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Background paper

THE SUPPLY OF SKILLS TO THE
INDUSTRIAL SECTOR IN DEVELOPING COUNTRIES 1/

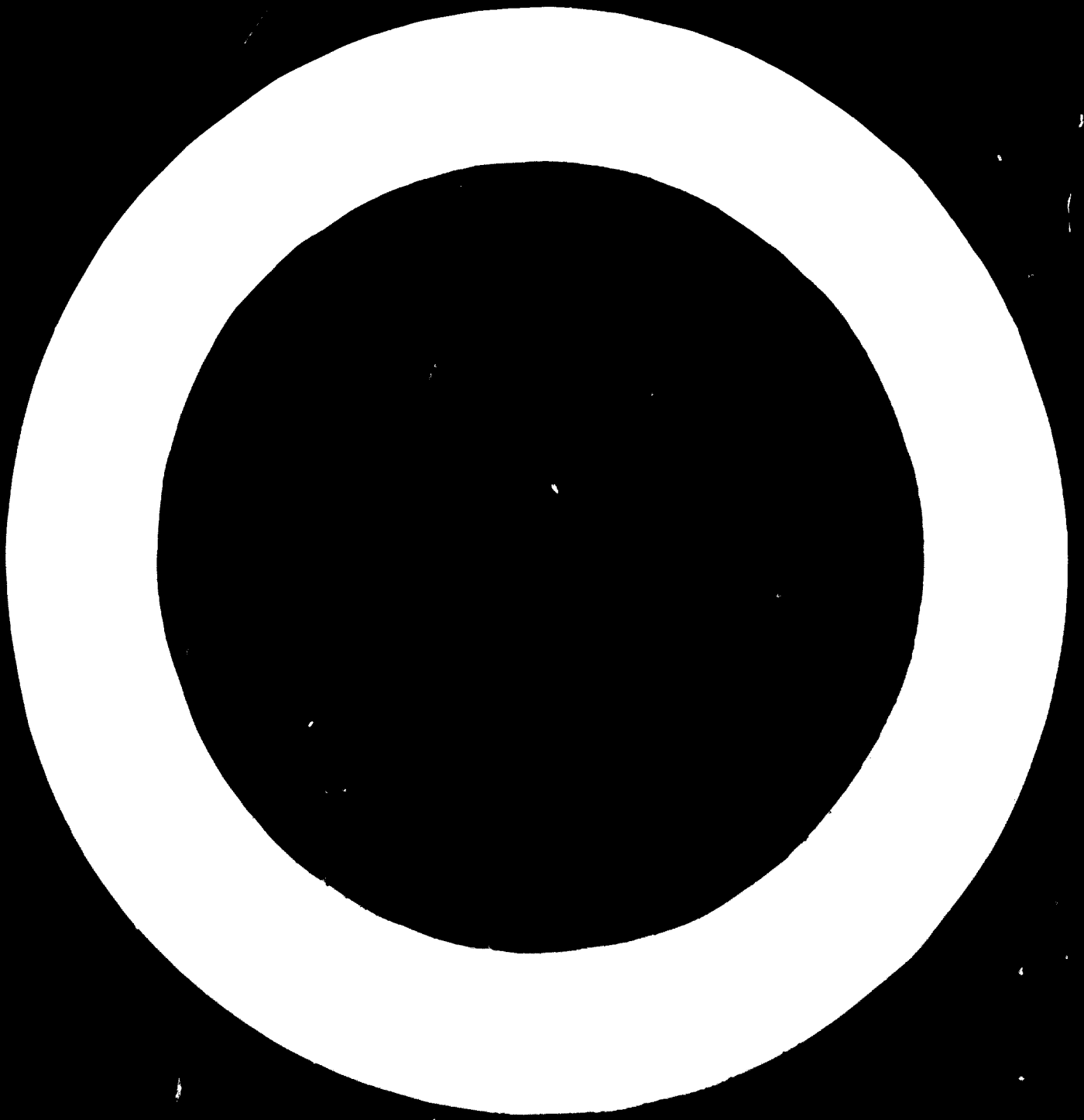
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1/ The views and opinions expressed in this paper are those of the consultant and do not necessarily reflect the views of the secretariat of UNIDO.

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Introduction

1. The main factors limiting the growth of industry in developing countries are capital and skills. In many cases, skills are a more serious constraint than capital. Countries with adequate skills are not only able to absorb a high rate of capital formation, but to get a better return on capital. Shortage of skills is not an absolute constraint on growth, for they, like capital, can also be imported. A judicious and explicit policy for using scarce domestic and foreign skills and for accelerated production of domestic skills is, therefore, an essential part of any serious industrialization programme.
2. One of the major differences between rich and poor countries is the difference in the stock of skills. This is quite clear from table 1 below.
3. It is difficult to quantify the position very precisely, but as far as engineers are concerned, the United Kingdom is ten times as well off as Brazil, and the United States about 1,000 times better off than Guinea.
4. The urgency of the skill problem is now generally recognized. Governments tend to place great emphasis on formal educational programmes as a solution. Education can add to the enjoyment of life of almost everyone in the community and can be a major force in creating national unity. But it makes heavy demands on scarce skills and can impose relatively higher financial burdens in poor countries, which often have one quarter of their population in the age group 5-14, than it does in developed countries where the ratio usually is nearer to 15 per cent. Furthermore, expenditures on education are not always productive from an economic standpoint.

We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche.

Table 1

Engineers, scientists and agronomists as a
proportion of the labour force 1959-60

| | | | |
|----------------|--------|----------------|----------|
| United States | 1.7 | Turkey | 0.2 |
| Canada | 1.3 | Philippines | 0.2 |
| U.S.S.R. | 1.2 | Iran | 0.2 |
| United Kingdom | 1.0 | Brazil | 0.1 a/ |
| Italy | 0.9 | China (Taiwan) | 0.1 |
| France | 0.8 | India | 0.05 |
| Japan | 0.7 | Pakistan | 0.05 |
| Yugoslavia | 0.5 | Thailand | 0.01 |
| Greece | 0.4 | Nigeria | 0.01 |
| Spain | 0.3 | Guinea | 0.002 a/ |
| Argentina | 0.2 a/ | - | - |

a/ Engineers only

Source: A. Maddison, Foreign Skills and Technical Assistance in Economic Development, Development Centre, the Organisation for Economic Co-operation and Development (OECD) 1965.

5. There are four common and characteristic errors in educational policy in developing countries:

- (a) Education is usually too academic and curricula are derivative from those in the developed world. Those who get this education do not have skills appropriate to the needs of the economy and their expectations of lucrative employment are doomed to disappointment.
- (b) In many countries where the enrolment figures seem impressive, there are enormous and unproductive drop-outs by children who fail to terminate their courses because of the inadequacy of entrance tests or of books, teachers, and equipment.
- (c) The quality of teaching is poor because of inadequate salaries. Higher education often suffers because teachers work on a part-

/...

time basis, and the number of institutions is too great.

- (d) There is not enough emphasis on practical and in-service training.

6. Because of all these problems in making up a coherent educational programme, there have been several attempts to develop the art and science of manpower and educational planning and to link it with general development planning. Many countries can obtain guidance in this respect from the co-operative research venture conducted by the Mediterranean Regional Project of the OECD. Case studies are now available for Italy, Greece, Spain, Portugal, Turkey and Yugoslavia, and more recently, for Peru and Argentina.^{1/} However, these can only form the broad guidelines of a long-term policy. Greater emphasis should be placed on ensuring that facilities are available for producing the specific practical skills which are needed, and planners should take care to analyze in detail the skill requirements of major individual investment projects as well as to make the longer-term macro-economic forecasts of skill needs.

7. In the formal educational system, more emphasis should be placed on the quality of teaching of mathematics and science in secondary schools, and of engineering training at university level. There is also a need for adequately equipped technical training centres for intermediate-level technicians.

8. For skilled workers and foremen, most of the training will have to be done within firms, and it is essential to see that firms carry out this training properly. This is particularly necessary in countries where the "cheap labour"^{2/} syndrome persists. One of the ways of doing this is to

^{1/} All published by OECD. See also the valuable studies of Jan Auerhan, Lectures on the Labour Force and its Employment, International Institute for Labour Studies, International Labour Organisation, Geneva (1964), and G. Haniotis, The Industrial Sector of the Greek Economy (1960-1970), Ministry of Co-ordination, Athens (October 1962).

