urban centres. Of the present 120 estates, fifty are located in or near centres with a population of less than 50,000 inhabitants, and the tendency is to steer estates towards the smaller towns and the rural areas. (For the information cited, see United Nations, Establishment of Industrial Estates in Under-developed Countries, op.cit., pages 17 to 25).

limited reserve of experts and technicians. ^{12/} ut even if, through such enormous effort and expenditure of resources, the minute nuclei of small-scale industries were kept in existence and their productive efficiency increased, the contribution to industrialization and its acceleration in the countries adopting such policies would be very slight. In sum, the considerations set forth above seem adequate to justify the statement that "small industrial estates" are condemned to stagnation from the outset.

The kind of small-scale industry which we have described as gaining ground in recent decades would find more congenial surroundings near large-scale and very large-scale industries; it would derive substantial benefits from proximity to these industries, and would be actively encouraged to improve its operations - in particular, to adopt more efficient and profitable methods of internal organization and distribution of products.

There is another danger which should not be overlooked. In estates intended for occupancy by small-scale industries, a government agency must establish a large number of infrastructure facilities that are essentially indivisible, and must furnish connexions with large-scale infrastructure facilities at the State and national level outside the estate (see section 8) as well as with individual installations within the estate

No matter how modest they may be, such facilities will probably be out of proportion to the dimensions of "small estates" of the Indian type. Consequently the costs of the infrastructure facilities per unit product for a "small estate" are much greater than they would be for a "large estate" in which there was considerable mass production.

This "diseconomy" is accentuated by the hostility to the enlargement of industrial estates that is encountered now and again. However, if the economically desirable policy of establishing genuine industrial estates of the kind described in the next section is substituted for the concept of "small estates", existing infrastructure facilities should be rebuilt de novo. While these facilities are too large in comparison with the size of the present estates, they will probably be inadequate if the "small estates" are greatly expanded.

6. The concept of the "large industrial estate"

The features most characteristic of the other, opposite concept of industrial estates, which we have called the concept of the "large estate" (see section 2), are:

12/ In India, to encourage the creation of industries maintaining a high level of productivity, restrictions are sometimes placed on the use of old or second-hand machinery in certain industrial estates; selected lists of preferred industries, based on intensive studies and containing a statement of economic and social considerations, are published. High-quality common facilities are provided (foundries supplying ferrous and non-ferrous castings; modern forging shops; testing laboratories; metal treatment shops; presses; instruction centres; depots for raw materials; technical information centres, scientific and technical motion pictures, etc.). Cf. United Nations, op.cit., pages 23 to 25.

- (a) the creation of a small number of vast estates, 13/ on the lines of the British Development Areas;
- (b) the location of the estate in a generally over-populated and predominantly agricultural district, where any new infrastructure facilities required can be built so that present and future needs will be fully met, and where environmental factors favour the reception and promotion of productive investment;
- (c) the installation, in the main centre of the estate, of one or more large industrial complexes which require capital-intensive investment and engage in mass production; 14/
- (d) the establishment of a close network of medium-sized and small-scale industries (or very small-scale or handicraft industries) near main industrial complexes; these industries should be located at suitable points, not necessarily immediately next to large industries but having good connexions with them, as well as with the points of arrival and departure of raw materials and finished products respectively. The various branches of industrial activity, including those with high or medium labour intensity, should be properly represented in the network;
- (e) the establishment of an appropriate agency, which should in most cases be public, to supervise the preparation and implementation of plans, the transfer of land under favourable conditions, and the construction of all infrastructure facilities (and possibly of industrial buildings for leasing); in short, the proper functioning of the estate;

13/ Size may be determined not only by surface area but also by the population inhabiting the area. In Italy, for example, the small industrial zones built in the past generally involved a small part of a single commune. Now, according to the new concepts of "large estates", industrial zones in southern Italy may cover an area of about 2,000 km² (or 772 square miles); theoretically, a circle with a radius of 25 km (15.5 miles), which must contain a minimum of 200,000 inhabitants and may include as many as 2 million (see section 10). The eight British Development Areas range from a maximum of 9,969 km² (3,718 square miles) (Scotland) in area to a minimum of 172 km² (66 square miles) (North East Lancashire). The population of the areas varies from over 2 million (2.4 million in the North Eastern Development Area; 2.6 million in Scotland) to the minimum of 90,000 inhabitants. Cf. A. Molinari and C. Turco, op. cit., for Italy and A. Reynell, La politica inglese di localizzazione dell'industria (1937-1959), VINEZ, Rome 1960, for the United Kingdom, and United Nations, op.cit.

14/ In some countries, these large complexes determine the kind of technology which will predominate in the estate (iron, metallurgical, chemical, petrol, textile and other centres); however, well-chosen medium-sized and small-scale industries from different fields of activity are not excluded.

- (f) the preparation of a "master plan" for the industrial estate which, taking account of the specific requirements mentioned under preceding heads, and of all those of the existing community which can be foreseen, will form a directing plan for the industries, the main arteries of communication and their lateral connexions, and the technical services (provision of electricity for light and power; the piping of water, steam, gas, compressed air, and the disposal of sewage; port installations, etc.). The master plan should also embody modern solutions for town-planning problems (localization of industrial and service buildings, of workers' houses and residential areas, open spaces, sports and recreational areas, etc.); it should do the same in the field of education (elementary and vocational schools, training centres, etc. [cf. section 10] and social problems.

7. Selection of location and preparation of master plan

The condition mentioned in paragraph 6 (b) is particularly important. It may be appropriate, when first examining the question of the selection of the location in which to establish industrial estates, to refer to the method used in the case of southern Italy. That region has been divided into three "homogeneous" areas on the basis of their relative capacity to absorb large and economically productive investments. The writer made the following statement on this matter in a paper submitted to the conference held at Tokyo in April 1957 under the auspices of the "Congress for Cultural Freedom":

"To have a concrete example of the solution of this problem I would like to refer to the results of some studies made in collaboration with the CENIS (Center of International Studies, Cambridge, Massachusetts, United States of America) concerning the economic development of southern Italy.

"We have identified in southern Italy (123,000 square kilometres [47,490 square miles] with a population not far from 20 million inhabitants and a density of 162 inhabitants per square kilometre [or 421 inhabitants per square mile]), three big "homogeneous" areas. The first one is not considered suitable, either for industrial investment or for important investments in other productive sectors. With some rare exceptions we do not envisage this zone, for the time being, as suitable for industrial investment. This zone covers about two-thirds of the area of southern Italy and 50 per cent of its population.

"This area is characterized by a serious lack of both natural resources and social overhead capital, by a density of population too high if related to the existing resources. Floods, soil erosion, etc., are the first difficulties to be overcome here, and public works must be undertaken as a preliminary measure of any substantial improvement in the local standard of living. Government action must be directed merely to improve the general conditions. There does not exist greater opportunity for local permanent employment. Public investments will have to be undertaken

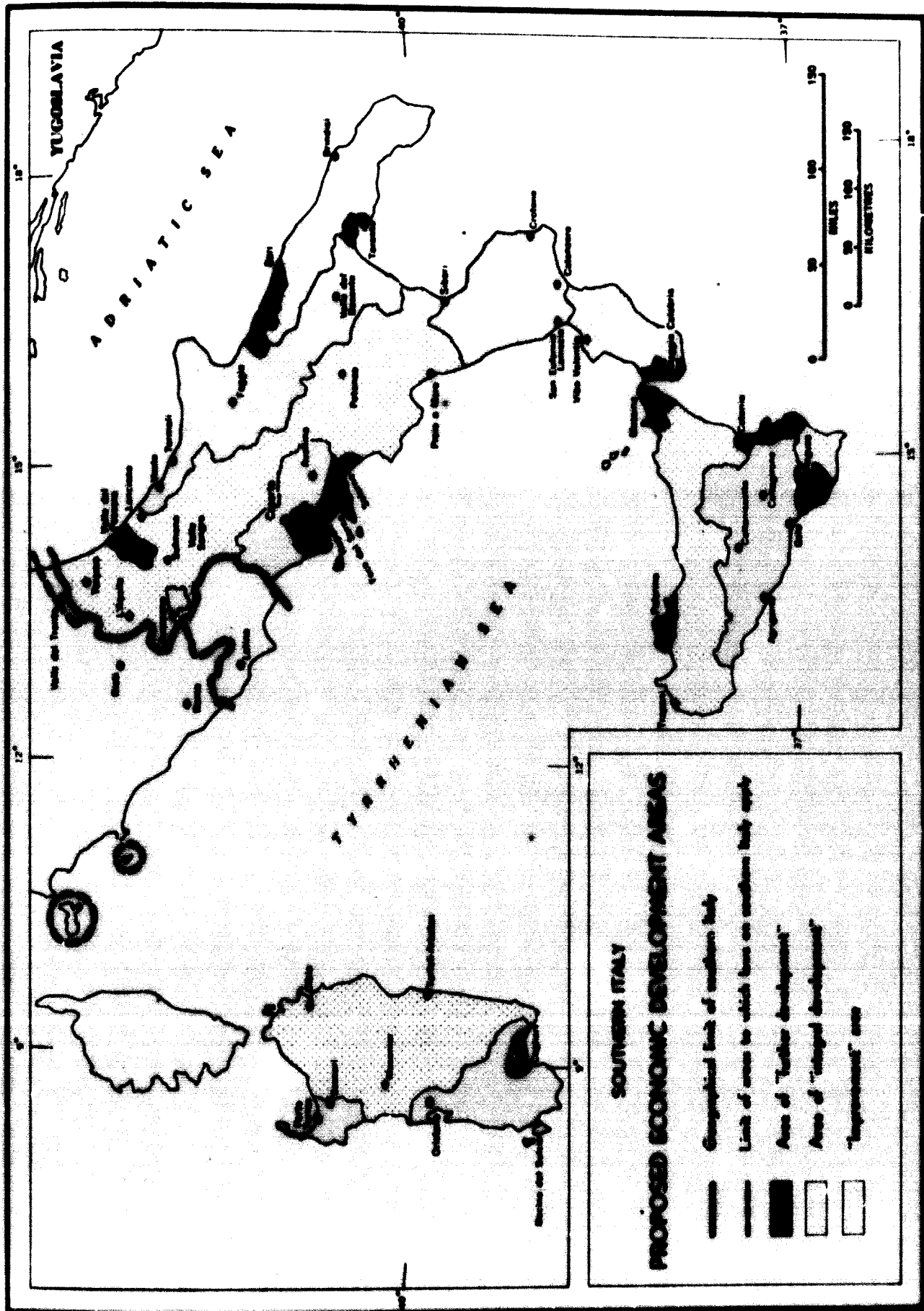
simultaneously with intensified action to promote emigration, both abroad and to the rest of Italy. The poverty of local resources will be apparent if we consider that a great part of the territory is mountainous, water is scarce and mineral resources almost inexistent. We have called this area zona di sistemazione (improvement area).

"A second area - called zona di sviluppo ulteriore (area of further development) - is centred around the cities where industry and trade have developed to a certain extent and have an evident and great opportunity to be developed further in the future. This area covers only 5 per cent of the southern Italy territory and 25 per cent of the population. The density is very high, about 1,000 inhabitants per square kilometre. We have here a great concentration of social and technical capital in industry, in agriculture and in tertiary activities. The possibilities of a further exploitation of natural resources are rather scanty. In this area we find also the bigger size of industrial units.

"The third kind of area possesses still untapped or not sufficiently exploited resources (reclaimable land with great possibilities of irrigation, water resources for electric power production) - where handicraft, cottage and small-scale industries have already attained a certain degree of development. These areas offer the greatest possibilities of investment. They have been termed zone di sviluppo integrale, i. e., areas of integral development, because it is possible and convenient to channel investment in all the sectors of economic activity. This area represents about one-third of the territory and 25 per cent of the population of southern Italy."

As regards the "master plan" mentioned in paragraph 6 (f), this should also provide for the installation and administration (possibly at government expense) of the following services in the area:

- Technical research centres working in conjunction with the research centres of large industrial firms established on and outside the estate. (The research centres of large complexes are already able to produce rapid solutions for a large number of technical problems, particularly those of a more elementary nature pertaining to small and medium-sized industries on the estate.)
- Technological centres for the use of all the enterprises on the estate (testing laboratories, foundries, glass works for laboratories, and so forth).
- Training centres providing vocational and basic instruction.



MAP NO. 1328 1971 "SOUTHERN ITALY"
 SOURCE: Author's compilation for the sviluppo dell'industria nel Mezzogiorno (Sotenza), AUGUST 1962

- Centres providing technical, commercial and organizational advice, and economic and financial assistance. Such centres should play an important role in the area, particularly in connexion with the extension of modern systems of organization on the technical, administrative and commercial levels to small and medium-sized industries. ^{15/}

The aim therefore is to establish a veritable "industrial district" which may, by stimulation and experiment, act as leader in the process of economic and social development.

8. Infrastructure facilities

A full examination of the basic characteristics of large industrial development areas must include more information regarding infrastructure facilities. This term covers a considerable amount of heterogeneous works and equipment. Their particular characteristic is the fact that they are not physically part of single enterprises or of individual establishments, but are used by them as well as by the entire industrial estate.

Infrastructure facilities may be divided into two major categories. The first category includes broadly based infrastructure facilities which extend throughout the country, or, in the case of very vast countries, throughout a state or region - such as important lines of communication (roads, railways, rivers and canals, airlines and large ports), power stations and grid systems, telephone exchanges, etc.

