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**PROCEEDINGS
OF THE
CONFERENCE AND SEMINAR
ON
TECHNIQUES AND METHODOLOGIES
FOR STIMULATING SMALL-SCALE
LABOR-INTENSIVE INDUSTRIES
IN DEVELOPING COUNTRIES**

Prepared for the
Agency for International Development

Edited by
Donald E. Lodge
and
Kay Ellen Auciello

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FOREWORD

The Conference and Seminar on Techniques and Methodologies for Stimulating Small-Scale, Labor-Intensive Industries in Developing Countries was held on the campus of the Georgia Institute of Technology on March 10-14, 1975. The meetings, supported by the U.S. Agency for International Development, were designed to present information on successful contemporary programs for the stimulation of small-scale industries in developing countries. Speakers, representing a cross section of outstanding government and private sector organizations, presented case histories of their individual experiences.

The principal goals of the conference were:

- . To identify, analyze, and compare existing methodologies designed to stimulate small-scale industry.
- . To disseminate knowledge about operational and linkage efforts in small-scale industry development to developing country participants and educational administrators attending the conference.
- . To establish the necessary links for coordination of future efforts of both the organizations in the developing countries and international development organizations.
- . To establish adequate "feedback" mechanisms for the present and future in order to enhance the design and utilization of the Small Industry Program of the U.S. Agency for International Development.

The conference audience consisted of public- and private-sector officials and educational institution administrators from developing countries, including 211(d) counterpart institutions, representatives of other organizations interested in industrialization, and U.S. public- and private-sector representatives.

One hundred twenty-one persons participated in the two-day conference. Twenty-two delegates represented ten LDC's: Brazil, Colombia, Ecuador, Ghana, Korea, Mexico, Nigeria, Peru, Philippines, and Thailand.

A selected group of 211(d) counterpart institution representatives and resource persons participated in the three-day seminar, which followed the conference.

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CONFERENCE SCHEDULE

Sunday, March 9

- 5:30-7:00 p.m. Registration in Lobby outside Saxony C, Townehouse Motel
6:00-7:00 p.m. Early Bird Reception, Saxony C, Townehouse Motel

Monday, March 10

- 8:30 a.m. Registration, Lobby of Space Science and Technology Building
9:00-9:15 a.m. Welcome by Joseph Pettit, President, Georgia Institute of Technology, Atlanta, Georgia, U.S.A.
9:15-10:00 a.m. Keynote Address by Daniel Parker, Administrator, Agency for International Development, Washington, D.C., U.S.A. "Appropriate Industrialization for Developing Countries"
10:00-10:15 a.m. Coffee Break in Lobby
10:15 a.m. Case Histories of Successful Operational Programs
10:20-11:00 a.m. Case No. 1: Paul Lofthouse, Director of Technical and Industrial Liaison, Intermediate Technology Development Group, Ltd., London, England
11:05-11:45 a.m. Case No. 2: Bart Duff, Agricultural Economist, International Rice Research Institute, Manila, Philippines
11:50-12:30 p.m. Case No. 3: Yeo G. Yun, Head, Techno-Economics Group, Korea Institute of Science and Technology, Seoul, Korea
1:00-2:00 p.m. Lunch in Student Center Ballroom
2:15 p.m. Case Histories of Successful Operational Programs (continued)
2:30-3:00 p.m. Case No. 4: Ross Hammond, Chief, and Nelson Wall, Head, International Development Branch, Industrial Development Division, Engineering Experiment Station, Georgia Institute of Technology
3:00-3:15 p.m. Coffee Break in Lobby
3:15 p.m. Case Histories (continued)

- 3:20-4:00 p.m. Case No. 5: Ignacio Deschamps, General Director, and Humberto Soto, Project Supervisor, Techno-Economics Division, Mexican Institute of Technological Research, Mexico, D.F., Mexico
- 4:00-4:40 p.m. "Characteristics of Successful Operational Programs"
Hugh H. Miller, Executive Secretary, Office of the Foreign Secretary, National Academy of Engineering, Washington, D.C., U.S.A.
- 4:40 p.m. Adjourn until Dinner
- 7:00 p.m. Banquet in Student Center Ballroom
Address by:
Dean Rusk, Samuel H. Sibley Professor of International Law, The University of Georgia, Athens, Georgia, U.S.A.

Tuesday, March 11

- 9:00 a.m. International Development Organizations
- 9:05-9:35 a.m. Manuel Alba, Director, Technology and Development Institute, The East-West Center, Honolulu, Hawaii, U.S.A.
- 9:35-10:00 a.m. Frederick T. Moore, Economic Advisor, Department of Industrial Projects, International Bank for Reconstruction and Development, Washington, D.C., U.S.A.
- 10:00-10:15 a.m. Coffee Break in Lobby
- 10:15 a.m. International Development Organizations (continued)
- 10:15-10:45 a.m. Mikoto Usui, Head, Technology and Industrialization Program, Development Centre, Organisation for Economic Co-operation and Development, Paris, France
- 10:45-11:15 a.m. G. H. Clement, Special Advisor, Information Sciences Division, International Development Research Centre, Ottawa, Canada
- 11:15-11:45 a.m. "Science and Technology Programs in AID"
William H. Littlewood, Associate Director, Technical Assistance Bureau, Office of Science and Technology, Agency for International Development, Washington, D.C., U.S.A.
- 12:00-1:00 p.m. Lunch in Student Center Ballroom
- 1:30-2:15 p.m. Group Sessions

2:15-2:45 p.m.	J. Levitsky, Chief, Technical Services Group, Small-Scale Industry Section, United Nations Industrial Development Organization, Vienna, Austria
2:45-3:00 p.m.	Coffee Break in Lobby
3:00-3:45 p.m.	Group Session Reports
3:45-4:30 p.m.	Program Recap and Evaluation
4:30 p.m.	Adjourn

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Former U. S. Secretary of State Dean Fusk (left) talks with Thomas C. Niblock, Director, Philippine Mission, USAID, before delivering the banquet address.



Dean Fusk, Samuel Sibley Professor of Law, University of Georgia and former U. S. Secretary of State addresses attendees at the International Development Conference. Seated are Dr. Joseph Pettit, President, Georgia Institute of Technology and Thomas C. Niblock, Director, Philippine Mission, U. S. Agency for International Development.



Curtis Farrar, Acting Assistant Administrator, Technical Assistance Bureau, U. S. Agency for International Development presents the keynote address of the International Development Conference.



Dr. Joseph Pettit, President, Georgia Institute of Technology, and Curtis Farrar, Acting Assistant Administrator, Technical Assistance Bureau, U. S. Agency for International Development.



Ms. Monique Iavoie, Canadian International Development Agency, Mr. Cornelius Otiteh, Federal Ministry of Industries, Nigeria, and Dr. O. A. Oguntoye, Industrial Research Unit, University of Ife, Nigeria.



Attendees at the opening session of the International Development Conference.



A. O. Lewis, Industrial Research Unit, University of Ife, Nigeria, and J. W. Powell, Technology Consultancy Center, University of Science and Technology, Kumasi, Ghana.



Ross Hammond, Chief, IDD, Georgia Institute of Technology, is shown with conference speakers Yeo Gyeong Yun, Korea Institute of Science and Technology, and Paul Lofthouse, Intermediate Technology Development Group, Ltd., London.

