OCCASION

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

DISCLAIMER

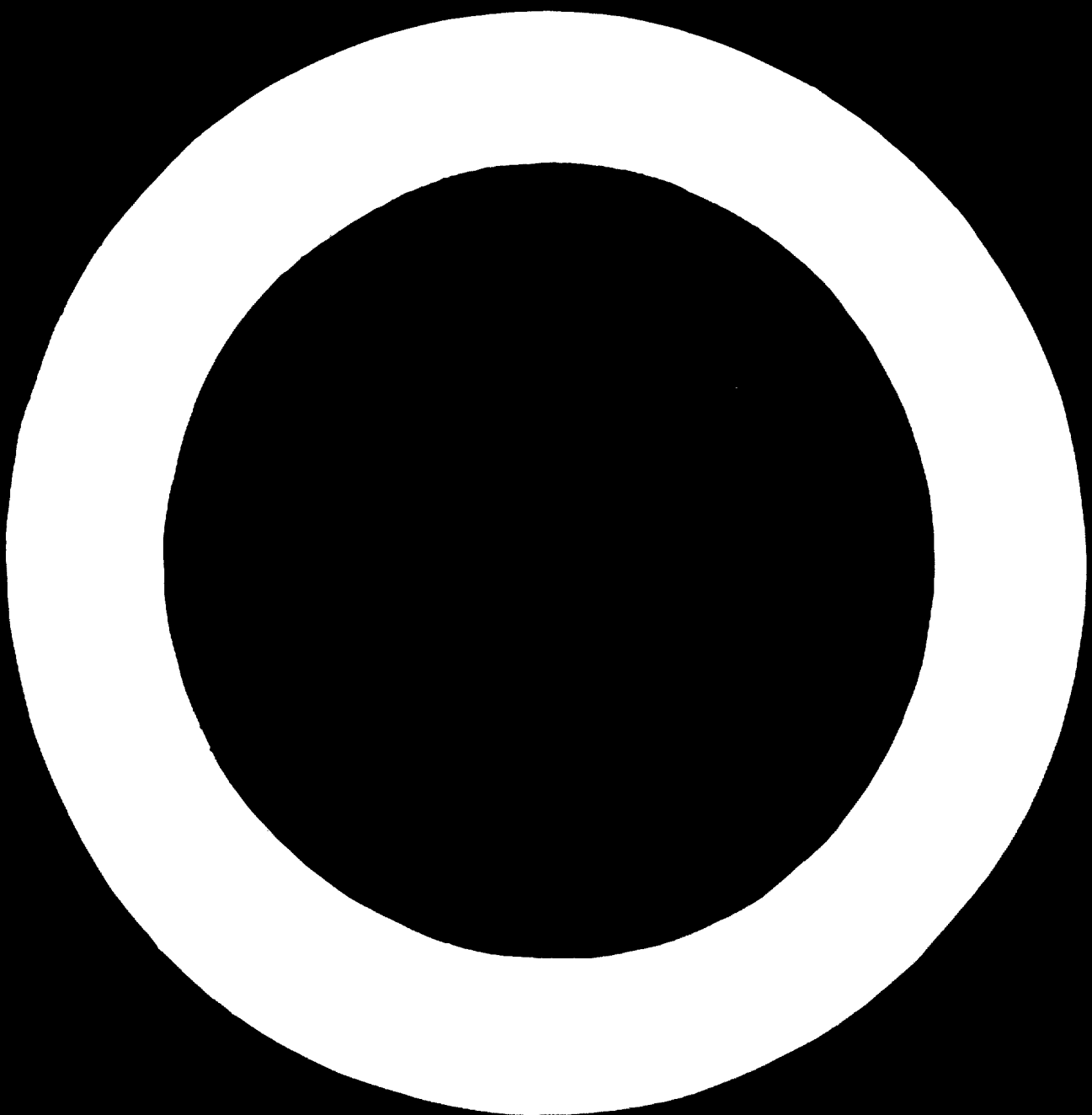
FAIR USE POLICY

CONTACT

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

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

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org



The Author: *Tadafumi Sakai, Director of the National Institute of Resources, Japan, has been associated with the Resources Council since its establishment in 1947 and is one of its councillors. He is a graduate of the Tokyo Institute of Technology where he majored in chemical engineering.*

The Resources Council, Japan

By Tadafumi Sakai

THE RESOURCES COUNCIL is an advisory organ to the Director General of the Science and Technology Agency of the Office of the Prime Minister. The Council researches matters concerning the integration and use of the country's resources. The Council was established in 1947, when Japan was in the midst of postwar economic and social unrest owing to the serious shortage of goods. At that time the Council was part of the Economic Stabilization Board, which was responsible for the policies of rehabilitation of the war-battered economy. The Council became an auxiliary organ of the Prime Minister's Office in 1952, when the Economic Stabilization Board became the Economic Planning Agency. With the establishment of the Science and Technology Agency in 1956, the Council became attached to the Agency, and the Secretariat of the Council was transferred to the Agency as the Resources Bureau. In 1968, the Bureau was transformed into the National Institute of Resources.

Functions

Owing to a lack of co-ordination, resources are often employed in such a manner that their full scientific value is not attained. It is vitally important, therefore, to seek methods conducive to the full scientific development and co-ordinated use of a country's resources.

An organization through which the findings of scientific and technological research can be applied is a vital co-ordinating element in a country's economy. To this end the Resources Council was established.

In working out an over-all system for their development, it should be kept in mind that resources are related directly or indirectly to each other. Research in various fields can become too specialized, and as a result the researchers fail to take an objective view of national aims. The utilization of resources should be considered not item by item but in a broader context. Scientific research should be conducted in order to discover basic relationships in the use of resources.

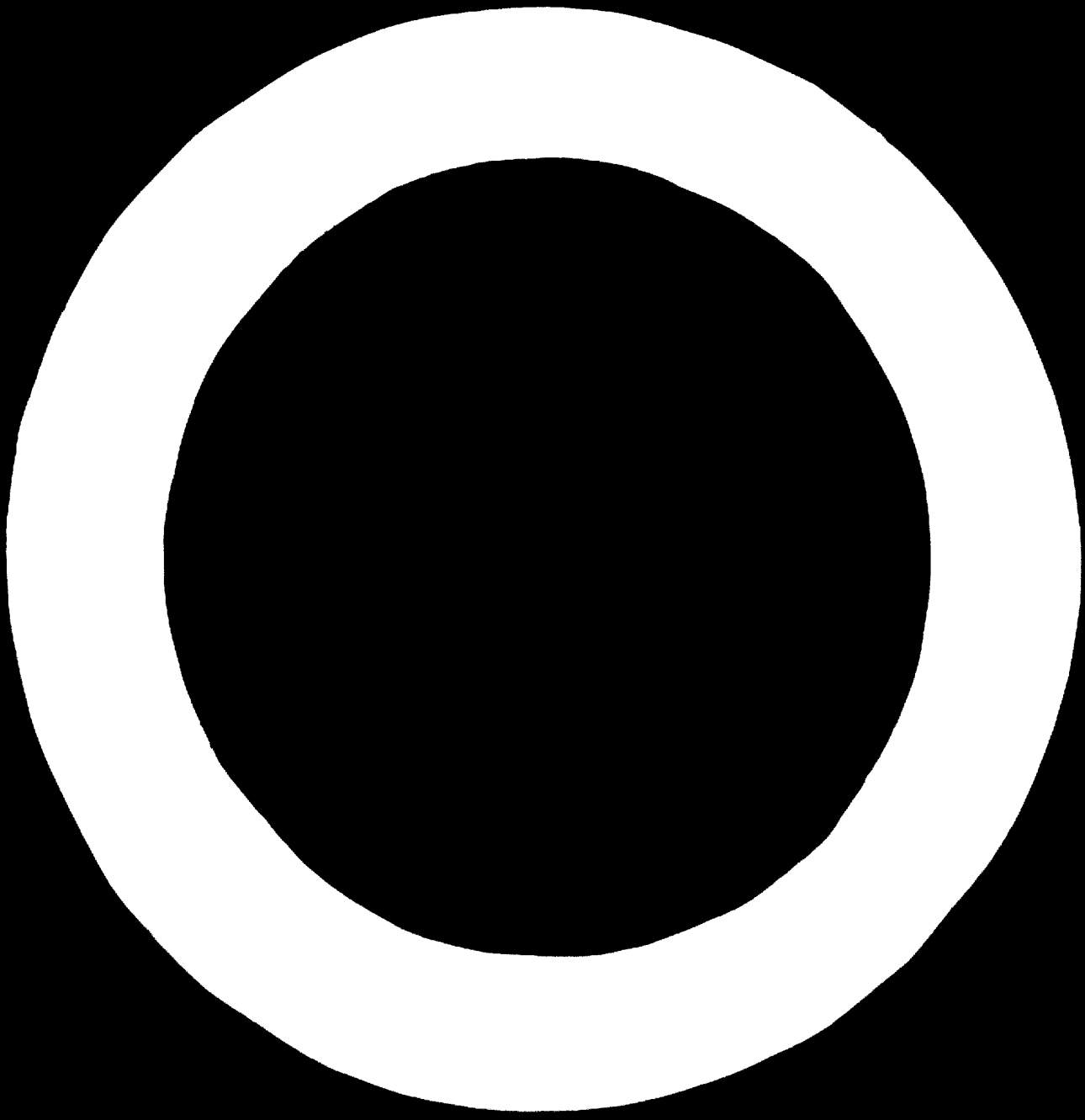
The research activities of the Council, although conducted from a scientific and technological viewpoint, aim primarily at contributing directly to the improvement of the standard of living. Administrative work is kept to a minimum.

The conclusions reached by the Council after its deliberations are reported to the Director General of the Science and Technology Agency, as also are the results of research on matters requested by the Director General himself. The Council's recommendations and reports are transmitted to the responsible administrative organs by the Director General; these contribute towards the establishment of government policies.

Organization

The Council consists of 20 members who are appointed by the Prime Minister. The Chairman is elected by the councillors. The Prime Minister also appoints specialist councillors for research into technical matters and secretaries to assist the councillors and specialist councillors.

