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D03851



United Nations Industrial Development Organization

Distr.
LIMITED

ID/WG.132/1
12 October 1972

ORIGINAL: ENGLISH

Seminar for the Stimulation of Industrial
Research in Developing Countries

Singapore, 21 November - 4 December 1972

INTERNATIONAL COOPERATION FOR INDUSTRIAL
AND TECHNOLOGICAL RESEARCH AND
DEVELOPMENT

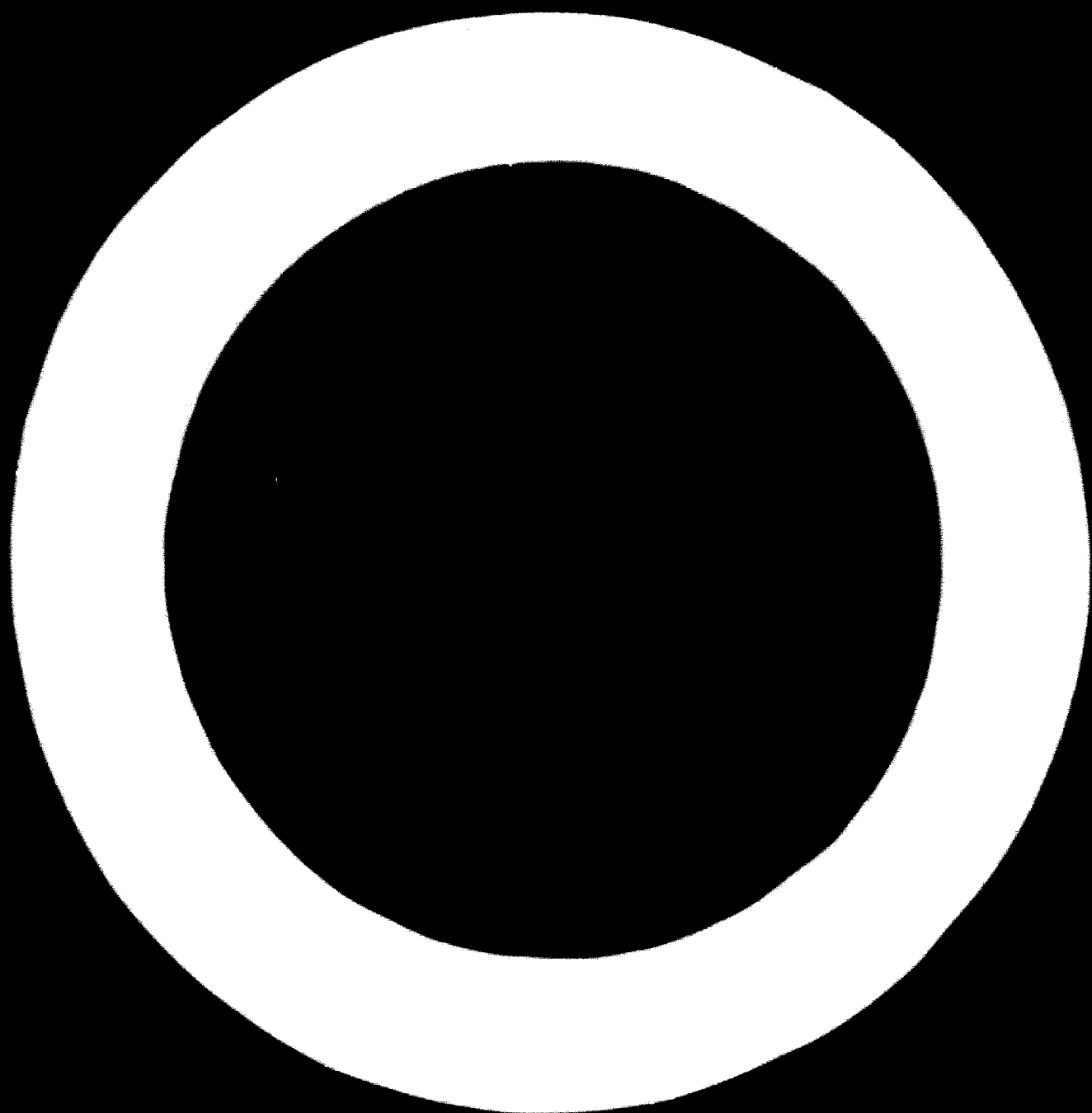
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id. 7-5917