^{2/} See Hla Myint, The Economics of the Developing Countries, London, (1964) for an analysis of this problem.

enforce a payroll levy, the proceeds from which are devoted to industrial training and with rebates to firms which carry out such training within their enterprises. This is the system used in Brazil with great success and now adopted in the United Kingdom. In countries where there is simply a legal obligation for firms to provide training, as in Pakistan, these legal obligations are usually ignored.

9. Planning ought to be reinforced by market forces. Many developing countries waste resources by operating with a salary structure that leads to inefficient use of their existing stock of skills. African countries have generally kept a colonial salary structure for civil servants and have made government positions so attractive that few people are interested in a business career. In India, the salary structure in the nationalized industries is below that in private industry, and managerial initiative is more constrained, so that there is little movement of industrial skills from the private to the public sector. This has been a major difficulty, e.g. in the development of the Indian steel industry. In some countries, salaries are so inadequate that there is considerable emigration of skilled personnel. Countries such as Mexico, whose wage and salary structures are designed to provide incentives to exploit scarce skills productively, have not had this problem.

10. One of the first economists to lay stress on use of foreign skills was Friedrich List.^{3/} His major arguments for protection in an industrializing economy were that it would entice foreigners from more developed countries to invest their capital and transfer their skills abroad, and that behind a protective barrier the industrializing country could create a flexible industrial labour force.

11. A vigorous attempt to use foreign skills was part of the industrialization policy of Colbert in France, Peter the Great in Russia, and Frederick the Great in Prussia. In the first half of the nineteenth

^{3/} See Friedrich List, National System of Political Economy, first published in 1841.

century, British contractors such as Thomas Brassey played a major part in spreading British railway technology to other European countries. The international trade in skills is as normal as that in commodities, and dependence on foreigners is not necessarily a sign of under-development. The size of the flow will depend a good deal on the size of the country. Small countries will have to specialize in certain kinds of skills, just as they do in commodity production, and they should aim to export skills as well as to import them.

12. Probably the earliest case of a planned import of foreign skills and effective transfer of knowledge is that which took place in Japan in the last century. When Japanese industrialization started in 1868, there was a vigorous exploitation of foreign skills. The Government of Japan sent people to study in various European countries and the United States. It brought in foreigners to help set up a modern army, navy, legal system, public health service, police and administration. It also brought in foreigners to teach in the new Imperial University in Tokyo and to help in new research institutions. Between 1872 and 1898 there were, on the average, 230 foreigners in government service every year. Their average salaries were ten times as high as Japanese received, and their cost was a substantial burden. The cost of foreign technicians was 40 to 50 per cent of the budget of the Ministry of Industry over the whole period of its existence. Foreigners were also employed in economic enterprises (about 460 a year, on the average, from 1872 to 1898). Between 1868 and 1895, the Government sent 600 students overseas. Government officials and businessmen made trips abroad to pick up foreign ideas. From 1868 to 1895, about 4,000 government officials went abroad. The total cost of foreign technicians and study abroad amounted to nearly 6 per cent of the central government budget, 1868-1872.^{4/}

^{4/} See Koichi Eai, Government Fiscal Activity and Economic Growth in Japan 1868-1960, Kinokuniya, Tokyo (1963), pp. 114-24, and K. Eai and Y. Shionoya, Government Expenditure, No. 7 in Estimates of Long-Term Economic Statistics of Japan since 1868, Tokyo (1966).

13. The Japanese themselves paid for all this technical assistance, and for this reason probably used it more effectively than in the case of its modern analogue when such aid usually comes to developing countries as a gift. As all of these people were paid by the Japanese, they also had to conform to what Japan wanted, instead of imposing foreign ideas.

14. Use of foreign personnel was, of course, a short-term expedient, but it helped to launch Japan quickly on the path of self-sustaining growth. Japanese experience in using foreign skills compared very favourably with that of India, which employed more than twenty times as many foreigners in government and business in the colonial period, but their skills were not, of course, used to spark economic development or to train Indians in industrial skills.

15. The efficient use of foreign skills and training receives inadequate attention in developing countries. These extremely scarce resources are usually neglected completely by planners although, as we will illustrate in the country case studies below, they can cost up to 8 per cent of GNP in some developing countries. Although there is now a more explicit dedication to planning in developing countries than ever before, this process of transferring skills is often organized less efficiently today than it was in Japan a century ago. This inefficiency is also widespread in aid-giving agencies in developed countries, which usually find it extraordinarily difficult to have effective policies for controlling such very diverse activities.

16. Nowadays, a good many of the skills supplied are paid for by developed countries, and are regarded by the recipients as a gift. In fact, this aid is often very costly, as foreign advisers or experts need a lot of briefing, use a good deal of the best housing, office space and transport facilities, and import foreign consumer goods. The most important of these costs is for briefing, because such experts necessarily absorb much of the time of the most skilled and responsible people in the domestic labour force. The false idea that technical assistance has no cost to developing countries is another major reason why it is often ignored by planners.

17. When skills come in connexion with a capital investment, great attention is usually given to the terms of the financial transaction, without close scrutiny of the costs and benefits in terms of skill transfer. For this reason, the potential contribution of well-organized private investment is often under-rated in comparison with intergovernmental loans or aid projects which seem less of a financial burden but often make a much smaller contribution to the skills of the recipient.

18. Another practical reason why the process of skill transfer is not well planned is that there is a multitude of sources for technical assistance, and each transaction is relatively small. This makes the process difficult to organize efficiently, and hard to plan.

19. The total flow of skills from developed to developing countries amounts annually to about one quarter of a million man-years. The cost of all foreign experts in 1962 was about \$4 billion, i.e. an average of about 1.6 per cent of the gross national product (GNP) of developing countries combined. In addition, there were expenditures of about \$600 million on study and training abroad. Not all of these expenses were borne by developing countries, and not all of them were for industry. Technical assistance does not provide a great many industrial experts. Less than 15 per cent of the total of bilateral technical assistance experts of OECD countries were in the industrial field. Multilateral aid and assistance from communist countries provided another few thousand. Almost no voluntary workers or Peace Corps people are in the industrial field. On the other hand, about one half of the experts provided under capital aid projects, and nearly all of those financed by private investment or on a consultant basis, were in industry. Of the total foreign experts in developing countries in 1962, probably 150,000 at least were in the industrial field.

Table 2

Total cost and numbers of foreign experts in developing
countries in 1962

| | <u>\$ million</u> | <u>Man Years</u> |
|--|-------------------|------------------|
| Technical assistance | 950 | 100,000 |
| Voluntary workers and Peace Corps | 120 | 18,500 |
| Skills associated with capital aid programmes | 190 | 9,000 |
| Private investment | 1,850 | 100,000 |
| Sales of private consulting services | 850 | 40,000 |
| | <u>3,960</u> | <u>267,500</u> |

Source: A. Maddison, Foreign Skills and Technical
Assistance in Economic Development, OECD, Paris
(1965)

20. This dominance of industry appears in all of the individual countries studied below, and it becomes more important the more developed the country is.

21. The major reason for planning for smaller dependence on foreign skills is that foreigners cost so much more than local people, but this is not true for all skills and it would not be rational to plan for autarchy.

22. Therefore, most developing countries need to:

- (a) Assess carefully the skill implications of their development strategy;
- (b) Ensure that their existing stock of skills is properly employed and that the salary structure is appropriate;
- (c) Avoid waste in their educational expenditures and ensure that the education system is geared to the needs of their economy;
- (d) Ensure that domestic enterprises give proper incentives for training and upgrading of workers;

/...

- (e) Plan carefully their use of foreign skills and training;
- (f) Create a strong co-ordinating office to supervise technical assistance;
- (g) Give major incentives to foreign private enterprise to supply skills and provide an effective training function.

23. Developed countries should also make a major effort to ensure that the industrial skills of private enterprise are made available to developing countries, both in connexion with foreign investment and independently of this.

24. In the rest of this paper, we have tried to show the role of foreign skills in the industrialization of four individual countries at different stages of development.^{5/} In Brazil, foreign skills represented only about 0.5 per cent of the high-level labour force, in Mexico about 1 per cent, in Pakistan about 1.7 per cent, and in Guinea more than 70 per cent. In Brazil, Mexico and Pakistan, the total cost of foreign skills was about \$100 million a year each and in Guinea about \$20 million. In Mexico and Brazil this represented about 0.5 per cent of GNP, in Pakistan about 1.3 per cent, and in Guinea about 8 per cent. In these four countries, about 11,500 man years of foreign skills were used at a cost of \$320 million a year.