At present, the Council has 723 specialist councillors, including university professors in physical science, engineering



The Author: *Tadafumi Sakai, Director of the National Institute of Resources, Japan, has been associated with the Resources Council since its establishment in 1947 and is one of its councillors. He is a graduate of the Tokyo Institute of Technology where he majored in chemical engineering.*

The Resources Council, Japan

By Tadafumi Sakai

THE RESOURCES COUNCIL is an advisory organ to the Director General of the Science and Technology Agency of the Office of the Prime Minister. The Council researches matters concerning the integration and use of the country's resources. The Council was established in 1947, when Japan was in the midst of postwar economic and social unrest owing to the serious shortage of goods. At that time the Council was part of the Economic Stabilization Board, which was responsible for the policies of rehabilitation of the war-battered economy. The Council became an auxiliary organ of the Prime Minister's Office in 1952, when the Economic Stabilization Board became the Economic Planning Agency. With the establishment of the Science and Technology Agency in 1956, the Council became attached to the Agency, and the Secretariat of the Council was transferred to the Agency as the Resources Bureau. In 1968, the Bureau was transformed into the National Institute of Resources.

Functions

Owing to a lack of co-ordination, resources are often employed in such a manner that their full scientific value is not attained. It is vitally important, therefore, to seek methods conducive to the full scientific development and co-ordinated use of a country's resources.

An organization through which the findings of scientific and technological research can be applied is a vital co-ordinating element in a country's economy. To this end the Resources Council was established.

In working out an over-all system for their development, it should be kept in mind that resources are related directly or indirectly to each other. Research in various fields can become too specialized, and as a result the researchers fail to take an objective view of national aims. The utilization of resources should be considered not item by item but in a broader context. Scientific research should be conducted in order to discover basic relationships in the use of resources.

The research activities of the Council, although conducted from a scientific and technological viewpoint, aim primarily at contributing directly to the improvement of the standard of living. Administrative work is kept to a minimum.

The conclusions reached by the Council after its deliberations are reported to the Director General of the Science and Technology Agency, as also are the results of research on matters requested by the Director General himself. The Council's recommendations and reports are transmitted to the responsible administrative organs by the Director General; these contribute towards the establishment of government policies.

Organization

The Council consists of 20 members who are appointed by the Prime Minister. The Chairman is elected by the councillors. The Prime Minister also appoints specialist councillors for research into technical matters and secretaries to assist the councillors and specialist councillors.

At present, the Council has 723 specialist councillors, including university professors in physical science, engineering

and social science, directors of private companies, engineers and personnel of government agencies. Secretaries are appointed from the staff of the Science and Technology Agency.

Research

Research committees are set up to perform surveys on specific subjects; each committee consists of the councillors and specialist councillors assigned by the Chairman of the Council.

At present, the Council has ten committees concerned with: land, water, forests, marine life, socio-economics, conservation and disaster prevention, foodstuffs, energy, synthetic polymolecular materials and industrial raw materials. There are also special committees for erosion and flood control, regional development, agricultural production, environment technology, urbanization, tropical resources and surveying.

The general affairs of the Council are dealt with by the Resources Section of the Planning Bureau, but affairs directly related to research work are dealt with at the National Institute of Resources of the Agency.

Current research

Since the establishment of the Council, the country has experienced rapid economic growth. This growth has brought manifold changes in the economic and social structure, an industrial structure that emphasizes the heavy industry and chemical sectors, the expansion of foreign trade based on imported industrial fuel and raw materials, and exported finished products. The population is now concentrated in urban areas, and traffic congestion, pollution of air and water caused by too rapid economic growth is apparent.

The Council has conducted research on the prevention of public hazards and the improvement of urban environment, and has made long-range studies on the utilization of resources. Its studies have included general research on the following:

- *Land resources.* Research on actual use of land resources; on supply and demand trends; on flooded areas.
- *Water resources.* Research on changes in demand and supply of water; on international activities dealing with resources (International Hydrological Decade IHD), Economic Commission for Asia and the Far East (ECAFE), Food and Agriculture Organization of the United Nations (FAO), Organisation for Economic Co-operation and Development (OECD) and World Health Organization (WHO).
- *Forest resources.* Research on the role of forest resources in changing social and economic environments; on the connexion between forest resources and urban development.
- *Conservation and disaster prevention.*
- *Land subsidence.* Research carried out with special reference to the development and control of ground water.
- *Erosion and flood control.* Research, with special reference to the Mogami River, on the causes and social and economic effects of floods, the historical progress of land and water conservation measures, and other questions concerning land and water conservation.
- *Energy resources.* The Council submitted a report on techniques for utilizing liquefied natural gas in 1969 and made a recommendation on the use of energy of thermal power stations for supplying electric power, for utilizing surplus heat for local air-conditioning purposes, and for serving agricultural and fish cultivation in 1970. The Council is undertaking preparatory work for research on the rationalization of transport techniques and systems for energy resources.
- *Synthetic polymolecular resources.* Research on future sources of petrochemicals and demand and supply questions; research on the beneficial effects expected from the use of new construction materials and the problems involved.
- *Industrial raw materials.*
- *Nickel resources.*
- *Marine resources.* The propagation of fish and shellfish, for example.
- *Foodstuff resources.* The modernization of food-processing techniques, for example.
- *Agricultural production.* Research on the chief areas producing tangerines, on feed demand and supply and on effective uses of microbial resources.
- *Tropical resources.* The development and utilization of tropical plant resources.
- *Social and economic affairs.* Research on resources development; on the development of tourism; on industrial areas and urban functions.
- *Regional development in Western Japan.* The effects of large-scale development projects on resources utilization and transport patterns; research on future development policies.
- *Urban problems.* Research on appropriate forms of urban functions; on urban growth processes and improvement of urban functions.
- *Environment technology.* Research on the improvement of living conditions and the aims of reorganization.

Special research has been conducted on:

- *Water resources control.* Numerous single-purpose and multipurpose water facilities are being constructed for the utilization and development of water resources, for water pollution control, flood control and other purposes. Accordingly, there is an increasing need for control systems capable of combining all aspects efficiently and of integrating their operation.

The purpose of the present programme is to conduct basic research preparatory to the establishment of systems based on the latest scientific techniques for the control of water resources. Priority is given at present to basic research on paddy water control and water pollution control; mathematical models for water control; new observation, analysis and information systems; and on data collection.

- *Waste recovery, utilization, and disposal systems.* In recent years urban and industrial wastes have been increasing rapidly.

The purpose of the present programme is to conduct

research into the amount of waste being recovered, gathered, transported, utilized and disposed of; to consider artificial systems for the circulation, utilization and disposal suited to various areas and industries and to identify possible ways of utilizing waste materials and controlling pollution.

At present, a study of the recovery of urban wastes and their disposal is being made in cities and towns throughout the country. A study has been made of industrial wastes in Osaka and other industrial communities, and an interim report will be published shortly.

In addition, the Council is conducting, in co-operation with the National Institute of Resources, research on optimum system designs for the recovery, utilization and disposal of industrial wastes. In this project, taking Osaka as a model, a detailed questionnaire is being distributed and the data collected from 3,000 factories are being assessed. This is being compared with research data on construction wastes and wastes from tertiary industries, as well as economic planning indices to show how Osaka will dispose of its industrial wastes in the future. Finally, a design for the optimum systems of waste recovery, utilization, and disposal is being worked out that takes into account expected future progress in waste utilization and disposal techniques. A feature of this study is that it employs techniques of systems analysis.

Research on future resources

To establish an economic basis for a healthy and comfortable standard of living, the Council is investigating various aspects of resources utilization, with 1985 as the target year. To this end, a comprehensive study of likely changes in the demand for resources and of problems involved in their supply is being made. This project attaches importance to: raising industrial systems to the international level of sophistication; distribution of population; public nuisance control; and the general improvement of living conditions.

UNIDO Projects Around The World

Electrical Engineering Industry Testing and Experimentation Centre to be built in Spain

Electric power consumption in Spain has tripled within the last ten years, according to United Nations Economic and Social Affairs statistics, and a continuation of this extraordinary development is forecast for the next decade. Spain's industry that produces equipment for the generation and distribution of electric power must therefore vitalize its efforts to keep up with the expected demand. To transport the additional generated power, new networks of higher voltage will have to be set up.

To assist the Spanish industry to meet this challenge, an electrical engineering industry testing and experimentation centre will be built in Madrid. Under the sponsorship of the UNDP Special Fund, the Spanish Government will be assisted by an allocation of about US$700,000 for the first phase of this project. The Government will invest nearly US$8 million (approx. 600 million pesetas) in the entire project, which will be implemented by UNIDO.

The centre will assist the industry with design, applied research and consulting services, and will make its testing facilities available to both private and public companies. The centre will be the first of its kind to be built in a Spanish-speaking country, and the Government of Spain plans to open it as a training ground for high-level electrical engineers from all Spanish-speaking countries, as well as for engineers from other countries.

During the first phase of the project, to be realized within the next three years, the high-voltage and high-power laboratories are to be engineered and constructed with the assistance of UNIDO experts. The high-voltage laboratory will have an impulse generator capable of generating lightning impulses of up to 4 million volts, a 1.2 million volts cascade generator and a rectifier to allow the application of 1 million volts DC.

The centre will be designed with flexibility in order to meet the challenge of many types of projects. It will

be capable of investigating and testing electric power distribution equipment of up to 380 kV, such as transformers, reactors, circuit breakers, isolating switches, insulators and conductors of transmission lines and substations, cables, lightning conductors and measuring transformers. This dynamic development of electrical engineering suggests that new technologies must be quickly learned and applied; the high DC voltage that will be available points to these new technologies. The study of the effects of industrial pollution on electrical equipment and transmission lines will be carried out by the centre, and disturbances caused by high-voltage equipment to telecommunication, radio and television transmission must be investigated.

The high-power laboratory to be built in Madrid at the same time as the high-voltage testing facilities, will, according to plan, also have a wide range of facilities. The most important piece of equipment will be a 2,500 3,000 MVA (3 million kilowatts) short-circuit test generator. This large generator has a particularly heavy rotating part. Acceleration of this rotor for 20 to 40 minutes results in an accumulation of kinetic energy capable of delivering the above-mentioned amount of power (equivalent to the power output of a major power plant), which is sufficient to test large electric power equipment under full load. Banks of capacitors and inductances with their auxiliary electronic equipment will permit the simulation of practically all conditions under which electrical equipment is expected to perform.

Under a fellowship programme, Spanish engineers will be sent abroad for training in high-voltage and high-power engineering and testing; the first three fellows commenced training in 1970 in Czechoslovakia, the Federal Republic of Germany and the United States.

Upon completion of the laboratories, the staff will begin an international exchange of knowledge of electrotechnics. The centre hopes to contribute significantly towards the building of better electric power equipment and the expansion and upgrading of its manufacture, particularly in Spanish-speaking countries.