WELCOME ADDRESS

Joseph Pettit
President
Georgia Institute of Technology
Atlanta, Georgia, U.S.A.

Good morning. This is a formality which I'm called upon to do rather often--to welcome one conference or another. We have a lot of them here in many different fields of interest. I'm particularly pleased, however, to launch this one as I'm interested in the subject matter and in the people. I've had the opportunity, as Mr. Hammond indicated, to visit at least two of the counterpart institutions with whom we have been communicating: Soong Jun University in Seoul and University of the Philippines. I hope to have a chance to see the work at the other places. We are the beneficiaries of a sizeable grant from AID, stemming from earlier work that we have done here within the state, and you'll have plenty of chances to learn about that. Many of you know about it already. Georgia is a developing state, like many of your countries, and has in the last two or three decades gone through some of the same transitions that are still in front of many of the world's nations; transition from a predominantly agricultural society to one with more emphasis on industry and commerce and the need for substitute employment generation as agriculture wanes or becomes more efficient. Either cause has the same effect--less employment in agriculture. So we have had, through our Engineering Experiment Station, much activity in this area. It's strange in many ways that Georgia is unique. Beginning in the 1860's agricultural experiment stations were set up across the land in connection with state universities or land grant universities, and outreach into improvements in agriculture was universal across the United States. But there has not been the same universality of industrial development. There have been things called Engineering Experiment Stations at many state universities, but they have not done what has been done here in Georgia: reaching out into rural and semi-rural industrial localities and building up industry in the way that agriculture has been built up. We're very proud of this and AID is taking note of it in giving us a grant to continue this work to strengthen our capabilities to move into academic programs related to it.

The work has been done by what you will hear called IDD; it's so much easier and shorter to say than Industrial Development Division. IDD is part of the Engineering Experiment Station, which, in turn, is a part of Georgia Tech. The Station comprises our applied research arm. It is staffed largely with full-time research people numbering some 300 professional and support staff. It is closely related to the academic programs. The professionals in the Experiment Station are members of the general faculty of Georgia Tech and participate in campus governance. The Station has gone through various transitions. There was a time when it was primarily the contracting mechanism whereby professors did sponsored research. Now we've built up a large sponsored-research activity within the teaching faculty without going through the Experiment Station. This does not mean that we want to separate these two groups. In fact, I'm doing everything I can to keep them closely together, because I believe that we have a certain advantage by having a whole spectrum of activities ranging from highly theoretical or basic scientific research; our physics, chemistry, and mathematics departments; on through engineering, and over into the very applied field of research and service in the Experiment Station.

I mentioned the size of the Experiment Station in the terms of numbers of people. Let me give you some numbers as far as the academic side is concerned. We have really two campuses. This is the main one, here in Atlanta. We have here 8,200 students. That may seem large or small, depending on your frame of reference. By modern standards it's small, and that's fine; I like it that way. We have only four major areas of education. We are primarily dedicated to the training of professionals in engineering, architecture, science, and management.

The Engineering College is the largest. It is, in terms of number of degrees granted last year, the fourth largest in the nation, coming after Purdue, Illinois, and Penn State. We're almost the same as Penn State. We have about 5,000 students in the College of Engineering. It's the only public or private engineering college in the state of Georgia, which has four-and-a-half million people. And I should hasten to say that we are not a private institution. It happens that in the United States those institutions called "institute of technology"--to wit, Massachusetts, Illinois, and California--are all, with the exception of this one, private institutions. We are a part of the University System of Georgia.

Architecture, the same. We're the only college of architecture, public or private, in the state of Georgia. We'd like to think that in both of those fields we're not only unique in Georgia, but that we render a unique service in this part of the United States. We have many students from adjoining states; indeed, we have students from some 48 out of the 50 states. About 40% of our students are from outside of Georgia. I should say that most of our faculty is also from outside of Georgia, and among myself and my five vice-presidents, only one is from Georgia. Georgians may view this with a little concern, but we think it's good for Georgia and you know it's good for us. We like it here very much.

We have a College of Industrial Management with about 1,700 students in the undergraduate and graduate programs. Its characteristics may look the same as in the catalog of other colleges of business administration. The difference here results from the climate; the student body and the faculty here at Georgia Tech are more quantitatively oriented. The graduate students in that college are almost 100% engineering or science undergraduates.

Finally, we have a college in which we have our degree-granting programs in math, physics, chemistry, biology, geophysical sciences and psychology, and our service departments in humanities and the social sciences. Though we do not grant degrees in the humanities and social sciences, we have a strong commitment to the broad liberal education of the professionals we are educating. We have been able to recruit and retain some excellent faculty in those fields who have that same dedication. We may not have as distinguished a faculty as one might find at Harvard or Stanford in the humanities, but our faculty is not dedicated to reproducing only their own kind; they are dedicated to training broadly educated professionals to serve our society.

I mentioned we have another campus. We have at Marietta, about 15 miles north from here, our two- and four-year programs in engineering technology. It started as a two-year course for training technicians and has expanded to four years. We now have some 1,900 students enrolled in those programs. At the bachelor's level, the Bachelor of Engineering Technology, we probably are the third or fourth largest. We were one of the first to have accredited programs in those areas.

Well, I could go on telling you a great deal about Georgia Tech. I am very enthused about it, but you do have a few other things on the program and we perhaps should get to them.

It is my pleasure to introduce the keynote speaker. With no sense of apology to you, but it may indeed prove to be fortuitous, I must explain that the person I intended to introduce and was going to introduce, Daniel Parker, the Administrator of AID, was unable at the last moment to come. He has a higher duty, and were he not successful in this higher duty of appearing before the Congress of the United States in behalf of AID and their budget, we wouldn't have this meeting today. So we have to commend him for making his appearance in defending AID before the financial people in the Capitol. Instead, I am really pleased to present someone whose past experience and interest have been very close to the subject of this conference. Curtis Farrar is the acting head of the Technical Assistance Bureau of AID. This is an organization with a central staff of about 180 employees and it's responsible for programs of the kind we will be talking about--agriculture, education, development administration, urban development, nutrition, health, science and technology. Mr. Farrar has been with AID since 1963, prior to which he spent 11 years with the Asia Foundation. His educational background includes a Bachelor of Arts from Yale in Political Philosophy and a Ph.D. in Economics from the London School of Economics. We are very happy to welcome you to this platform, Mr. Farrar, and look forward to hearing from you.

APPROPRIATE INDUSTRIALIZATION
FOR DEVELOPING COUNTRIES

Keynote Address By
Daniel Parker
Administrator
Agency for International Development
Washington, D. C., U.S.A.

Delivered By
Curtis Farrar
Acting Assistant Administrator
Technical Assistance Bureau
Agency for International Development
Washington, D. C., U.S.A.

We in the Agency for International Development, AID, have recently been giving increasing attention to encouraging small-scale industry development and employment generation in the less-developed countries. We are particularly interested in developing programs designed to accomplish these goals through cooperative activities with such countries--primarily in the rural areas. This is a very complex field. We do not profess to have all the answers, and we need all the intellectual talent that we can muster to help us. For this reason, I readily accepted the invitation to be with you today to share some of my thoughts and to let you know the importance the Agency places on the subject of this Conference.

A decade or two ago industrialization was accepted as virtually synonymous with modernization and development. It was seen by many developing countries as the centerpiece of the development process.

