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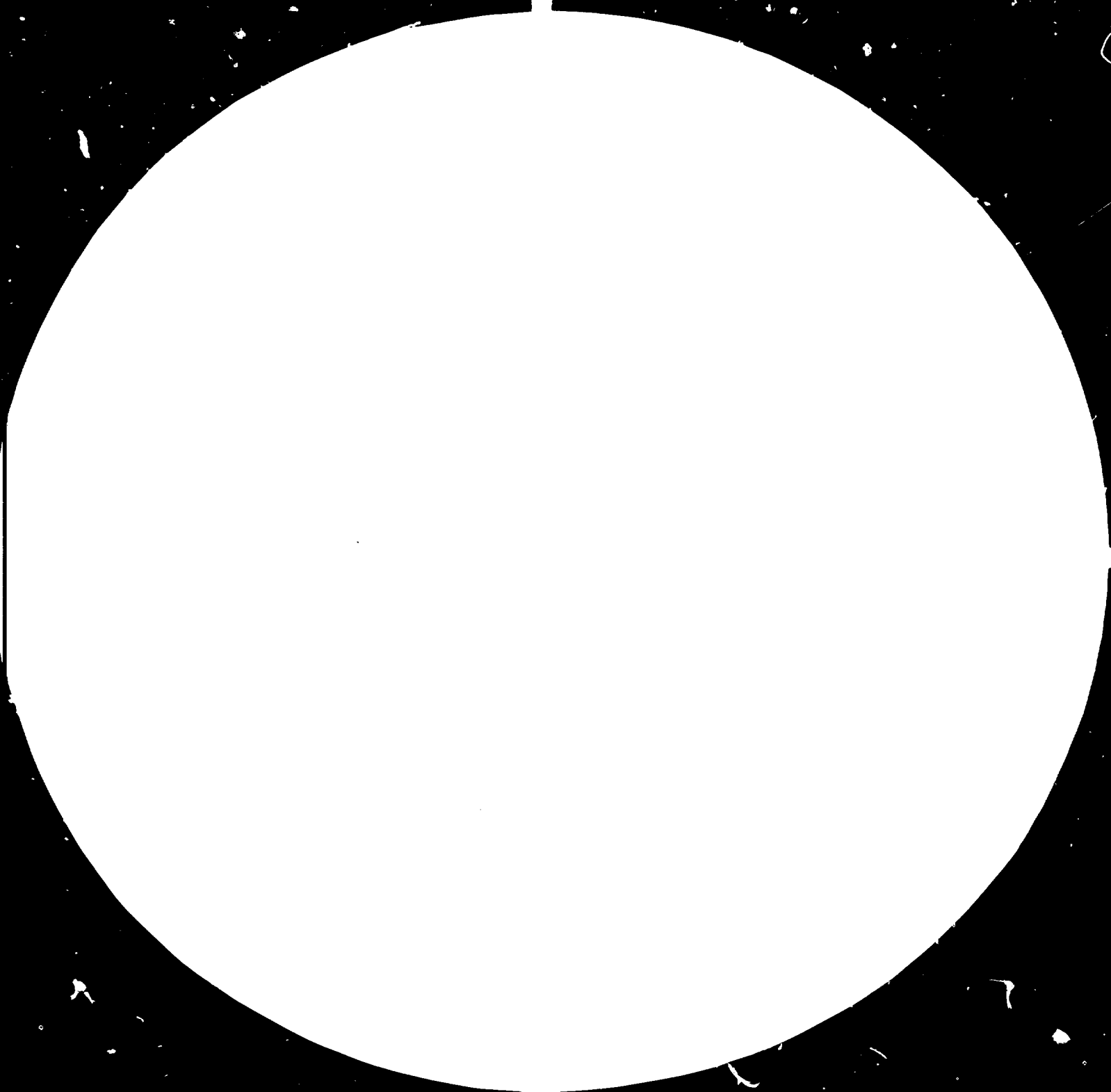
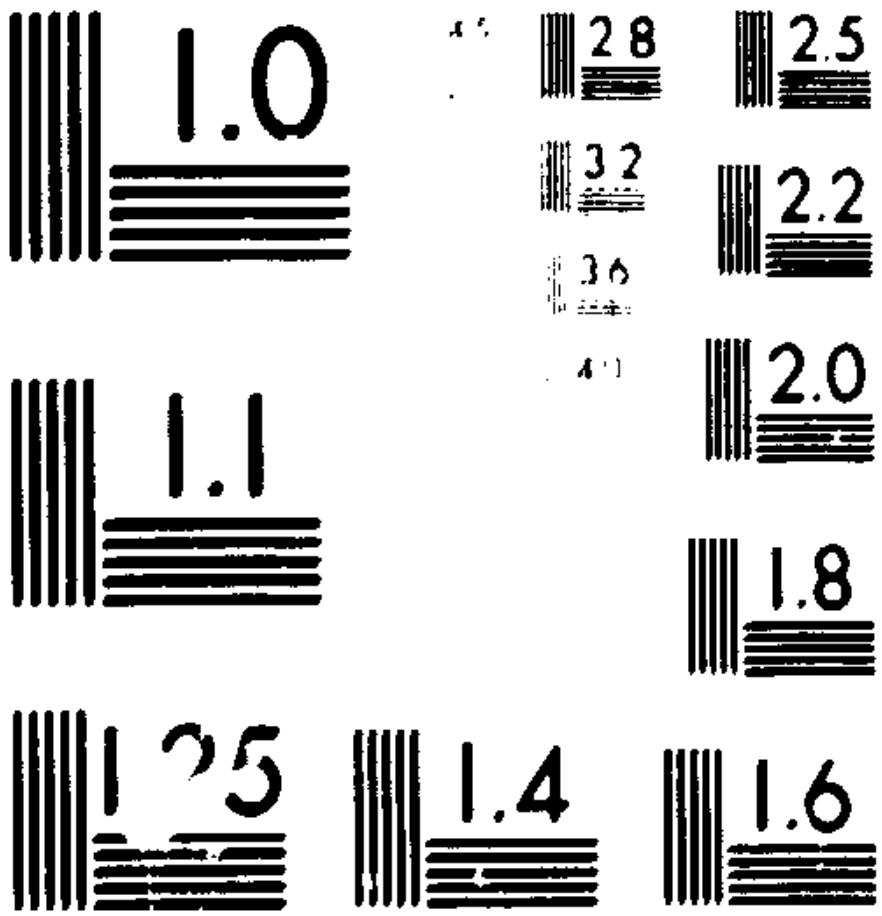
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org