25. It should be stressed that the statistical estimates in the following sections should be treated with considerable caution. This is a field in which few surveys have been made, and where a good part of the figures have to be based on intelligent guess-work. It would be extremely useful to have a few government surveys as a cross-check on these estimates.

^{5/} A much more detailed study of another country can be found in Foreign Skills and Technical Assistance in Greek Development, by A. Maddison, A. Stavrianopoulos and B. Higgins, OECD Development Centre, Paris (1966).

Brazil^{6/}

26. In the past twenty years, the rate of industrial growth in Brazil has been impressive. From 1950 to 1982, industrial production grew on an average by 9.1 per cent a year. The rate of industrial expansion has been faster than any West European country. Heavy industry now represents 45 per cent of Brazilian manufacturing output. Brazil has a chemical industry and machinery industry, builds ships and produces more than a quarter of a million vehicles a year, including all kinds of automobiles, trucks and buses. Two thirds of the output is produced by firms with more than 50 employees.

27. Information on the stock of skills in Brazil is poorer than in many other countries, but it would seem that the stock is small in relation to the level of income and industrial development. According to estimates of the United Nations Educational, Scientific and Cultural Organization (UNESCO), university graduates were 0.7 per cent of the labour force in 1960. This is something like the situation in Egypt and India, but considerably less than in Southern Europe (Greece 2.3, Spain 1.7, Yugoslavia 1.3). The proportion of engineers in the labour force is only one third of that in Spain and one half of that in Turkey.

28. Some countries waste their stock of skills by faulty salary structures and incentives, so that key people are not in the right jobs in the public service, nationalized industry or teaching. In some countries, there is unemployment and emigration of highly skilled people. This does not seem to be the case in Brazil.

29. The formal educational system in Brazil covers a rather small portion of the population and is very inefficient as a producer of skills.

30. Less than two thirds of children aged 7-11 attend primary school. The drop-out rate is high. In 1961, there were 4,121,000 children in first grade and only 751,000 in fourth grade of primary school, so that only about one third of Brazilians were graduated from primary school.

^{6/} This section is based on material collected by the author at the end of 1964.

31. Until very recently two-thirds of the secondary education in Brazil was private and subject to payment of fees, whereas university education was free. This situation was changed in 1966. There is a heavy bias at the secondary level towards academic training and preparation for the university, not enough stress on science and technology or provision of terminal courses for middle-level personnel. As in many countries at this level of development, there is a sharp cleavage between rich and poor, and between occupations which are acceptable to ambitious people and those which are regarded as fit for workers. As a result, very few people aspire to middle-level skills. Such jobs are held by people whose basic training has been preparation for higher education or by upgraded workers whose basic education is weak. This situation will change as the urban population grows and industry develops, but social forces may well resist changes towards a more rational system.

32. In 1964, only 3 per cent of secondary education provided vocational courses in agriculture and industry, and secondary education as a whole covered only about 10 per cent of the population aged 12-19.

33. The total number of students in higher education in 1962 was around 107,000. Enrolments in higher education are about 1.4 per cent of those aged 20-24, which is a good deal lower than in the Mediterranean countries or some other parts of Latin America. However, the higher-education system seems relatively efficient in that about 80 per cent of the entrants graduate. In 1963, the number of graduations was more than 18,000. This is about 1.3 per cent of the population aged 24. Post-graduate students receiving degrees were about 600 in number. The ratio of teachers to pupils was very high, at about 1:4, but most of the teachers were on a part-time basis.

34. The distribution of higher education by field of study was not too favourable to the growth needs of the Brazilian economy. About one quarter of the students were enrolled in the law faculty, and only 12 per cent in engineering.

35. Because of the weakness of the educational system, Brazilian industry has supplemented technical education by creating the National Service of Industrial Apprenticeship (SENAI). This was founded in 1942, at a time when skilled workers were particularly needed and scarce. At that time, secondary education was virtually non-existent in Brazil. SENAI created a system of specialized schools for industrial apprentices, which in 1964 had about 38,000 students enrolled in 115 schools. The courses last from one to three years, with five months of full-time school and seven months of work each year.

36. Since SENAI was created, conditions have changed in Brazil. Many more people are coming into factories from secondary education, so that the basic education of workers is now better, and there is less need than 20 years ago to improve it. There has also been a considerable reduction of labour turnover, which has increased the profitability of in-service training. A few years ago, the labour turnover in Sao Paulo was as high as 100 to 120 per cent in many firms. It has now been greatly reduced because firms are now older and better established, the average age of workers has risen,^U and the labour laws require heavy compensation to the worker who is dismissed. Furthermore, it has been found that training in factories is cheaper and more efficient than in schools.

37. SENAI has done a great deal to stimulate in-service training and has handed over some of its schools to local authorities. Part of its staff is engaged fulltime in helping firms to plan in-service training or to send them to other plants for training. It constantly surveys industry's needs for skills and is always adapting its curricula. It has also trained the training supervisors who are now to be found in most large plants. As a result, more than 70,000 apprentices are now getting training in schools in their firms - about twice as many as in SENAI schools. In the State of Sao Paulo, about 60 per cent of the 114,000 juveniles in industry are receiving school or plant training which will turn them into skilled workers.

^U The average age of workers is still low in industry. The average age in the Mercedes Benz plant in 1964 was only 28.

SENAI training is of high quality, and is costly. Equipment costs per trainee run about \$5,000 and there is a staff of 3,000. SENAI is financed by a 1 per cent payroll levy on industrial firms, but this can be refunded to firms which provide adequate in-service training. In fact, 30 per cent of the contributions are refunded for this reason. SENAI has found that the 1 per cent levy was adequate for the maintenance of the skill level in most firms, but not for training costs in new firms. In Mercedes Benz, training costs amounted to 2 per cent of the payroll, as well as the 1 per cent contribution to SENAI which was paid voluntarily. SENAI has made a proposal that banks provide finance for the training costs of new plants, which they estimate to be around 4 per cent of the cost of new plant and equipment.

38. SENAI has been worried about the training of managers, who are apparently scarcer in Brazil than technically qualified personnel. It did not want to provide this training itself, and separate courses for management training have been created at the Catholic University, which in 1964 provided training in eight-to-nine-week, half-day courses for about 400 managers a year.

39. The quality and quantity of SENAI training have helped to make it possible for Brazilian industry to grow faster than any country in Europe and America. Brazilian industry is conducted in large-scale modern enterprises, producing as wide a range of goods as many European countries, and of a quality which is well up to international standards. In the space of ten years a large-scale motor industry which produces cars, trucks and buses of almost 100 per cent Brazilian manufacture has been constructed. The contribution of SENAI schools and of in-service training to the production of skilled workers has been of major significance, and that of the state and federal governments has been negligible. What is needed in the secondary schools is a greater emphasis on science and technology in general education, so that people entering the labour force will be able to adapt to a changing economic structure and technology.

40. Foreign direct investment has also played an important part in supplying skills for Brazilian development. Unlike the situation in countries

such as Chile or Iraq, where foreign investment has affected a small natural resource sector, foreign enterprise in Brazil has played a widely diffused role in spreading industrial know-how. Most of the big firms in Brazil have some foreign participation. Before the motor industry was started in 1956, the Government created a group of its own development bankers to plan the development of the industry. They set out to attract foreign companies which would participate in the equity and provide know-how. There are French, German, Japanese and Swedish firms in the industry, as well as one United States firm - the Kaiser Corporation. There is also a completely independent company - Venag. Apart from these major producers, Brazil also approached many other foreign firms to help technically in setting up a components industry. Examples of what has happened with the manpower in foreign firms are as follows:

- (a) Mercedes-Benz (produces trucks and buses). This is a joint enterprise in which most of the capital is Brazilian. The firm started in Brazil in 1956, and in 1964 had 4,600 employees (of which thirty were engineers). The German company still had nineteen Germans working in Sao Paulo. Half were engineers and the others were foremen; only six of these intended to stay permanently. More than 100 Germans worked in the plant in the first eight years, and the peak at any one time was forty nine. About eighteen Brazilians were sent to Germany for training.
- (b) Young (automobiles). This is purely Brazilian. Some foreign technicians were hired by the firm, but more Brazilians went abroad for training than in the case of Mercedes.
- (c) Milling (automobiles). This joint enterprise had ninety from the United States in 1959 and by 1964 had reduced the number to twenty.
- (d) Smith (pharmaceuticals). This is an entirely United States firm, which now employs only one of its nationals in Brazil.