But today that assumption seems in disarray. To some observers industrialization is to blame for many of the world's ills. I refer to environmental pollution, waste of resources, neglect of agriculture and the aggravation of poverty problems in both urban and rural settings. It is still generally agreed that appropriate industrialization is the mark of a developed country. But many of those who once held high hopes for the fruits of industrialization have become disillusioned. I suspect that the people attending this conference have overcome their disillusion and are optimistic about the contributions to

well-being that appropriate industrialization can make. I consider myself to be in your ranks.

I have some Apollo astronaut friends who have given me pictures of Earth which they took on their way to and from the moon. They make obvious just how finite Earth really is. How mankind uses and recycles the resources of this finite body will determine how we survive.

I think when you look at it this way you can see that there is no such thing as a "material" value. There is only the value added cumulatively by man. How man adds value to whatever he does is going to be the basis upon which we measure the quality of life, because man adds value both in tangible and in intangible ways. When we look at this finite earth, we realize that it is man that is the real asset, because man has the mental power to manage his environment and add value to its resources. But we've got to look at how, in qualitative terms, the world utilizes this principal asset. Unfortunately, the world has a very high proportion of people who are engaged only in self-sufficiency--a "subsistence" life. They produce basically nothing more than the requirements for their own individual consumption, which usually means a very minimal and basic life.

They include rural subsistence farmers; and also those whom Argentine economist Raul Prebisch has referred to as the "marginal population...people who have broken their links with rural life but have not yet managed to become an integral part of the ordinary life of the cities."

The Pearson Commission on International Development concluded in 1969: "The failure to create meaningful employment is the most tragic failure of development." I go even further in suggesting that this is the fundamental failure and abuse of all time. I have long felt that the Third World poverty problem is not just one of feeding the world but of generating enough jobs to permit every worker to pay for his share of an adequate world supply of food.

To invoke the ghost of Malthus has become a popular rhetorical technique of late. Doomsayers tell us the pressure of ever-expanding population will soon exceed the world's carrying capacity. They warn that our numbers and dietary habits will soon outrun the world's ability to produce adequate food for all and that we must choose now whom we will allow to starve to keep enough food for the survivors.

But Malthus could not foresee the development of the system advantages we have today. I refer to the development cooperation between nations, our ever more productive technology which can be made even more productive through sustained research and the mechanisms for large-scale international transfers of food. This system is capable of helping the poorer areas achieve a balance between population, resources and agricultural development that will reduce dependence on their food imports to a safer margin.

I came to AID eighteen months ago certain in the assumption that the best way to promote and speed development in the less-developed countries in the long run is to use private skills and private energies. This includes

the transfer of technology, management and marketing skills through foreign investment. It also includes the absolutely crucial contribution to development which must come from each developing country's own private sector in collaboration with a progressive and active governmental policy.

But I also feel today as I did almost five years ago when I testified in a private capacity before the Joint Economic Committee of the U. S. Congress: that the dependence on overall GNP growth is all too common in some developing countries. This is particularly true where the large capital-intensive models of production of the advanced countries are grafted, without modification, onto essentially agrarian economies. The result is somewhat akin to an unsuccessful organ transplant. A sort of rejection process sets in--and unemployment is its painful symptom.

Using a different analogy, Keith Marsden of the International Labor Organization refers to how "the backwash effects of a technological mismatch can exceed the spread effects," and thus the technological and income gap becomes wider. He cites this classic example:

"One country imported two plastic injection-moulding machines costing \$100,000 with moulds. Working three shifts and with a total labour force of forty workers they produce 1.5 million pairs of plastic sandals and shoes a year. At \$2 a pair these were better value (longer life) than cheap leather footwear at the same price. Thus, 5,000 artisan shoemakers lost their livelihood; this in turn, reduced the markets for the suppliers and makers of leather, hand tools, cotton thread, tacks, glues, wax and polish, eyelets, fabric linings, laces, wooden lasts and carton boxes, none of which was required for plastic footwear. As all the machinery and the material (PVC) for the plastic footwear had to be imported, while the leather footwear was based largely on indigenous materials and industries the net result was a decline in both employment and real income within the country."

A mismatch like this not only kills off competing activities in the traditional sectors but has to be fed by external linkages established with suppliers abroad to be kept alive. This, Marsden points out, is "because the indigenous industry lacks the specific skills, materials and equipment to satisfy its individual requirements, and time and money are too short for it to make the necessary adjustments." In some cases there may have to be a trade-off in quality of goods produced versus labor-intensive methods.

Too often attempts have been made to compress decades or even centuries of development into the two or three years it takes to build a production plant and get it running. But transferring such an alien innovation without adaptation contributes little to employment growth or to an upgrading of the skills which are needed to promote self-sustained growth.

I still have deep faith in the ultimate benefits which can come from relevant industrialization and international trade generated by technologically and culturally compatible foreign investment.

However, to participate effectively in LDC markets, advanced industry and the world's developing assistance agencies must learn how to adapt technologies and processes to local conditions and the smaller market scales. This is no easy job. However, these disparities of scale must be overcome in order that advanced technology can be put to use effectively in the less developed world. We've learned that one can't transfer technology in a neat bundle. We in the private and public sectors must take conscious actions to ensure that technology is adapted to the needs and resources of the developing countries, and particularly to the needs of the poor majority of their citizens.

I think we can learn a lot from the work of people like Ernst Schumacher and his colleagues at the Intermediate Technology Development Group. One of their members is attending this conference (Mr. Paul Lofthouse), so you will hear more about their experiences in adapting intermediate technology to the needs of developing countries.

We've come a long way from what was known as the "trickle-down" theory. This was the premise, which frankly I never bought, that if you help modernize an economy, you benefitted all of the people living in that economy. But the problem is that in most of the developing world there are many people, sometimes a very high proportion of the total population, who are completely outside of the monetized economy. And so in this sense, no matter how much you roil up the economy it doesn't help the billion or so people that never touch money--they are forever locked into subsistence-level production.

So the effort now must be to reach through this barrier of absolute poverty and help to develop this basic asset of the world: man. It is interesting to look at a peoples' development on what I call the "brawn and brain scale" with the bottom being the brawn and the brain being infinitely upward. If you measure one's productivity on that scale, I think you can get a pretty good measure of what an individual is, what a community is, and what a group or an organization or a society or a nation or a world is. I believe that the real asset that God put on earth was man with a soul and a brain; and I say that the principal problem in the world, but especially in the so-called underdeveloped countries, is the under-utilization of that asset.

Applying this to the subsistence farmer, as he advances to where he produces more than his own needs, the challenge is to engage his surplus talents in commercial crop production; and to engage other talents in the post-production phase of the agricultural system such as product storage, shipping, processing and marketing.

The central concern of all of us must, therefore, be to discover the means by which we can enable this poor majority to participate actively in the economy of their own nation. They should be given the opportunity to become an integral part of what is now, in fact, a single interdependent world economy.

Against this background, the International Labor Organization has proposed to reverse the trickle-down strategies of the recent past. It proposes that "employment becomes the target and over-all growth the by-product." These, of course, are not mutually exclusive objectives. Recognizing that there are some exceptions there are, nevertheless, many industrial opportunities which do not require high capital investment and which are compatible with the use of large amounts of unskilled or semiskilled labor. At AID, too, we recently reaffirmed a 1973 policy determination that "particular attention will be paid to stimulating commercially viable small-scale industry, which tends to use more labor and less capital per unit of output."