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UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

MEETING WITH REPRESENTATIVES OF ITIS (INTERMEDIATE TECHNOLOGY INDUSTRIAL SERVICES) AND PENELECTRO

SI/MLW/78/001

Small Scale Manufacture of Glass Containers

Report of Mission *

to

London

11 - 13 February 1980

by

N.G. Biering
Industrial Development Officer
Chemical Industries Section
Industrial Operations Division

*This report has been reproduced without formal editing.

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INTRODUCTION

Over the past years there have been a number of contacts between the Intermediate Technology Development Group (ITDG), London and UNIDO of which the most noteworthy was the participation of a number of ITDG's staff in the International Forum on Appropriate Industrial Technology in New Delhi in November 1978.

In the specific field of small scale glass manufacture the initial contact dates back to 1977 and following the establishment in 1978 of the Intermediate Technology Industrial Services (ITIS) the ties between this unit of ITDG and the Chemical Industries Section have been gradually strengthened. Numerous letters have been exchanged and two UNIDO experts in glass technology and glass design have had informal meetings with ITIS staff.

Towards the end of 1979 UNIDO was actively involved in two small scale glass manufacturing projects in Malawi and Upper Volta while ITIS was engaged in similar projects in Kenya and Sri Lanka and it was found that the time was ripe for an in depth consideration of the scope for future co-operation in this field.

With the particular aim of identifying ways of strengthening the project in Malawi the writer carried out a mission to London from 11 to 13 February during which he was accompanied by Mr. John Cochrane, UNIDO expert attached to the Malawi project.

The visit comprised discussions with several staff members of ITIS, who had come down to London for this purpose, as well as with Messrs. Penelectro in Southend which has designed a small, simple and inexpensive electrically heated glass furnace. A list of the persons met is given in Annex I.

ITIS

ITIS is a subsidiary of ITDG engaged in the identification and/or development of small scale, appropriate and, if required, unconventional production technologies and in the promotion of these technologies in developing countries.

Funded by a grant from the British Ministry of Overseas Development the unit is capable of funding inter alia development of new technologies, design of the related equipment and the testing and demonstration of the technologies under field conditions, i.e. projects involving a fairly high degree of risk.

The technologies, once developed, are freely available through their inquiry service and Regional Technical Advisers, and may also be taken up by relevant UNIDO projects. In fact, the promotion of "ITIS technologies" through UNIDO would probably be most welcome.

The scope for ITIS/UNIDO co-operation will be exposed in the following and additional information on ITIS itself is given in Annex II.

ITIS AND SMALL SCALE GLASS MANUFACTURE

Since its creation in 1978 ITIS has been promoting an intermediate hollow glass manufacturing technology and has received indications of interest from several countries but until very recently the unit had not been actively involved in any specific project.