UNIDO Management Team Examines El Salvador's Textile Industry

The recent growth of the textile industry in El Salvador and its increasing importance to the national economy stimulated the Government to request UNIDO's assistance in solving immediate short-term problems, and its advice on the future organization and management of the textile industry.

The value of locally manufactured textiles has more than doubled in the last ten years, and there are now more than twenty spinning and weaving factories in El Salvador. Unfortunately, the organization and management of the industry have not been able to keep pace with this rapid rate of expansion. As the Government and the country's industrialists were anxious to determine future markets to be developed, they sought means of reducing production costs so that the country's textiles would be more competitive in domestic and foreign markets.

The President of El Salvador (second from right) visits UNIDO Management Clinic

UNIDO responded to the Government's request by providing a four-man team of management consultants under the Industrial Management Clinic Programme, which is designed to help solve industrial problems at

the factory level through on-the-spot diagnoses. The team recently completed a one-month assignment during which selected textile mills were visited and conferences held with industrialists and government officials on technological, financial, manufacturing and marketing problems, including cost reduction; quality control; maintenance of machinery and equipment; development of new products and markets; and training of personnel. In addition to recommending measures to be taken both individually and jointly by various enterprises, the UNIDO team identified the future prospects and needs of the industry and made proposals as to how these needs might be met with the assistance of the United Nations. The President of El Salvador, Sanchez Hernandez, visited one of the clinics held by the management team.

Since its inception in 1967, UNIDO has sent management clinic teams to Indonesia, Pakistan, China (Taiwan) and Yugoslavia. Under UNIDO's programme the textile, chemical, metal, pulp and paper and cement industries have received assistance.

Preliminary Construction Work for Pilot Plant in Rwanda

A pilot plant for pyrethrum processing is being established at Ruhengeri in the Republic of Rwanda. The US$ 1,250,000 plant will produce extracts from locally grown pyrethrum (chrysanthemum) flowers, the export of which will earn foreign exchange to stimulate further industrial development in this landlocked African country. This United Nations Development Programme Special Fund project is being carried out by UNIDO as executing agency in co-operation with the Government of Rwanda.

The civil engineering works phase of the project, preliminary to the plant erection, involves levelling of the plant site and foundation engineering as well as the construction of an access road and a water supply system. These are currently being implemented and will involve an estimated 44 weeks of work. The civil engineering works phase is being undertaken by the Rwandese company, ETIRU S.C.P.R.L., under contract to UNIDO.

The plant, comprising both the equipment and the structural frame, is being supplied by the United Kingdom firm of Rose, Downs and Thompson Ltd., which will also be responsible for the erection and commissioning of the plant as well as the training of local personnel. The plant is scheduled for completion late in 1971.

Access road to pyrethrum processing plant at Ruhengeri, Rwanda, under construction

Concrete mixers and aggregate stock pile

Checking excavation depth for foundations

The Seminar was opened by H. E. Abbas Ordoobadi (second from left), Adviser to the Minister of Economy of Iran and Chairman of the Seminar. On the left Mr. Jean Petitpierre, Deputy Resident Representative for Iran; and on the right, Mr. H. Einhaus and Mr. V. Pevlov of UNIDO

AN ANCIENT Iranian proverb says, "If you can name a thing, you can possess it." This pithy and subtle testimony to the power of information is still true today. It means simply that if a person or a nation is informed about something – whether a manufacturing process or a better method of growing wheat – that person or nation can use the information, put it to work and thus "possess" it. Upon the fundamental truth of this simple proverb rests the complex business of supplying information.

The truth of the old proverb as related to present-day industrial information was emphasized recently in Iran when 24 representatives from 19 countries of Africa and Asia met in Tehran to discuss ways of providing effective industrial information to developing countries.

The "Interregional Seminar on Industrial Information for the ECAFE and ECA Regions", held from 14–25 September, 1970, was sponsored jointly by the United Nations Industrial Development Organization (UNIDO) and the Government of Iran. (The regions mentioned are those under the jurisdiction of the Economic Commission for Asia and the Far East, and the Economic Commission for Africa.) Six experts from UNIDO and a programme specialist from the United Nations Educational, Scientific and Cultural Organization (UNESCO) also attended the Seminar. Abbas Ordoobadi, Adviser to the Minister of Economy of Iran, was the chairman of the Seminar. Eight sessions of the ten-day meeting were devoted to discussions and the presentation of papers; two days were spent visiting local industrial documentation centres and services.

The Tehran meeting enabled high-ranking government officials, executives of private firms and officers of trade organizations from ECAFE and ECA areas to meet for the first time around the conference table. Such a face-to-face gathering of policy-making officials was, in itself, an example of the dissemination of industrial information. As the draft report of the Seminar pointed out, personal contact is the most valuable and effective means of communication.

The Seminar was convened to determine how industrial information services can provide scientific, technological, economic and business management know-how to industry in developing countries. The chief problem confronting the delegates was how to establish an effective system

through which information can be expedited. Such a system must be flexible as industrial information, which reflects growth and advancement in industry, includes not only statistics but current data on innovations, techniques, legal aspects, and the latest findings of research and development.

Effective dissemination of industrial information is not just a matter of distributing printed material to catch-as-catch-can clients. As defined by participants of the Seminar, industrial information consists of "those specific items of scientific, technical and economic knowledge which can be communicated and applied in order to facilitate and accelerate the process of industrial growth".

"Specific items" include not only those concerned with manufacturing processes or technology, but what might be called "before" and "after" items. Feasibility studies, investment promotion and pre-investment surveys belong to the "before" category; information on repair and maintenance, financing, marketing and labour relations are "after" items, vitally important to running a business.

The means of communication are equally important. In addition to printed matter and personal contact, industrial information services use microfilms, radio, television, posters, industrial fairs, exhibitions and conferences.

In his opening statement, the UNIDO Director of the Seminar said, "... the vast reservoir of industrial knowledge and experience available from both industrialized and developing countries... continues to grow at such a pace that it is referred to as 'the information explosion', and some of us may well feel that we are in danger of being submerged by floods of information". Tapping this reservoir, he pointed out, required selectivity: how to select the right information for the user; where and how to find information appropriate to local needs, how to create awareness of the need; and how to select the best avenues of communication.

"It is a missionary quality which makes the true information officer", the Director continued. "He should not be satisfied with the delivery of the information he has been asked for, but should ... follow up and check whether the industrialist has been able to make practical use of it. He should ... maintain a continuous dialogue with his customers in industry to determine their current and future needs."

During the eight days of discussion, papers were presented on the status, mechanism and scope of industrial information services in the ECA and ECAFE regions and on similar services in industrialized countries. UNESCO provided a detailed review of activities in information and documentation among the member organizations of the United Nations family with emphasis on the value of these activities in international co-operation. Three policy documents were read concerning the issues to be considered in the establishment and operation of information services.

The following facts and observations from papers read at the Seminar highlight various aspects of industrial information:

- In the Union of Soviet Socialist Republics (USSR), a scientific information institute was first established on 19 July 1952 under the authority of the Academy of Sciences. This All-Union Institute for Scientific and Technical Information (VINITI) is currently engaged in making abstracts or digests of all scientific and technical literature in the world. These are published regularly in the VINITI

Opening session of the Industrial Information Seminar in Tehran

Abstract Journal, so that subscribers can keep in touch with a vast field through capsulized information.

● There are 100 specialized industrial information centres in the USSR, each dealing with a particular branch of industry such as food processing, aircraft, railways or radio-electronics.

● In Poland, information centres are located at large industrial enterprises. They serve a two-way purpose by funnelling information from outside sources to the various departments within the enterprise and by collecting information on the techniques and experience of their own establishment for dissemination to other enterprises that have similar problems.

● In the United Kingdom, the Ministry of Technology in conjunction with the Ministry of Education and Sciences has established 70 industrial communication centres at colleges to bring science and industry closer together. In 1967, an Engineering Technical Consultative Service for Productivity was instigated to help small and medium-size industries in mastering new methods. This service is effected by groups of experts who visit factories free of charge and instruct foremen, workers and tool designers.

● In France, branches of industry have their own information set-ups. The ceramics industry, for instance, has two information organizations, both engaged in gathering and processing all current literature on ceramics. They evaluate and abstract information from several hundred journals and keep an indexed file of all patents pertaining to ceramics – from 300 to 400 annually.

● The countries of Latin America, with the exception of Brazil, enjoy the distinct advantage of having a common language, a favourable aspect for establishing regional industrial information centres. There are, however, only a few centres established so far, a fact that underlines the importance of holding a workshop meeting on industrial information for Latin America. Such a meeting has been planned by UNIDO for 1971.

● A compendium of the participation of industrial information services in developed countries in the transfer of technology shows that this participation is by no means universal nor even multilateral. It is most often based upon historical ties between certain industrialized and developing countries. This type of transfer, mostly bilateral, is certainly not in the best interest of developing countries that have severed historical ties for political or economic reasons.

● Information and documentation services should not be confused. An information centre actively supplies, produces or generates information for those who receive, read, hear, adapt or in some way consume it. Documentation centres and libraries on the other hand are "storehouses" of information. Documentation can be compared to tinned food; information to fresh vegetables for immediate consumption.

● Approximately 30,000 scientific and technical periodicals are published annually throughout the world, and every year about 1,500 new ones appear. More than 100,000 science and technology books are published annually and 300,000 patents are issued throughout the world.

● There are fewer "secrets" in science and technology than is commonly believed; most are published. A technological gap, however, does exist between industrial and developing countries. Inability to disseminate the vast amount of information is partly the reason for the gap. Even the largest organizations cannot hope to keep up with it. For example, the American Chemical Society spends about US$16 million annually to screen some 12,000 periodicals for information applicable to the field of chemistry alone.

Sixteen distinct aspects of industrial information were identified and discussed by Seminar delegates and a consensus was expressed in a number of recommendations. The majority viewpoint concerning each item can be summarized as follows:

1. *The flow of industrial information*, both internationally and within countries, can be made easier if governments take measures to remove existing obstructions and barriers caused in part by communication gaps, language differences and secrecy.
2. *Patent and processing rights* should be made more readily available and royalty payments reduced, particularly for small and medium-scale industries.
3. *Specialized industrial information facilities in developing countries*, such as those concerned with cement, jute or textiles, should be strengthened by a regional or interregional pooling and sharing of information.
4. *Governments in developing areas should assume responsibility* for the transfer of information to industry in the same spirit and to the same degree that they accept responsibility for economic development itself.
5. *The establishment of national clearing houses* in each country would do much to ensure that industry is provided with the information it requires.
6. *Scientific and technical documentation centres* should be strengthened and emphasis placed upon collecting and processing industrial feasibility studies and technical assistance reports.
7. *Feasibility studies* should be made available at nominal cost to small industrialists by industrial information centres.
8. The *information needs of small and medium-size enterprises* should, as a rule, be given priority by national industrial information services, because these industries cannot afford to hire consultants or finance pre-investment studies. The over-all requirements of the entire industrial sector, however, should not be neglected.
9. The *personnel of industrial information centres* should be valued more highly by governments of developing countries. Higher salaries and better facilities would attract well qualified personnel.
10. *Industrial information* should be free of charge in developing countries.
11. *A follow-up of industrial information services* rendered is essential in evaluating their effectiveness. Uniform procedures for follow-up should be established.
12. *Mass media* should be used to heighten public awareness of industrial information needs and services.
13. *The value of computers* for storage of industrial information is unquestionable, but most developing countries are not able to shoulder the cost of a computer centre. UNIDO was requested to investigate this problem.