The other category consists of secondary infrastructure facilities which become more extensive around and within industrial installations. Secondary infrastructure facilities may, in turn, be subdivided into two groups:

- (a) infrastructure facilities designed for true industrial services, either within the estate (roads crossing the estate; common transport; power stations or transformers; water-works, steam works, etc.), or on the perimeter for connecting the estate with the broadly based infrastructure facilities (in order to facilitate, for example, the flow of labour and of merchandise, telephone communications, etc.);
- (b) infrastructure facilities of a civil and social character (not of a purely industrial character) used by the whole community as such (town-planning facilities, houses, open spaces, schools, hospitals, clinics, etc.).

^{15/} P.N. Rosenstein-Rodan (Technical Progress and Post-war Rate of Growth in Italy, Milan, 1960) has drawn particular attention to the fact that a good deal of technical progress (with lower capital/output ratio; higher capital/labour ratio; increasing returns) may take place "without change in technical knowledge" (inventions), but with the introduction of "new previously not used, although known, methods of production". He ascribes "as much weight to increasing returns as to true technical progress" in this particular type of progress.

All these infrastructure facilities need not of course be established immediately, but it is essential that they should all be planned in advance and located at the most appropriate points. 16/

In countries with a socialist economy, secondary infrastructure facilities may be programmed and constructed more or less simultaneously with basic infrastructure facilities. In countries with a non-socialist economy, secondary infrastructure facilities are generally constructed only after private enterprise has decided to locate establishments on the estate. This can explain, at least in part, why the under-developed countries with socialist economies may be expected to take the lead in the process of industrialization over the non-socialist backward countries.

The amount of the various types of infrastructure facilities needed cannot be stated. It can only be noted that it will be at a maximum when the estate is destined to become an area of "integral" economic development (see section 10). It has already been pointed out elsewhere (see section 5) that infrastructure facilities on small estates are more expensive per unit of output than those on large estates because they have to attain a certain minimum (indivisibility). In other words, the small estate is unable to support the economic burden of constructing modern and costly connexions, particularly with the broadly based infrastructure facilities (national roads, main railway lines, etc.). Moreover, small estates are unsuitable, without complete reorganization, for servicing more extensive areas when, as is desirable, they are to be considerably enlarged. Thus it may be affirmed that the small estate eventually stifles its own development.

9. Advantages of "large" estates

First of all, the advantages to be obtained from the presence of large or medium-sized establishments (on the optimal scale), which tend to be more numerous in large estates, must not be overlooked. There is, in the first

16/ In industrial localities which have grown up rapidly and spontaneously, it is distressing at times to see houses, huts, workshops, shops, canteens, restaurants and the like (frequently without hygienic services) jumbled together, sometimes blocking communications or rendering them unusable. Such makeshift infrastructure facilities are destined to be pulled down in the more or less early future.

17/ Thus, the reduction in costs of production and distribution of the introduction into the domestic market (and eventually also the export) of tools and machines for the more depressed sectors (agriculture, small scale industry, transport, etc.) which employ such labour - thereby increasing their output. Moreover, high-intensity capital investment results in higher profits and savings, with consequential increase in investment. The cost per unit of output tends to be lower, ceteris paribus, in the larger-scale production producing the same article. High-intensity capital investment is also essential in the first stage of the initial development process (such as, for example, power stations, cement factories, and also steel works which are now regarded, in the under-developed countries, as forming an integral part of infrastructure facilities or indeed as a complete infrastructure in themselves).

In addition to the aforementioned advantages, viewed from the micro-economic standpoint, there are those resulting from the large estate regarded in its composite whole as an economic "complex". Examples of such advantages may be set forth briefly as follows:

- (a) The industrial, economic and social environment of the large estate maximizes the advantages of the external economies;
- (b) Infrastructure facilities are used with the maximum efficiency; medium-sized and small-scale enterprises located on large estates benefit, at little or no cost, from general services (designed for large industrial complexes) and from external economies;
- (c) It is possible and more economical on the large estate to organize, with the help of large industrial complexes, efficient qualifying courses for labour and centres for spreading technical programs, which penetrates only very slowly in small firms, isolated or grouped on small estates;

17/ According to Bain, op.cit., page 53, "Economies of the large plant or firm are reflected in a decline of the production and distribution costs per unit of output as the plant or firm is increased in designed productive capacity and if at the same time it actually produces at the successively larger designed capacities. The decline in unit costs with increases in the scale of plant or firm will ordinarily tend to be encountered over a certain limited range of increasing scales of plant or firm, and then cease to be encountered if the scales of plant or firm are increased still further." It may be useful to quote in this connection the conclusions of an investigation into industry in the United Kingdom: "We measured efficiency in the four different ways (high physical output per head, low prime costs per unit of physical output, high value of net output per head, and high value of gross output per head) for the homogeneous trades... we found that ... efficiency increases with size" (National Institute of Economic and Social Research, Occasional Papers, XI, Productivity, Prices and Distributions in Selected British Industries, by L. Costas, Cambridge University Press, 1942, page 45).

- (d) Large estates constitute a powerful stimulus in attracting new domestic and foreign capital;
- (e) The process of spreading the benefits of industrialization outside the estate is facilitated and accelerated;
- (f) Within the radius of the vast area from which labour is drawn, "mixed" family economies are established, that is to say with incomes derived partly from agriculture and partly from industry. This new type of family economy is also helpful to agriculture;
- (g) In the modern industrial world, large enterprises engender the establishment of small and medium-sized industries (connected with the former by special contracts: see section 4); the effect here is therefore the opposite of what was experienced in the last century.

It is also necessary to consider the more long-range economic and social advantages to be derived from the existence of the zonal "complex" as such. Although studies and experience in the matter are not available, it may be inferred that such complexes have cumulative economic effects greater than those of a type of industrialization which is dispersed and scattered.

Moreover, technical development tends, with some rare exceptions^{18/}, to increase the size of the operative units and plants^{19/}, thereby continually reducing the importance of small-scale industrial units.

At this point the question arises whether the concept of the large estate - requiring considerable investment of long-term capital with delayed productivity - may be applied to under-developed and over-populated countries which lack capital and where there is little inclination to save. In the first place, it is noteworthy that in all over-populated and densely populated countries, whether with a capitalist or a socialist background, the approach to economic development always begins with the construction of large industrial complexes and with important public works of an infrastructural character. In the south of Italy as well as in Latin America, in India or in Russia or in China, investment in large complexes of a high capital intensity cannot be postponed. Modern economists, moreover, agree with this line of action, particularly in the case of the more backward countries, in which such types of investment may even become an indispensable condition for eventually giving more scope to high labour intensity investments.

18/ See, for example, Organisation for European Economic Co-operation-European Productivity Agency, Small Mill-mills (An Economic Inquiry), Paris, 1960.

19/ See the monographs submitted to the Milan meeting (1960) on "Technological Progress and Italian Society". For example, Gian F. Micheletti, Trasformazione tecnologica delle macchine utensili e dei trasporti interni; A. Scortecchi, Rapporto sul progresso tecnico dell'industria siderurgica Italiana; I. Persano, Il progresso tecnologico dell'industria Italiana della carta; L. Callino, Aspetti dell'evoluzione organizzativa negli stabilimenti "Olivetti"; and other sector monographs (automobiles; mining industry; textile industries; cement; electromechanical industries; etc.).

External assistance is of course essential and, in fact, has never been lacking in the case of Russia, India or China. However, as we point out in the following section, the technique for granting loans or assistance to under-developed countries, and the methods used, will have to be more intelligent and reasonable than in the past.^{20/} In view of the formal international undertakings assumed in this matter by the countries belonging to the two great power blocs in the world, it would seem unreasonable to assume that there will be such a shortage of capital as to prohibit the construction of industrial estates of the type indicated.

The conclusion, therefore, is as follows: since large complexes must be constructed, it is wiser to locate them on large estates of the type mentioned in section 6.

10. Industrial estates or economically planned areas

In section 7, when speaking of the concept on which the large industrial estate was based, we mentioned the "master plan" for the large estate which, according to the Italian concept of industrial zones, forms the central pivot on which the whole system of public and private works and participation needed for the construction of the estate turns. Such a plan is regarded not only as a means of regulating the orderly installation of industries but also as a veritable "integral" plan for the economic and social development of the large zone. In other words, industrialization is considered not as an end in itself but only as a lever, an instrument designed to break up, in radical fashion, the poor and backward environment of a vast area which in Italy, as we have said, may cover as much as 2,000 square kilometres [772 square miles] and include, in some cases, up to 2 million inhabitants, but which may cover an even larger area, as in the United Kingdom. This approach may be justified on the basis of three considerations:

- (a) It was true in the past, and it is still true, that some enterprises which are located in poor, over-populated and agricultural areas - generally in order to exploit the natural resources of the locality, or to utilize low-cost energy or important infrastructure facilities (harbours, railway lines, etc.) - bring only very little benefit to the population of the area (apart from persons employed in the enterprises), even after they have been established for decades. (Examples of this have occurred in the south of Italy, in Calabria, in Sardinia and in Sicily). In such cases the function of industry may be compared with its action in the early days of colonialism: all profits go abroad (or to other areas of the country), with not even a part of them invested in the area, in the surrounding territory or in the country itself.
- (b) If the industrial estate is to achieve the purpose for which it is established, it should become an area of attraction for enterprises, capital (domestic or foreign) and manpower, whether the latter be managerial or supervisory personnel (originating from other more

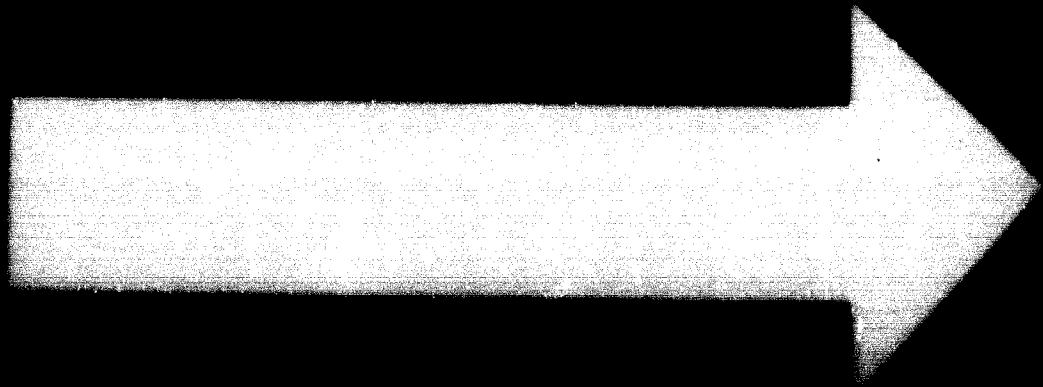
^{20/} See F.W. Rosenstein-Rodan, International Aid for Under-developed Countries Cambridge, 1961 (cyclostyled).

developed areas of the country, or (from abroad) or simply unskilled labour. The estate should therefore have the same function as industrialized areas in developed countries. For that reason, it should have the facilities and the attractions (including the amusements) of large urban and industrial centres: schools, education centres, open spaces, modern houses, markets, rapid and cheap means of communication (particularly telephones), and infant schools; maternity and child welfare centres; sports grounds, etc.

- (c) Since the transition from extensive agricultural activities to industrial activities gives rise to economic and social difficulties and tensions, positive economic and social measures designed to prevent and cure them should also be prepared, in the shape of the introduction of co-operatives, trade unions and welfare workers; plans for the use of leisure time; satisfactory hygienic and environmental conditions; measures for preventing usury; development of intensive agriculture; installation of service centres (for the hiring and repair of agricultural machines, tractors, various tools, and implements and machinery for handicrafts, small-scale industries and the like); and the diffusion of mass communication media (radio, television, technical journals) etc.

Priority should be assigned, within the framework of a national plan for economic and social development, to the gradual construction of such large industrial estates, regarded as "integral" development zones. They should furnish evidence of the under-developed State's ability to give partial implementation to its national plan for economic and social development. These considerations explain why international aid to under-developed countries should not be confined to single short-term self-liquidating projects - which are the concern of the normal banking institutions - but should finance the plan as a whole and, in particular, its partial implementation in large industrial estates, through long-term loans, with larger appropriations in the early stages.

Specific arrangements of this kind obviously cannot be made for small industrial estates, owing to the restricted area occupied by the industrial nuclei, which bring no benefit to civil and economic organization or to town-planning. The presence of a very small industrial community, employing some hundreds of persons at the most, has no appreciable influence on the economy of the rural centre any more than on its civil organization or town-planning.

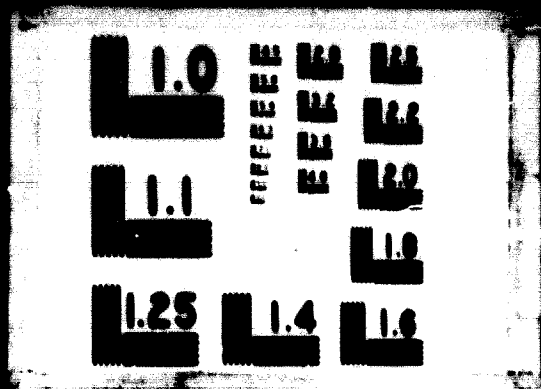


15. 7. 74

9 OF 9

DO

3 7 3 6



11. Selection of locality

The selection of the locality in which the industrial estate is to be established is not always easy. The difficulty is not only one of identifying appropriate territories for investment, reference to which has been made in section 7, or of evaluating local conditions (unemployment; existence of a minimum of infrastructure facilities; consumer markets; labour and energy resources, etc.), but also of settling a question of principle regarding the participation of public authorities. The question may be put in the following terms: is the area for the industrial estate to be selected by the central (or local) authorities, or, in countries where the principle of freedom of action for private property prevails, should private individuals be permitted to make that choice, leaving to the State the sole task of encouraging the installation of entrepreneurs and private capitalists in the estate by means of appropriate incentives?