41. With the help of information from the United States Department of Commerce, John Shearer has estimated the number of United States employees working in United States firms in Brazil in 1955 when such firms employed 93,108 persons in Brazil, 630 of them being from the United States^{8/}. Most of the latter were high-level technical and managerial personnel. At that time the book value of United States investment in Brazil was around \$1.2 billion. If we are right in assuming that the book value of all foreign investment in Brazil was \$3.0 billion, then the total number of foreign high-level personnel in Brazilian branches and subsidiaries of foreign firms would probably be about 1,500 to 1,600. The usual pattern is for foreign firms to replace some of their foreign staff by Brazilians as they become established. As the flow of new investment has been very low for the past two or three years, it may be that the number of foreigners is now a little lower in relation to the stock of capital than it was when Shearer made his study. It might therefore be reasonable to guess that the number was around 1,250 in 1964^{9/}. As the cost of such personnel is around \$35,000 a year each, their total annual cost is probably around \$45 million.

42. According to Shearer, the ratio of United States to Brazilian employees in Brazil was fairly low in comparison with the situation in other countries, so there seems no reason to suppose that the ratio was unnecessarily high. Brazil has, in fact, certain legal restrictions on the permissible number of foreign personnel in foreign firms, and it does, of course, require such people to have labour permits, but the Brazilian restrictions do not appear to be severely applied.

43. The general pattern of foreign investment has been the same in most industries. It has provided an opportunity for Brazilians to acquire high-level and middle-level foreign skills very quickly and after that, foreign

^{8/} J. C. Shearer, High Level Manpower in Overseas Subsidiaries, Princeton (1960).

^{9/} Information available in Sao Paulo suggested that there were 375 foreign engineers in the automobile industry in 1964.

manpower has been greatly reduced. Training for Brazilians has occurred mainly in Brazilian plants. It does not appear that foreign interests have crowded out Brazilian entrepreneurs, and the foreign financial interest has not been dominant in most branches of industry. There has been extensive use of mixed enterprises. Thus, in spite of erratic changes in exchange control regulations governing foreign investment, which led to big fluctuations in financial inflows, Brazil derived substantial technical benefits from foreign investment.

44. Thus, Brazil solved the manpower problems of rapid industrialization mainly by a brilliantly conceived scheme of industrial apprenticeship, and by extensive use of foreign skills in training for key jobs. A third major source of skills for industry has been immigration from Europe, other parts of South America and Japan. This has made a major contribution to new enterprises. However, most of the industrial development has occurred in areas of Brazil which were already most developed and where the basic educational facilities were best. The weakness of the formal educational system, particularly in the north-east of the country, has been a major handicap to the production of new skills in that area, where economic development has been much slower.

45. The total cost of foreign skills supplied to Brazil is probably around \$100 million a year or the equivalent of 3,000 man years of high-level skills a year¹⁰. The domestic stock of high-level skills is probably about 2 per cent of the labour force or about 500,000, so that the import of foreign skills is only about 0.5 per cent of the domestic high-level labour force. However, the average income of foreigners was much higher than that of Brazilians so that the share of the high-level wage bill for foreigners may have been about 3 per cent. Some of this of course, was covered by foreign technical assistance programmes, but a good part

¹⁰ Details of this calculation are not given here, but they were made in the same way as those for Mexico as shown below.

was borne by Brazil. The import of foreign skills in Brazil is only about one-half the level of Mexico. As an offset to the import of skills, it seems that there was apparently no significant export of Brazilian skills^{11/} nor is there the tendency which exists in Argentina and Chile for highly trained people to emigrate. About three quarters of the foreign skills are used in industry.

Mexico ^{12/}

46. The Mexican census of 1960 showed that there were 158,000 persons with 15 years of education or more, i.e. 1.4 per cent of the labour force. This is similar to the proportion in some Mediterranean countries (Spain 1.7, Portugal 1.4, Greece 2.3), and is higher than the level in Brazil, India and Egypt. Not all people with higher education are active in the labour force and not all high-level manpower consists of people with higher education. Judging by the situation in countries where figures are available on both types of high-level manpower--as defined functionally and on educational attainments--and by the number of persons in such professions as medicine and teaching, it seems likely that high-level manpower in Mexico is somewhat less than 2.5 per cent of the labour force.

47. The first and compulsory phase of Mexican education is a six-year one from the age of six to twelve. About 32 per cent of Mexicans aged eleven to twelve were successfully completing their primary education in 1960. Only about one tenth of these were from rural areas although one half of the population lives there. In 1960 there were still 35 per cent of Mexicans who were illiterate.

48. About 8 per cent of Mexican children obtain secondary education and less than one quarter of these get vocational training.

^{11/} There has been some effort by SENAI to spread its apprentice training techniques to other parts of Latin America, and seven teachers from SENAI have helped in this.

^{12/} This section is based on material collected by the author in the autumn of 1964.

49. In 1963, 35,500 Mexican students entered higher educational institutions. This is about 5 per cent of the population aged 19. They were heavily concentrated in Mexico City. A total of 16,000 of these were in the National University, 3,400 in the Politecnico, another 2,700 in the Federal District and 13,400 outside the Federal District. In their first year, 58 per cent of the students were enrolled in scientific faculties, 19 per cent in economics and administration, and 23 per cent in social sciences and humanities. Thus, the distribution of studies was relatively favourable to professional fields important for economic growth. According to a report prepared for the Ford Foundation, there appear to have been only about 500 post-graduate students in scientific and technical fields in Mexico in 1963.

50. The average period of study before graduation from the University of Mexico is about five years and the drop-out rate is around 60 per cent so that university students who graduate are about 2.0 per cent of the relevant age group.

51. It would seem that good use is made of the available skills. The income of government officials seems to be sufficient to attract people with ambition and brains, and the relative income of school teachers has increased appreciably in recent years. Mexico is not suffering from emigration of highly trained personnel. The main defect in salary structures seems to be that university teachers are very poorly paid, so that this is largely a part-time occupation.

52. There are several channels through which Mexico supplements its own stock of skills by imports from abroad.

53. Technical assistance. In 1963, a total of 142 experts were provided under technical assistance programmes. The bulk of these were supplied by the United Nations programmes, by France and the United States, although Germany and the United Kingdom also made contributions. Half of the total were teachers and another seventeen were working on education programmes. Only eight were concerned with industry and technology.

54. Private foreign enterprise. Foreign investment in Mexico had a book value of around \$1.5 billion in 1964, and about half of this was in industry. Of the investment, 90 per cent was from the United States. The foreign investment in Mexico is spread over a large number of firms and is not heavily concentrated in one sector, as is the case in many developing countries. The foreign manpower provided, therefore may play a more widely diffused role in fostering the skills needed for development than is the case in many other countries.

55. It has been estimated that there were 960 United States personnel employed in United States companies in Mexico in 1955.^{13/} Most of these personnel were high-level and there were about 700 in industry. In 1955 the book value of United States investment in Mexico was around \$600 million. If we are right in assuming that the book value of all foreign investment in Mexico was around \$1.5 billion in 1964, then the total number of all foreign personnel working in Mexico for foreign firms was probably around 2,400, of whom about 1,800 would be high-level personnel in industry.

56. These 1,800 foreigners would represent around 3 per cent of the high-level manpower in Mexican industry. In many cases, their skills are of a type not possessed domestically. This is particularly true in the early stages of a given investment when domestic personnel are being trained in new techniques. The Columbia University Study on joint business ventures in Mexico gives details of nine companies which were promoted with the help of Nacional Financiera. In all of these, foreign technical personnel were used. Not all of these enterprises were successful, and foreign expertise might not have been indispensable in every case, but it played a vital role in the initial stages in such successful enterprises as Celanese, Tubos de Acero and Altos Hornos.

^{13/} J. C. Shearer, op. cit., p. 57.

57. Many foreign companies tend to keep more people abroad than they need. They have greater ease in dealing with people from the parent company, and probably expect them to be more docile in following head office policy. In some cases, the managerial personnel abroad are not of top quality, and both they and their companies would not always welcome a transfer back to the home country. Shearer stresses these points, and his evidence shows that United States companies in Mexico have a ratio of United States staff which is twice as high as in Brazil, even though the availability of local personnel is smaller in Brazil. He infers that many foreign personnel are doing jobs for which Mexicans are available. But the Mexican immigration authorities and Nacional Financiera have exerted constant pressure on foreign companies to replace foreign by Mexican personnel when qualified Mexicans are available, and it seems doubtful whether many of the former are redundant. One major reason why there may be a bigger need for foreigners in Mexico than Brazil is that there has been no significant inflow of immigrants to Mexico since the Spanish civil war. Mexican immigration policy is far more restrictive than that of Brazil.