14. *Fellowships and study missions* to industrial information centres in industrialized countries would enable information officers from developing countries to increase their knowledge and improve their skills.
15. *Governments of industrialized countries* were requested to make every effort to improve the mechanism for the transfer of proprietary and other industrial information, and to open training opportunities for officers from developing regions.
16. *The assistance of UNIDO and other relevant international organizations* was requested in a number of spheres: in securing mailing lists and organization charts; in acquiring literature; in facilitating liaison with United Nations information services; in supplying films. UNESCO was specifically requested to "examine ways and means for facilitating the full participation of developing countries in the work of the International Federation of Documentation (FID)".

Acting upon the approved recommendations of the Tehran Seminar on Industrial Information, UNIDO's Provisional Work Programme for 1971 - 1972 includes the following items:

"... in co-operation with UNESCO to explore the possibilities of financing the acquisition of the industrial information equipment and basic reference materials for the initial establishment of industrial information services in developing countries as well as for the reinforcement of existing services."

"... to undertake a feasibility study on the selection and use of computers for processing industrial information. Emphasis will be placed on determining at what stage the use of computers becomes technically and economically feasible."

These two projects are planned to supplement UNIDO's routine activities in the field of industrial information, including its service for developing countries which provides practical assistance by answering without charge all inquiries on problems of industry.

Answers to Industrial Inquiries

The UNIDO Industrial Inquiry Service receives requests from developing countries for possible solutions to a wide variety of industrial problems. To give readers an idea of the topics covered, each issue of the Industrial Research and Development News *publishes selected questions recently received by the Service, in addition to the answers provided.*

Readers are invited to write to the Industrial Inquiry Service for further details on the answers to the questions published below, quoting the reference number, or to submit inquiries on other industrial problems.

Small-scale production of potato chips (1220)

An inquirer from Turkey asked for solutions to problems he is encountering in the small-scale production of potato chips (crisps). His query was as follows:

"We cook potato chips in sunflower seed oil at temperatures of approximately 350 F. When the oil is fresh we get very good-tasting chips. But after a short period the oil gets black and loses some of its viscosity resulting in bad-tasting, dark-coloured potato chips; the chips also get blisters full of oil. This condition worsens gradually until the chips cooked in this oil are inedible and we have to discard the oil and put in a new supply.

"We do not have automatic cooking facilities but instead use a pot holding about 70 pounds of oil. We throw in the sliced, washed potatoes, cook them and take them out with a ladle.

"We tried filtering the oil through nylon cloth and activated carbon but got no results. Automatic, motor-driven filter machines are not available locally and our capital is too limited to import one.

"We think that one reason for the bad flavour is that the amount of acid in the oil increases as it is used, but we cannot see how a filter machine of any kind would eliminate the excess oil acids.

"If we knew exactly what theoretical procedure should be followed in recovering the burned oil, we could build a machine here. We built a slicing machine with a daily capacity of two tons of peeled raw potatoes for about $200 because importing one would have cost $4,000.

"Any suggestions that might help us in the other phases of production will be greatly appreciated."

Because of the detailed background information given and the specific problems indicated, the Inquiry Service transmitted the questions directly to several competent sources of information. Excerpts from some of the answers forwarded to the inquirer are given below.

Experts at UNIDO headquarters provided the following information:

"The cooking temperature of about 350 F is rather high and will affect the oil in two ways. First, small residua from potatoes will be overheated and finally burned to black coal-particles in the oil, which will increase along with the quantities of potatoes cooked. The dark colour of the burned potato particles will immediately be absorbed by the oil and cause its colour to change from its natural light yellow to dark brown.

"Second, if a vegetable oil is heated to more than 212 F in the presence of oxygen, oxidation takes place, resulting in an increase of the free fatty acid (FFA) content. These fatty acids will give the chips a bad taste. With temperatures of 350° F this reaction will progress quickly.

"In a filtration process, the burned solid particles are removed, but the dark colour of the oil and its FFA content remain unchanged. The only possibility of regenerating

the oil is to apply a complete refining process consisting of neutralization, bleaching and deodorization.

"In the neutralization process, the FFA content is neutralized by adding equivalent quantities of alkali (soda-lye). The free fatty acids react with the alkali and form soap, in vegetable oil technology called soap-stock, which is removed later by simple water washing. After this procedure the oil regains its neutrality.

"In the bleaching process, the dark colour of the oil is removed by adding bleaching earth after vacuum drying of the neutralized oil. The bleaching earth absorbs the substances causing the dark colour, and the natural light yellow colour of the oil reappears. The used bleaching earth is later removed from the oil by simple filtration with filter cloths.

"In the deodorizing process, the neutralized and bleached oil is heated to about 356 - 392 F but, most important, under vacuum of about 3 - 5 Torr so that no air is allowed to cause oxidation. At these temperatures live steam is blown through the oil for a certain time, depending on the oil quality, until the substances causing bad smell and bad taste in potatoes are removed.

"The only way to regenerate the used potato cooking oil is first to apply filtration and then a complete refining process consisting of neutralization, bleaching and deodorization. It is natural that these processes will cause certain losses, which depend on the FFA content and on the technology applied."

A research institute provided an up-to-date book on potato processing and, in a letter from the director of research, emphasized the following points:

"I would suggest first that he examine the pot in which the chips are fried. Any metal other than stainless steel or black iron which comes in contact with the oil will hasten the breakdown of the oil and the development of rancidity. For best results I would suggest a container of stainless steel. He should use as little oil as possible in the pot at any one time, but make frequent additions to keep it up to the minimum level. In this way he will be heating the oil as a whole for the least possible length of time. I would suggest that he filter his used oil through any kind of material that will remove the charred pieces of chips. Do not overheat the oil and heat it only when it is needed for frying."

One of the publications sent to the inquirer stated that dark-coloured chips result largely from potatoes high in reducing sugar and suggested several methods for treating potato slices to prevent browning. Water or solutions of chemicals such as the following are used: sodium bisulfite alone or with phosphoric acid and sodium citrate or citric acid; hydrochloric or phosphoric acid; citric acid or sodium citrate; calcium chloride and others. In all of these treatments the water or solutions must be heated to temperatures between 150 and 200 F. After rinsing, slices are placed in the hot solution for one minute or more and then dropped into the frying kettle. The solutions are maintained at the required temperature usually by steam-jacketed tanks. They are equipped with mesh chain belts to carry the slices from one end of the tank to the other during treatment.

An industrial information centre prepared a paper on the subject which included the following information:

"It is important to note that the reducing sugar content of the potatoes is considerably influenced by the temperature of their preceding storage. The sugar content shows an increasing tendency with decreasing storage temperatures. Thus if potatoes have been stored at a temperature around 41 F to keep them fresh, before processing they should be kept for eight days around 72 F. During this period the sugar content practically disappears. New potatoes may also be processed if they have been stored for one month at 64 - 68 F, provided they show an appropriate colour.

"For a subsequent frying, potatoes are to be peeled and chopped into chips 0.8 to 1.6 millimetre thick. A careful washing should remove any free starch and small potato particles, which tend to burn and to accumulate in the fat during frying.

"This washing should be performed with sprayed water, on a shaking riddle or, alternatively, in a pierced revolving drum. Under simpler conditions this washing may be carried out in a wire basket rotating in a water bath."

Crude oil cracking units (1201)

A UNIDO expert in South America requested information on crude oil cracking units in commercial operation, including minimum size, capital investment, product yields and operational cost factors.

He was sent a paper entitled "Processes for the Production of Petrochemical Basic Building Blocks", which had recently been presented at a symposium sponsored by UNIDO, and letters from several firms, one of which included the following information:

"For about ten years one large European company has been operating an ethylene plant with a capacity of 30 thousand tons per year using an autothermic fluidized-bed process for the pyrolysis of crude oil. The disadvantages of this process are the dilution of the cracking gas with flue gas and the necessity of using commercially pure oxygen as oxidizing agent.

"These disadvantages are overcome in a new moving-bed process using inert solid heat carriers which the Badische Anilin- und Soda-Fabrik AG (BASF) has been developing since 1963. An ethylene plant with a capacity of 36,000 tons per year operating on this process was expected to go into operation at the end of 1969.

"The investment cost of a plant designed to produce 300,000 tons of ethylene per year is estimated to be approximately DM 170 million. If Libyan crude is processed, 3.6 tons of crude would be required to produce 1 ton of ethylene, and such operation would yield the following by-products per ton of ethylene produced:

0.50 ton	C_3-cut (95% propylene);
0.25 ton	C_4-cut (55% butadiene);
0.45 ton	pyrolysis benzene;
0.70 ton	heating gas ($H_2 + CH_4$).

"Other processes for the cracking of crude oil are being developed and, to a certain extent, commercially used in Japan and France, but technical details are not known to us."

This article was written by a UNIDO expert, who is at present project manager of the Metalworking Industry Testing Centre currently being established in Chile.

Organization of an Industrial Design Office

MODERN INDUSTRIAL DESIGN depends for its success on the practical application of many sciences, not the least of which is management. The philosophy of management is determined by the objectives it sets for itself. In the same way it can be said that the philosophy of the designer is reflected in the precise manner in which he achieves the objectives specified by his management.

As the inherent quality of a product depends upon its design, the responsibility for the success of a product lies with the design unit of any manufacturing organization. Every design laboratory has, therefore, the function of assuring quality within the levels determined by the economics of the product.

Design office

Because of the wide variety of skills and expertise required by modern industrial design, the current tendency of management is to co-ordinate all design activity through a design office irrespective of the size of the enterprise. Small design units have always operated in this manner simply because one or two persons were responsible for all of the work.