The selection of the area for industrial development is generally left to the central authority both in highly developed countries (like the United Kingdom) and in economically under-developed countries (a priori selection). In some regions however, such as the south of Italy, it is not considered appropriate for such a decision to be made by the central authorities. In the case of southern Italy, special legislation (adopted in 1957 and 1959) leaves the selection of the zone in general to local initiative, in the sense that the local authorities (Chambers of Commerce, regional, provincial and communal administrative authorities), in agreement with an original group of investors (private or public), request the central authority to establish an industrial zone. This request is examined by the central authority, which will only permit the establishment of the new zone if it is satisfied that a

fairly wide range of special "minimum prerequisites" exist (see attached selection).

Information on the criteria applied in the south of Italy for the establishment of industrial zones may be found in various publications. See, for example, the present writer's Le zone industriali in Italia, op. cit. 1961 (printing), and United Nations, op. cit.

The minimum prerequisites for the establishment of industrial zones in the south of Italy may be classified as follows:

(1) Preliminary condition. The agencies requesting approval for the zone (consortia) must produce evidence that a certain number of entrepreneurs (private or public) undertake to establish themselves in the zone, so that from the outset the area can rely upon a minimum of industrial activity (such as to absorb at least 5 per cent of the population employed in industry according to the 1951 census). A tendency to a concentration of industry must also be shown.

In two of the new areas already approved, large industrial complexes will be installed - one of them under government auspices (a modern steelworks with an annual capacity of 1.5 million tons of steel and employing 5,000 workers, on an area of 200 hectares [500 acres] at Taranto), and the other by private enterprise (at Brindisi, for the construction of a large plastics plant which will employ about 1,000 workers on an area of 500 hectares [1,250 acres]).

(2) Essential criteria, strictly applied with no exceptions, as follows: (a) The zone must include, in addition to the main commune (the nucleus), all the surrounding communes - as an absolute minimum - and also, where appropriate, other communes up to a radius of 25 kilometres [15.5 miles]. These subsidiary communes form a reserve or "breathing" area, needed for the construction of working-class or residential districts, for the location of numerous industries, etc. (b) The population outside the main commune (the nucleus) must number at least 100,000 inhabitants so that the total population of the zone will attain a minimum of 200,000. This norm has been established in conformity with previous research in various countries and confirmed by the opinions of expert economists (Colin Clark, for example); it shows that only with a population of between 100,000 and 200,000 inhabitants is it possible to achieve efficient general services (commercial and transport) and optimum economic and functional administrative services (sanitation, schools, etc.) Moreover, in areas of recent economic development, it has been observed that full development for industries can be ensured only in a territory with 200,000 to 500,000 inhabitants. (c) The main commune (the nucleus) must have a population not less than one-third that of the whole area. If the main commune has a population of more than 500,000 inhabitants, the surrounding population must be below one-third of the population of that commune (the nucleus). (d) The territory of the zone should: be mainly flat; not be liable to landslides, flooding or earthquakes; form part of an area suitable for absorbing investment (see section 7); and have basic infrastructure facilities in the nucleus (see section 8). (e) The territory of the zone should also have adequate coal and water (for civil and industrial use) available, or have the possibility of gaining them readily. In addition to these essential prerequisites, the central commune must be supplied with complete social amenities for the zone, and in the economic, economic and social characteristics (such as location of an air-transport terminal, roads, ports, etc.) and its existing infrastructure facilities.

The central authority subsequently approves the statute of the agency which is to supervise the establishment and functioning of the area (consortium), on condition that the statute in question is in conformity with a model statute prepared by the central authority and that the consortium proves that it is capable, financially and economically, of carrying out its functions.

At a later date, the central authority approves (or rejects or modifies) the "master plan" which, as has been said, forms the basic instrument for the construction of the large industrial zone. The "master plan" must likewise be drawn up in accordance with the regulations laid down by the Government, which controls its implementation.

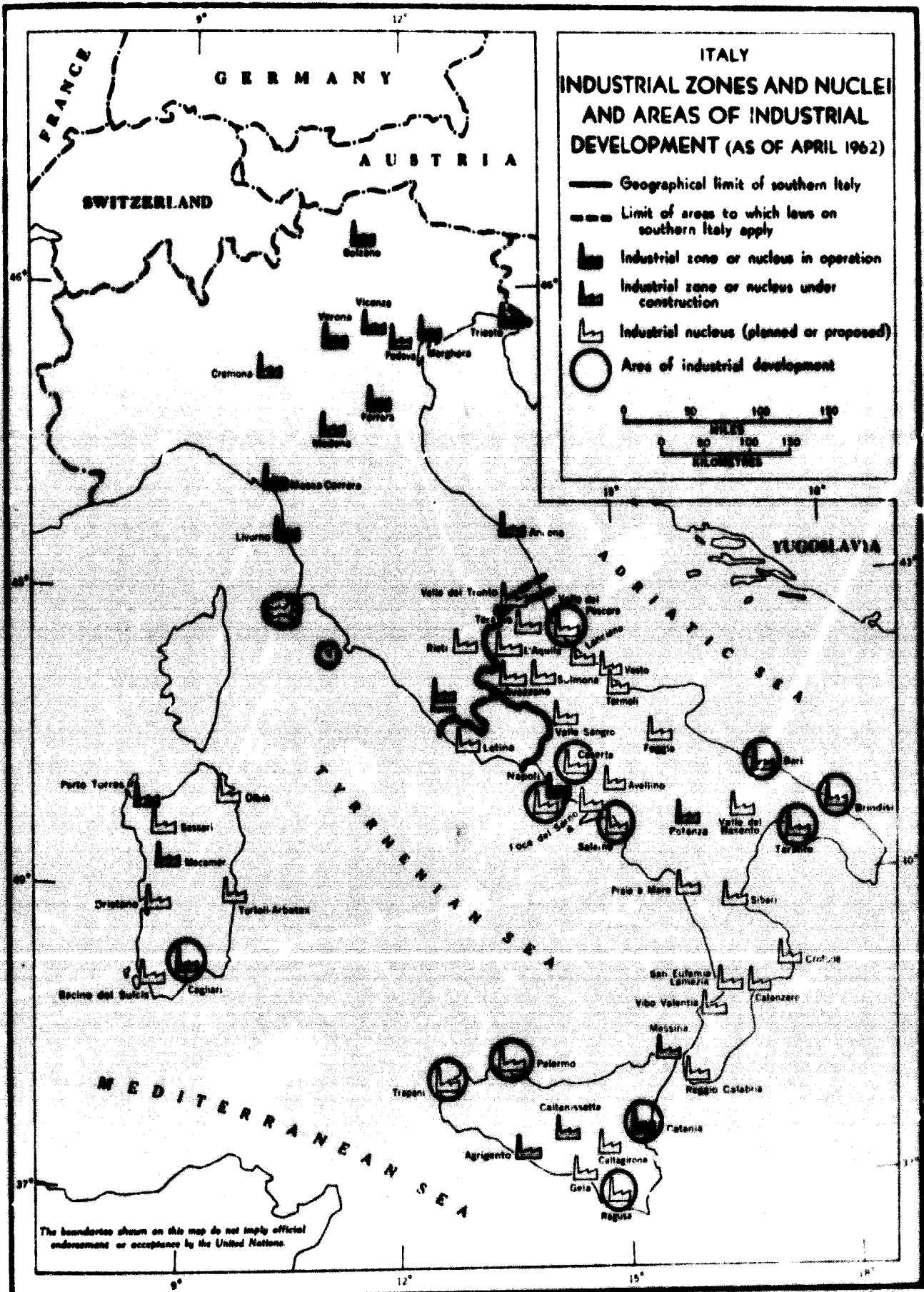
The number of industrial estates is generally not fixed in advance; in the United Kingdom, for instance, and in India, the Government establishes them in successive stages. In Italy, likewise, the number of zones to be established is not fixed in advance. The general principle has, however, been accepted of approving a limited number (probably from seven to ten, with one per region) in order to avoid the risk of a dispersal of resources and capital which might endanger the desired concentration of industries in a few efficient "centres" or "poles" of industrial and economic development.

Another problem related to the selection of the area is raised by the following question: should the location of new industries outside the estate be prohibited (or rendered directly or indirectly very difficult) in order to encourage the concentration of new enterprises within the selected area? Or should the Government confine itself to giving special assistance and encouragement to the enterprise (private or public)?

The United Kingdom, as is well known, has adopted the first alternative as a general rule. In Italy, on the other hand, it has not been deemed necessary to resort to such drastic measures and the aim has simply been to grant incentives in favour of industries which establish themselves in the zone, whilst allowing private enterprise full freedom to locate itself even outside the zone.

12. Recent developments in the Italian experiment

As we have noted, provision is made in Italy, within the framework of the policy for the economic development of the south, for the establishment of large industrial zones based on principles similar to those mentioned in the preceding sections. The Italian Government, however, although relying basically on such zones to accelerate industrial development, decided in 1960 that it was appropriate to grant incentives to smaller zones as well; these are



generally restricted to the limits of a single commune, and are called "industrial nuclei". 22/

This decision, which may seem to conflict with the dominating concept of large zones, was based upon the following considerations:

"Here in a vast radius of territory there are no prerequisites for the establishment of large 'development areas', the existence of industrial concentration may be observed, with population density and services different from those mentioned above (i.e. those in the large areas). Industrial concentration may be divided basically into two categories: 'large concentration', brought about mainly by the existence of many large industrial enterprises which locate themselves in a particular area and draw upon a vast surrounding area and population with special geo-economic characteristics; and 'small concentration', resulting from the agglomeration of a more limited number of industrial enterprises which supply smaller markets and exploit the raw materials existing in the area or some of the natural advantages and infrastructure facilities absent from neighbouring zones.

"The Committee of Ministers for the Mezzogiorno has provided that, in addition to such areas, "industrialization nuclei" may be established which, owing to the nature of their infrastructure facilities, may encourage the process of smaller industrial concentration and thereby reduce the total cost of the installations."

The "industrialization nuclei" will enjoy the same assistance and co-operation as the "large areas of industrial development". The regulations issued continue as follows:

"In order that a 'nucleus' may be approved, it is considered essential that in the locality suggested a tendency towards a certain concentration of industrial activity should be evident. Such a situation will come about, either from the existence of industrial establishments to which new enterprises are to be added, or from the effective desire of new undertakings to establish themselves, proved by the submission of concrete projects of some importance from either the technical-economical or the financial standpoint.

22/ The prerequisites for establishing an "industrial nucleus" may be summarized as follows:

- (a) The territory in question must have an area of not more than 100 hectares [250 acres], to be developed, as a rule, in communes with less than 7,000 inhabitants;
- (b) At least a third of the area must be covered with industrial establishments committing themselves to settle in the territory;
- (c) The area may exceed 100 hectares if the surface covered by the establishments is more than two-thirds of the total area.

Corresponding to the commitments of individual entrepreneurs (i.e. purchase of land, acquisition of loans and contributions for the expenses of installation, submission of projects to be implemented, etc.) is the obligation of the communes and of other promoting agencies to contribute, on their own account, to the cost of equipping the area of the nucleus which it is planned to establish."

Although the "nucleus" is much more extensive than the extremely small Indian estates, it would seem that in Italy an intermediate solution is sought, lying half-way between the two contrasting concepts of the large and the small industrial zone and permitting the coexistence and development of both types of zone.

The success or failure of such an endeavour will depend upon the future maintenance of a reasonable proportion between the large areas of industrial development and the "industrial nuclei".

13. "Small" estates in the pre-industrialization phase

One of the possible arguments in favour of the establishment of small industrial estates (in the sense used in sections 3 and 5) is that it is essential, in the pre-development or pre-industrialization phase, to bring peasants and unskilled labour into contact with the first principles of the industrial process, with the more elementary machines and with motive power, electric energy and the basic notions of chemistry, physics, mechanics, thermodynamics, etc., so that they may be able to construct tools and equipment of an agricultural and industrial nature. The "communes" of communist China are probably based on this principle, carried to its extreme consequences. The greater part of the costs to be borne in this way by the community should accordingly be regarded to some extent as part of expenditure on vocational training.

It is difficult to give an opinion as to the effectiveness of this method even for the sole purpose of encouraging an attitude of understanding and liking for industry, from which the agricultural masses of poor and backward countries are so far removed. It is feared, in fact, that the result may be to produce a worker who can see no further than the few square yards of his factory and the handful of fairly simple machines installed therein. That would be to create an erroneous conception of "true" industry.

It would seem more logical, and certainly less costly, to establish hundreds of vocational schools which would give practical training and inculcate the basic economic notions of large-scale industry. Yet it is easy to see that, while such a method could be employed in the initial phase of pre-development, it could be only provisional and could not be extended beyond that phase.

The problem examined in this paper, however, is concerned with the search for a permanent means of initiating and thereafter maintaining a continual process of industrialization.

Accordingly, if rapid progress along the road of industrial and economic development is desired, it would be necessary at a certain stage to abandon the small estate, and particularly the very small estate which, as we have observed, tends to stifle its own future development. The high initial outlay on the establishment of small estates would therefore, to a large extent, be wasted. ^{23/}

14. Conclusions

The problem of industrial estates as a means of initiating and accelerating the industrial process in under-developed countries, and particularly in those with a high population, is still at the first stage of examination and application.

The present paper has been chiefly concerned with one important and controversial aspect - the preference to be given to large or small estates, the distinguishing features of which it has attempted to identify.

It has been argued in this paper that small estates are definitely unsuitable from the economic standpoint, not only for accelerating the industrialization process but even for making any significant contribution to its early stages.