I know that there are some people in AID--and perhaps others in this very room--who feel that we are now viewing labor-intensity strictly as an end in itself. They feel that they are being asked to suspend their prudent judgment and to forget everything they ever learned about productivity and efficiency. They say they want to avoid the trap of making a frontal commitment to labor-intensive philosophy simply because a given country is burdened by surplus labor. I understand their point--but insist that they scrutinize local situations, as never before, from the standpoint of the effect on employment.

In capital scarce, labor abundant countries, the economically efficient use of available resources is the objective which should be sought. In many developing economies less labor is employed than is economically efficient and, more importantly, socially desirable.

If there are a number of different ways of making a certain product, we ought (other things being equal) to opt for the one yielding the highest output for a given capital cost. And when creating new industries, we should be giving priority to products and processes requiring less capital for the same output value than competing substitutes. (For instance, this may mean choosing cotton ginning and spinning rather than the production of synthetic fibers.) In countries such as India where the daily wage for an unskilled worker is roughly the equivalent of 50 cents a day, one would expect a different mix of capital and labor than in the United States where the average daily wage is roughly 60 times higher. Yet in some cases almost identical technologies are applied!

The objective, as Marsden points out, is to achieve the largest product output to share among the population by using capital, the scarcest ingredient, most economically, even if this may mean using more of the more plentiful factor, labor, in the "factor mix" of any production process.

I don't think this amounts to an "either/or" proposition. It doesn't commit us imprudently to labor intensity or capital intensity. What we have to do is apply the whole range of management techniques--from production planning to improved marketing--to raise the productivity of both existing capital and labor.

This approach and methodology has been developed and tried here in Georgia, by our host institution. And AID is supporting the adaptation of Georgia Tech's skills and experience to the needs of developing countries.

Ninety-nine percent of world expenditure for technological development takes place in the advanced countries; only 1 percent in the developing countries. How this 99 percent is used depends on the situation of the advanced countries. This includes the stage of development they have reached already, the relative prices of machines and labor, public opinion and the areas where breakthroughs in the application of new knowledge are imminent. To overcome economic backwardness, we have to find ways to direct accumulated scientific and technical knowledge to the problems faced by developing countries. Not nearly enough is being done.

A century ago the United States faced a parallel challenge in the field of agriculture. The response to it was the creation of a land-grant college system providing a network of agricultural extension services and facilities.

Whether by extraordinary foresight, or a combination of pragmatism and good luck, we created in this country a uniquely successful system for promoting agricultural production. It was so effective in fact, that we have been forced to idle much of its capacity over recent decades, and only in the past year or two have we gone back into full gear. And, as you know, the land-grant college has not limited itself to the agricultural sciences. The same approach has extended to fields closely allied with the subject of this conference. Very early on, for instance, some agricultural colleges incorporated the study of engineering and mechanics to their programs and expanded further into agriculturally related industry development and marketing.

The land-grant college system combines many elements. It generates knowledge through research. It creates beneficial linkages operating in both directions between the producers and the laboratories. It provides training that is applicable directly to the problems of the farm, or the plant, but also draws on advanced theoretical science. It stimulates a fruitful interaction between the private commercial and industrial sector, public agencies, and academic institutions.

In shorthand, we might describe this system as a "problem-solving network." It may not be desirable to replicate it fully or without adaptation in other countries. However, the concept of linking the sources of expertise with the action agencies and with the consumers of the expertise is a powerful one. Some countries have done this in the small industry field.

Japan, for instance, has pioneered in the area of government assistance to small industries through an industrial-extension service. Techniques have been developed to identify improvements that can be made without significant capital expenditures. When these industrial services proved to be too expensive because of the very small size of many of the firms, the Japanese advisory services turned to group diagnosis and "self-education" diagnosis. We should study such programs to see what we can learn from these examples.

The linkages which Georgia Tech is developing with counterpart universities, research institutions and government ministries overseas to do joint work on problems of industrialization technology is another example about which you will learn a great deal during the next few days. Research, training and conferences such as this one support these linkages and benefit all who are involved.

It is fortunate that such institutionalized cooperative relationships across national borders are increasing. But much more needs to be done if we are to solve some of the world's most urgent problems. We have come to realize that these problems in one country affect people in many other countries. We have made a start in realizing that if the problems reveal our interdependence, so must the search for solutions rely on international cooperation.

U. S. Government support to the U. S. farmers through the land-grant colleges was never considered by the American people as "welfare." What we now need are the same outlook and values to be applied on the international level. We seek to share our technology with other countries because it will benefit both the recipient and the giver. We are doing this because we are in fact interdependent--we are not providing "welfare" as some Americans interpret "foreign" assistance.

This conference has an important role to play in strengthening the sharing of knowledge that is so crucial to the solution to our problems. Your subject matter is central to the development goals of the developing nations.

There is no end to the questions to which you will be seeking answers; but here are just a few which I hope you will consider:

First, How can industrial growth best complement and promote agricultural development?

Second, Many countries ignore the rural consumer goods market and concentrate on the big-city market. What can be done to expand the rural market?

Third, Should non agricultural investment be concentrated on luxury products for the small wealthy elite or on basic human necessities like housing, clothing, furniture, and utensils that can be purchased by the majority?

Fourth, Must new factories always be centralized and located in the few largest cities? Or can they be more efficiently spread throughout the national economy so as to prevent stifling urbanization and provide better service to the rural areas where the bulk of the people of the Third World live?

Fifth, It is alleged that in some countries the employees of modern large-scale factories are likely to become an "aristocracy of labor." Between them and the majority of people who are left behind in the march of progress, there will be differences in wages and living standards. If this is true, what are its implications?

Sixth, Experience in Taiwan suggests that industrialization is encouraged when governments are willing to think of traditional small producers as potential modern producers, rather than as inefficient handworkers who will gradually disappear as modernization advances. What can we do to stimulate similar progressive policies in other areas of the developing world?

Seventh, How can we efficiently and progressively increase the skills of unskilled labor, and provide new jobs to match these skills? Training and job opportunities, particularly in the rural areas, should go hand in hand.

Eighth, Most countries have not tried to organize the nationwide system of capital formation which is needed for small industry development. Capital should be increasingly financed from internal sources through private savings and reinvested profits. What can we do to spur action in the area of capital formation systems?

I realize I have posed more questions than this conference alone can digest. I have one more point to add, however. It illustrates two things: 1) the complexity involved in choosing appropriate technologies, whether for small industry or other sectors; and 2) the way in which technology, properly used, can enhance man's ability to solve problems.

This is a programmable calculator. It's so small that many in the back may not be able to see it. Yet it has 100 steps in its memory, five storage registers and nine addressable registers. This is more than sufficient to solve many of the basic but complex calculations needed by engineers, economists, statisticians, bankers and a host of other professionals.

This machine, with a selection of canned programs prepared by the manufacturer, costs less than \$1,000. Other programs can be developed by the user to meet his specific needs.

But isn't this a labor-displacing device? The opposite of what we want? Perhaps it will put engineering aides and statistical clerks out of work.

But with the exception of only a few countries, this middle-level technician is in short supply. The chances are that an engineer assigned to a provincial office, for instance, doesn't have an aide to do his calculations. And being too busy himself, he may not do the quality design work that will save resources in the long run. Or, alternatively, he may do high quality work at the expense of quantity.