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The operation of an industrial research institute is highly complex, both from within and particularly from without. From within the institute must be geared to thinking in terms of handling technical services and research as marketable commodities in terms of financial or social benefit. This means that the Director, and through him the staff of the institute as a whole, must constantly be concerned with the industrial application of research results as well as with the technology of industrial services and research.

The most important resource of an industrial research institute, and the one on which its success mainly depends, is its human resource. It is often falsely assumed that the training of personnel for such organizations can be fully provided by universities and other academic institutions. Schools are media for the assemblage and transmission of facts and of theories relating to facts; they have little to do with the application of facts within the confines of practical or economic limitations. Only in exceptional cases have teachers been required to make their way in life through the practical application of the facts and theories which they teach. Accordingly then, the staff of an industrial research institute must rely on its practical experience and the practical experience of others in the same field of endeavour. It is not surprising that so many industrial research institutes in the world fail to achieve significant results in industry when their staffs have been biased so heavily in favour of academics. This has been particularly true in the advanced countries where, of course, most of the industrial research institutes have been established.

On the outside, an industrial research institute must be integrated in its policies and activities with the economy of the country or region with

which it is meant to relate - with industry, with government and with academic and training institutions. Interplay with industrial operations, if it is to be effective, should be intimate and over a wide range including such technical services as trouble-shooting, engineering services, supply of technical information, standards and approvals testing, chemical and biological analysis, industrial productivity and management services. The extent to which any of these services are provided should be dependent upon local demand, which itself will change from time-to-time, requiring expansion of one type of service and the cutting back or phasing-out of another. In other words, the institute must be a dynamic organism, highly flexible in its operation and constantly anticipating the technological needs of its community.

Industrial research itself, even from the conception of the idea, must be related to sectors of the economy - particularly industrial, sometimes governmental - for the research to come to successful fruition. The various phases of industrial research - idea formation, research input, development, pre-production operations, innovation and commercialization, must be all part of the awareness exercised by the industrial research institute. It must be constantly evaluating its research projects, not only for technical feasibility, but also for market feasibility and the likelihood of capitalization for commercial application.

When looked upon as described above, the complexity of operation of an industrial research institute is seen to extend far beyond scientific and engineering technology and it becomes immediately obvious that to meet the required spectrum of capabilities, an institute cannot operate as an island unto itself - it must have a wide range of information and experience available to it. It has been through this realization that the World Association of Industrial and Technological Research Organizations - WAITRO - was brought into being.

WAITRO, whose membership now has reached seventy-six organizations, most of which are industrial research institutes which operate laboratories, has members in over 50 countries in the world. WAITRO provides a mechanism through which cooperation between individual research institutes and, more particularly, between staff members having similar interests and problems, may be achieved. The exchange of ideas and information through WAITRO comes at the senior level through biennial meetings of the General Assembly at which matters of mutual concern in the operation of member institutes are discussed. This takes place in a setting with representatives of many international and national assistance agencies whose resources are available for encouraging cooperation for industrial and technological R & D.

The WAITRO canopy provides an ideal starting point for the formation of regional sections or chapters of WAITRO members which can provide for the more regular meeting of member delegates on problems relating to technical projects, management, innovative mechanism and so forth. The establishment of regional sections can lead to the cooperative use of expensive equipment and of specialized facilities such as pilot-plants, publishing facilities and specialized instrumentation-servicing depots.