The large industrial estate - viewed as a prime instrument for rapid industrialization - is presented as an optimum collection of large industries with high capital intensity (forming the central motive force) together with medium-sized and small-scale industries, mostly with high labour intensity. Infrastructure facilities, industrial nuclei and community services in the vast area needed by those industries are located appropriately. In this way, industry becomes a means for promoting economic and social development of an "Integral" kind, involving the whole population of the estate and the neighbouring territory and thereby solving simultaneously, and with single purpose, the economic, town-planning and social problems accompanying such development.

If the arguments in favour of the large and against the small industrial estate have perhaps been set forth in too controversial a manner, this has been done mainly in order to provoke criticism and reflection, which are essential if the right approach is to be found.

Other controversial or obscure points relating to minor problems dealt with in the later paragraphs have appeared in the course of the discussion. One such question relates to the attempt to find an intermediate concept between the two conflicting ideas, through the establishment of "industrial nuclei" as a form of smaller concentration in regions where it is inadvisable to establish large estates.

^{23/} The cost of the small estate in India has been estimated from a minimum of approximately 400,000 to a maximum of \$1 million, depending upon its size.

The special feature of all these problems, and of many others still to be examined, is the fact that an approach to their solution requires continuous collaboration between economists (particularly specialists in macro-economy), demographers, geographers, sociologists, statisticians, jurists, town-planning specialists, industrial and public works technicians, and general planning experts. and all this must go forward pending the better instruction of the investigators by experience which is procurable only over a long period of time.

UNION OF SOVIET
SOCIALIST REPUBLICS

Introduction

Economic development in the Soviet Union has proceeded at a very high rate. In 1960 the gross output of heavy industries in the USSR was 65 times that of 1913. More than 36,000 large industrial enterprises and a considerable number of smaller plants were built, reconstructed and commissioned in this country between 1918 and 1960.

In the last years, the economic development of the Soviet Union has become especially rapid. The long-term plan of development of the national economy for 1959-65, which is being fulfilled very successfully, provides for a total capital investment of about 300 billion roubles ^{1/}, or about the same amount that had been actually invested for the development of the national economy of the USSR during the preceding forty years of Soviet power.

The progress in all fields of economic development can be equally observed in all the Union and autonomous republics, areas and regions of the multi-national Soviet Union.

Before the October Revolution, the Union republics lying in the Asian part of the USSR were backward, semi-colonial territories. The population of these territories suffered greatly from a terrible exploitation, and no attention whatsoever was paid either to economic or to industrial development. In the years of the Soviet power these republics have undergone the greatest changes in the field of economic development. The rate of growth of heavy industries in the central Asian republics considerably exceeds the average rate for the USSR.

The economic development of the Soviet Union, especially in recent years, is characterized by a high concentration of production in all branches of industry on the basis of technical progress, specialization and integration.

Considerable increases in the capacity of separate industrial units, achieved in recent years, have made it possible to increase to the same extent the capacity of whole industries complexes, while improvements in technological processes and in production planning have considerably facilitated

^{1/} One rouble = US\$ 0.90.

the development of specialization in certain branches of industries, particularly in the machine-building industry and of interrelation in other industries, mainly in the iron and steel, petroleum and chemical industries.

In recent years there has been a considerable increase in the size of industrial enterprises and a strong tendency has developed to locate the enterprises of various industries in groups. This is done on the basis of industrial and economic co-operation between enterprises, which provides for the highest economic efficiency in construction and operation.

The problems of group location of large industrial enterprises in relation to industrial towns are referred to by the expression "organization of industrial regions."

An industrial region is a group of industrial enterprises linked by co-operation in production and located so that the distance between them permits the operation of a single and most economical system of power supply, water supply, sewerage, transport, communication lines and storage facilities, as well as a single system of housing for the employees of the enterprises.

The new large industrial regions and their townships are centered around heavy industrial enterprises such as mining, iron and steel, petroleum, chemical, heavy machine-building industries and big power stations. The industrial regions usually also include light machine-building industries, instrument industries, food industries and other light manufacturing industries.

In recent years, a radical change has occurred in the location and development of industrial enterprises in relation to industrial towns. In the past, the enterprises even of heavy industries had limited capacities and occupied limited tracts of land, and could therefore be built within the city limits, thus forming the town's industrial area. Today, even large-scale industrial enterprises require large independent sites and are therefore located far beyond the city limits. This is also necessitated by the fact that industries such as iron and steel, petroleum, chemicals, paper, cement, etc. emit noxious gases, dust and fumes. Although reliable anti-pollution devices are applied, strict zoning regulations are required for large-scale territorial arrangements involving industrial enterprises and their towns.

In general, these regulations are as follows:

Large heavy industry enterprises which are the foundation of an industrial group in a particular region shall be located separately at a specified distance from each other and from the town and be connected with the town by reliable passenger transport facilities.

... which occupy small sites and exhaust insignificant amounts of energy. They are located in groups either in the areas adjacent to the town or even within the precincts of the town. Groups of such enterprises, located either in the outskirts or within the town boundaries form important industrial regions. These industrial regions are integral parts of the town and their planning and architecture should therefore be in harmony with those of the residential districts.

The protection of residential districts against even small amounts of harmful matter emitted by industrial enterprises should be secured by planting green belts and, above all, by limiting to the maximum the emission of pollutants.

Both the industries and the town are serviced by a single regional system of power supply, water supply, sewerage, transport, communications and storage facilities.

Thus the entire group comprising large industrial enterprises, the town with its own groups of small enterprises and regional engineering works, makes an industrial region with a territory which may cover tens of thousands of hectares. Within this territory, the town occupies an isolated place and is located at a considerable distance from the big industrial enterprises.

The socialist economy, which is being developed on the basis of national plans, provides for the following subsequent stages in the formation and development of industrial regions: planning, layout, construction and development. The experience of the Soviet Union in the organization of industrial regions is examined below under these four headings.

The Organization of Industrial Regions in the USSR

Planning

National long-term planning in the Soviet Union provides not only for a high rate in the growth of production and for continuous technical progress in all branches of the national economy, but also for the most rational geographical location of productive installations. It aims at a balanced development of the national economy throughout the Union republics and large economic areas, taking into consideration specialization of production and cooperation on the basis of the division of labour between industries.

On the basis of these main principles of socialist planning, national long-term plans of development are worked out for each separate branch of industry with due consideration for the geographical location of the enterprises in each branch. The type, capacity, structure and product assortment of each large enterprise are determined taking into account the requirements of neighbouring economic areas for the products of that enterprise.

As a rule, the economy of each large economic area is divided into two main industrial groups. The first group includes key branches of industry, the products of which are of all-Union or inter-area importance. It is this group which determines the degree of specialization of the area and forms the basis of its economic structure. The second group includes industries meeting the demand of the first group and utilizing local raw materials and labour. Both groups should ensure the comprehensive development of the large economic area.

At present, the country is divided into seventeen large economic areas, each of which includes several neighbouring economic administrative areas, linked together by common economic requirements. Each economic administrative area has its own long-term plan of development providing for the distribution of productive installations within the area. The total number of economic administrative areas in the Soviet Union is of about one hundred.

The geographical distribution of productive installations in the economic administrative areas is based on thorough topographic, geodetic, climatologic, geological and demographic surveys and an economic study of the area as a whole. The distribution is concerned with both industrial and agricultural production, so as to use in the most effective way raw materials, fuel, power, water and mineral resources; groups of industrial enterprises, so as to find for them the most rational location regarding raw materials, power supply and market and taking into account the advantages of specialization and co-operation between enterprises; towns and townships, with due consideration for optimum population and full use of labour; regional power supply, water supply, transport and communications, and centres for the production of building materials.

Thus, the distribution of the productive installations in the economic administrative areas determines the type and geographical location of industrial enterprises and related towns and townships in the industrial areas.

Each economic administrative area comprises several industrial regions. There are at present in the Soviet Union several hundred large industrial regions. The long-term plan for each region specifies the number of employees of the industrial enterprises of the region, which permits to determine the size of the population of the industrial towns in the region. In the conditions provided by socialist planning, this is a reliable means of controlling the population of the towns and to create the best public services and sanitary conditions.

As stated in the draft new programme of the Communist Party of the Soviet Union, "Full-scale communist construction calls for a more rational geographic distribution of the industries in order to save social labour and ensure the comprehensive development of areas and the specialization of their industries, to work with the over-population of the cities, facilitate

the elimination of essential distinctions between town and countryside, and further even out the economic levels of different parts of the country."

Layout and design

Each industrial region in the Soviet Union is laid out and designed on the basis of the approved long-term plan of economic development of the region.

Since an industrial region includes a group of industrial enterprises interconnected by production co-operation and a single system of works, utilities and housing, the layout of each industrial region is carried out for the region as a whole as well as for each constituent item.

Each industrial region project aims at achieving:

a rational location of towns and townships so as to achieve best land use from the point of view of natural conditions and convenient transportation to the enterprises; an efficient organization and development of regional works and utilities-power supply, water supply, sewerage, transport, communications and storage facilities serving both industrial enterprises and settlements, and an optimum location of industrial enterprises, power stations and other utilities on particular construction sites; the location of building material plants so as to use as much as possible local natural resources - clay, sand, stone, metal, gravel and timber; proper sanitary living conditions, protection of nature and improvement of landscape.

At the same time, the project of construction planning determines the requirements in building materials and elements, building machines, temporary buildings and labour as well as costs, over the construction period.

Thus, the project comprehensively solves the main organizational problems of the industrial region and determines what should be built, where and how.

All designing work in the Soviet Union is entrusted to the state designing offices, each specializing in a given branch of the national economy.

Construction

All construction work of industrial regions, including towns and townships, industrial enterprises, and regional works and utilities, is financed by appropriations from the state budget. "Capital construction," as it is called, is carried out by regional construction trusts with the help of other state specialized organizations. Each trust has at its disposal everything needed for construction: building machines, plants manufacturing all construction materials and elements (regional construction centres) and the required numbers of wor-

kers and engineers. Material resources are allotted by the Government on the basis of the approved capital construction plans. The primary socialist principle of construction is to use industrial methods allowing for the maximum use of prefabricated elements manufactured at specialized plants and their erection at construction site by mechanized means. In every industrial region provision is made for the manufacture of the best building elements from the technical and economical viewpoints, in the smallest possible number of types.

The uniformity of construction elements is secured by single designing specifications; a regional catalogue of drawings for the fabrication of construction elements and products and their application in a particular industrial region, is prepared by the designing organization.

This allows for construction in the shortest possible time, maximum labour productivity, achievement of better quality, and reduction of the cost of construction of buildings, structures and communications.

Development

Development of an industrial region, continuous improvement and development of production are controlled by the state plan and governed by the Soviet of National Economy of the economic administrative area.

All the questions relating to the further development of an industrial region, such as construction of new enterprises, utilities and communications and reconstruction of the existing ones, expansion and reconstruction of towns, are settled first in the plan of economic development of the region, then in projects for the expansion or reconstruction of individual projects, and, finally, in the construction according to the single plan.

The questions of construction of new industrial enterprises or reconstruction of existing ones, which may cause considerable increases in urban population, are considered not only from the point of view of the economic efficiency of new industry in a particular region, but also taking into account the interests of the population in respect to public services and sanitary conditions. The national planning of distribution of industry aims at achieving the proper concentration of industrial production and limiting the resulting excessive expansion of the towns, and, therefore, ensuring the best living conditions for the population.

The basic law of economic development in the Soviet Union is to achieve in the interest of society the highest results at the lowest cost. Accordingly, at all levels of national planning, designing and construction, chief emphasis is laid on the most rational and effective use of materials, labour, financial

resources and natural wealth, and on the elimination of excessive expenditure. Maximum effectiveness of capital investment is achieved by selecting the most profitable and economical capital construction methods, efforts to obtain maximum growth of output per invested rouble, and reduction of time lapse between investment and return.

The principal economic data on effectiveness of capital investment used to evaluate plans and projects are: specific capital investment or increment of production per one rouble of capital expenditure; labour productivity or expenditure of labour per unit of output; unit production costs including transport charges for delivery to consumers. The data for each industrial region are compared with those of other industrial regions of the country with a view to improving the organization and development of the region concerned.

An example

Let us consider, as an example, the organization of the Pavlodar industrial region in the Kazakh Republic in central Asia. This industrial region includes: a group of large enterprises of heavy branches of industry - alumina and aluminium factory, integrated petroleum refinery and chemical plant, and machine-building plant located separately at a considerable distance from one another and from the town; a group of enterprises of light and local industries forming the urban industrial region within the town boundaries; the Pavlodar town where live all the people employed at all these enterprises; regional engineering works and utilities designed to service all industrial enterprises and the town - the single power system including thermal power stations, step-down sub-stations, electric power lines and steam and hot water pipelines, a single regional system of water supply and sewerage; a single transport system including railway junction station and approach tracks to enterprises, a network of highways and garages, river port and airport; and a single regional system of telephone and telegraph communications.

For constructing all the above, a regional construction centre has been organized comprising stone, gravel and sand pits, concrete and brick plants, plants for manufacturing reinforced concrete, steel and wood elements, repair shops and other facilities.

All the projects in the Pavlodar industrial region are constructed by the regional construction organization according to the plan, taking into account the interests of both the industry and the town and following the specified sequence of construction.

In considering the possibility of building a cement plant in this region, it was found that the location of such a plant in the region was not expedient because of possible dusting of the territory and excessive increase in population.

The economic data on construction and operation of the Dnieper industrial region demonstrate the considerable effectiveness of the capital investments made there. The practice and experience of this region are characteristic of those of the other industrial regions organized in the Soviet Union.

Construction and Development of Industrial Towns
in the USSR

The rapid growth of industry in the USSR and the resulting increase in the urban population have resulted in plans for the development and reconstruction of existing towns and the construction of new ones in all areas of the country.