If this engineer had a tool such as this at his disposal, I suspect the benefits resulting would substantially exceed the cost. It would allow him to use his skills more efficiently. And his skills are scarce and costly to develop. It could also be used by his aides and other paraprofessionals to increase their efficiency as well.

An instrument like this machine can be dismissed offhandedly as a gimmick, or frill. At the other extreme, we can accord it too much power, and let it define our problems for us. A wiser use would be to let it serve us by doing the tedious, time-consuming work necessary to implement our ideas. That, after all, is the function of all technology, isn't it?

If you keep that in mind as you confer over the next few days, the answers to many of the questions which you will be asking will come more easily. The promise of small industry for rural development and employment generation, particularly for the poor majority, is great. I wish you all success as you exchange ideas, information and methodologies on this crucial subject.

SESSION CHAIRMAN'S
INTRODUCTORY REMARKS

Ross W. Hammond
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Thank you very much, Mr. Farrar. We quite appreciate the circumstance that compelled Mr. Parker to cancel out. I think you have expressed very well the heart and content of this conference, and we appreciate your taking the time to be with us.

I would like to restate, if I may, a couple of points about the conference. This conference provides an occasion for a network of seven organizations from four continents with a common interest in small industry development to get together for the first time to discuss problems and solutions. This two-day conference will be followed by a three-day seminar involving just these network organizations and a few observers and resource persons. Hence, the meeting has important overtones to a number of the organizations represented, since it has brought all of these coordinating groups together for the first time. But this two-day conference is the matter at hand, and it was planned to be a convergence of three types of organizations. First is what I would call the practitioner organizations; those which are in the field applying techniques and methodologies in real world situations. Then we have asked a number of international development funding and linkage organizations to tell about their small industry interests and programs. And, finally, we have representatives from the small-industry-oriented counterpart organizations working in a number of countries around the world. This is intended to be a kind of "show and tell" conference focused on the practicalities of industrialization stimulation. We don't intend to focus on development theory, however important that may be. We do intend to explore what makes seemingly successful programs successful and to discuss what common problems and issues exist in employment generation through small-scale industrialization.

CASE HISTORIES OF SUCCESSFUL
OPERATIONAL PROGRAMS
CASE NO. 1

Paul Lofthouse
Director of Technical
and Industrial Liaison
Intermediate Technology Development Group, Ltd.
London, England

Ladies and Gentlemen. I would like to start with a brief description of the reason for the formation of ITDG. It was started some ten years ago by Dr. Schumacher. I think he was probably one of the earlier people that preached the concept that the developing countries required what 'e called at that time "intermediate technology," but what is now being called, possibly more correctly, "appropriate technology." The early stages of the group were mainly a question of lobbying and attempting to persuade both the U.K. Government and also the developing countries themselves to recognize that smaller-scale industry could be more applicable in their developing condition. Over the last five years this philosophy seems to have been accepted, and I won't flog it any further because it was already mentioned in the keynote speech.

Now the next thing I would like to talk about is the general *modus operandi* of the group. We ourselves are a very small group. We only employ somewhere less than 30 people altogether, and we are a nonprofit-making, registered charity and, as such, constantly short of money. However, we have one perhaps unique advantage in that certainly in the U.K. there is a large body of people who are very interested in the work we are doing. We have formed what we call our panel structure. There are panels on agriculture, building materials, chemistry and chemical engineering, cooperatives, forestry and forest products, power, rural help, transportation, water treatment. There isn't a panel on industry because it just didn't work out that way. That is done by myself, actually. The general panel structure: In the case of agriculture we have Dr. Darling, who is the principal of Wye College, as the chairman. The panels meet about once a month, more often if necessary, to consider inquiries and questions from developing countries, and they're

constituted mainly of experts in every field or in every branch of the particular field that they cover. This enables us as a group to call on some 300 top-level experts to help the developing countries with any problems that may come through. So far it has worked out very well, and, really, this is the only way we can operate because we haven't the money to retain the experts permanently.

Now I'd like to talk particularly on the industrial side because that is where my main interests are. Originally the Industrial Liaison Unit was formed five years ago. It was partially funded by the Ministry of Overseas Development. The stated objectives of the ILU were research into the requirements of developing countries for the small-scale industries suitable for local markets and the availability of equipment and techniques from the Western world of the scale required by developing countries. We didn't really do any research into the requirements of developing countries. Following the UNIDO research in Nigeria on the need for hospital equipment, we thought that the most practical way of doing this was to set up a factory in Zaria in northern Nigeria to actually make it. The factory takes primary-seven-school leavers, and we call it the Production Training Unit. Surprisingly enough, it is run under the auspices of the Ministry of Industry because we didn't want to get involved with the educational constraints. I hope I'm not treading on anyone's toes there. But the Ministry of Industry particularly wanted people trained on the shop floor to get the basic skills so that they become useful and money-earning people in their own right. The Ministry of Overseas Development put into the scheme, apart from the cost of the man running it, some £ 1,500. The North Central State Government, over the first two years, contributed somewhere about £ 3,000. We found that this is an excellent idea because the state governments themselves felt this was their project, not something superimposed on them by expatriates, and as such they took a personal interest in it. In fact, that original seed capital is still circulating, and currently we are training there somewhere about 30 school leavers a year. I think it's a measure of the success of the unit that we have withdrawn our men completely now. It's being run entirely by Nigeria and the North Central State, and they are currently setting up another six like it--one in Maiduguri, one in Sokoto; there are other states I know, but in the northern states generally. I can't remember where the others are. This unit exists almost entirely on locally available raw materials with a minimum of imported items; such things as bicycle wheels and hospital trolley wheels and things of that nature. Apart from that, it is all made locally, from locally available raw materials. Now as far as the availability of equipment and techniques from the Western world, this, due to available funds, has been largely concentrated in the U.K. We have had quite a surprising, very helpful response from most industries in the U.K. You will hear, possibly later in the week, from Mr. Powell, with whom we have worked very closely over the years in Ghana.

I was in a company in Edinburgh which was currently manufacturing coats of arms of the Scottish clans in brass; it was a brass foundry. They were mounting these coats of arms on wooden shields and selling them to the tourists.

They started doing this when they had a recession and now it constitutes 40 percent of their production. The problem was getting the wooden shields. They were using, I think it was, beech, which didn't react very favorably to the central heating environment where most of their customers lived. When I was in Kumasi, John Powell was advising on the establishment of a very, very small-scale woodworking shop. I took one of these shields over with me and said, "Look, can you make these?" They used Ogum, which is a very good hardwood. They sent a couple of samples out. Now all these shields are coming from Ghana; I think they've imported somewhere about 1,000 or maybe 2,000. They are made and finished in Ghana, and they are sold to the company in Edinburgh for actually one penny more than the old one, but they're certainly of quality. They are quite happy to pay extra. This is a case where, by some knowledge of the needs of developing countries, through our contacts with developed countries and developing countries, a mutual trade can be developed. They are currently working on making wooden handles for Footprint Tools, another company that was very helpful: Ghana wanted to make hand tools, screw drivers, chisels and things of that nature. We said they couldn't really afford the high-level technology for metallurgy equipment, drop stamps and all that stuff; and in any case the market won't absorb it. So Footprint Tools is sending heat treated blanks over to Ghana and Ghana is now setting up a finishing section where they are polishing the blanks, putting edges on them and making handles. And the last information I had was that Footprint Tools now wants to import the handles from Ghana because we are desperately short of hardwoods in the U.K. All sorts of things of this nature can be quoted.