58. Purchases of foreign skills by private enterprise. The most advanced firms in Mexico are mainly public or foreign enterprises. The purchase of foreign skills and know-how by private firms will therefore be limited. The major outlays are likely to be made when the firms purchase machinery from abroad, the manufacturer providing skills for the period in which the machinery is being put into working order. Payment for such services is included in the cost of the capital goods. Between 1958 and 1963, Mexico imported capital goods at an annual rate somewhat above \$0.5 billion of which about one fifth is for transport equipment which would not need foreign know-how for its installation. Some of the machinery is imported by foreign firms which already have technical experts working in Mexico, and other imports represent goods with which Mexican enterprise is reasonably familiar. Perhaps \$100 million of the imports of machinery were made by firms which needed foreign technical help for its installation. It would

be reasonable to assume that about 5 per cent of the cost of this was a payment for foreign expertise by private industry. The total payment by private Mexican industry for foreign expertise is probably around \$7 million a year, about \$5 million for expertise required to install machinery and around \$2 million for surveys, consultants and patent fees.

59. Public enterprises and government departments. Public enterprise is probably responsible for an appreciable portion of industrial output and is involved in some of the most complex fields. It can be assumed that public enterprise will avoid hiring foreigners if possible, but that foreign surveys and experts will be needed from time to time, or technical arrangements with foreign companies such as that between Petróleos Mexicanos and Dupont on petrochemical development.

60. Know-how transferred under capital aid schemes. Mexico has not received grant aid, but has had a considerable number of small-size loans from foreign governmental agencies, loans guaranteed by foreign governments or loans from the Inter-American Development Bank, the International Bank for Reconstruction and Development or the International Finance Corporation. There were thirty-three such loans in 1963, and eighteen in 1962. In all cases, these were tied to specific investment projects, either in industry or to provide infrastructure. In many cases, the bilateral government loans were made to finance machinery imports. Construction projects were usually carried out by Mexican contractors, and there is no evidence of projects being delayed or failing through lack of skills.

61. The total cost of foreign skills used in Mexico is probably around \$95 million a year. The bulk of this goes into Mexican industry. The flow is probably equivalent to around 3,000 man years of high-level skills or about 1 per cent of the total high-level manpower in Mexico.

14/ The investment of Nacional Financiera in industry is about \$2 billion. It owns thirteen firms outright and has a controlling interest in forty more. Apart from this, the Government owns the electricity industry, railways, the petroleum industry and some other enterprises.

Foreign training

62. In 1963 there were probably about 1,600 Mexicans enrolled in higher education institutions abroad and about 1,000 getting practical training abroad.

63. The Mexican authorities have had a vigorous policy for promoting foreign graduate training, starting in 1944 with the scheme of the Bank of Mexico, which provides full and partial scholarships, mostly for graduate study for its own employees and other promising people. In a study of the Bank of Mexico prepared in January 1961,^{15/} fourteen Mexican organizations are listed which give scholarships for study abroad. The most important of these appears to be the Bank of Mexico. Between 1944 and the end of 1960, a total of 606 persons had received grants from the Bank of Mexico and completed their courses. Of these, 126 had been employed by the Bank of Mexico at the time the fellowship was awarded. The report also lists fifteen professors from the Polytechnic who had benefited from courses in the teaching of mechanical and electrical engineering. In January 1961 there were ninety-one persons abroad with Bank of Mexico scholarships.

64. Of the 1,600 Mexicans engaged in academic study abroad in 1963, about 300 had foreign official scholarships, perhaps 200 had Mexican scholarships, and about 200 had scholarships from foreign universities. About one half of the students were therefore getting some type of support. Most of those on scholarship were engaged in some kind of post-graduate study; and the other half were mainly children of wealthy parents and were doing their undergraduate work in foreign countries.

65. In relation to domestic student enrolment, the quota of Mexican students abroad was very modest. There were 100,000 students in higher education in Mexico in 1963, so that those abroad were about 1.5 per cent

^{15/} Becarios y Programas de Becas, Bank of Mexico.

of the total. Mexican universities had an enrolment of 1,700 students from the United States in 1963, so that the inflow of students was higher than the outflow.

66. As far as can be ascertained, most Mexicans who have been trained abroad return after this training is completed, largely because they can be fairly sure of getting good jobs at home. There are only forty-three Mexican professors teaching or doing research in United States universities, compared with several hundred from Greece. There are good job opportunities and financial rewards in Mexico for trained people, so that there is not the incentive to train abroad for work abroad that is found in some other countries.

67. Of the 1,189 Mexicans studying in the United States in 1963, a total of 497 were studying scientific and technical subjects, i.e. about 42 per cent, whereas the proportion enrolled in these fields in the first year of study in Mexico was 58 per cent.

68. Thus, the distribution of studies was much more favourable to the production of skilled manpower for economic growth than is the case in Greece. A total of 343 of the Greek students in the United States were doing post-graduate work, or 29 per cent of the Mexicans in the United States. This is a much higher proportion than in Mexico itself where it is probably not more than 1 per cent.

Pakistan^{16/}

69. The stock of skills in Pakistan is meagre. People with higher education were only 0.4 per cent of the labour force in 1961. This is less than one half the level of India, Egypt or Turkey. Engineers and scientists were 0.05 per cent of the labour force, medical personnel 0.03 per cent, and secondary and higher teachers 0.2 per cent. Normally, we would expect these three groups to be about half of the high-level labour force defined on a functional

^{16/} This section is based on material collected by the author in the spring of 1965.

basis, so that high-level manpower in Pakistan is probably around 0.56 per cent of the 37 million labour force, or about 210,000 persons in 1965. In the Union of Soviet Socialist Republics and Western Europe, the comparable figure is about 5 per cent.

70. The situation with respect to middle-level technicians and skilled workers is even worse. The polytechnical schools have just started turning out technicians, and industrial apprenticeship covers only a few thousand workers.

71. The modern sector in Pakistan is still small. Enterprises with more than twenty persons employ only two million persons. The productive tasks involved do not require very complex skills in most cases. Four fifths of the manufacturing labour force is still in light industry. However, the rapidity of the expansion already experienced has put considerable pressure on skills. In public works, irrigation and power, the pressure of demand has led to large-scale import of foreign skills. The public works department is building dams and power stations in West Pakistan (WAPDA) and alone employs about 300 foreign engineers.

72. In 1963, Pakistan received about \$22 million of technical assistance. Two thirds of this was from bilateral programmes of Western countries, about \$3.4 million from United Nations programmes and about \$3.9 million from the Ford Foundation. These programmes provided about 720 experts, 200 of whom were working on industrial projects.

73. Another 800 foreigners worked for the Pakistan Government in various capacities, many of them in public works or industrial projects. These were financed by capital aid schemes and by the Government's own resources.

74. In addition, there were probably about 2,000 foreign technicians and engineers in the private sector. Some worked for foreign firms, which invested about \$20 million in Pakistan in 1963, and many were working for Pakistani enterprises.

75. Thus, the total of foreigners was about 3,500. Most of them were high-level, and their total cost was probably about \$105 million.

76. Scholarships for Pakistani trainees under technical assistance and cultural programmes totalled about 1,500 in 1963, but many more Pakistanis were studying abroad. Because of low salaries in the public services, a good deal of talent has emigrated, particularly doctors and nurses working in the United Kingdom. In industry, however, salaries for qualified Pakistanis seem to be relatively high, as the Government has put pressure on foreign firms to hire local talent, and there seems to be little loss of industrial skills from emigration.

77. The total cost of foreign personnel required to fill gaps in local skills is more than 1 per cent of GNP. The Third Five-Year Plan envisages a substantial absolute increase in the modern sector, a heavier emphasis on more sophisticated products and capital goods, a need to develop industrial exports and operate in a less protected economy. If these tasks are to be achieved, the present makeshift arrangements for producing skills will have to be improved, or a much larger proportion of key technical jobs will have to be filled by foreigners.