Under the policy of balanced distribution of productive forces adopted in the USSR, new towns have been constructed mainly in industrially underdeveloped areas with a small number of cities, that is, in Siberia, the Far East, central Asia and Kazakhstan.

Between 1926 and 1961, 976 new towns and 1,940 new workmen's suburban settlements have appeared on the map of the Soviet Union. Most of these are industrial towns. A number of old market and administrative towns also have become industrial centres.

In the period covered by the Seven-year Plan of development of the national economy, 1959 to 1965, more than 7,000 large industrial enterprises and about 15 million apartments are to be constructed. The housing resources of the whole country will increase by 1.6 times, and will be equivalent to approximately 180 new towns with a population of 250,000 each. Natural resources will be further exploited on a great scale, especially in the eastern and south-eastern areas of the country. New industrial regions and towns will be organized.

As indicated in the preceding section, the general layouts of towns are worked out on the basis of projects of regional planning of industrial regions taking into consideration the future expansion of the towns within the next twenty to twenty-five years.

The general layouts take into consideration the estimated number of urban population, the direction of territorial extension, the location and method of organization of residential and industrial areas, the location of the town and district centres, suburban and town transport, supply of utilities, organization of public services and amenities and creation of suburban zones.

On the basis of the general layout, plans are elaborated for construction in the next few years, as well as detailed planning projects for the construction of separate industrial and dwelling areas and micro-areas. ^{2/}

^{2/} See footnote 3

The towns are constructed in the areas with favourable natural conditions, for the most part near rivers, open water reservoirs and huge tracts of forest. The suburbs are planned with a view to improving the climate in the town and providing recreation areas for the town population. The housing projects are located in comparatively high and healthy areas, up-stream of rivers from industrial enterprises emitting noxious gases and effluents.

A problem of primary importance is that of proper choice of area for housing and industrial construction. The areas for residential districts are chosen simultaneously with those for industrial construction. Both should present advantages from the point of view of natural and sanitary conditions and should not require an expensive preparation of the site.

Another important problem is that of the proper determination of the scale of development of the industrial towns. The estimated size of the population of a town is the basis for all further technical and economic calculations. It determines the size of the town territory and predetermines to a certain extent its planning structure, the organization of transport facilities, the cubic capacity of public buildings, the capacity of water supply and treatment works, their location, etc. If the estimates of population and future expansion of the town are not done in a proper way, serious difficulties will inevitably appear in the construction and maintenance of the town, to overcome which subsequent reconstruction involving unnecessarily high expenditures may be necessary.

The proper determination of the scale of development of a town in the Soviet Union is ensured by schemes of district planning and general layouts of towns and by close co-ordination of hypotheses on the town's development with the long-term plans of development of the national economy.

A related problem is that of the determination of the optimum size of a town and the corresponding regulation of expansion of existing towns and of new ones.

The optimum size of a town is determined by the highest level of comfort and sanitary conditions obtained at the minimum material and financial cost for the construction of profitable industrial, dwelling and public buildings, equipment, transport and organization of public services and amenities.

Too big cities suffer from grave shortcomings. The sanitary and living conditions of the people in such cities become worse because of the increasing number of industrial enterprises and cars, which contaminate the air with fumes, dust and exhaust gases. Because of heavy traffic, the streets of big cities are noisy and dangerous. To get to their places of occupation the city inhabitants have to cover large distances and waste much time,

energy and money. Considerable expenditures are needed for transportation facilities, water supply lines, sewerage, etc. In a large city, the average cost of total urban construction per one town-dweller is much higher than in a smaller one. On the other hand, the dwellers of small towns also experience much inconvenience, because of lack of necessary material conditions to achieve a high level of comfort.

The planned economy of the USSR permits to control the trends in urban construction and to regulate the scale of development, that is, to prevent on the one hand the construction of giant cities, and, on the other hand, the lagging behind of the development of small towns. The state plans and planning projects limit the number of industrial enterprises to be constructed in big cities, thus keeping in check the resulting increase of population.

In the Soviet Union there exist many small and medium-sized towns with favourable conditions for the development of industry and housing. It is there, as well as in the new towns, that is proposed to carry out most of the new industrial construction. The estimated population of these towns should be within the range of 200,000 to 300,000.

As far back as 1935, when considering the project of reconstruction of Moscow, the Government of the USSR came to the decision to forbid the construction of industrial enterprises in the capital. Similar decisions have been adopted in forty-eight large cities of the country.

The population of big cities in the USSR is restricted and reduced through urban decentralization, that is, by the construction of satellite towns. A number of satellite towns, such as Zhukovsky, Dubny, have been built in the environs of Moscow. At present, the new satellite town of Krukovo is being built near Moscow, in a beautiful and healthy location. The satellite town of Sumgait is under construction near Baku, and that of Rustavi near Tbilisi. The majority of the population of the above-mentioned towns work at local enterprises and research institutions.

The industrial areas are important parts of a town, and to a considerable extent determine its size, as well as the labour and living conditions of the people. In zoning a town, the principles outlined in the preceding section are applied to determine the location of industrial and residential areas. It may be added that, within a given industrial area, the construction of enterprises of different sanitary characteristics and not connected with one another by technological processes is not allowed. On the other hand, common location of enterprises connected by technological processes ensures maximum economy in the construction and operation of transport facilities, electric power supply, engineering works and utilities, etc.

The grouped enterprises are served not only by common sources of electric power supply, water supply, sewerage and gas supply, and by a

single transport system, but also by common auxiliary and repair facilities. Such co-operation has large economic, organization and technical advantages, since it allows for reduction of construction cost, limitation of required site size and length of approach tracks, etc.

The experience gained in urban designing and construction has shown that it is not advisable to allow the creation of too large industrial areas in towns -in practice areas with enterprises employing more than 25,000 workers- because this results in difficulties in regard to both passenger and industrial transport.

In the industrial towns of the Soviet Union, the network of streets is divided into: high-speed town highways intended for heavy traffic at high speeds and connexions to remote residential and industrial areas; arterial streets for public transport, connecting dwelling and industrial areas and public centres; local streets, driveways and footpaths in micro-areas. To isolate transport communications from dwelling buildings, high-speed town highways run through wide green zones; high-speed highways are routed around dwelling areas.

Green belts are created around towns and between industrial and residential areas.

In planning and building industrial towns in the Soviet Union, great importance is attached to the installation of engineering works and utilities for industrial enterprises and dwelling areas and the organization of public services and amenities. To prevent shortages of water, separate industrial water mains are installed and arrangements made for recirculation water lines at industrial enterprises.

As a rule, towns are supplied with electric power from a single regional power system. When connexion to the power system is either impossible or undesirable from a technical point of view, provision is made for supplying electric power to a town from independent power stations.

Steam and hot water are usually supplied to towns from thermal power stations and big regional boiler houses. At present, all new towns and settlements are, as a rule, provided with centralized heat supply systems. Gas is supplied to the dwelling areas from natural gas sources and from special gas generating plants.

*

* *

Among many of new industrial towns constructed in the post-war period (between 1945 and 1960) on the basis of planned industrial development of new economic areas, one of the most characteristic is the town of Angarsk the construction of which was started in 1949.

The town of Angarsk is located in the Angara-Irkutsk-Cheremkhovsky industrial area in Siberia. It is being built as a large power and industrial centre based on the use of water power of the Angara river (the Irkutsk and Bratsk hydroelectric stations) and coal from the Irkutsk-Cheremkhovsky fields. Its population, which is now 154,000, is scheduled to reach 200,000.

The plan structure of the town and the division of the site into functional zones - industrial, transport, residential and recreational - are determined by natural conditions - confluence of the rivers Angara and Kita, high surface relief, existence of forests and of the Siberian railway main line.

Industrial and residential areas are separated by a dense forest belt, two kilometres in length, which affords reliable protection to the dwelling area against fumes. The respective location of the two zones eliminates any possibility of contamination of water reservoirs and air within the dwelling area.

The planning structure of Angarsk is simple and logical. The over-all shape of the town extending from the north to the south follows the topography of natural border. The town has a regular right-angled network of streets. Short and convenient connections are provided between residential and industrial areas.

The system of arterial streets breaks down evenly the territory of the town; it is co-ordinated with the industrial areas, the railway station, the town centre and the park zone as well as with neighboring settlements. The arterial streets divide the town into micro-areas of 25 hectares each ^{3/}. The micro-areas are divided into dwelling blocks located around vast yards with green plantations. Nearby are schools, kindergartens and crèches, small shops and canteens, sports grounds and gardens. In dwelling areas are located clubs, cinemas, libraries, department stores, public buildings, gardens and parks. In the town centres - the buildings of Soviet organizations, the palace of culture, library, park, etc.

^{3/} In the industrial towns of the Soviet Union, the residential areas are subdivided into town districts (with a population of 50,000 to 150,000), dwelling areas (with a population of 30,000 to 50,000), and micro-areas (with a population of 6,000 to 8,000).

UNITED STATES OF AMERICA

The United States industry has a new look -- the planned industrial park, industrial counterpart of the landscaped residential subdivision. The idea of planned industrial parks is not altogether new, since several tracts of land subdivided into industrial sites were planned and developed as single units before 1900. What is new is the rapid and widespread growth of industrial parks throughout the country -- especially in the outskirts of metropolitan areas. Such expansion has been made possible by the development of limited-access inter-city expressways tied to ready-access circumferential highways in the suburbs of metropolitan areas. For example, Route 128, built in the early nineteen-fifties as a by-pass to speed through traffic around Boston rather than along its congested city streets, has generated such a spectacular development of privately financed industrial parks and individual manufacturing plants that it is frequently called "Boston's golden industrial semi-circle."

Strung along the 65-mile-long Route 128 are 209 modern industrial plants representing a total investment of \$140 million and employing 30,000 persons. Most of the plants, including 17 more plants under construction, are within 16 planned industrial parks, in various stages of completion. Land that a few years ago sold for \$1,000 per acre is now selling for \$26,000, and one tract has investments averaging \$185,000 per acre.

Growth of the planned industrial park idea

Why has the planned industrial park idea become so popular? There are many reasons. The industrial park, or planned subdivision for industry, is a logical, man-directed response to present-day trends and conditions in the location of industry in metropolitan areas. Many types of industry are now using horizontal-line production methods best housed in a land-consuming one-story building. More employees are driving to work and parking their cars instead of using public transit -- another factor arguing for more space in the plant site. Space is also required for loading docks and for employee cafeterias and recreational facilities. Furthermore, planners and manufacturers, profiting by lessons from the past, are reserving industrial land for future expansion needs. These trends have forced industry to seek outlying sites in the metropolitan areas where larger parcels of vacant land in single ownership are available and where the land is priced by the acre rather than the square foot. Defense security is another factor of more recent cogency in inviting location of industry at some distance from in-town industrial and population concentration.

✓ It may be noted in this connexion that new plants usually have at least one temporary wall.

What is a planned industrial park? It is a tract of land subdivided and developed according to a comprehensive plan for the use of a community of industries. An industrial park must have utilities, roads and other essential services available -- not just promised -- for the immediate use of occupants purchasing sites in the district. This means that at least a part, or an instalment, of the entire tract is improved, whether it is a single street, several blocks or a larger area.

The comprehensive plan must insure adequate and continuing control of the area and buildings through zoning and private restrictions incorporated as legal requirements in deeds of sale or leases, all with a view to protecting the investments of both developers of the district and of industries occupying the improved sites. The management handles negotiations with local governmental authorities on behalf of the industrial owners or tenants, and it may erect buildings prior to sale or lease for speculative purposes.

Most industrial parks owe their existence to private entrepreneurship and initiative and thus do not stem from governmental planning. There is an increasing tendency, however, for municipal and county governments to sponsor and develop industrial parks.