The principle that should be followed in a design office is to have one engineer responsible for all design aspects of a given product or group of products. He is known as the project design engineer. In medium-sized to large organizations he leads a team of engineering specialists and has available to him, but on a shared basis with other project design engineers: a drawing office, laboratories, workshops, the service of model makers and of technical writers, library and information services, and other facilities. It is customary for each of these services to be under the control of a manager responsible to the chief engineer, technical director or other senior executive in charge of technical services, of which the design office and laboratories are a part.

In a very large company the laboratory may have its own manager, but it is more usual for the project design engineer to have his own laboratory. When there are several laboratories, some performing a common service in a specialized field, all laboratories should be responsible to an over-all manager.

This article, however, is not concerned with the needs of large firms but rather concentrates on the design office for a company of two to three thousand people. For an organization of this size, it is recommended that the company put back into the business at least 10 per cent of its annual over-all profits to support future research design and development. In the long run the success of any company depends as much on its ability to keep abreast of technological developments as it does on the capability and efficiency of its management.

The size of a design office depends on the number and complexity of the products being developed. If the products are relatively simple, one project design engineer may be able to cope with several products. In a company of similar size to the one used to illustrate this article, there may be three or four project design engineers each responsible to the chief designer or design office manager, and all sharing a common drawing office and a common laboratory. A chief draughtsman, responsible to the design office manager, is in charge of the drawing office and provides services for the project design engineers. The laboratory is staffed by engineers and/or technicians who are directly responsible to the project design engineers for the duration of the project. In this way flexibility of staff is achieved. If it is necessary to supplement the staff with specialists, they should report directly to the design office manager.

Specifications and standards

It is vitally important that the product be fully specified, but, unfortunately, the average engineer is not a good specifications writer. The staff should include, therefore, one or two technical writers who can draft specifications to the dictates of the project design engineer.

The drafting of standards for the design office is the responsibility of the technical writers. These standards cover among other things: standards for the drawing office; guides to drafting specifications; and standards for preferred components, sizes, modules, threads, fixings and the like. The formation of standards for the design office should be directed by the design office manager, using where possible national and international standards as the basis of operations. Specified procedures and disciplines are needed for running the design office, such as: the procedure for procuring design approval; disciplines regarding modifications, changes, concessions and the like; and procedures for handling progress reports and financial returns.

The design office staff should include a projects secretary whose duties are to "chart" the progress of each project, prepare progress reports and monitor expenditure against the budgets (each project should have its own budget). The projects secretary also prepares financial returns on a monthly basis and generally superintends the preparation and release of the project documentation.

Production engineering

Tool design should be considered a function separate from product design and, more specifically, a responsibility of the production engineering and planning department. The work of the design office is usually considered to be completed with the formal release of the "production" specifications and drawings, but, to enable tool design to proceed at an early stage, it is customary to permit some drawings to be given experimental release meaning that they are not necessarily complete and may be subject to change. If there is a choice in the manner of designing the details of a product, preference should be given to the design that is most economical to produce, other factors being equal. Often this will be dictated by the availability of machine tools and production facilities. For this reason it is desirable to attach to the design office a production liaison engineer. His function is to guide the design office on the preferred methods of manufacture. Similar action is required of the design office in respect of the choice of tolerances and materials. The design engineer must always keep in mind that the tighter the tolerances the more difficult it will be to produce the item consistently. Materials should be chosen as much for their availability as for their suitability, although suitability must always take precedence.

Quality

The responsibility for achieving the requisite levels of quality and reliability inherent in the final design rests with the design office. Throughout the design phase of a project it is necessary to prove, step by step, that the design will meet the necessary standards. This implies a series of tests on materials, components and assemblies. In some cases, this work may be done in the design laboratory by the design staff, in others, by the quality control laboratory or inspection personnel. For this and other reasons a quality assurance engineer should be attached to the design office. His functions are similar to those of the production liaison engineer, namely to guide the design office on quality and reliability matters and to arrange for approval of the various components of the design. He should be in accord with the design office on the following: the schedule of tests necessary to establish the data upon which decisions concerning approval can be taken; who is to carry out the tests; and the action necessary in the event of failure to meet specifications. Other duties that he would be expected to perform are: inspection and testing of fully engineered prototypes and the planning of inspection and tests of the product during production (when, where, what and by whom).

Proving design by manufacture

Once it is clear that adequate and satisfactory manufacturing information and specifications exist, the next step is to prove that the design information is technically correct, that it results in practical and economic production and is unambiguous, and that it produces the specified article made in the required manner at the appropriate quality level. To achieve this to any degree of satisfaction, a limited number of prototypes should be made in precise accordance with the data whether engineering drawing, work instruction or test schedule.

To be of value to production, this operation must precede the production process. As a post-design service, engineering prototypes are needed in which every detail has been proved to conform to design. If details do not conform, indication should be given of how they differ from the requirements, to what extent and why. Such a procedure requires comprehensive and precise inspection and reporting.

To produce the limited number of prototypes required, skilled inspectors and self-contained model shop facilities are highly desirable. It is essential that every item produced as a prototype (as distinct from experimental work) be made according to engineered drawings, be inspected in every aspect and be comprehensively recorded; a report should then be made that includes comments on any questions that may have arisen concerning the method of manufacture or the presentation of the information on the drawing. A good system is to use a report form stamped on the back of each prototype drawing: thus each drawing can be "proved" in a practical manner. The same technique should be adopted for all subassemblies, modules and systems.

The inspection team for the above set-up should be directly responsible to the quality assurance engineer, who should co-ordinate the receipt and dissemination of information. Data should be collected on the best methods of inspection and/or testing, inspection schedules, test specifications, planning sheets and workshop instructions so that ambiguity or error in drawings can be detected and desirable changes negotiated.

Functions of a design office

The functions of the design office are:

- Ensure adequate market research to determine what is needed.
- Draft a design specification that meets the approval of customer or market research authority, sales office and all others concerned.
- Determine estimated works cost, selling price, the likely cost of development, time of development, estimated production quantities and the date of starting production. Draw up schedules for the various phases of the work and financial budgets for each phase.
- Design experiments and tests to gain further knowledge of the variables affecting the quality and reliability of components, products and processes.

- Devise means of evaluating the products of other manufacturers.
- Use statistical methods to predict over-all tolerances of proposed designs and capability studies of manufacturing processes and to ascertain individual dimensional accuracies acceptable to the process.
- Conduct approval tests on new materials, components, assemblies and processes.
- Adopt recommended standardization and production engineering practices and quality control wherever possible. (Use standard drawing practices and standard nuts, bolts, rivets and other fixing devices.)
- Specify every detail of the design by drawing and/or specification - leave no part of the design unspecified.
- Prove the accuracy of every drawing by manufacturing strictly in accordance with its instructions.
- Prove that the requirements of the design specification have been fully met by comprehensive tests on experimental and fully engineered prototypes.
- Produce design office manuals detailing the disciplines and standards to be applied.
- Develop systems for the collection, analysis and feed-back of data arising from rejections and defects recurring in subsequent production, after-sales service and customer complaints. Use this information to improve the product design, quality and/or reliability so as to reduce the risk of defectives arising and thereby reducing manufacturing and servicing costs.

Research Projects

REPORT FROM CENTRAL LEATHER RESEARCH INSTITUTE (CLRI), MADRAS

Vegetable tannins as a thinner in petroleum drilling

Recently, new uses for vegetable tannins have been found in various industries. One of the largest uses of tannin extracts outside the leather industry is their application as a mud thinner in the petroleum industry.

At present, the standard thinner used in the different oil wells in India is the cutch extract which is suitable only down to a depth of 10,000 feet. For deep drilling, where high temperatures of approximately 200 - 250°F and formations with unfavourable conditions are encountered, a new product is necessary.

CLRI has been striving to develop new drilling mud additives from the available vegetable tanning materials without wasting the potential ones or affecting their consumption in the leather industry. A metallic derivative of myrobalan extract developed at this Institute has been satisfactorily tested for the high-temperature conditions prevailing in the deep drilling of oil wells. All the laboratory tests carried out at CLRI and by outside agencies have indicated the suitability of this product as a thinner for deep drilling, as compared with the other proprietary products currently used for the purpose in other countries. The product is going to be field tested in an oil well shortly.

Processing of animal casings

The small intestines of cattle, sheep, goats and pigs are generally used as casings for sausages. Because of the shortage of natural animal casings in European and American countries, many of them import large quantities of these animal casings from other parts of the world. In India, however, a considerable quantity of animal casings are being wasted because of the unscientific and sub-standard processing of the material and lack of expertise.

CLRI has been working on this problem for some time and recently has taken out national and international patents on a process for the scientific treatment of animal casings. The distinguishing feature of the process is that such casings, unlike the conventional wet salted products, are obtained in clean, dry, ready-to-wet form. Being free from extraneous matter, the casings exhibit a characteristic translucency and are capable of being instantly soaked back to their natural soft and flaccid condition with the original gloss. The goods can be stored indefinitely at room temperature without the aid of any special preservatives. These casings can be rendered fully sterile and offered for sale in

neatly packed polythene bags conforming to the highest possible standards of hygiene applicable to food products. The product has been comprehensively factory-tested on a large scale in a dozen countries, including Australia, the Federal Republic of Germany, France, Japan, Sweden, the United Kingdom and the Union of Soviet Socialist Republics, and the reports on its performance from all these countries have been very encouraging.

The processed casings can also be employed with considerable advantages as a starting material for a number of other products, such as surgical sutures and strings for musical instruments.

The process has been licensed for commercial manufacture in India, and the product is available to consumers there and abroad. Entrepreneurs in other countries can be licensed for production of the casings in their respective countries.

The Indian patent number is 90469. Processing of dry ready-to-wet sausage casings from mammalian intestines.

Synthetic resin impregnants for leather

The use of synthetic resin impregnation to improve the quality of upper leathers for finished footwear has been increasing tremendously. In India, the manufacture of upper leathers for indigenous consumption and export is expanding rapidly, and impregnation has become a normal procedure in the manufacture of tight grain upper leathers with uniform thickness for footwear.

Most of the resins are imported and are proprietary products, usually condensation products of amides and formaldehyde. The products in the low price range, however, are generally based on a condensation of urea and formaldehyde and are commonly used in the industry.

To reduce dependence on the import of products and know-how, the Institute undertook work leading to the development of both cationic and anionic resins for impregnation of leather. These products have the following salient features as against the conventionally used products based on urea:

- A longer shelf life in the humid and tropical climate;
- Comparatively greater stability in the acid medium;
- Capability of reversing the surface charge on the leather during impregnation;
- Better performance in impregnation as compared with the higher-grade and more expensive resins, such as those based on melamine and dicyanamide;
- Low cost.