I think it should be mentioned, I was just talking about the Zaria workshop, that we had a very unusual spin-off there. One of the things we made was wheel chairs for handicapped people. They have a beggars' union there, and the chief of the beggars' union came to see us and said, "We'd like to buy one of these." These are the disabled beggars, so we suggested to them that instead of buying it, they could earn some money. We gave them some fret saws, found some second-hand plywood, and they started cutting out letters of the alphabet--which had an enormous sale in schools. They are employing themselves; we didn't put any money in at all. They control it themselves; there are somewhere around 20 beggars that are completely self-supporting now, working on small craft work.

Now all this is very small-scale, and I think at this point I should comment that we are very well aware of the fact that what we are doing is very, very small-scale indeed. It is not going to solve the problems of the world, but we have found that by dropping a small-scale activity in area after area, these things tend to grow. Other people can take an example from them and they do grow. There are times when one goes to some of these places and thinks yes, we are doing a very good job of work, and then you get on a plane and fly across Africa and realize it's just a drop in the ocean. But if somebody doesn't start with a drop, we'll never fill the ocean.

Other activities that we did during the last two years included quite a lot of research into small-scale water conservation, water storage tanks in Swaziland and Botswana. Another odd one came up when I happened to be in Zambia,

I think it was, where I met the head of a medical research station. He wanted to set up a lot of medical extension centers that could be serviced by push-bike. The problem was that he wanted to weigh the children regularly, and he wanted a small scale--small weighing scale--just to weigh the babies once a month and keep a record of the weight, which is one of the best indications of health. Well, there just wasn't one available at the price he wanted, so I went to see the technical director of another company in the U.K., and he modified one of their standard lines, since this was the only way we could get it cheap enough. They modified one of their standard lines, put a new dial on it so that the dial was exactly the same marking as the record card so that you really could use the thing if you were virtually illiterate. And that scale is now being sold to medical centers all over the world, at £ 6.50, complete with carrying case and four little slings to put the babies in so that you don't waste time. So, industry is interested and can be utilized, provided they are given the problem. Now about two years ago the research program ended, and I'm very pleased to say that the Ministry seemed to think that this was a very good thing. The Ministry of Overseas Development in London now has given us considerably more funding, which has enabled us to employ three technical experts apart from myself. This helps us considerably in the answering of questions. We are currently answering technical inquiries at the rate of some 250 a year. Here is a list of them which I don't propose to read out, though if I don't talk long enough, I may. But it includes everything: chicken hatcheries, palm oil, soap, bricks, toothpaste, footwear, knitwear, you name it--there is an inquiry on it.

Incidentally, I would like to refer to the keynote speech this morning. This Keith Marsden one--now if that one had come to us as an inquiry, we would have said, "Well, let him buy a lot of small sewing machines, old Singer sewing machines. They can put their output up, they can put their earnings up, they won't put everybody out of work and the total capital involved is virtually negligible." So, this is the sort of attitude that we tend to adopt. We look at the market potential, we look at the number of people employed.

I did one for the United Arab Republic, I think it was. They wanted a labor-intensive plant in the shoemaking line, but they wanted it for high-grade shoes. So I went to one of the foremost companies in the U.K. which makes shoemaking equipment, with the director of the Small-Scale Industries Division. And we spent a day on it and decided what things could be done efficiently by hand and what things needed machinery to insure consistency of product. And it worked out very well indeed, because you have the advantage of saving your total capital investment. You're not putting people out of work, but you're getting a consistent product which is saleable overseas and could be sold as handmade--provided the last little bit is handmade--and you always get more money for handmade things. But you get the consistency of the machine.

In addition to the main group work, we do have a subsidiary called Development Techniques, as was mentioned. This is largely involved in research and development of equipment which is just not now available in the world. It all started, and some of you might have heard this tale before, in which case, apologies, but it all started in Zambia where the Zambians were importing vast quantities of egg trays and exporting vast quantities of waste paper. And one member of our group was over there and the question was posed to him at one

stage, "Look, can't we get a machine for making egg trays from our own waste at the right scale?" Well, I had just joined the group then, and this was slung onto my plate. I went through the industry as it was then, and the cheapest commercially available machine was somewhere about £ 200,000, and the output of this machine was a million a month. I did a quick flip around Zambia and checked on their market requirements. Their market requirement was estimated at about a million a year. Well, we had all sorts of problems with this, the first one being that egg trays are patented throughout the world. There is a patent on every egg tray that you buy, so the first thing we had to do was design a new egg tray that broke the patent, that had a unique feature that we could patent ourselves, because there is no point in having the machine if you can't get the patents. And without mentioning names, the people involved in making the large machines were not cooperative, to say the least. I did see them, actually, and they had assured me, categorically, that their experts had been working on this for ten years and it was completely impossible to "scale-down" their machine. Now I use the word "scale-down" deliberately, because this is one thing we avoid like the plague. You cannot "scale-down" highly sophisticated, capital-intensive, modern equipment. You have to start from first principles, and in fact, on this particular occasion we got no help from anybody. So we started with a Kenwood mixer in the kitchen; put a bit of paper in, put a bit of water in to see whether it would pulp. And it did. And then we borrowed the vacuum equipment from Manchester University to see, if you sucked this pulp through a mesh, whether you could form anything with it. And it did. I'm not going through all the stages because it was very long and tedious. Now, to cut a long story short, we eventually developed a machine which was capable of a third of a million a year, and we sold it for £ 8,500. If you deal with sums, the capital cost per egg tray is slightly less than on the sophisticated ones. Of course, it has the advantage also that they are employing their own waste paper; it's import substitution, all the other things that the economists talk about. We're rather pleased, actually, because we put the first machine up in East Central State, Nigeria. The last time I went over, which was in October, that machine had been running 16 months, 16 hours a day, six days a week. And they complained that one of the slides was wearing slightly. Well I worked out that by that time it had produced somewhere around 800,000 egg trays. I think that's not bad going, without a single replacement. They've got three there now, actually, and imports of egg trays into Nigeria have almost stopped, but they'll have to get another one in the Lagos District, which is a very heavy consumer.

Now, one of the problems we had, particularly in Nigeria, was when we got over there they said, "Yes, but we haven't got any waste paper." I believe the New Nigerian sells for 4 kobos and the resale price on the market is 3 kobos because they haven't any wrapping paper. So, almost the whole production is using printer's offcasts which have no commercial value at all and they were currently being burnt. And this is really rather nice because if the printer happens to be running bright blue, you have bright blue egg trays and this is fun.