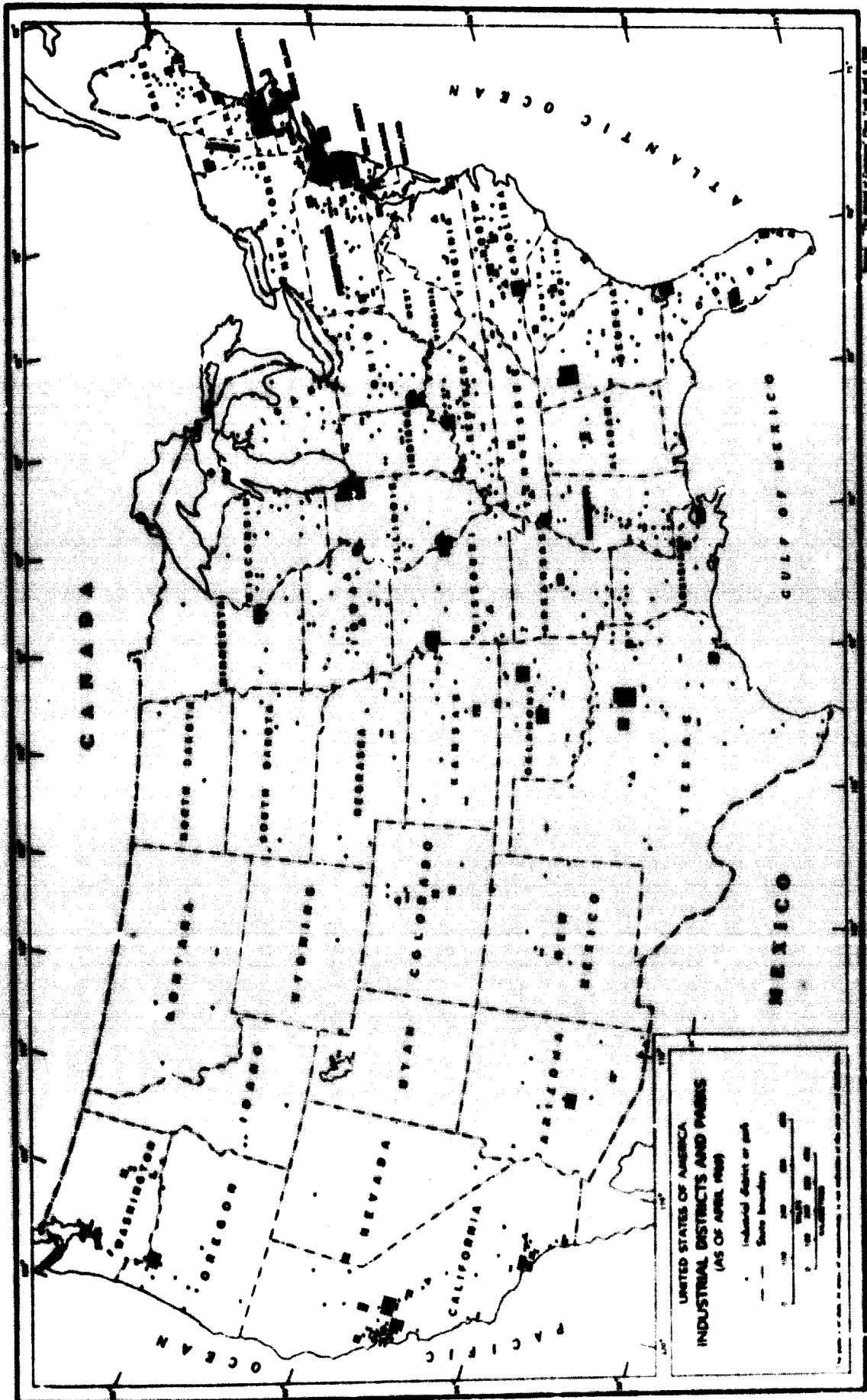
In 1953, a survey made by the Office of Area Development, United States Department of Commerce, covered 122 industrial parks ^{2/}. More recent listings of industrial parks appearing in various journals include up to 1,000. These areas range all the way from highly developed industrial parks to more tracts of raw, undeveloped land which are not properly classified as industrial parks. These developments are virtually in every state, with especially large concentrations in the Middle West and the Northeast. California, Florida, and Texas, which were late-comers in the development of industrial parks, are now experiencing a particularly rapid growth.

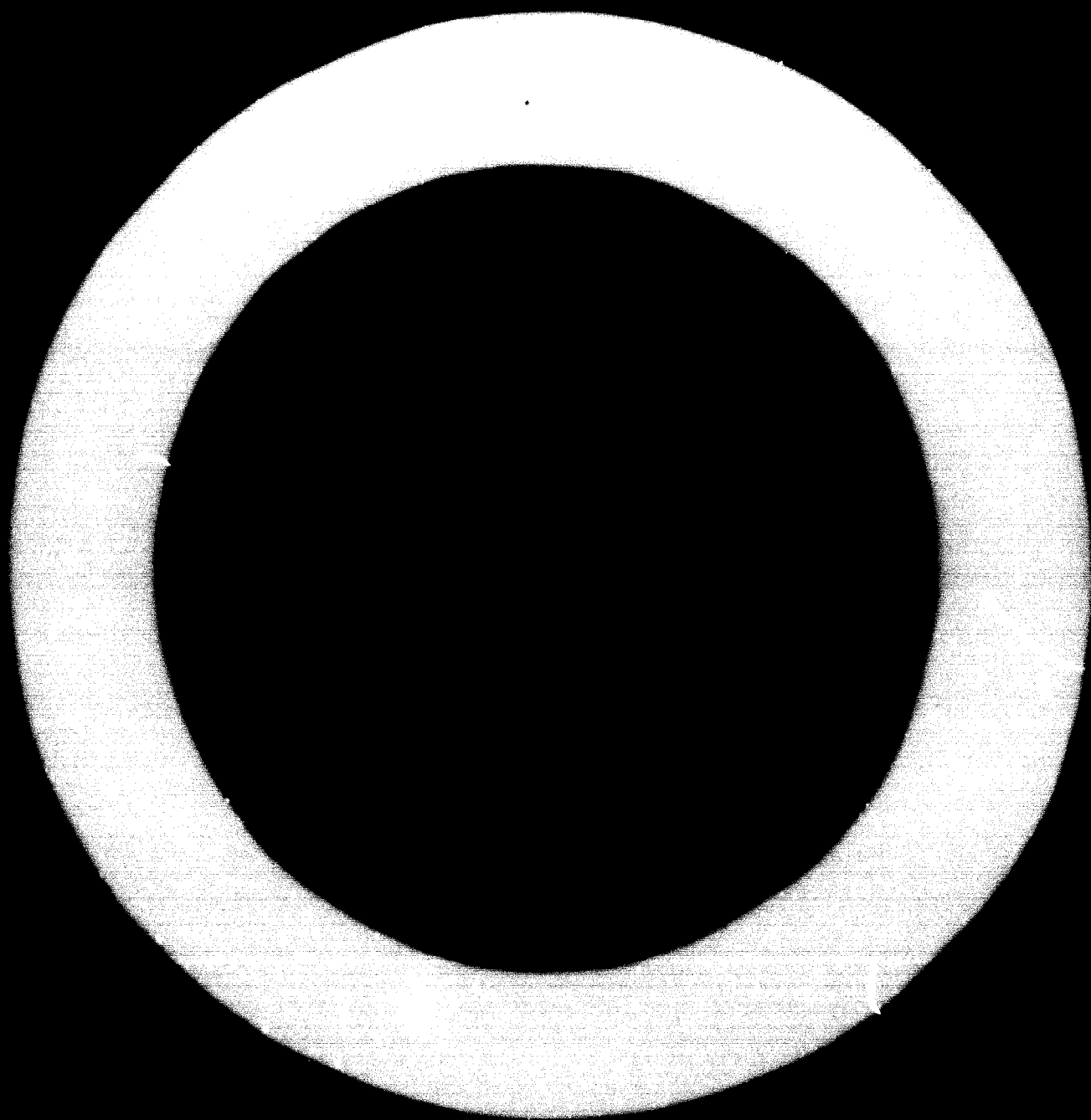
Most industrial parks in the United States fall into four categories:

1. Railroad (Profit)

Examples: Fairfax Industrial District in Kansas City, Missouri (Union Pacific); Central Manufacturing District in Los Angeles, California (Santa Fe); Elizabeth, New Jersey Central District (Central Railroad of New Jersey).

^{2/} The results of this survey were published in 1954 in Organized Industrial Districts, A Tool for Community Development, by Theodore F. Pasma (Washington, D. C.).





Examples: Brookhollow Industrial District in Dallas, Texas (Windsor Properties, Inc.); Trinity Industrial District in Dallas (Industrial Properties Corporation); New England Industrial Center near Boston, Massachusetts (Cabot, Cabot and Forbes); Fair Lawn Industrial Park in Fair Lawn, New Jersey (McBride Real Estate); Los Angeles Airport Industrial tract, California (Hyden-Lee Development Company).

3. Community (Non-Profit)

Examples: Lowell (Massachusetts) Industrial Park (New Industrial Plants Foundation); Oklahoma Industries Industrial District in Oklahoma City (Oklahoma Industries, Inc.); Erie (Pennsylvania) Industrial Park (Greater Erie Industrial Development Corporation).

4. Community (Local government)

Example: Chico, California.

Sponsors of industrial parks vary widely. For example, development organizations with a profit motive include railroads, industrial realtors, industrial development corporations, chambers of commerce, land development companies, financial institutions, and individual investors. Approximately one-third of all industrial parks have been developed by railroad companies.

The non-profit community type represents, for the most part, community development corporations and local chambers of commerce, whereas the local government category includes municipal government, county government, re-development and housing authorities, port authorities, airport authorities, and other types.

A functional classification of industrial parks would include, in addition to railroad districts: light and medium manufacturing; processing, warehousing and distribution; airport; and port districts. Recently, emphasis has been placed on research and development facilities. Walther Research and Development Park along Route 128 is a good example. The Boston area, with Harvard University, the Massachusetts Institute of Technology, and other scientific and educational institutions, provides a rich storehouse of talent, laboratories, and libraries. Another example is the recently organized North Carolina's Research Triangle Park, Inc., capitalizing on similar educational and scientific resources provided by Duke University, North Carolina State College, and the University of North Carolina, all

within 15 miles of each other. Stanford Industrial Park is another district where availability of scientific and professional talent is a prime location factor.

The largest industrial parks average about 1,000 acres, although the majority have less than 500 acres. A 1958 study of 300 industrial parks cited 492 acres as average, but the median was only 152 acres.

Several industrial parks were started before 1900. Although it was not a planned industrial district in the modern sense, the New York Dock Company was organized on a planned basis in 1830. Clearing Industrial District in Chicago began operations in 1899, North Kansas City Industrial District in 1900 and Central Manufacturing District of Chicago in 1905.

The industrial parks established in the United States prior to 1940 predominantly were tied to the railroads, whereas the recent parks are mostly related to expressway development.

Internal planning of the park

A number of planning safeguards have been adopted to secure maximum efficiency of operation within an industrial park. Such efficiency of operation is attained by requiring that tract layouts afford free movement of truck traffic without interference with rail freight switching, provide for drainage runs to coincide with major streets, and place streets and tracks on contours so that parked trucks and spotted freight cars stand on level ground.

Planners have also made an effort to keep curves for rails at a minimum to avoid angles at important intersections, to lay out street axes so that the best-appearing building front faces highway traffic and that the long dimension of the anticipated building is not exposed to mid-afternoon glare, to see to it that rails can reach a maximum number of sites though crossing a minimum number of streets, to see that construction may be carried out in progressive stages, if desired, with necessary land easements being held in reserve for future needs, and to see that street widths are adequate for anticipated traffic.

Although provision is generally made to allow for flexibility, the over-all industrial park plan should include details on (a) site layout, (b) site preparation and grading, (c) streets, (d) rail facilities, (e) storm drainage, (f) sanitary sewerage, (g) water and gas systems, (h) electric and telephone systems, (i) development schedule, (j) development costs, and (k) land use controls.

In communities where existing zoning is inadequate or outmoded, control can be effected through covenants pertaining to (a) fumes and odor, (b) construction and plant design, (c) landscaping, (d) building setbacks, (e) employee parking, (f) truck loading docks, (g) storage facilities, (h) waste disposal, (i) billboards and signs, (j) fences and walls, (k) improvements made or erected, and (l) other factors as required. Specific uses permitted in the industrial district can be clearly defined in zoning ordinances or protective covenants which run with the land sales. Insofar as possible, performance standards should be specified rather than certain industrial uses prohibited.

It has been demonstrated that there is a direct relationship between the success of a district and the degree of control maintained over it. Adequate control through restrictions embodied in covenants and zoning ordinances not only results in the preservation or increase of land values for the developer and the occupants, but also promotes harmony and compatibility with nearby residential areas.

Some industrial parks provide a service (often called the "package plan") whereby a district architect and contractor will carefully supervise the design, construction, and maintenance of the new plant according to the manufacturers' own specifications, consistent with building codes and established restrictions in the district. In addition, financial assistance on favorable terms may be obtained from the district management if needed. All the company has to do is select a site in the park.

In some cases, the developer (private or community) may go so far as to erect a shell building which may be finished off (when an occupant is found) in 60 to 90 days to meet the specific requirements of the client.

Advantages to the manufacturer

As a planned "community of industries," an industrial park provides the manufacturer with a choice of sites laid out for modern plant construction and future expansion and on land protected from encroachment by other land uses through appropriate zoning controls. Utilities, streets, and rail lead tracks are installed, ready for his use. Requirements as to site layout, building construction and landscaping help create and maintain an efficient, pleasant working environment.

The controls exercised by well-planned and well-supervised districts assure the property buyer of a desirable address, considerate neighbors, and security against deterioration of property values.

In planned industrial parks, assurance that attractive plants will be built is made by requiring architectural approval of plans and specifications and by requiring ample building setbacks to provide for attractive landscaping. Most manufacturers today are well aware of the public relations value, locally and nationally, of a well designed plant.

Industrial parks appeal primarily to light and medium types of manufacturing, warehousing, research laboratories, and processing-distributing operations. Industries requiring large tracts of land for a single plant will rarely find adequate space available in the average industrial park. In such event, they prefer to develop on cheaper, outlying land. So too, newly-formed or small firms which are unable to afford prices asked for fully-serviced sites in industrial parks must seek locations on less expensive acreage.

After a park is developed and occupied, certain operating economies may be realized. For example, many communities require that industrial sewage be treated before being emptied into public lines. If such is the case, one rendering works may serve all of the tenants at a pro rata cost. Some industrial parks have their own police force and fire departments. Others offer public warehousing facilities on a group basis. Many have restaurant facilities, and some have motels. Along Route 128 a combined motel and restaurant serves primarily the occupants of two industrial parks. Here, even helicopter service to Boston's Logan International Airport is being inaugurated.

Some specific economies that are possible to individual industries through association in an industrial park are revealed by the experience of the Westbury Industrial Park on Long Island, New York. No one industry in the Westbury Industrial Park can afford to pay \$120,000 per year to rent an electronic data-processing computer, especially since no one industry requires the use of such equipment on a full-time basis. However, twenty industries not only can but do support such an installation, and by doing so can compete with larger firms. Pooling the cost of even such routine items as snow-removal, garbage-disposal, protection and countless other services also serves to reduce overhead; and the co-operative support of food, recreational, and medical facilities ensures satisfaction in these service fields.