78. At the moment, the educational plan is not related to the economy's needs. Education is being expanded rapidly because it is a popular item of consumption which is assumed to contribute in some major way to economic growth. However, the educational programmes are, in this consultant's opinion, somewhat vague and costly and may raise great expectations, leading to enormous frustrations and social problems. Most of the students emerging from this system will expect jobs of a type which cannot be provided. As yet, Pakistan does not have "educated" unemployed, but this may well come soon.

79. It seems clear, even without the help of detailed manpower planning, that the system is unsuited to the real needs of the country. 70 per cent of the children now enter primary schools, but 65 per cent of these drop out during the primary year.

Priority should be given to reducing inputs rather than to increasing the initial enrolment rates. Quality should be improved by retraining the less qualified teachers during vacations, but the easiest contribution to quality would be free government provision of textbooks, papers and pencils. Secondary education is still designed largely as preparatory rather than terminal; it is still too literary and has not enough science courses. Apprenticeship training is available for only about 3,000 students, i.e., not more than 2 or 3 per cent of juveniles in industry. In the State of São Paulo in Brazil, we have seen above that 60 per cent of the juveniles in industry are covered by apprenticeship schemes which involve intensive training, often of 45 hours a week. Apprentice training in firms is less costly and quicker than in schools, and Pakistan would do well to copy the Brazilian system.

80. Higher education in Pakistan is generally of poor quality and still seems designed to provide middle-level administrators for rather routine government jobs.

81. There were 257 colleges controlled by six universities in 1960. Half of these taught only for intermediate level, which is really a pre-university course. The rest also provide a two-year course leading to the B.A. degree and the universities provide courses leading to the M.A. Real graduate work is largely done abroad. A total of 212 of the colleges were liberal arts institutions; only 43 were institutions specialising in skills important for the economy. Only 73 per cent of the students presented themselves for examination and of these, 60 per cent failed. The situation may have improved during the Second Five-Year Plan. It seems doubtful whether quality has improved, and the numbers in the educational process have certainly grown. The idea of improving quality by requiring three years of study for a degree instead of two was dropped during the Second Plan.

82. It seems clear that the intermediate courses should no longer be considered as higher education, but as secondary education. Half of the colleges should therefore be turned into secondary institutions, be given a

more scientific and technical bias and provide terminal rather than preparatory courses. In higher education, at least half of the colleges instead of only one sixth, should provide for scientific and technical specialties. Shortage of science teachers should be tackled by having longer academic years, two shifts, more extensive use of part-time teachers from industry, and greater use of foreigners. Library and laboratory equipment should be greatly improved.

83. The Government could give a lead to employers by changing educational requirements for entry to the civil service. Middle-level personnel should be required to have a good terminal secondary education, rather than low-quality higher education, and greater emphasis should be given to science.

84. Secondary technical education and the improvement in higher education should be given priority over expansion of numbers, and over expansion of primary education.

85. Pakistan's macro-economic planning techniques are much further developed than those of the other countries we have considered, but the Third Five-Year Plan does not adequately analyse the skill needs. Insofar as the problem is explored at all, the Plan explicitly presents large-scale disequilibrium between demand and supply, with no indication of a policy solution. Educational planning is conceived as something separate from manpower planning, and training is treated as something quite distinct from education. There has been a considerable increase in educational expenditure, which will be more than 3 per cent of GNP in the Third Plan, but this effort is not related to the manpower needs of the economy in a quantitative analytic framework, even though the 1959 Commission and the Second Plan provided sensible guidelines as to the direction of change needed. The educationists in Pakistan are quite skilful in the logistics of their sectoral programmes. They know about teacher-student ratios, the attrition rates for teachers, the unit cost of school buildings, the cost of equipment per student, and how to phase their plans to meet the targets. But the targets they are given are vague, unspecific and incomplete.

86. A systematic effort to project future skill requirements is necessary if the educational sector is to do its job properly. The manpower planning unit should be responsible for projecting separately all skills which are likely to be a potential bottleneck, i.e. all skills for which the training lag is significant. The manpower projection should cover the whole economy and its skill needs, and it should cover skills produced both by the educational system and by in-service training.

87. The functional manpower requirements should be defined in terms which are meaningful to educational and training institutions. The manpower and educational planners should get together and try to hammer out a provisional agreement on the degree of detail required and the classifications to be used. This can be modified later, particularly by comments from industry. When the classification is reasonably firm, it should become a standard for use by the Ministry of Labour in manpower surveys, by the industrial and population censuses, by educational statisticians and all other bodies working in this field. Firm pressure will be needed from the Planning Commission to ensure this standardization.

88. It will be necessary to improve knowledge of the existing stock of skills if planning is to have a firm basis. At the moment, much of the plan deals with future increments, with not even an estimate of the 1965 position. In most cases, the lack of base year data or estimates has led to a neglect of wastage through death and retirement, and this biases the estimates of future needs in a downward direction. The newly available population census for 1961 provides useful detailed data on professions, but the classification is not detailed enough for manpower planning purposes, and it provides no cross-classification by industry. The existing manpower surveys of the Ministry of Labour provide a detailed industry breakdown for firms with more than twenty employees, but the skill breakdown is confined to eight categories, which are not well defined. The survey should be expanded to provide skill data according to the new classification. At a later stage, the survey should be further expanded to provide a cross-classification of educational attainments and functional skills.

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89. The biggest increase in educational output projected in the Third Plan is at the skilled worker level. Here, responsibility is spread between the Departments of Labour and Education. The liaison between the two ministries is not close, and the training effort at this level is very poor. The vocational schools are of very poor quality, and there are only six industrial schools run by the labour departments, with an enrolment of 1,400. Enrolment in Ministry of Education schools is perhaps 3,000 and there are perhaps 2,000 in private schools. Some big firms, notably the railways and the shipyards, have apprenticeship schools, but the total covered by training schemes at this level is only about 8,000, an extremely low figure; the target of 50,000 by 1970 is certainly not too high. However, the Ministry of Labour's record in this field is not encouraging. The number enrolled in its schools rose from 1,100 in 1947 to 1,400 in 1965, as compared with its Second Plan target for 1965 of 4,100. During the Second Plan it expected to raise the number of training centres from five to ten, but they rose only to six. The apprenticeship statute has not been enforced against employers, and only about 2 per cent of juveniles in industry are apprentices under training.

90. Training at this level should take place as far as possible in firms. Inside a plant, instruction can be given with better machinery; training will be geared to the specific needs of the job; and apprentices will have a clear idea of their future job. A certain amount of training is needed in schools outside firms. But, as far as possible, these should have close links with industry; their students should spend part of their time on the job; and wherever possible, they should already be apprenticed to a firm rather than, as at present, be students who still have to find a job. This kind of system cannot be enforced by the present apprenticeship law - the sanction against employers for non-fulfilment is imprisonment, and few courts are likely to impose it. In the earlier stages of industrialization, heavier reliance will have to be placed on schools outside the factory. At the moment, there are only about seventy undertakings with more than 500 workers,

and the efficiency of a factory school obviously depends upon the size of the plant. With the growth of industry, a bigger burden can be assumed by in-plant training. The apprenticeship service will provide teachers and run schools, as well as help to set up and provide instruction facilities inside plants. It should keep a continuous statistical record of apprentices and their fields of specialization. Curricula should be modified continuously in the light of technological developments. This should be relatively easy because of the close association of employers with the scheme.

91. The great advantage of such a scheme is that it is effective in enforcing the participation of entrepreneurs, who will both provide training and ensure that it meets their needs. It also gives workers a real opportunity for upgrading their skills, which the present system does not offer.

Guinea^{17/}

92. Most of the Guinean population is agricultural, and the average income is very low. Apart from subsistence agriculture, the major activity is the mining of bauxite and production of alumina. It also has a plantation economy, producing coffee, bananas, pineapples, oranges and lemons, and mining companies produce iron ore, gold and diamonds. Since independence, several factories have been built. Before independence, industry consisted of a few soft-drink firms, a plastics firm making sandals and other consumer goods, the bauxite mines of Loos, and iron ore mines.

93. The infrastructure is very poor. There is a port at Conakry, and a paved road for 100 kilometres in the direction of Kindia; a railway from Conakry to Mamou. There is electricity for industrial purposes in Conakry and in the alumina plant at Fria, but not elsewhere. The airport at Conakry has been enlarged to take jets. There are minor airports elsewhere, and a larger airport at Kankan. Most of the population does not have piped water, sewage disposal facilities, electricity or roads.