However, there is a long tradition for small scale glass manufacture in Asia ranging from full mechanization to mouth blowing and thus a great deal of experience to draw from as well as considerable scope for improvement.

Sri Lanka

In November 1979 an ITIS team carried out a two week exploratory mission to Sri Lanka to assess the feasibility of introducing electric melting to the small scale glass industry. The team identified a small scale manufacturer producing tumblers and lamp chimneys of rather mediocre quality by mouth blowing, who was interested in upgrading his production technology in order to diversify into the more lucrative market for containers and other higher quality products. A copy of the mission report was given to the writer.

As a result of the visit the entrepreneur has now ordered a semi-automatic 8 mould press, an electric lehr and various other ancillary equipment from India and has also with the support of ITIS ordered a 4 ton/day electric furnace from Penelectro, UK.

The identification and introduction of this kiln is thus the most important contribution of ITIS to the project and one of crucial importance to its success as well as to the success of others which may follow in the future.

Penelectro furnace

Until the recent involvement of ITIS no continuous glass melting furnace of the minimum capacity required (5 tons) was commercially available and in any case not at a cost making it accessible to small scale entrepreneurs. ITIS having identified this lacuna in the equipment range available for this type of semi-mechanized glass plant contacted Penelectro (an important designer and supplier of glass furnaces) and convinced the management of the need for a simple and inexpensive furnace of maximum 5 tons capacity. ITIS financed the design work required to develop this furnace which is now going to be installed in Sri Lanka.

The writer had the opportunity to visit Penelectro's Headquarters and discuss the matter with the technical staff concerned. It was explained that the extremely low cost (about 1/3 of the price of a conventional kiln of this capacity) had been achieved by stripping the furnace design of all the automatic feeding and control mechanisms which are normally standard equipment. The result is a furnace which is less complicated to operate and which allows a far greater flexibility in the daily output than normally without any significant influence on the quality of the glass.

The furnace is, obviously, available to any interested company or entrepreneur and it should be given serious consideration when putting together the final equipment list for the UNIDO project in Malawi. Penelectro offered to forward a quotation for the kiln together with a technical description in the near future.

Boirant bottle making machine

During the course of the discussions another very recent example of an ITIS initiative of interest to UNIDO was exposed and the writer was given a copy of a document describing the matter in detail.

One of the biggest dilemmas facing planners of small scale glass manufactures is the lack of forming equipment capable of producing bottles with a sufficient degree of accuracy required by modern automatic filling lines in breweries and soft drink factories. The only commercially available machines are of the individual section (IS) type and the one with the smallest capacity will produce about 3,000 tpa (about twice the total capacity envisaged for the Malawi project) and cost at least US $ 150,000.

However, up to the mid 50's, when the IS machines were introduced, automatic single head suction and blow machines for bottle making were

still being manufactured and used extensively. Their robust and rather simple construction, the relative ease of their operation and their modest production speed would probably make them well suited for small scale glass works in developing countries.

The action now taken by ITIS is in a way typical of the pragmatic approach of the organization. They have located four single head suction and blow machines of the Roirant F type in Sweden where they were operating until 1971, and bought these machines very cheaply. Within the next few months the two best of these machines, which are all in a fairly good state will be reconditioned for the purpose of a practical production trial.

It is the idea that one machine will be made available to an existing small scale plant in Asia (still to be selected) for a symbolic cost of £2,000 while the other will be incorporated in a completely new (and thus inexperienced) operation - possibly the plant proposed for Malawi. Both machines will operate under these two different sets of conditions for six months and a report will be made on their performance and possible problems experienced.

Following this trial the company Armytage (UK), which is a manufacturer of semi-automatic glass making equipment, will be contracted to work out a more contemporary design for a similar machine using the best features of the existing machine and incorporating alterations based on the experiences gained during the field trials.

POSSIBLE UNIDO/ITIS CO-OPERATION

The above examples of ITIS' involvement in the field of glass manufacture point towards three concrete areas of co-operation between UNIDO and ITIS all of which were discussed and on which a certain agreement was reached:

Transfer of Sri Lanka know-how

The semi-automatic manufacture in Sri Lanka is expected to be in operation by the end of 1980 with a relatively short running-in period due to the high level of glass making experience among the workers and management of the plant. The size and type of manufacture will be similar to the one envisaged for Malawi (5 tons continuous electric furnace, semi automatic forming equipment (press line only), electric annealing lehr) and would provide a rather unique training opportunity for the Malawi personnel in advance of the installation of their own plant.