The industrial park affords other advantages to small industries that are usually available only to a large manufacturer. In the Westbury Industrial Park another aspect of inter-industry cooperation that has paid off -- and will undoubtedly pay off even more -- is access to specialized knowledge. Company A, for example, has been exposed to and has solved a technical, economic, or even administrative problem that is being encountered for the first time by Company B. Company A is in a position to give Company B some valuable advice. Since both companies are members of the association, and since each is concerned with the other's welfare, the advice is given and the companies profit from their interrelationship.

The cost of developing an industrial district community is high. Relatively high development investments, however, can be justified since manufacturers looking for locations are willing to pay the added expense involved in improving the site and being assured of the immediate availability of utilities and other facilities.

Ever since World War II it has often followed that when a company in the United States has definitely decided on new construction, one of its primary requirements is quick occupancy. It may be because of a lease expiration, a deadline on new production, or simply because the company faces a situation whereby the new facility would produce a profit if it were immediately available, and every day's delay in occupancy means a day of lost profits.

Thus, there evolved an economic need for simultaneous negotiation, design, and construction that would cut as much as six months off the time element required to erect a new facility, would produce the facility at the lowest possible cost, would provide undivided responsibility and authority, and would relieve the client from the pitfalls and tedious detail of personally co-ordinating and expediting the entire project. The phenomenal success of and demand for the "package plan" offered by an increasing number of industrial parks is directly due to the fact that it is the unique answer to this economic need.

Another advantage to both community and manufacturer relates to the method of financing industrial parks. A non-profit municipal park is not only exempt from the Federal corporation income tax, but in some instances it may possibly be financed at low interest rates through the issuance of tax-exempt municipal bonds.

The disadvantages of industrial parks for a given company may be summarized as relatively higher initial costs, insufficient room for expansion (especially for small companies in the early stages of growth), restrictions which to some may be burdensome, and a consequent loss of independent decision-making. These disadvantages are generally heavily outweighed by the advantages narrated above.

Advantages to the community

The advantages of an industrial park for the community itself can be considerable. Concentrating industrial operations in one or several organized districts makes it possible to reduce municipal costs needed to extend utilities and provide such other public services as fire and police protection for these plants. Strict zoning and architectural controls serve to improve appearance and help eliminate the citizen opposition of residential

property owners which so often arises when plants attempt to enter or expand in scattered locations throughout the community. The aesthetically pleasing appearance of an industrial park is also conducive to superior employee working conditions. In addition, off-street parking and loading dock requirements will aid in maintaining uncongested freight and traffic movement through the industrial area.

A successful industrial park may act on other site-seeking firms as a magnet. For instance, three industries were attracted to Lexington, Kentucky, because of favorable publicity concerning that community's industrial park. Although their land needs were greater than could be satisfied in the park, they still decided to locate nearby. In another instance, a firm was given the distributorship of a nationally known product because the controlling company was impressed with the superior appearance of the distributor's facility and of its park location.

The following facts about Fair Lawn Industrial Park exemplify what an industrial park can do for a community (in this case Fair Lawn, N. J., which has a population of 38,000): the park occupies 3 per cent of total land area (190 acres); pays about 20 per cent of Fair Lawn taxes (\$681,350); when filled up, will pay about \$750,000 in taxes; present plants employ 4,600; annual payroll created is \$24,500,000; average annual wage is in excess of \$4,000 (400 employees earn over \$10,000).

Most of Fair Lawn's firms are engaged in light manufacturing but there are several research and development laboratories whose technicians account for the high salaries (no warehouses are allowed). Plant sites cost \$35,000 to \$50,000 per acre.

Before Fair Lawn Industrial Park was established, a comparative analysis was made of two alternative land uses of the 190-acre tract of land: (1) as developed for single-family residences or (2) as developed for research and light manufacturing firms.

If developed with single-family residences, it was estimated there would be about 500 homes on the tract, each paying approximately \$350 annually in taxes and requiring an expenditure of about \$510 per year for municipal services and education -- a municipal service deficit of \$160 per home or an aggregate \$80,000 per year. On the other hand, if developed for research and light industry, it was estimated that the return to Fair Lawn, at only nominal cost to the community, would be about \$600,000 per year.

The impact of industrial growth on two of the towns adjacent to Route 128 further illustrates the value of industrial parks to a community. The New England Industrial Center (NEIC) in Needham, Massachusetts, contains approxi-

mately 100 acres of land. Development in the Centre started in 1953 following a zoning change to allow heavy industry and 93 per cent was developed by September 1957. The assessed valuation of this property previous to the industrial activity was only \$113,500. In 1957 the tax valuation following development of the NEIC was \$5,729,300 or a net tax base gain of \$5,615,800. Since the tax rate in 1957 was \$52 per \$1,000 valuation, the gain in tax base produced a net increase of tax revenue to Needham of \$292,000 (9.6 per cent of Needham's total real estate revenue from only 1.2 per cent of the town's land acreage).

Waltham, Massachusetts, has experienced a similar advantage from its \$22,000,000 of new plants along Route 128. Prior to the industrial growth, the developed area was unattractive and barely feasible for residential properties. This peat-bog and pig farm land has, however, been converted into a most attractive industrial center and research park. The new industrial properties contribute a net annual gain in gross tax revenue of approximately \$400,000 (1 January 1958). However, for a few years these gains will be offset by the interest and amortization costs on a \$1,000,000 bond issue floated to extend the sewer system to the Center.

With so many advantages arrayed in favor of the planned industrial district or park as a stimulus to industrial growth and sound community development, it is pertinent to point out those considerations which may restrict or rule out its suitability in a specific locality.

Planned districts have proven most effective in areas where good industrial sites are scarce, difficult to acquire or assemble into tracts of functional size, and not readily preserved under the pressure of residential and commercial expansion. Conditions such as these are commonly found in or near large urban and metropolitan areas. It is no coincidence that the majority of industrial parks are located in large metropolitan areas, primarily in suburbs due to lack of adequate space in the central city.

Several years ago, for example, the planning commission in Pawtucket, Rhode Island, increasingly aware of the need to attract new industries and hold on to existing ones anxious to expand, sought to identify the potential industrial sites in the community. Most of these sites proved to be too small to satisfy present-day industrial requirements. Of the two large tracts available, one was quickly designated for development as a planned industrial park.

Planned industrial districts are generally expensive to develop. The cost of improvements runs about 25 cents per square foot - higher in the larger cities. On the other hand, there may already exist in a community -- particularly in smaller communities -- a sufficient number of industrially-

zoned sites which are adequately serviced and physically suitable for industrial use. If these improved sites provide enough land area to satisfy local needs for future industrial growth, the community could well forego the added expense and effort involved in developing an industrial park. Only where there is a scarcity of improved sites for industrial use can the planned industrial park compete with independent sites already equipped with utilities.

External Planning Relationships

Although the initiative for promoting and developing planned industrial parks lies primarily in private hands, in the experience of the United States, all echelons of government from national to local levels may indirectly influence the decision as to where a park will be located and what will be its characteristics.

At the national level, policies of the Federal Government concerning reduction of urban vulnerability and industrial dispersion, interstate highway planning, urban renewal and urban planning grants, mineral subsidies, agricultural marketing, location of Federal buildings and installations, natural gas rates, power projects, tax amortization and numerous other matters may have a bearing on the economics of industrial park location. No single agency of the Federal Government, however, has direct planning function regarding industrial parks, although technical information on developing planned industrial parks is available from the Department of Commerce.

The policies of state governments likewise affect industrial parks only indirectly. The trend of an urban population which has been spreading extensively to the suburbs and beyond has stimulated regional and metropolitan planning as a whole. Thirty-three states have passed regional planning statutes permitting the establishment of state agencies competent to plan such aspects of the economy as expressways and land use. Of these, eleven states have enacted statutes since 1951 and nine others have substantially revised older statutes. The Oklahoma law authorizes regional planning agencies to zone within one-quarter mile of all state and national highways. Such a law, therefore, provides authority to state planning agencies to determine where industrial development may or may not take place.

The evolution and rapid growth of metropolitan planning authorities have strong implications for industrial park development. For example, the Maryland National Capital Park and Planning Commission has land use planning authority over much of the area of Montgomery and Prince Georges counties, adjacent to Washington, D. C. Carefully selected tracts have been zoned for industry and performance standards are under active consideration. Nevertheless, the most active planning activities at the metropolitan area level in the United States still relate to highways and utilities.

Industrial parks provide a focus for planning of metropolitan areas. Development in outlying metropolitan areas can be thinly scattered over the entire landscape with attendant disorders and high cost of utilities, schools, and other services, or conversely, development can be limited to a few areas in the interests of fostering compact satellite communities, each of which can support a full complement of utilities and services at reasonable rates and good quality standards. To achieve the latter type of planning objective -- that of progressive, compact development of selected areas -- the zoning tool has thus far been ineffective, not only because of its absence in many instances, but also because of its very definite limitations. The planned industrial park provides a focal point for community planning in the outskirts of metropolitan areas. The park, when used in conjunction with zoning, stimulates orderly and efficient development at the same time as it provides a place of employment. Other elements in community development follow closely upon the job opportunities.

At the local community level, industrial park developers have the most direct contact with the governmental planning process. Invariably, close relations are necessary in regard to zoning problems, extension of utilities, tax problems and many local ordinances. To minimize attendant difficulties with local jurisdictional officials, some local real estate companies, as well as numerous manufacturers, have discovered the value of good public relations programs (some of which involve liberal measures) and thus achieve their objectives. In this way industry can live harmoniously with the community of which it is a part.

Conclusions on the United States experience

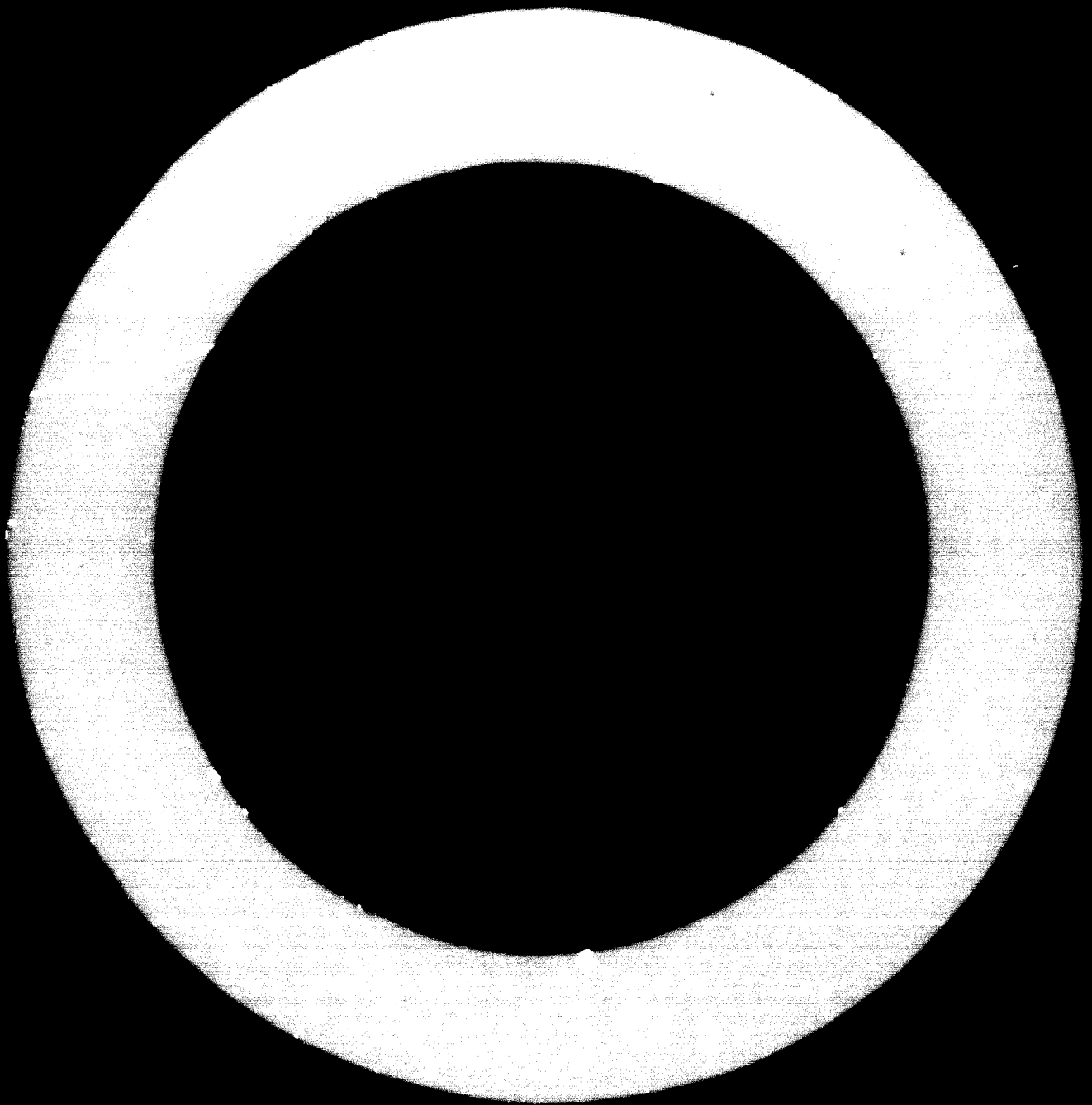
The recent widespread growth of planned industrial parks in the United States has generally been beneficial both to the industrial companies and to the community in which the park is located. For industry, the industrial park offers serviced sites, "back-log" construction and financing, protected investments, certain economic benefits attendant upon close association of various industries in one site, good neighbors, better working conditions, and the advertising value deriving from the "window" part in an attractive environment.

For the community, the advantages may be summarized as more effective use at less cost of service facilities and utilities, increased tax revenues, better assurance of a stable and growing economic base, compatibility of industry with a comprehensive community plan, and more efficient use of land available and suitable for industry. However, as has been noted, the planned industrial park is not suitable for industries requiring large acreages of cheap land -- such as basic steel and chemical industries -- and hence a community should have available other industrial sites than those found in a planned industrial park.