There are two other things we are particularly interested in. I was told the other day, last night actually, that I might be wasting my time on one, but I am waiting for some facts to see about that. We've got a lot of inquiries

from developing countries for glass jam jars. I was horrified to find South America importing empty jam jars from the U.K., filling them with tropical jams, and reexporting them to the U.K. again. And, you know, it just doesn't make sense because basically glass is silica sand, limestone, and soda ash. I went to one of these experts and I said, "What is soda ash?" He said, "Ah, this is an important thing that is in short supply and that is why glass making is in such short supply." We went to a well-known company, the only people who manufacture in the U.K., and asked them. I thought, "Well, look I'm sure that company didn't exist in Egyptian days, but they did make glass things!" So, I found out that you can use seaweed, wood ash, and all sorts of things, and we get a different color glass but this doesn't really matter. Even from the marketing point of view, if you're going to sell tropical jams, and if you have a slightly green glass with little tiny bubbles in it, it really is not a detraction. So we're looking into that one. One feels that the cost of the plant for making about 6,000 jam jars a day is about £ 25,000; as far as I can see at the moment, it might be cheaper.

The other one which we are particularly interested in is a small-scale paper conversion plant. Which really, to make paper out of paper, it's reutilizing waste paper with no virgin pulp at all. Again, we have been very fortunate here, because one of the biggest paper groups in the U.K. is collaborating with us on this. I really think we can produce a plant for making about six tons of paper a day, 30 inches wide, for somewhat under the £ 100,000 mark. But when you consider that the normal paper plant is around the £4 million mark, we're still in the intermediate level.

But, you know, a lot of people think that "intermediate" means only a little bit better harrow or plow or something, but we are tending to change our name to "appropriate." Our new journal, of course, is the Appropriate Technology Journal. In a lot of cases we have found that you develop something, the market changes, and you need some increase in the capacity of the plant. We would like to say that it's not a static concept, it's a dynamic one. And just, at the risk of boring you, to go back to the paper unit, we designed the original machine for 125 units an hour, but certain markets require more, so we modified it to 250 units an hour. It has now gone up to 1,000 units an hour. The interesting part is that the people who refused to let me into their works have now signed an agreement with us to buy our big unit. They asked me; I didn't ask them. They said, "Look, we want a unit like this. We can't make one this size; can we buy yours and sell it for you?" In response to which, I might add, I now have the right to use all their patents. So, really, these things go full circle.

One or two other small things that we're doing. We are trying to produce industrial profiles. Now they're neither technical nor economic. They are really semi-technical; very loosely technical, but they are descriptive of what can be done in the various ranges of industry. We constantly get inquiries, "Please, can I set up a factory for ABC?, "whatever it may be. We go back and say, "Yes, you can set up a factory for that. What is your marketing condition? How much money have you got?" and so on and so forth. And we never get an answer. So, what we're trying to do, we've done one on iron founding. And at the risk of being thought that we are trying to sell inferior material to

developing countries, we started this one at the crucible foundry. The total imported material cost £ 6.15. The rest will be built locally. Now this is a technique that is still used in developing countries. I could take you to six of these in the U.K. that are still operating for small-scale iron foundry requirements. Very often a little man occasionally wants a casting for something or other, and these are still working in the U.K. There is a country that has asked me to get one over to them as quickly as possible because they have a very good engineering workshop for repairs, but they don't have a production net at all, and from time to time they have broken castings. They just want to be able to make a rough casting that they can machine for use as a part in their repair shop. And castings are virtually impossible to obtain in that district. After all, you can always get a bit of cast iron; the incidence of smashes and breakdowns in the developing countries is just as high as here. We are doing the same thing, in somewhat more detail, for woodworking and the metal industry--forging, particularly, where we will start with the blacksmith. Whether these profiles will be of any use or not, I don't know. The first profile only came out two days ago and so far 300 have been distributed by request. We have not heard whether people like them yet.

Well, it is now eleven o'clock. I think what I would like to do very briefly, in fact extremely briefly, is to say that while we recognize that there is an economy of scale, there is also an economy in small-size equipment. These particular egg tray plants, as an example again, undercut the imported item by one penny per unit. If you are producing stuff on a very large scale and have to transport it a long way, then the cost of transport very often more than nullifies the savings in the cost of production. The same thing was raised with me last time I was in Ghana. They have two highly sophisticated sugar industries. It's an American concern that is dealing with this. The refineries are only working about 20 percent of the time, and the sugar is rotting in the fields because it costs too much to transport the cane to the refineries. Now, I believe that the proportion is a ton of sugar for 20 tons of cane. What they're trying to do is set up small open sulfation processes and produce a first-class sugar in districts where the sugar is grown. Thereby, you've only got a ton to transport. You're utilizing the bagasse for fuel and power sources, and you have a ton of sugar to move instead of 20 tons of which 19 is waste. I think, as a final comment, as a group we never tell a country what we think they need. We are constituted solely to respond to their requirements and to try to help them to find what they want and what they feel they need themselves. I'm afraid in the past there have been occasions when people have told them what they ought to have. Also, we have the advantage of being a nonprofit making group; we can't give them any money, so that if they're not keen enough to do it, we can't answer the questions. Thank you very much.

CASE HISTORIES OF SUCCESSFUL
OPERATIONAL PROGRAMS
CASE NO. 2

Bart Duff
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A large number of you here have already heard the IRRI story. I hope that what you see or hear today may update you a little bit. We have a few new gadgets that we are working on out there now, which have just come on the scene in the last year. I didn't prepare a formal paper, but for those of you who are interested, we have a semi-annual progress report which details the research, design and development activities of the Engineering Department at the Institute. Dr. Amir Khan, who is the head of the project, and I authored a paper a year or so ago which specifies some of the operational and objective features of the program. For those of you who are interested, I have a few copies with me. If we run out here, I will certainly be pleased to honor requests when I get back to Manila later this week. My format for the presentation is, very briefly, to give you some feeling for the way we operate, why we operate, and then I'd like to just give you a pictorial presentation and let you judge for yourself some of the merits of an approach like this.

Now it may seem a little unusual, because the International Rice Research Institute is best known for its engineering in genetics, to have us moving into the area of mechanical design and development work. However, we find that this is really a very complementary activity in terms of the overall program of the Institute. There are many constraints which lend themselves to engineering solutions in trying to increase the production of rice that's available to consumers in the developing world. Consequently, we feel it is an important part of the program. As already has been echoed in the previous two speakers' comments, this lack of what we call appropriate technologies in the developing world is another reason it's often cited. Developing backward linkages, trying to maximize the interactions between the industrial sector and the large potential market in the rural sector--these are some of the ancillary objectives

of our program. We have a very narrow focus, unlike some of the case studies that you may hear. We focus principally on rice production and post-production activities. This is much in consonance with the other activities of the Institute, where we don't try to do everything. We have narrowed that focus down very finely, and we haven't even worked on other crops until very recently. We think that this has been a decided advantage in the short run in that we have been able to produce some product designs which are amenable to local resource endowments, and we have been able to get some of those into production fairly quickly. We have a very small staff, just as the ITDG people. We have about 42 people in our Department, composed of three expatriates, and a team of about a dozen design and test engineers from the Philippines. We have a production prototype shop, and then we have a very small technology transfer program which we are hoping to expand very soon.

All right, what do we consider when we are trying to come up with an approach to a particular problem? There are basically three types of constraints that we visualize. First is on the demand side. What does a farmer need? To get at this problem we do what in industry you call product planning. As the economist in this group, I am partially responsible for some of the marketing surveys. We do farm-level surveys to try to figure out what kinds of machines or improved technologies would make a significant impact on increasing incomes, reducing losses, decreasing costs, etc.