As contacts between delegates within WAITRO continue, the intimacy of contact between specific industrial research institutes, particularly between younger ones in developing countries and more mature ones in advanced countries, will occur. The pairing or "twinning" of these institutes has substantial cooperative potentialities in the undertaking of projects on a combined basis, training of technical and administrative personnel, in the seeking of specialized technical information, in the periodic assessment of research programs, and in introducing potential investors to new processes and other developments arising through R & D. It is to be hoped that financial assistance to encourage and accelerate the working relationship between industrial research institutes will

be forthcoming from specialized agencies of the United Nations and from governmental assistance agencies throughout the world. The sums of monies involved for promoting this inter-institute relationship is small, relative to the benefits to be derived.

The first study undertaken by WAITRO has been to catalogue the priority of problems and needs facing industrial research institutes in developing countries. The results have been compiled and issued as Publication No. 3 of WAITRO (1972). All of the thirty needs designated in a questionnaire relating to this report will require more international cooperation of one type or another between advanced and developing countries. Seven of the needs require financial assistance, such as for equipment, research projects, travel to seminars and meetings, academic training of technical personnel, technical services and laboratory and office buildings. However, most of the needs require a more subtle type of cooperation, whose requirement is the inter-action of people rather than the provision of money directly. For example, at the top of the list in priority rating were designated "industrial training of technical personnel", "training in industrial application of R & D" and "industrial exploitation of R & D results". The main source of assistance in such areas come from people who have the practical experience of confronting the same problems. Likewise, the "managerial training of personnel", "promoting research programs", "needs related to trouble-shooting" are problems that are best handled on a cooperative basis between experienced industrial research institutes passing along experience to younger ones.

One of the unfortunate aspects relating to the human factor in cooperative programs is that the best qualified people to render assistance are those who are practicing rather than preaching, and the time available of the practicing people is limited. Thus availability must be measured in days or a few weeks away from their regular job, certainly not in months or years.

Consequently, the most effective cooperative programs which depend upon the human element will be those making greatest use of modern means of communication and transportation. To make the most efficient use of capable people requires that certain basic concepts be followed in structuring an international cooperative program. Some of these concepts may be considered at this time.