The manufacturing conditions of these new resins have been standardized, and the products have been widely tested in the Institute and different commercial tanneries with satisfactory results.

The anion-active resins have been used principally for impregnating the full chrome and chrome retan upper leathers made from cowhide. The cation-active resins are used for all types of upper leathers made from hides and skin using chrome and other combination tannages and for manufacture of shrunken grain leather from prechrome tanned leathers. The products, which are expected to be available from commercial manufacturers shortly, are expected to help not only the industry in India but also in other developing countries where conditions are similar.

The Indian patent number is 120113. Synthetic resin materials for use as a filling agent in leather manufacture.

Grafting of Synthetic polymers onto collagen and hide

During the last decade various synthetic polymers have been intense competition for leather in its traditional markets. This challenge has resulted in the need for research to maintain the competitive position of leather and to find new outlets for animal hides. Leathers with new properties can be created through the chemical modification of collagen. Unique properties can be built into a material by grafting synthetic polymers on to the material. The CLRI has developed processes for grafting vinyl monomers on to collagen using the ceric iron redox system. The per cent of grafting varied with the type of monomers used; methylmethacrylate gave the maximum per cent of grafting.

The process was very simple when applied to collagen solution or collagen powder. With the three dimensional network structure of hide, however, the process had to be suitably modified for effecting grafting. The grafted hides were fuller and more uniform and showed promise for making leather with improved properties.

Ceric ion induced grafting of vinyl monomers onto collagen

Nature of modified collagen	*Per cent of grafting*	*Shrinkage temperature of grafted collagen*
		°C
Polyacrylonitrile-collagen graft	60.87	68
Polyacrylamide-collagen graft	26.36	–
Polymethylmethacrylate-collagen graft	160.00	78
Polymethylacrylate-collagen graft	104.60	64
Control collagen - ungrafted	–	56

For Your Information . . .

The following publications may be purchased from: United Nations sales distributors, through local book dealers, or directly from: Sales Section, Room 1059, United Nations, New York, N.Y. 10017, United States of America, or Distribution and Sales Section, Palais des Nations, CH-1211 Geneva 10, Switzerland. Prices are given in US dollars but payment may be made in other currencies.

Following a series of regional symposia in 1965 and 1966, the International Symposium on Industrial Development was convened by UNIDO in Athens in 1967. It was the first major international meeting devoted exclusively to the problems of industrialization of the developing countries and paid special attention to the scope for international action and for co-operative efforts among the developing countries themselves in order to solve these problems.

The series entitled "UNIDO Monographs on Industrial Development Industrialization of Developing countries: Problems and Prospects" comprises 21 monographs devoted to the main issues of the Symposium agenda. Some monographs deal with specific industrial sectors, some with general industrial policy and others with aspects of international economic co-operation. All of them are based on the discussions in Athens and the documentation prepared for the meeting. Since economic, technological and institutional aspects of each subject are described with particular reference to the needs of developing countries, it is hoped that the monographs will make a distinctive contribution in their respective areas and, in particular, will prove useful to Governments in connexion with the technical assistance activities of UNIDO and other United Nations bodies concerned with industrial development.

Textile Industry.

Monograph No. 7, 87 pages (Sales No.: E.69.II.B.39, Vol. 7, $0.50)

In this monograph discussion is limited to the following groups of fibres: the so-called apparel fibres (cotton, wool, and man-made fibres) and the industrial fibres (jute, sisal, henequen and abaca).

Chapter 1 is devoted to trends since 1954 in production and consumption in developing and developed countries. An analysis shows the more rapid growth of production than of consumption in the developing countries, which implies changes in the pattern of international trade.

Chapter 2 examines international trade in textiles and shows that the most marked movement took place in cotton cloth. Within the space of twelve years, the export of cotton cloth by developing countries doubled, whereas imports were reduced. A description is given of the Long-Term Arrangement Regarding International Trade in Cotton Textiles, which, under the auspices of GATT, came into force in October 1962.

Chapter 3 reviews the plans and prospects in developing countries for the consumption and production of apparel and industrial textiles. Possible future trends in both types of textiles are suggested and some indications are given of the points to be observed by developing countries to safeguard the industry.

Chapter 4 is concerned with the technical and economic factors of relevance to developing countries. It reviews the basic stages in textile production and relates them to recent technological developments. Economies of scale are considered with regard to apparel textiles and jute and hard fibre processing. In the section dealing with selection of machinery, the advantages and disadvantages of using second-hand machinery are described. Consideration is given to the significance of the development of synthetic materials for developing countries. This chapter concludes with a section on the organization of mill production.

Chapter 5 presents the considerations that determine the establishment or modernization of a textile industry. Labour and raw materials are first discussed in view of the large proportion of total costs represented by these inputs. The importance of the co-ordination of the establishment or expansion of a textile industry within national development plans and the part that must be played by Governments are discussed. The circumstances under which regional co-operation can best be applied are described. The necessity of the preparation of a feasibility study prior to the establishment of a textile industry is mentioned, and the elements that should be contained in the study are listed. Modernization measures required at the national or mill and factory level are discussed.

Chapter 6 describes the issues discussed at the Athens Symposium and the recommendations approved.

Chapter 7 describes the field and supporting activities undertaken by the United Nations in the textile industry.

Food-Processing Industry.

Monograph No. 9, 77 pages (Sales No.: E.69.II.B.39, Vol. 9, $0.50)

Chapter 1 is concerned with the general nature of food processing and shows that through sophisticated techniques many common operations and functions have been developed where previously different techniques and equip-

ment were used. The importance of packaging to the industry is stressed and new techniques described. Quality control and the observation of sanitary and nutritional standards are described and their importance emphasized. The consideration that must be given to food habits in the introduction of new products is outlined in the final section of this chapter.

Chapter 2 considers world trends in the food industry and points to the increasing demand for convenient foods. Refining processes for ingredients in food manufacture and cost-cutting techniques in the transport of ingredients and finished products are described.

Chapter 3 provides an analysis of the major factors to be considered in the establishment of food industries in developing countries. The part to be played by Governments in the preparation of long-range plans is discussed. The importance of proper market research prior to the establishment of the industry is mentioned. The factors to be considered in the supply of raw materials are noted. The type of factory required is described. Suggestions are made as to the types of new materials and products that might be considered by developing countries. The questions of personnel requirements and costs are dealt with in the concluding section of this chapter.

Chapter 4 is devoted to the evaluation of food processes. Various new and longer established methods of food preservation are described. Special significance is given to new technologies in the production of protein. Consideration is given to the importance of applying advanced processing methods for carbohydrate raw materials, and descriptions of some such processes are given. Possibilities for the processing of oils and fats products in developing countries are discussed.

Chapter 5 is concerned with the requirements of a food factory: the buildings; water requirements; waste disposal; maintenance; utilities; facilities for personnel; and the like.

Chapter 6 gives an analysis of the key factors influencing investment in the food-processing industry and presents profiles of food-processing plants in various countries.

Chapter 7 describes the issues discussed at the Athens Symposium and the recommendations approved.

Chapter 8 reviews UNIDO action to promote the food industry in developing countries.

Industrial Research,

Monograph No. 10, 74 pages (Sales No.: E.69.II.B.39, Vol. 10, $0.50)

This monograph attempts to guide developing countries in their industrialization by suggesting areas in which they should concentrate their research and development activities and the optimum methods of organization of these activities.

Chapter 1 is concerned with the establishment of an industrial research institute in a developing country, the tasks to be performed by such an institute and factors peculiar to individual countries that must be given due consideration.

Chapter 2 analyses the main fields of industrial research of importance to developing countries. Mention is made of the advisability of collaboration with research institutes in developed countries before proceeding to applied and fundamental research. Areas of co-operation between a research institute and the Government are described.

Chapter 3 deals with the organization of industrial research. The types of research to be carried out in the institute determine its framework. Descriptions are given of the types of research carried out in university research institutes, non-government research institutes, in individual industrial enterprises, within industrial associations, in non-profit organizations, and in multipurpose and unipurpose research institutes. Guidelines for the determination of the organizational structure and for the establishment of staffing policies are given.

Chapter 4 is devoted to the financing and functioning of an industrial research institute. It begins with the question of securing long-term financial backing and gives suggestions for budgeting and financial administration. The factors to be taken into consideration in determining a balance between in-house and contract research projects are enumerated. The concluding section deals with the relationship between the institute and its industrial clientele.

Chapter 5 describes the issues discussed at the Athens Symposium and the recommendations approved.

Chapter 6 is a review of United Nations action and bilateral action for the promotion of industrial research.

Standardization,

Monograph No. 12, 66 pages (Sales No.: E.69.II.B.39, Vol. 12, $0.50)

Chapter 1 stresses the importance of the role played by standardization in planning and recommends to developing countries the simultaneous development of industry and industrial standardization. It describes the elements of standardization. The relationship between standards and quality control is discussed, including sections on certification marking, the interest of consumers and international trade. The need for harmonizing standards at all levels is stressed, and attention is given to the problems encountered in transport and communications, in large-scale industrial sectors and in medium-sized and small enterprises.

Chapter 2 describes the development and present state of national standardization boards, with separate sections on the situation in Europe and North America, Africa, Asia and the Far East, Latin America and the Caribbean, and the Middle East. On the international level, a description is given of non-governmental organizations. The extent of the application of recommendations by international organizations (ISO and IEC) in national standards is discussed. The chapter concludes with a section on the work of specialized multinational organizations.

Chapter 3 deals with the problems that have to be faced when a national standards board is being established, and outlines the conditions that must be considered in each case. Ways in which industrial laboratories and technical in-

formation services can be used are described. The training of standards engineers is discussed, and some possible solutions for developing countries are suggested. The chapter concludes with a consideration of regional co-operation programmes.

Chapter 4 gives an account of the issues discussed at the Athens Symposium and notes the recommendations that were approved.

Chapter 5 describes United Nations action and other assistance to promote standardization and suggests future objectives and policy.

Domestic and External Financing,

Monograph No. 16, 48 pages (Sales No.: E.69.II.B.39, Vol. 16, $0.50)

Chapter 1 is devoted to domestic financing in developing countries and provides a general outline of the problems encountered in mobilizing savings and channelling them towards development of the industrial sector. A description of the primary sources of national savings such as household, business and public savings is followed by an outline of the functions financial institutions fulfil in mobilizing domestic financial resources. The importance of development finance companies with or without government participation is stressed and the role that commercial banks play in this context is underlined. Consideration is given to the significance of voluntary savings consisting of life insurance premiums and compulsory savings such as social security and pension fund payments.