Developers of industrial parks have not been in every case foresighted, cooperative, and responsible. Some have overextended themselves financially and others have misrepresented their plans to the local community. As a result, there is at present a movement to establish standards for certification of industrial parks.

The planned industrial park, with its sporting economies and social and aesthetic values, has been thus far largely a private enterprise response to deficiencies in the supply of industrial sites and to other economic and social factors. The potential contributions of the industrial park concept to metropolitan planning have not been fully realized. Certainly the need for industrial parks should be related to studies of future land requirements for the metropolitan area as a whole. Furthermore, the need for planned industrial parks should be integrated with comprehensive metropolitan planning since the industrial park itself becomes an important traffic generator as well as a place of work for thousands of persons who have shopping, recreational, educational and other business and living requirements.

As population and industry in the United States expand it is inevitable that the planned industrial park concept will change. In whatever way the new concept evolves, there will still be numerous advantages for both community and company where industrial plants are associated together in attractively and effectively planned industrial parks.



WHERE TO BUY UNITED NATIONS PUBLICATIONS

AFRICA

CAMEROON: LIBRAIRIE DU PEUPLE AFRICAINE
La Garanti, B.P. 1197, Yaoundé.
ETHIOPIA: INTERNATIONAL PRESS AGENCY
P. O. Box 120, Addis Ababa.
GHANA: UNIVERSITY BOOKSHOP
University College of Ghana, Legon, Accra.
GHANAO: CENTRE DE DIFFUSION DOCUMENTAIRE DU S.E.P.I., 8, rue Michaux-Bellaire, Rabat.
SOUTH AFRICA: VAN SCHAIK'S BOOK STORE (PTY) LTD.
Church Street, Box 724, Pretoria.
UNITED ARAB EMIRATES: LIBRAIRIE "LA RENAISSANCE D'EGYPTE"
9 Sh. Adly Pasha, Cairo.

ASIA

AFRICA: CURATOR, GOVT. BOOK DEPOT
Nairobi.
BANGLADESH: ENTREPRISE UNIERE DE LIBRAIRIE
Khanmohar & Paperette East, Panch-Pani.
CEYLON: LAKE HOUSE BOOKSHOP
Kandy, Newspapers of Ceylon, P. O. Box 244,
Ceylon.
CHINA:
THE WORLD BOOK COMPANY, LTD.
20 Chung King Road, 1st Section, Tientsin,
Tientsin.
THE COMMERCIAL PRESS, LTD.
211 Wilson Road, Shanghai.
INDIA: THE STANDARD BOOK COMPANY
28 Market Road, Madras.
INDONESIA:
JOHANNESBURG: LIBRAIRIE J. THOMSEN
Place de l'Europe, Luxembourg.
KENYA: KAUFBRAUN BOOKSHOP
20 Union Street, Nairobi.
LIBERIA: SOLAVERELLI BOOKSHOP
Evangeloskou 11, P.
Apostolou 18, Nafphton.
NETHERLANDS: STATIONERY OFFICE
Batavia.
NETHERLANDS: LIBRAIRIE COMMISSIONAIRE
Scheepstraat 11, P.
Van der Grinten 21, P.
Van der Grinten 15, Nijmegen.
NETHERLANDS: LIBRAIRIE J. THOMSEN
Place de l'Europe, Luxembourg.
NETHERLANDS: N.V. BERTHOLD HANFF
Lange Voorhout 5, 's-Gravenhage.
NETHERLANDS: JHANN GUNDT VANUM
Kort Jaarweg 41, Gm.
NETHERLANDS: LIBRERIA RODRIGUES Y CIA.
184 Rue Surcouf, Libourne.
NETHERLANDS:
LIBRERIA BOCH
11 Canal Universidad, Barcelona.
LIBRERIA MUNDI-PANORAMA
Corredo 27, Madrid.
NETHERLANDS: C. E. FRITZE'S KUNGL. HOFBOK-
HANDEL A-B
Fredsgatan 2, Stockholm.
NETHERLANDS:
LIBRERIE PAYOT, S. A.
Lausanne, Geneva.
MARIE BAUMHARDT
Kilbuckstrasse 17, Zurich 1.
NETHERLANDS: LIBRERIE MADINETTE
449 Avenue Cordon, Brugges, Belgium.
NETHERLANDS: UNION OF BOOK DEALERS REPUBLICS:
DEVIKURANDHAYA KRIVER
Srinivaswala Place, Madras.
NETHERLANDS: H. G. STATIONERY
OFFICE
P. O. Box 222, London, S.E.1
(and other branches in Berlin, Birmingham,
Bristol, Cardiff, Edinburgh, Manchester).
NETHERLANDS:
CARRARIVA ZALCIDA
Ljubljana, Slovenia.
NETHERLANDS: BRUNING PRODUCE
Jugoslavinska Kralja, Torontop 27/11,
Belgrade.
NETHERLANDS:
PROSVETA
5, Trg Obratno i Jedinstvo, Zagreb.
NETHERLANDS: PROSVETA PUBLISHING HOUSE
Import-Export Division, P. O. Box 222,
Torontop 15/1, Belgrade.

EUROPE

AUSTRIA:
GEROLD & COMPANY
Grosz 31, Wien, 1.
B. WILLENSTORFF
Markus-Brunnenstrasse 10, Salzburg.

BELGIUM: AGENCE ET MESSAGERIES
DE LA PRESSE, S. A.
14-22, rue du Perol, Bruxelles.
CZECHOSLOVAKIA: ČESKOSLOVENSKÝ
SPISOVATEL,
Národní Třída 9, Praha 1.
GERMANY: EJNAR MUNKSBAARD, LTD.
Nørregade 6, København, K.
FINLAND: AKATEEMINEN KIRJAKAUPPA
2 Keskustatu, Helsinki.
FRANCE: EDITIONS A. PÉDONE
13, rue Soufflot, Paris (IV).
GERMANY, FEDERAL REPUBLIC OF:
R. EISENSCHMIDT
Schwanthaler Str. 69, Frankfurt/Main.
ELWERT UND MEISER
Hauptstrasse 101, Berlin-Schöneberg.
ALEXANDER WORN
Springstrasse 9, Wiesbaden.
W. E. SAARBAUGH
Gartenstrasse 30, Köln (1).
NETHERLANDS: KAUFBRAUN BOOKSHOP
20 Union Street, Nairobi.
NETHERLANDS: SOLAVERELLI BOOKSHOP
Evangeloskou 11, P.
Apostolou 18, Nafphton.
NETHERLANDS: STATIONERY OFFICE
Batavia.
NETHERLANDS: LIBRERIA COMMISSIONAIRE
Scheepstraat 11, P.
Van der Grinten 21, P.
Van der Grinten 15, Nijmegen.

NETHERLANDS: LIBRERIA J. THOMSEN
Place de l'Europe, Luxembourg.
NETHERLANDS: N.V. BERTHOLD HANFF
Lange Voorhout 5, 's-Gravenhage.
NETHERLANDS: JHANN GUNDT VANUM
Kort Jaarweg 41, Gm.
NETHERLANDS: LIBRERIA RODRIGUES Y CIA.
184 Rue Surcouf, Libourne.
NETHERLANDS:
LIBRERIA BOCH
11 Canal Universidad, Barcelona.
LIBRERIA MUNDI-PANORAMA
Corredo 27, Madrid.
NETHERLANDS: C. E. FRITZE'S KUNGL. HOFBOK-
HANDEL A-B
Fredsgatan 2, Stockholm.

NETHERLANDS:
LIBRERIE PAYOT, S. A.
Lausanne, Geneva.
MARIE BAUMHARDT
Kilbuckstrasse 17, Zurich 1.
NETHERLANDS: LIBRERIE MADINETTE
449 Avenue Cordon, Brugges, Belgium.
NETHERLANDS: UNION OF BOOK DEALERS REPUBLICS:
DEVIKURANDHAYA KRIVER
Srinivaswala Place, Madras.
NETHERLANDS: H. G. STATIONERY
OFFICE
P. O. Box 222, London, S.E.1
(and other branches in Berlin, Birmingham,
Bristol, Cardiff, Edinburgh, Manchester).

NETHERLANDS:
CARRARIVA ZALCIDA
Ljubljana, Slovenia.
NETHERLANDS: BRUNING PRODUCE
Jugoslavinska Kralja, Torontop 27/11,
Belgrade.
NETHERLANDS:
PROSVETA
5, Trg Obratno i Jedinstvo, Zagreb.
NETHERLANDS: PROSVETA PUBLISHING HOUSE
Import-Export Division, P. O. Box 222,
Torontop 15/1, Belgrade.

LATIN AMERICA

ARGENTINA: EDITORIAL SUDAMERICANA, S. A.
Alamo 500, Buenos Aires.
BELGIUM: LIBRERIA SELECCIONES
Calle 972, La Paz.
BRAZIL: LIVRARIA ABIR
Rua Mexico 98-B, Caixa Postal 2291,
Rio de Janeiro.
CHILE:
EDITORIAL DEL PACIFICO
Alameda 57, Santiago.
LIBRERIA IVENS
Calle 528, Santiago.
COLOMBIA: LIBRERIA BUCHNOLZ
Av. Jiménez de Quesada 5-25, Bogotá.
COSTA RICA: IMPRENTA Y LIBRERIA TREJOS
Avenida 1313, San José.
CUBA: LA CASA BELGA
Calle 428, La Habana.
NETHERLANDS: LIBRERIA COMMISSIONAIRE
Scheepstraat 11, P.
Van der Grinten 21, P.
Van der Grinten 15, Nijmegen.
NETHERLANDS: LIBRERIA J. THOMSEN
Place de l'Europe, Luxembourg.
NETHERLANDS: N.V. BERTHOLD HANFF
Lange Voorhout 5, 's-Gravenhage.
NETHERLANDS: JHANN GUNDT VANUM
Kort Jaarweg 41, Gm.
NETHERLANDS: LIBRERIA RODRIGUES Y CIA.
184 Rue Surcouf, Libourne.
NETHERLANDS:
LIBRERIA BOCH
11 Canal Universidad, Barcelona.
LIBRERIA MUNDI-PANORAMA
Corredo 27, Madrid.
NETHERLANDS: C. E. FRITZE'S KUNGL. HOFBOK-
HANDEL A-B
Fredsgatan 2, Stockholm.

MIDDLE EAST

NETHERLANDS: LIBRERIA COMMISSIONAIRE
Scheepstraat 11, P.
Van der Grinten 21, P.
Van der Grinten 15, Nijmegen.
NETHERLANDS: LIBRERIA J. THOMSEN
Place de l'Europe, Luxembourg.
NETHERLANDS: N.V. BERTHOLD HANFF
Lange Voorhout 5, 's-Gravenhage.
NETHERLANDS: JHANN GUNDT VANUM
Kort Jaarweg 41, Gm.
NETHERLANDS: LIBRERIA RODRIGUES Y CIA.
184 Rue Surcouf, Libourne.
NETHERLANDS:
LIBRERIA BOCH
11 Canal Universidad, Barcelona.
LIBRERIA MUNDI-PANORAMA
Corredo 27, Madrid.
NETHERLANDS: C. E. FRITZE'S KUNGL. HOFBOK-
HANDEL A-B
Fredsgatan 2, Stockholm.

NORTH AMERICA

NETHERLANDS: LIBRERIA COMMISSIONAIRE
Scheepstraat 11, P.
Van der Grinten 21, P.
Van der Grinten 15, Nijmegen.
NETHERLANDS: LIBRERIA J. THOMSEN
Place de l'Europe, Luxembourg.
NETHERLANDS: N.V. BERTHOLD HANFF
Lange Voorhout 5, 's-Gravenhage.
NETHERLANDS: JHANN GUNDT VANUM
Kort Jaarweg 41, Gm.
NETHERLANDS: LIBRERIA RODRIGUES Y CIA.
184 Rue Surcouf, Libourne.
NETHERLANDS:
LIBRERIA BOCH
11 Canal Universidad, Barcelona.
LIBRERIA MUNDI-PANORAMA
Corredo 27, Madrid.
NETHERLANDS: C. E. FRITZE'S KUNGL. HOFBOK-
HANDEL A-B
Fredsgatan 2, Stockholm.

OCEANIA

NETHERLANDS: LIBRERIA COMMISSIONAIRE
Scheepstraat 11, P.
Van der Grinten 21, P.
Van der Grinten 15, Nijmegen.
NETHERLANDS: LIBRERIA J. THOMSEN
Place de l'Europe, Luxembourg.
NETHERLANDS: N.V. BERTHOLD HANFF
Lange Voorhout 5, 's-Gravenhage.
NETHERLANDS: JHANN GUNDT VANUM
Kort Jaarweg 41, Gm.
NETHERLANDS: LIBRERIA RODRIGUES Y CIA.
184 Rue Surcouf, Libourne.
NETHERLANDS:
LIBRERIA BOCH
11 Canal Universidad, Barcelona.
LIBRERIA MUNDI-PANORAMA
Corredo 27, Madrid.
NETHERLANDS: C. E. FRITZE'S KUNGL. HOFBOK-
HANDEL A-B
Fredsgatan 2, Stockholm.

Orders and inquiries from countries where sales agencies have not yet been established may be sent to: Sales Section, United Nations, New York, U.S.A., or to Sales Section, United Nations, Palais des Nations, Geneva, Switzerland.

Litho U.N. Geneva
17028 — February 1963 — 4,000

Price: \$ U.S. 5.50
(or equivalent in other currencies)

United Nations publication
Sales No.: 62.II.B.5
ST/ECA/73

[Box]



15.7.74