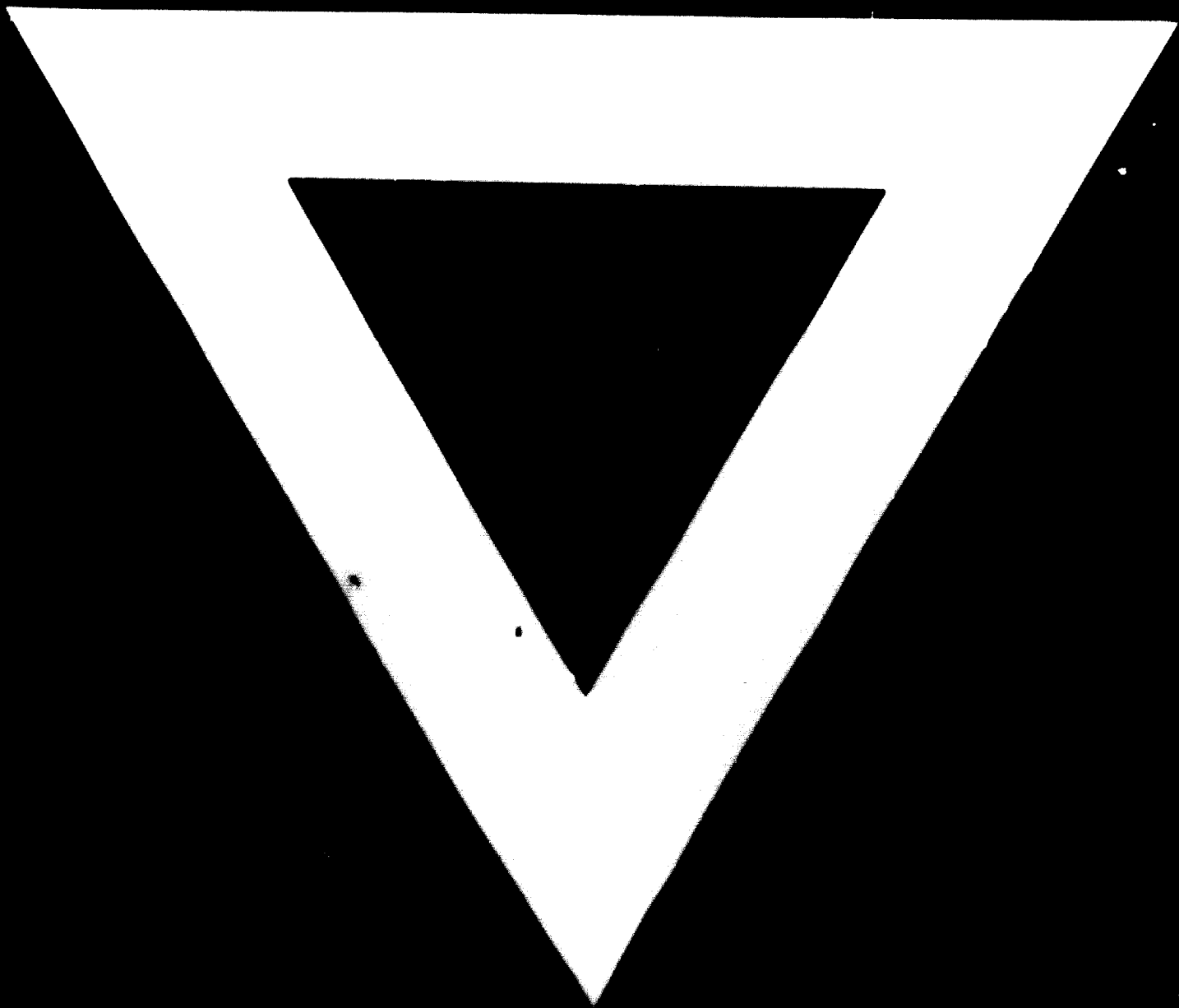
First, it is cheaper and more expeditious to transmit information rather than move people, so that where possible, information will be travelling between source and the point of need. Longer communications will go by air mail; shorter more urgent ones by telex. However, people on occasion will need to be moved. Some from developing countries will require short time exposure to experience or longer term training in another part of the world or, an experienced man may be required to travel to a younger institute. If a twinning arrangement is to be set up between two institutes, it soon becomes apparent that economy can be effected if a group of younger institutes in a region can be served as a unit, rather than serving each institute in the region individually. For example, if experienced personnel are travelling from an established industrial research institute to provide a short course in management training or on guidelines to industrial application of R & D results, then the trained man may as well speak to representatives of a number of younger institutes in a region than to deal with each individually. By having the assistance programs structured on a regional basis in the developing part of the world, a cooperative inter-play is encouraged between the member institute of the regional section. In the same way, it may be advisable to have a small grouping of two or three experienced institutes relating to a regional section in the developing world.

As a tangible initiation towards the establishment of cooperation between industrial research institutes, the formation of a regional section of WAITRO could be considered at this time, embracing as a nucleus WAITRO members in Singapore, Indonesia, Malaysia, Thailand and in the Philippines. This section

could be expanded as other WAITRO members appear in Southeast Asia. The regional section could consider problems of mutual interest, encouraging exchange of technical personnel on research projects and assisting one another in formulating recommendations affecting government policies relating to technology and industrial development in their respective countries. Also, as a collective group, they would be able to be more effective in calling on international assistance and cooperation from international assistance agencies. I suggest that representatives here today think in specific terms of the ways and means by which effectiveness in research and technical services may be increased and economies be achieved by regional cooperation.

Research in the advanced countries has been very much of a cooperative affair from the start, probably far more so than often appreciated. Through the media of technical publications, symposia and most effectively through personal contact in the recent years of rapid transportation, R & D programs have been achieved through scientists and engineers being brought into contact with very current information and then applying it to their own specific problems in their own particular ways. Thus research thrives on the transmission of information and the coming together of participators. This applies not only to R & D, but also to industrial application of research products for which contact with commercial developers is essential. The well established lines of communication between R & D organizations in the developed world must be extended to these counterpart organizations which are springing forth in the developing world.





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