The representatives of ITIS confirmed that Malawi fellows would be welcome in the Sri Lanka plant and even suggested that the cost of the training might be borne by ITIS. Another realistic possibility for transfer of the know-how accumulated in the Sri Lanka plant would be to assign the owner, who is an experienced small scale glass technologist, to the Malawi project on a short term consultancy.

Trial operation of Roirant bottle machine

As mentioned above ITIS wants to test two reconditioned Roirant bottle machines under field conditions for six months and it is most probable that the Malawi plant could benefit from this opportunity. The machine would be made available to the plant for a token fee of £2,000 (which could be absorbed by the project), the only condition being that a report on its performance should be made to ITIS at the end of the trial period.

This would be a unique and not at all costly way of expanding the manufacturing capability of the plant into the area of narrow necked bottles as well as of other types of containers with considerably reduced capacity tolerances and should, in the opinion of the writer, be welcomed. It may be added that a similar machine will have been

in operation somewhere else under the auspices of ITIS for a considerable period of time before the start of the Malawi operation and that the accumulated experience will contribute to an easier start.

Use of Indian glass making equipment

For a number of years India has been manufacturing a range of glass making equipment. One of the major manufacturers in this field is MEHNDIRATTA + ASSOCIATES, Shikohabad from which UNIDO has received quotations related to the Malawi project and which will be supplying the Sri Lanka project with most of its equipment.

The advantage of using Indian equipment besides the principle of supporting exporting industries of developing countries is that the low level of Indian salaries and wages makes the equipment very attractive from a cost point of view and that most of the items are of a fairly simple and robust construction well suited to conditions in other developing countries.

It is, nevertheless, possible to identify specific weaknesses in many equipment items due to application of sub-standard materials for critical components or non-awareness of more recent developments and know-how. If improved on these few points the equipment would reach a performance level equal to that of standard equipment from an industrialized country but still be substantially cheaper. As an example one could mention the electrical annealing lehr of Mehndiratta which would be much improved if its heating elements were replaced by elements of European origin.

ITIS is proposing to carry out a study of the availability and quality of Indian glass making equipment with indications of how this could be improved as suggested above. The objective of this exercise would be to promote the improvement of the equipment to allow for its increased

application in future small scale glass plants to be erected in other developing countries. The Terms of Reference will be forwarded to UNIDO for our consideration and possible financial support.

CONCLUSIONS AND RECOMMENDATIONS

The mission has led the writer to the conclusion that there is a good opportunity for co-operation between ITIS and UNIDO in the field of small scale glass making as well as in other areas of appropriate technology.

A dynamic and inspired approach to the solution of problems encountered in the development and transfer of appropriate technology is characteristic of the work of the Unit and it has resulted in the accumulation of know-how which in many cases is highly relevant to the work of UNIDO. It is worth noting that the Unit welcomes the application of their ideas and technologies within UNIDO projects, inter alia because their funds do not permit them to get actively and intensively involved in projects in a particularly technological category once one or two pilot projects have been successfully completed and can be refered to as demonstration objects.

More specifically ITIS does not intend to get involved in any more small scale glass projects than the ones in Sri Lanka and Malawi and possibly Kenya for which preparatory activities are far advanced.

Besides the application of know-how already existing in ITIS and the production units which the Unit has offered assistance and which, consequently, are (at least morally) committed to make their technology and experience available to other interested parties, UNIDO could benefit from a co-operation with ITIS in development of new technologies and equipment.

The activities of ITIS in the field of glass manufacture demonstrate how they are in a position to invest funds into the development of new technologies without any "Government Request" or other formal authority from external bodies. It appears that suggestions from UNIDO (or any other source) of potential areas of technology development would be met with considerable interest and might be realized at short notice at the cost of ITIS. This would add a new dimension to our work which hitherto has been difficult to introduce.

On the other hand, there also seems to be some scope for a similar co-operation under UNIDF financing (subject, of course, to the availability of funds) whereby UNIDO would engage the services of ITIS to solve certain technological problems or to develop equipment prototypes required for the introduction of new technologies.

In view of the above observations it is recommended to make increased use of the expertise and know-how available to ITIS through a number of specific joint activities in areas of mutual interest. In view of the fact that concrete proposals for such co-operation have already been discussed during the writer's mission it is suggested to proceed with their implementation as early as possible.

With particular reference to the UNIDO Small-Scale glass manufacturing project (SI/MLW/78/801) it is recommended that the appropriate local authorities be made familiar with the offer of ITIS to

a. establish (and possibly also finance) a transfer of know-how and experience from the Sri Lanka plant in the form of fellowship training and eventually short term consultancies before and during the start-up of production in Malawi

and

b. make available to the Malawi plant a second hand Roirant bottle making machine at a nominal cost for trial operation during a minimum period of six months.