Chapter 2 provides an analysis of the major factors to be considered in external financing of developing countries. The advantages and disadvantages of bilateral public financing are discussed. Terms and conditions of financial assistance from market economy countries and countries with centrally planned economies are noted. Aspects of bilateral financing are compared with multilateral aid and private export credits. Suggestions for improving bilateral financing are made. A description of various methods of private export credits and their guarantees follows. The regionalization and international co-operation to promote private foreign investments is mentioned, and a section is devoted to questions dealing with the repatriation of funds including the effect on the balance of payments. Special significance is given to ways and means of establishing joint enterprises. The problems of multilateral external financing and the various methods and organizations through which this aid is channelled are dealt with in the concluding section of this chapter.

Chapter 3 describes the issues discussed at the Athens Symposium and the recommendations approved.

Chapter 4 reviews UNIDO action to promote industrial financing in developing countries.

Annex 1 gives an outline of UNIDO assistance in industrial financing.

Annex 2 provides a list of meetings, seminars and training courses organized by UNIDO.

For reference . . .

Below are reviews of recent books which serve as reference books in the UNIDO Industrial Documentation Unit.

Partners in Development,

by the Commission on International Development, Praeger Paperbacks, New York, 1969, 400 pages, $2.50

A Commission on International Development, independent but financed by the World Bank, has produced a report entitled *Partners in Development*. It constitutes a review of the recent history of economic development and development aid and offers recommendations which could guide the aid effort over the next two decades. The Commission's Report proposes a philosophy of international co-operation in development, for both developed an developing countries, as well as far-reaching programmes for action.

The Chairman of the Commission on International Development is the Right Honourable Lester B. Pearson, Nobel Peace Prize winner, former President of the United Nations General Assembly, and former Prime Minister of Canada. Members of the Commission are: the Rt. Hon. Sir Edward Boyle (United Kingdom); the Hon. Roberto de Oliveira Campos (Brazil); the Hon. Douglas Dillon (United States); Dr. Wilfried Guth (Federal Republic of Germany); Professor Sir W. Arthur Lewis (St. Lucia); Dr. Robert E. Marjolin (France); and Dr. Saburo Okita (Japan).

Considerable economic progress has been achieved in the developing world over the past two decades, and in the view of the Pearson Commission development aid has been a substantial contributor to this good record. Now, however, new policies must be established based on a more fully integrated working partnership in development between those who assist and those who are assisted, and on a clear recognition of the real inter-relationship of aid, trade and investment. This drawing together of the various elements in international development inevitably and rightly shifts the emphasis towards a much greater degree of multilateralism.

With recommendations addressed to the developing and industrialized countries and to international organizations, the report sets forth a strategy based on the need for much more effective international co-operation for development.

After an introductory chapter dealing with the rationale for aid, the Commission looks at the record of the past twenty years and seeks to identify the major difficulties and obstacles that have to be surmounted if the international development effort is to progress satisfactorily in the future. The remainder and bulk of the 400-page report discusses policies and measures which should be adopted in the main areas of international assistance and in related policy fields, such as international trade and population control.

The main recommendations include:

- Recognizing that development, to be successful, must be a partnership based on joint effort towards clearly defined economic goals and that increases in development aid should be allocated on the basis of increasingly explicit criteria based primarily on economic performance. Performance of all participants, donors and recipients, could be more effectively reviewed in a multilateral or regional context if consortia, consultative groups and regional organizations containing both parties were strengthened or created where they do not now exist. It is recommended that the World Bank and the regional banks take the lead in actions to improve and complete this structure.
- Linking increases in aid more closely to specific criteria of development performance and utilizing it in support of those objectives which would allow recipients eventually to achieve independence of concessional finance while continuing to grow at least at 6 per cent per year.
- Changing those trade policies of advanced countries that raise obstacles to the growth of export earnings from developing countries, developing specific plans to assure that greater shares of advanced country markets for appropriate products will be served by developing countries, and granting generalized non-reciprocal tariff preferences to manufactured goods imported from developing countries.
- Securing more outward-looking and competitive trade policies on the part of the developing nations, and an expansion in trade among themselves, facilitated by preferential tariff arrangements between them and new facilities for re-financing their exports.
- Increasing the volume of official development assistance, in the form of grants or loans on soft terms rising to 0.7 per cent of donor GNP by 1975 if possible and in no case later than 1980, as part of an increase in the over-all flow of resources between rich and poor, including private investment, to 1 per cent of donor GNP by 1975.
- Linking increases in aid more closely to the economic objectives and development performance of the recipients, and extending the procedures under which both donors and receivers jointly review past performance and plans for the future in a multilateral context.
- Shifting the balance of aid more towards a greater multilateral component from 10 per cent of total official development assistance to a minimum of 20 per cent by 1975 and further strengthening the multilateral aid system by supporting regional development banks with funds as they demonstrate the capacity to put them to good use.
- Establishing the International Development Association (IDA) in a larger and more central role in the international aid system by expanding its resources from the present $400 million to $1.5 billion by 1975, by assigning it basic responsibility for evolving criteria for allocation of aid among countries, and by giving it an explicit mandate to so allocate its own resources as to offset some of the more pronounced inequities in the pattern of bilateral aid.
- Improving the climate for foreign private investment in developing countries by promoting greater stability in the treatment of such investments, and strengthening multilateral and bilateral programmes to offset the special risks.
- Alleviating the current debt problem in countries with sound development programmes by more liberal use of long-term debt re-scheduling and refinancing and by treating debt relief as a legitimate form of aid. To reduce future debt problems created by increased borrowing for development, the Commission, with one dissent, recommends that all official development assistance loans have an interest rate no higher than 2 per cent, and maturity and grace periods ranging from 25 to 40 years and 7 to 10 years respectively.
- Rendering the large increase in World Bank lending (which would normally be extended on near-commercial terms) more usable in countries with growing debt burdens by establishing a fund within the Bank which could subsidize interest rates on some of these loans; it is recommended that this fund be financed through transfer to the Bank of an amount equal to half the payments of interest due from developing countries to developed countries as a result of official bilateral loans.
- Pressing for adequate analysis of the problems of rapid population growth and their bearing on development progress.
- Initiating a sequence of steps leading to the progressive untying of aid, especially now that the creation of Special Drawing Rights by the International Monetary Fund offers a new mode of relief for the balance of payments problems of donor countries.
- Requesting the president of the World Bank to call a conference of heads of international and national agencies and of representatives of donor and recipient countries, in 1970, to discuss the creation of co-ordinating machinery capable of relating aid and development to other areas of foreign economic policy, moving towards standardized assessments of development performance, producing clear and regular estimates of aid requirements, and providing balanced and impartial reviews of donor aid policies and programmes.

Assessing the progress of the developing countries in the industrial field in the last twenty years, the report notes that between 1950 and 1967, the average growth of manufacturing in less developed countries was over 7 per cent per year, compared to almost 6 per cent for the world as a whole (excluding centrally planned economies).

Turning to the problems ahead, the report points out that policy-makers have generally become aware that further advances in import substitution will be difficult. In many countries, import substitution has taken place almost regardless of price or quality, and the goods thus produced cannot compete in export markets.

The report warns that although continued protection for new industries may be required, the point has been reached where the system of protection should be gradually adapted, and limited to activities which promise to be competitive in the long run. In some cases, the report suggests, this change can take place within the context of gradual regional integration.

"A more dynamic industrial sector will require public

institutions designed to facilitate private business", the report declares. In this connexion, it expresses the view that the international agencies should play a more active role in advising developing countries in their policies towards foreign investment. Pointing out that apart from the International Finance Corporation (IFC) UNIDO is the only international organization active in the field of private foreign investment, the report recommends that UNIDO and other financial institutions such as the World Bank expand further their advisory role regarding industrial and foreign investment policies, and that the IFC reorient its policy in this field.

The United Nations Economic and Social Council,

by Walter R. Sharp, Colombia University Press, New York, 1969, 322 pages, $8.75

In what Mr. Sharp calls the "veritable labyrinth" of agencies, special programmes, commissions and committees of the United Nations, it is difficult to tell who is responsible for what and to whom. This situation is primarily due to the fact that the United Nations system is a conglomerate of interdependent administrative and operational bodies with different structures and varying degrees of autonomy. Perhaps the most complex of these bodies to define is The United Nations Economic and Social Council (ECOSOC) whose importance in United Nations affairs has grown over the years with the increasing problems posed by the economic and social development of the developing countries. The core of this problem is how to utilize effectively the relatively limited resources at the disposal of the world organization in achieving a task of such dimensions.

The Charter of the United Nations in Article 60 vests the responsibility for the discharge of the functions of the Organization in the General Assembly and, "under the authority of the General Assembly, in the Economic and Social Council". The powers of the Council are laid down in Chapter X, Articles 61 to 72.

Mr. Sharp is disturbed about these provisions. He considers that "the Charter relationships between the Council and the Assembly are to a considerable degree ambiguous or repetitive". He argues, therefore, that there is need for rationalizing ECOSOC/Assembly relationships by mutual agreement.

A considerable part of the book is devoted to a detailed and often critical appraisal of the role of the Council within the United Nations system, which includes ECOSOC as: a world policy forum; an interagency co-ordinator for administrative and budgetary matters and for substantive activities; and a body to initiate programme planning and appraisal.

He is particularly critical of the injection of extraneous political issues into lengthy policy debates, which to some observers and delegates has become a ritualistic bore, and calls for more skilful planning of the Council's sessions.

Concerning ECOSOC's role as co-ordinator, Mr. Sharp sees two major difficulties: *(a)* the failure of Governments to co-ordinate their own policies regarding the economic activities of the United Nations family; and *(b)* the resistance of the Specialized Agencies to heed ECOSOC exhortations. There is also the problem of "proliferation" of co-ordinating committees. Besides the Council, there are the Administrative Committee on Co-ordination (ACC); the sessional Co-ordination Committee; and the Special Committee for co-ordination relating to the Development Decade. He applauds the increasing interagency staff contacts through the "fairly elaborate" ACC machinery, the seconding of staff by one agency to another and the bilateral agreements for the distribution of responsibilities in overlapping areas as a more effective means of co-ordination.

A new factor in the co-ordinative role of the Council is the creation of UNIDO, which has been allotted by the General Assembly the central role co-ordinating the activities of the entire United Nations system in the field of industry. Mr. Sharp views the development of the Council's mandate on co-ordination as emphasizing "programme-budget integration in relative long-range terms, thus calling for different techniques", more than has heretofore been the case, which brings us to the third major role of ECOSOC, that is, programme planning and appraisal.