94. However, the potential of Guinea is much more promising than that of many other developing countries. Its mineral resources are immense, with some of the richest bauxite and iron ore deposits in the world. It has more than a million head of cattle, which are kept as a symbol of wealth but which could be a major source of income. Agricultural land is not scarce, and there is plenty of water. Lack of skills is the major obstacle to development in Guinea, and the major reason why its capacity to absorb capital aid is limited.

95. Before achieving independence in September 1958, Guinea belonged to the French franc area and enjoyed preferential and guaranteed markets for its tropical produce, as well as budget subsidies for deficits in current expenditure. It also received capital aid from France. All this ceased

^{17/} This section is based on material collected by the author in January 1965.

abruptly with independence, as did the fairly substantial pension payments to ex-servicemen of the French army. At that point, Guinea cut its commercial links with France and with its neighbours, Senegal and Ivory Coast, with which it had previously had a customs union within the franc area. Guinea also lost the services of French administrators, technicians and entrepreneurs.

96. Save for a short period prior to independence when Guinean ministers were in office under the loi cadre as a step towards independence, the Guineans had had very little experience in government. A few Guineans had served as members of the French parliament.

97. The cadres of the administration had consisted of French officials; banking was done by French banks; most of the major retail and wholesale business was conducted by French, Syrians, or Lebanese; and the large banana and pineapple plantations were run by Frenchmen. Therefore, the running of the administration and of the economy depended to a large extent on foreign skills. There were probably some 600 Frenchmen in administration and about 2,500 foreigners in productive and service enterprises^{18/}, plus a French army contingent of several thousand with French officers. Guinea had been part of a wider federation of French West Africa, and the most important administrative officials had been located in Dakar. At the time of independence, two mining companies were operating in Guinea, one producing iron ore, and the other bauxite. Work had been started on a very large plant to produce alumina, and ultimately aluminium at Fria.

98. Very few Guineans had had university education outside Africa. Including those who had trained as "African" doctors or veterinarians in Dakar, the total with higher education was less than 50.^{19/} About 500 had had secondary education at the French Lycee William Ponty in Dakar. At the time of independence, only about 10 per cent of the children of school

^{18/} See Elliott Berg's estimate for 1958, "Socialism and Economic Development in Tropical Africa", Quarterly Journal of Economics (1964).

^{19/} See Elliott Berg, op.cit.

age were in school, and most of the teachers were French. There was a "chefferie" of Guineans who had administrative functions in support of the French administration, but who held little responsibility under the French system of direct rule. Many Guineans had been soldiers in the French army, and some had been officers or non-commissioned officers. Some of these returned to Guinea at independence. Other skills available in the country at the time of independence were those of trade union leaders who had been active in politics and were very efficient organizers.

99. On independence, the French administration and army were withdrawn in a matter of weeks. A good many French planters and businessmen withdrew at the same time, and after two years all the French banks were withdrawn. Relations with the bauxite mining company were broken off after the Canadian proprietors refused Guinean conditions, but Fria continued its development and became the mainstay of the economy.

100. The skilled manpower problem of Guinea was, therefore, without parallel. All other African countries which have become independent have had more preparation and a more gradual transition in personnel needed for running the administration and economic activity. This is true even of the Congo. Guinea completely had to reorient its external economic relations, and in this small country the overhead costs of sovereignty made serious claims on the available talent. The Foreign Office requires about twenty professionals in Conakry and about thirty in its ten embassies abroad, even though it has been run very economically. The army now has a strength of 3,000. The national assembly has seventy-four deputies. Furthermore, the thirty-two foreign embassies in Conakry have also absorbed some of the total stock of skills in clerical work, chauffeuring, car repairs etc.

101. The need for skills was enhanced by Guinean ambitions for social and economic development. A rapid expansion in education was started and

has now brought one half of the children into primary school. A technical university has been created. An ambitious programme of industrialisation has been put in train. As the Government preferred to run all productive enterprises itself, its need for manpower was greatly swollen.

102. In order to meet these needs, Guinea had to supplement its own skills from abroad. All economic enterprises and investment projects had to depend on foreign skills, because almost all the Guineans with education, leadership ability and ambition were absorbed into the administration and in politics. The number of State employees has increased five-fold since independence.

103. For a short time, Guineans placed some hope on help from the United Nations. But the United Nations was not then equipped for such emergencies, and could only send a small number of people. The Union of Soviet Socialist Republics and other socialist countries of Eastern Europe stepped in on a major scale, sending hundreds of technicians within weeks of being asked, making major loan commitments and concluding commercial agreements to take Guinean agricultural exports.

104. As far as technical assistance was concerned, Guinea quickly found substitutes for French aid. Apart from help received from Eastern Europe, aid was obtained from the People's Republic of China, from the United States and from the Federal Republic of Germany. Not all of the help was well suited to the needs of Guinea, but quantitatively the country received about as much assistance per capita as did other French-speaking African countries.

105. The industrialisation projects are of a miscellaneous character; some were designed largely with the idea of eliminating imports, but the canning plant at Niono and the sawmill at N'Zarokoro were designed partly to foster exports. The printing works and radio station were created because of the strong feeling that they were a necessary attribute of sovereignty.

106. The biggest productive enterprise in Guinea is the bauxite and alumina complex at Fria, which is owned by an international consortium and whose foreign personnel are nearly all French, provided by Pechiney. This huge plant produces about one sixth of the world's alumina (480,000 tons a year), and has an investment of \$160 million, including the railways to Conakry and the port installations. This compares with a Guinean national income of around \$250 million. The output of Fria is worth just over \$30 million a year and represents half of Guinea's exports. The thermal electricity generated by Fria is about three quarters of Guinea's energy output.

107. In June 1963 the personnel structure of Fria was as follows:

Table 3

| | <u>Nationals of Guinea</u> | <u>Foreigners</u> |
|------------------|--------------------------------|-------------------|
| Cadres | 1 | 41 |
| Technicians | 30 | 247 |
| Salaried Workers | 22 | 86 |
| Wage Earners | 834 | 0 |

Source: Bulletin Spécial de Statistique, Conakry, p.12.

Since then, further progress has been made toward Africanisation.

108. Fria is pursuing a policy of Africanisation, but it will necessarily take a long time to complete the process in such a complex plant where a technical difficulty leading to a two-hour stop in production would put the plant out of action for six months.

109. The bauxite mines of Kassa on the Isles de Loos had been worked by Canadian interests before independence. A disagreement led to nationalisation in 1961 and the loss of 60 foreign personnel. The result has been a drastic fall in output and exports. Exports in 1962 were 44,000 tons compared with 541,000 in 1960; with Hungarian help, they have risen considerably since 1962.

110. The iron ore company, Compagnie Minière de Conakry, is still in private

hands. In the first half of 1963, it had 39 foreign personnel and 635 Africans. Its output was about the same as at the previous peak.

111. Diamond exports in terms of carats appear to have been well below the 1958 level since independence. However, figures on the value of exports show an increase. There are now Soviet geologists in this industry, and Soviet experts are carrying out a geological survey.

112. In manufacturing, the Government has undertaken a number of projects which have required foreign skills. In January 1965, the situation was as follows:

- (a) The Patrice Lumumba Printing Works, built with a loan from the German Democratic Republic, still had several technicians sent by that Government. The plant was working at a small fraction of capacity. The country's only newspaper had a circulation of only 8,000 two or three times a week, and rather few books were printed. The capacity of the plant is several hundred thousand newspapers a day.
- (b) The canning factory for fruit and meat at Mamou was built by Soviet technicians and still had Russian managerial personnel.
- (c) The brewery had a German brewer.
- (d) The sawmill at N'Zerekore was built with Russian aid and still had Russian engineers.
- (e) The fishing industry was built up by a joint Guinean-Polish enterprise.
- (f) The furniture factory, built with a Yugoslav loan, still had 30 Yugoslav technicians. It was working well below capacity for lack of upholstery materials.
- (g) The ~~combine~~ for cigarettes and matches was completed in October 1964, after fourteen months' construction work supervised by fifty Chinese. By January 1965, the factory was producing at about half of capacity. It turned out six million matches and 750,000 cigarettes a day. It had fifty Chinese supervising and training 500 workers. Production was going very smoothly.
- (h) The textile mill, under construction, will handle spinning, weaving and finishing and employ 1,000 Guineans. This is a mixed enterprise managed financially by Goffinex (Compagnie Financière pour Commerce Extérieur) which engaged Flatts Brothers (United Kingdom) as managing agents. They

recruited thirty-eight foreign personnel from various sources for managerial and training functions.