The fact that Mr. Cochrane, who has been nominated by the Malawi Government to assist in the development of the project, participated in the discussions with ITIS will greatly facilitate the future co-operation.

ANNEX I

List of Persons Met

ITIS

Mr. David Wright, General Manager
Mr. Ian McChesney, Industrial Adviser
Mr. Garry Whitby, Industrial Adviser
Mr. Ken Marshall, Economist

Penelectro

Mr. Henry Fontana, Director
Mr. Randal Rue, Project Engineer

Why 'Intermediate Technology'?

The phrase 'intermediate technology' is frequently misunderstood. Essentially, it is a technology where the equipment cost per workplace is intermediate between that of the traditional technology in a developing country and the capital intensive technology of an industrialised country.

It is not necessarily labour intensive or small-scale. Nor does it mean by definition an 'inferior' product or an outdated process. It may be 'modern' in both design and operation. What it is, however, is the appropriate technical solution to a specific problem.

Where is *ITIS*?

The ITIS office is located at Rugby, between London and the major industrial centres of England. Personal visits to our office are most welcome. London is 55 minutes by hourly train. Birmingham airport is 45 minutes by road.

Postal address:
Intermediate Technology Industrial Services
Myson House
Railway Terrace
Rugby CV21 3HT

Cable Address:
ITIS RUGBY

Telephone:
Rugby (0788) 70126

Intermediate Technology Industrial Services

ANNEX II
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"The chance to work is the greatest of all needs . . . the primary need is workplaces, literally millions of workplaces."

E. F. Schumacher, *Small is Beautiful*

What is *ITIS*?

Intermediate Technology Industrial Services is a new unit of the Intermediate Technology Development Group. It has been set up to provide technical and financial assistance to meet the needs of developing countries for unfamiliar or new technologies, primarily in the small industry sector.

What's the goal of *ITIS*?

Our objective is to assist in creating more places of work in developing countries through the establishment of production facilities using local resources to meet local needs. To achieve this goal, ITIS provides information about existing technologies and carries out studies to determine which technologies may be most appropriate. More importantly, we also provide funds to field test new technologies in developing countries and assist in the installation of new equipment.

What services are available?

ITIS can:

- answer enquiries about existing technologies for specific small-scale industrial activities.
- recommend sources of supply for machinery and equipment.
- identify the requirements for new products or processes through field visits by technical experts and market studies.
- assist the adaptation of existing technologies and the development of new technologies.
- provide funds to field test and demonstrate new technologies in developing countries.

For example, ITIS is currently acting on requests such as these:

- "Can I do galvanising on a small-scale? Where can I buy the appropriate equipment?"
- "Can ITIS carry out a study of the needs of local printers and advise what machinery would be most suitable to increase their output to meet local demand?"
- "A new design of evaporator has been developed by a European company. It appears ideal for the small-scale sugar refineries here in India. Can you provide the funds to test a field prototype?"
- "We have large quantities of waste sawdust at our timber mill. Can ITIS identify an existing process which could turn this waste into some useful form?"
- "I was told I couldn't produce glassware on a scale of less than 10 tons per day. I've recently heard ITDG is helping to develop a 2 ton/day plant. Is this true?"
- "I would like to expand my bakery to produce 5,000 loaves per day. Can I modify my existing ovens or do I need new equipment?"
- "I want to make paper on a small-scale. I know this is done in India. Can you help to adapt the Indian method to make use of the raw materials I have available?"

To whom?

The services of ITIS are available not only to Government departments and development agencies but also to private voluntary organisations and individuals. ITIS can assist anyone who is concerned with the establishment of small industries in developing countries.

How does *ITIS* operate?

The first point of contact for all enquiries and requests for assistance is one of the unit's Regional Technical Advisers. Each Adviser is responsible for a specific group of countries to which he makes regular visits to establish direct contact with those requiring our services. It is also the role of the Advisers to define the need for any new technologies, especially those of common interest to several countries.

When such needs have been defined, it is the responsibility of our Project Managers to organise the development of the appropriate technical solutions. The Managers are further responsible for the testing and demonstration of new technologies, and, together with ITIS' Commercial Advisers, for the delivery and installation of the relevant hardware.

What's the cost?

The services of ITIS are normally provided without charge. This is possible because ITIS is funded by a grant to the Intermediate Technology Development Group from the British Ministry of Overseas Development. The Group itself is a non-profit organisation registered in the UK as a charity. It was founded in 1965 by the late Dr E. F. Schumacher.