Pursuing the need for the rationalization of ECOSOC functions with which he began his treatise, Mr. Sharp argues that the Council would be well advised to concentrate on two main types of substantive action: "the allocation of United Nations system resources for development in relatively long-range terms, together with intensified efforts to promote their expansion in magnitude"; and "the sustained appraisal of programme performance and substantive impact through the application of the most sophisticated criteria of evaluation available".

There has been a growing concern of late both within and without United Nations circles about the effectiveness of present technical assistance programmes. It is partly in connexion with this concern that agency capacity studies are being conducted, long-range programming is being increasingly resorted to, and the evaluation of field projects receiving greater attention. These are among the measures being taken by United Nations bodies engaged in technical co-operation, indicating that a trend in the direction indicated by Mr. Sharp already exists among individual agencies and their specialized fields of activity, if not in ECOSOC itself. It is the co-ordination and perhaps even the merging of functional or sectoral long-range programmes of individual agencies that presents difficulties. Here Mr. Sharp sees ECOSOC as evolving into "a planning and resource allocation instrumentality for the United Nations complex of organizations". Although he proposes this development convincingly in the direct language that exemplifies his approach throughout, such a development involves more than the future of ECOSOC itself to which he particularly addresses himself. In advancing it he must be aware that he is questioning the whole concept of relationships in the United Nations system, a subject obviously beyond the scope of this review.

G. S.

Calendar of Meetings

Conference on Computational Techniques as an Aid in Physical Metallurgy

Leeds, 4—5 January. M. Yates, Iron and Steel Institute, 39, Victoria St., London S.W.1., United Kingdom.

Automotive Engineering Congress and Exposition

Detroit, Michigan, 11—15 January. Society of Automotive Engineers, 2 Pennsylvania Plaza, New York, N.Y. 10001, United States.

East/Central Engineering Conference and Tool Exposition

Cincinnati, Ohio, 19—21 January. Society of Manufacturing Engineers, 2501Ford Rd., Dearborn, Michigan 48128, United States.

Instrumentation for the Process Industries Symposium

College Station, Texas, 20—22 January. Dr. R. G. Anthony, Department of Chemical Engineering, Texas Agricultural and Mechanical University, College Station, Texas 77843, United States.

Canadian Ceramic Society Annual Meeting and Conference

Toronto, 14—16 February. Mr. H. L. Taylor, Canadian Ceramic Society, Box 426, Don Mills, Canada.

Technical Association of the Pulp and Paper Industry 56 Annual Conference

New York, 22—25 February. Mr. W. L. Cullison, Director of Technical Operations, 360 Lexington Avenue, New York, N.Y. 10017, United States.

Conference on Advancing Industry

London, 4 March. B. A. Hodges, Secretary, Institution of Heating and Ventilating Engineers, 49, Cadogan Square, London S.W.1., United Kingdom.

Western Metal and Tool Conference and Exposition (WESTEC)

Los Angeles, California, 8—12 March. American Society for Metals, Metal Park, Ohio 44073, or Society of Manufacturing Engineers, 20501 Ford Road, Dearborn, Michigan 48128, United States.

Development in Rapid Mechanical Production Processes

Bilston, Staffordshire, 16 March. Iron and Steel Institute, 39, Victoria Street, London S.W.1., United Kingdom.

Institute of Electrical and Electronics Engineers International Convention and Exhibit

New York, 22—25 March. J. M. Kinn, Institute of Electrical and Electronics Engineers, 345 E 47th Street, New York, N.Y. 10017, United States.

Japan Atomic Industrial Forum 4th Annual Conference

Tokyo, March. S. Hashimoto, Sr. Managing Director, Japan Atomic Industrial Forum, 1—13, 1-chome, Shimbashi, Minato-ku, Tokyo, Japan.

Rolling Mill Conference

Houston, Texas, 5—7 April. Mr. W. C. Friesel, Managing Director, Association of Iron and Steel Engineers, 1010 Empire Building, Pittsburgh, Pennsylvania 15222, United States.

Third Offshore Technology Conference and Exhibition

Astrohall, Houston, Texas, 19—21 April. S. Houston, OTC, 6200 N Central Expressway, Dallas, Texas 75206, United States.

Diesel and Gas Engine Power 56 Anniversary Conference and Exhibition

Toronto, 18—22 April. Mr. A. B. Conlin, Jr., Director, Technical Departments, American Society of Mechanical Engineers, 345 E 47th Street, New York 10017, United States.

Symposium on Process Instrumentation in the Metal Industries

Swansea, 19—21 April. Institute of Measurement and Control, 20 Peel Street, London W.8., United Kingdom.

International Solvent Extraction Conference 1971 (ISEC 71)

The Hague, Netherlands, 19—23 April. General Secretary, Society of Chemical Industry, 14 Belgrave Square, London S.W.1., United Kingdom.

Electric Process Heating in Industry Technical Conference

Milwaukee, Wisconsin, 20—21 April. Mr. F. Pyecroft, Philadelphia Electric Co., 211 S. Broad Street, Philadelphia, Pennsylvania 19105, United States.

Pulp and Paper Industry Technical Conference

Savannah, Georgia, 21—23 April. Secretary, Institute of Electrical and Electronics Engineers, 345 E 47th Street, New York, N.Y. 10017, United States.

International Symposium on Chemical Engineering at the Service of Mankind

Paris, 22—24 April. Société de chimie industrielle, 80 route de St.-Cloud, 92 Rueil Malmaison, France.

International Engineering Conference and Tool Exposition

Philadelphia, Pennsylvania, 26—30 April. Society of Manufacturing Engineers, 20501 Ford Road, Dearborn, Michigan 48128, United States.

Hydraulic Control of Rolling Mills and Forging Presses

Glasgow, (Spring). Iron and Steel Institute, 39, Victoria Street, London S.W.1., United Kingdom.

The Industrial Research and Development News *is published in three language editions, English, French and Spanish. The annual subscription rate for each edition is US$4.50. Readers in Africa and Europe who wish to subscribe should write to:*

Distribution and Sales Section
Palais des Nations
CH-1211 Geneva 10
Switzerland.

Readers in other parts of the world should send their requests to:

Sales Section
Room 1059
United Nations
New York, New York 10017
United States of America.

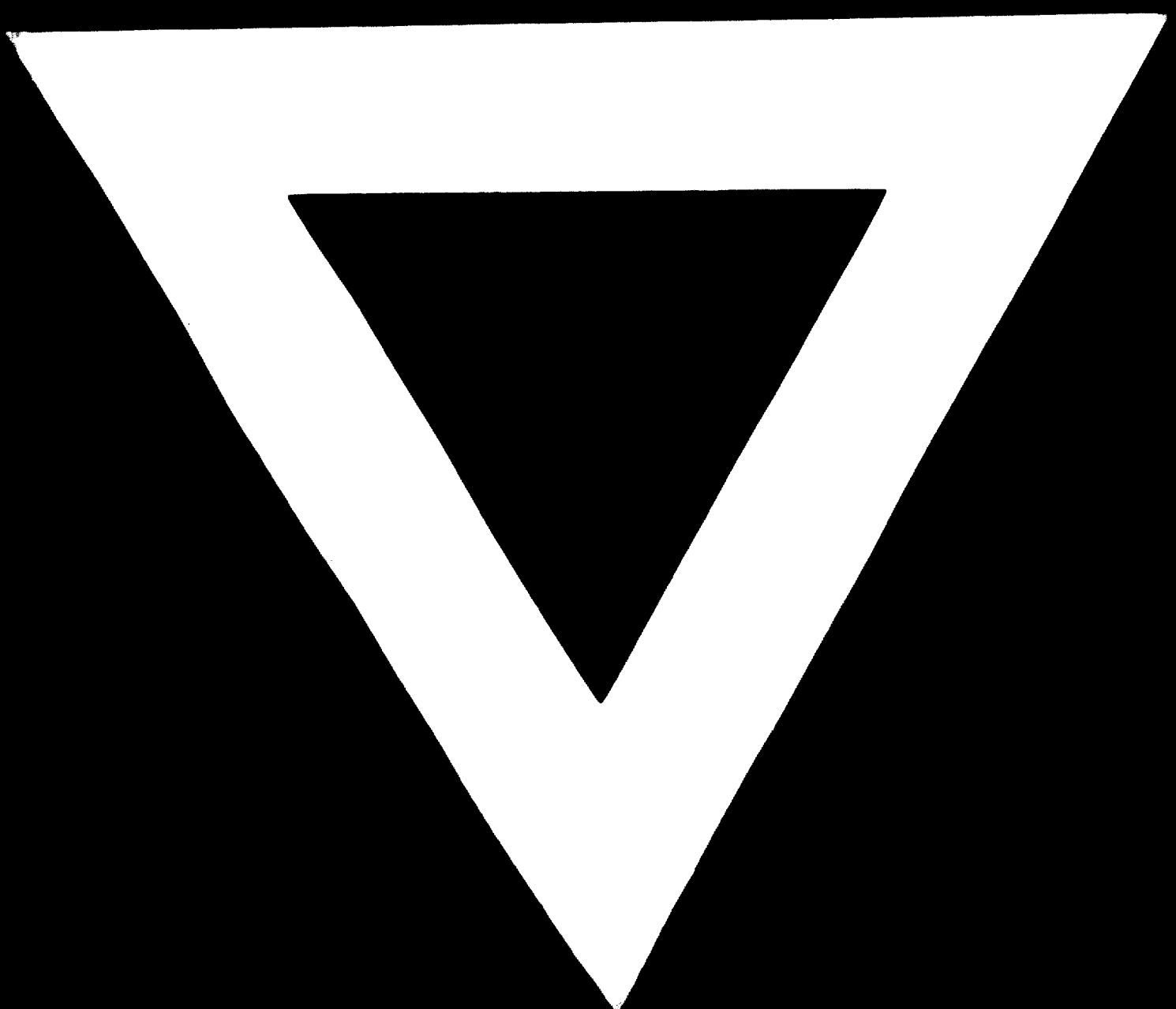
Articles to be considered for publication, comments on material published and suggestions for topics to be covered should be sent to:

Industrial Research and Development News
United Nations Industrial Development Organization
P.O. Box 707
A-1011 Vienna
Austria.

Printed in Austria
70-8288—March 1971—3,900

Price: $ U.S. 1.25 — Annual subscription: $ U.S. 4.50
(or equivalent in other currencies)

United Nations publication
ID/SER. B/14



74.10.17