- (i) There are some foreign private enterprises in manufacturing, with a few foreign personnel, mainly in soft drinks (Soboa, and Coproa). The plastics firm of Costantin Gemayel was still private, but with a strong government participation, and employed a few foreign personnel.
- (j) Air Guinea was created with ten Soviet aircraft and with Russian training assistance.

113. Construction and contracting work has been done by foreign firms, e.g. extension of the airport by the Union of Soviet Socialist Republics; Kindia Mamou road by Belgian contractors; Hotel Gbessiah by Swiss contractors; Hotel Camayenne by the Union of Soviet Socialist Republics; and the sports stadium and Polytechnic by the Union of Soviet Socialist Republics. The barrage at Kinkon is being built with Chinese help.

114. Most industrial projects have been financed by credits from communist countries, and most of their experts are industrial, although they also supply teachers, doctors and nurses. None of the United States aid or technical assistance is concerned with industry. The bulk of German aid consists of help to the action économique of the army.

115. Guinea is heavily dependent on foreigners for its health and education services. In January 1965, 435 of the 635 secondary school teachers were foreigners, and also 49 of the 56 teachers at the Polytechnic. There was an ecole de langues with foreign teachers, and a United States A.I.D.-financed technical school with 25 foreign teachers. In the health service, the situation was as follows in 1962:

Table 4

| | <u>Nationals of Guinea</u> | <u>Foreigners</u> |
|-----------------------|--------------------------------|-------------------|
| Doctors | 71 | 88 |
| Dentists | 0 | 12 |
| Pharmacists | 5 | 4 |
| Laboratory assistants | 3 | 10 |
| Midwives | 61 | 25 |
| Social workers | 23 | 1 |
| Nurses | 1,114 | 14 |

Source: Bulletin Spécial de Statistique, Conakry (1964)

116. From September 1964 to mid-1965, medical resources were also supplemented by the presence of the United States hospital ship "Hope" in Conakry, with 30 specialists and surgeons, 35 nurses, and 30 laboratory assistants. It dealt with special cases and also performed a training function.

117. It should be noted that some of the Guineans who are qualified for teaching or medicine are working in administration, e.g. in January 1965 the Minister of Education, the Governor of Kindia, and the Ambassador to France were doctors, and the Director of the Plan was a veterinarian.

118. As compared with other African countries, the use of foreign skills in Guinea in areas connected with national sovereignty is negligible. In productive enterprises and capital investment, Guinean dependence on foreign skills is very high. Even building contractors and architects must be imported. The present inefficiency of some of the manufacturing enterprises is due only partly to the fact that Guineans are in the process of learning how to run them. They are also hindered by shortage of materials because of the payments crisis and by transport difficulties or shortage of electric power. Nevertheless, it is clear that the present degree of industrialisation puts a considerable strain on existing Guinean skills. There is a good deal of abandoned machinery in the country. This applies particularly to vehicles out of order because of bad driving or poor maintenance, and also because of unsurfaced roads and bad weather. Lack of maintenance has also put many telephones and elevators out of order.

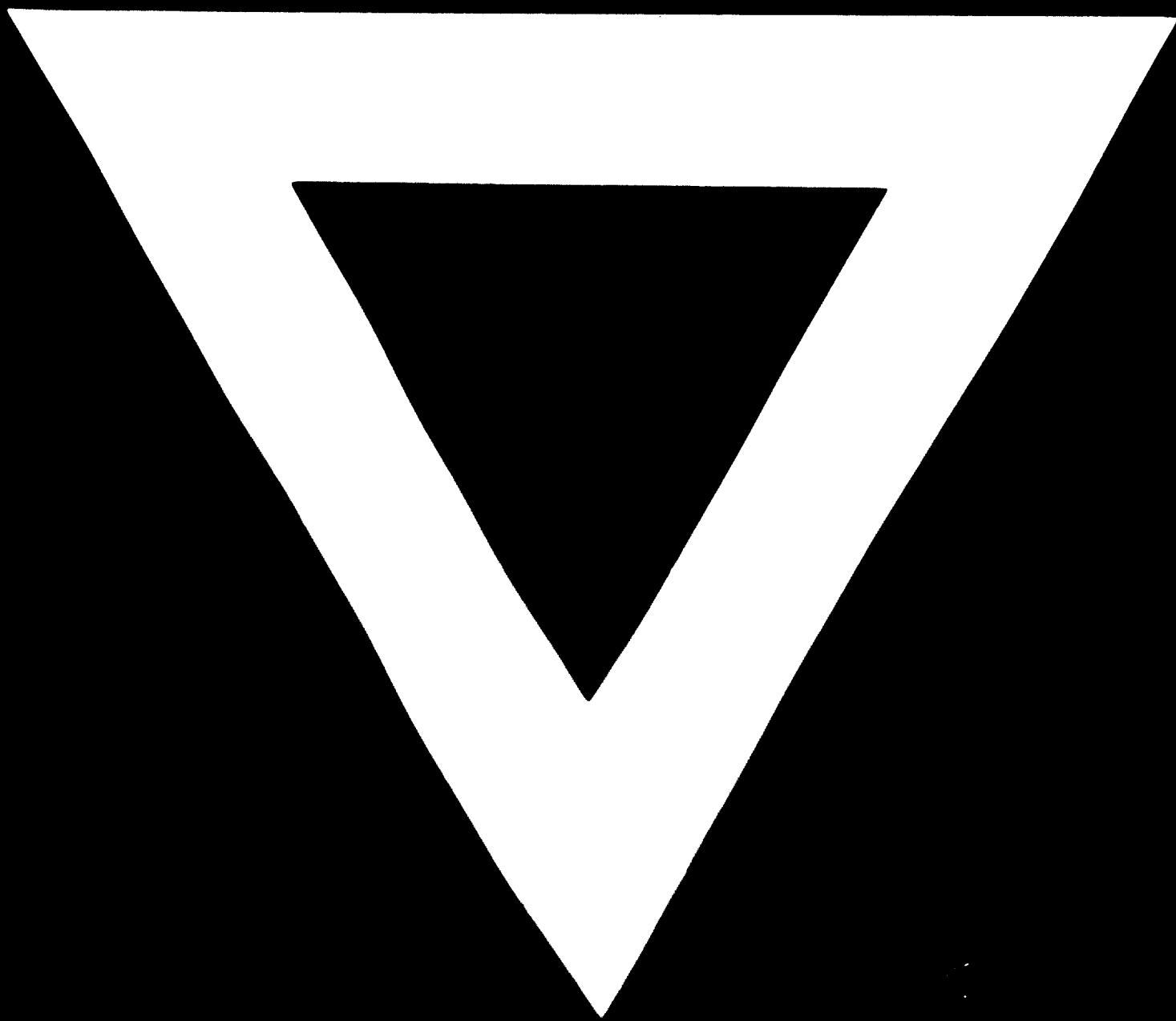
119. The following table gives a rough idea of the sources of foreign skill used by Guinea in January 1965.

Table 5
Sources of Foreign Skills in 1965

| | <u>No. of persons</u> |
|---|-----------------------|
| Bilateral technical assistance of Western countries | 320 |
| Technical assistance & capital projects: | |
| Yugoslavia | 40 |
| China (mainland) | 250 |
| U.S.S.R. | 250 |
| Other communist countries | 100 |
| United Nations technical assistance | 15 |
| Private foreign investment | 500 |
| Private voluntary agencies | 150 |
| Purchases of skills by Guinea apart from those financed by aid programmes | 400 |
| | <u>2,025</u> |

Sources: Various Guinean sources, embassies in Conakry, and OECD.

120. The foreign skills used by Guinea are: high-level (including the Soviet teachers at the Polytechnic and thirty leading United States doctors); middle-level (nurses, technicians in Fria, etc.); and skilled workers (chiefly from Chinese technical assistance). The cost of the skills varies enormously. The services of United States doctors probably command an average opportunity cost of around \$40,000 a year whereas for Chinese textile workers it may be as low as \$500 plus cost of transport. In 1962, the average salary for all foreign workers in Fria was \$8,500, to which must be added overhead for transport, terminal benefits, free housing, etc., so that it would seem reasonable to assume that the opportunity cost of foreign technicians was \$10,000 each on an average, or total of around \$20 million for the year. (This is about 8 per cent of GNP.) Not all of these costs are borne by Guinea, but they provide some measure of magnitude of foreign skills.



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