The second type of constraint is on the manufacturing side. When we are trying to develop a new design, we have to keep in mind what the capabilities of the small- and medium-scale manufacturers are. Our observation, in general, has been that the kind of designs we produce--the sophistication of them--dictates the kind of production process that is used to produce them. You can't generalize this, obviously, but to some degree it's certainly true. And certainly for small- and medium-scale firms we feel it's almost an axiom. What kind of raw materials are available? What component parts are available locally? What's the maintainability of the product that is produced once it is out in the field? These are some of the considerations we have to keep in mind when we are working with the manufacturers.

The third set of constraints is, how do we get these designs out to the manufacturers and, through them, to the farmers? Now this is the one I think that the conference and seminar are addressing themselves to, largely, and it's one that we are certainly confronting directly now. In the early years of our program we had very few designs to extend. Now we have a few that we feel have some potential markets throughout the Asian rice-producing areas, and we are having some real difficulties getting those designs into production. Not because they are not viable to farm levels, but we have to develop a linkage here between our R&D program, through the manufacturer, to the farmer. Particularly when you are working with small- and medium-scale manufacturers, as many of you know, the process can be a very time consuming, expensive and often frustrating process.

In the developing countries we usually categorize the process of design transfer in three ways. In the early stages of development, the country will usually import; will have what we call a material-transfer mechanism. That,

in agriculture, might mean importing four-wheel tractors or diesel engines or complete assemblies. The next step is, as they become more sophisticated and aware of local requirements, the actual design transfer. This may be bringing in blueprints--partial assemblies with partial local production. And the third phase is what we call capacity transfer. This is when you begin to build up capability within these countries to actually design, develop, produce and market products that are in consonance with local resource endowments and factor prices. We find that countries, particularly in Asia, fall in the whole spectrum here. We have countries like Korea, for example, where they are doing an enormous amount of their own design work and I think we are going to hear a little bit about that from the KIST story--all the way down to Bangladesh, where we are still importing almost entire assemblies and machine units.

We feel that programs like the IRRI one have a contribution to make in terms of developing local capacity. We are not just producing a design in the Philippines and then giving it to a manufacturer. We are also trying to instill a feeling that they themselves should be involved in that. This is part of the frustration with the transfer process; we have got to identify local institutions, agencies, firms, individuals who understand this process and are willing to work with us; just as in the improved rice varieties we find that many of the designs, as they leave the Philippines, are not suitable for conditions that we might find in Korea or Indonesia. Consequently we need a local, national program that can filter, adapt, and change those designs when they are not suitable.

I mentioned the marketing survey. We go through a design conceptualization stage, we then go through a design execution, a prototype development, to a test evaluation, a tentative market development, and then finally to a commercial market orientation.

We do some of our own invention in the Philippines, but we are certainly not adverse to picking up designs and ideas from other people. Many of the designs that you will see today reflect what we think are the best components of a design that may have originated elsewhere. A lot of it is adaptive and applied R&D work. There is some very innovative work that you'll see also, but not all of it is. The designs are made available free of cost without licensing or royalty agreement to any interested manufacturer who is capable of producing the equipment and evidences an interest in commercial distribution. We have a patent policy in the Philippines and the United States. Our reasoning for this is a little bit the converse of the ordinary reasons for seeking patents. We only wish to protect a broad spectrum of potential manufacturers from the possibility that one manufacturer would patent our designs. So we do patent these designs, but not with the idea of licensing or seeking any monetary return on them.

O.K., with those brief remarks I think I'll go ahead and show you a bit of the slides. This is merely a cartoon that reflects some of the remarks that were made earlier about the appropriateness or suitability of certain types of technology for the developing countries; in this case, mechanization technologies. This is the International Rice Research Institute, located about 60 kilometers south of Manila. It is a relatively small institution

with about 35 scientists and a total staff of about 800. These are some of the engineering program objectives in the development of improved mechanization technologies. First of all, to increase incomes and general welfare in the rural areas. This could come about through increased production, and I list a whole series of potential effects of different types of mechanization which have their final result in incomes. Secondly, to strengthen backward linkages between agriculture and the urban sectors. And thirdly, some of these other issues such as reduction in foreign exchange components.

This is the general overall set-up in our department; quite simple, really; we have such a small staff. On the left here, we have the economics group which does some of the product planning, marketing studies, and manufacturing studies. On the far right, we have the machine design and testing work, and this shows the processes that these designs go through and their involvement. And then, in the center, we have the transfer of technology. We have begun to develop an outreach program in a number of other countries throughout the Asian region. These are listed on the right. Our primary focus until very recently had been in the Philippines because of its proximity. There has also been some evidence of interest in Latin America and Africa in the last year or year-and-a-half.

This is the breakdown in terms of program project components. It's relatively straightforward, when you're looking at rice. We have this broken down into irrigation equipment development, field production equipment and post-harvest or post-production equipment. Starting first of all with the irrigation equipment; this is a simple little foot-operated pump which was released about three years ago; very inexpensive; can be made by a shoemaker or a blacksmith in almost any small village shop. Prototype units of this could pump about 50 gallons a minute at about a one-and-a-half-meter head. We're still working on a few design problems which came out after this unit entered production; the durability of the canvas bellows has been a bit of a problem.

Another idea--this again is not an original one--is called the sivonious rotor windmill. The original design for this came from Finland in about 1932, or at least the concept. We merely used some old oil barrels to produce a multi-directional windmill which we hope to eventually hook up to this pump.

Again, this is not a new idea; this was picked up in the United States about a year ago by Dr. Khan. It's merely a pipe in vertical orientation with a right elbow bend; the pipe goes around in a circle and the centrifugal force throws the water out into this little circular trough. We're going to hook this up to that vertical-axis windmill. This unit will pump about 25 gallons a minute from about 15 feet, so we think this has some potential. It's about as simple a pump as you could ever devise.

Another pumping device, using the principle of a jet pump. We take an ordinary centrifugal pump, which is very common in the Asian region for irrigation, introduce the jet orifice into the discharge line and duct the entire discharge through this orifice. We can get four or five times the discharge of the centrifugal pump alone by introducing the simple little device into the line. Now, of course, you're trading off a pressure head. In other words,

you can't lift the water nearly as far, but for very low lifts it's a very effective device.

This is a laboratory test model. The centrifugal pump used to power this has an output of about 100 gallons a minute. This device in the line has a discharge of about 450-500 gallons a minute.

Land preparation. Of course the traditional method is generally water buffalos where they're using puddled soils. This is a typical picture in the Philippines. North of Manila we see lots of these large tractors being used.

This has been the most successful innovation that we've actually introduced to date. It's a small tractor patterned largely after the British Landmaster in terms of performance specifications. It was released about three years ago. These are the prototypes that we went through in evolving the design. We built four of them before finally finalizing the design. Again we simplified fabrication techniques; basically we didn't try to design a tractor from the ground up. The machine can be made in a very small shop using very labor-intensive techniques; it's very easy to maintain, very easy to operate, and it sells for about one-half the cost of a Japanese or an English machine. The cost is about 2 1/2 times the cost of a water buffalo, but it will do about four times as much work. We have begun to add some accessories to this small tiller so it can be used for transporting products, pumping water, cutting grass, and used in a range of upland or inter-row cultivation requirements. In Thailand they are building this machine using a locally built engine, so their machine is about 80-90 percent local content. I'll talk a little bit later about this engine.

A new project we are just beginning to evaluate now is this small four-wheel tractor. This is merely a test machine imported from the U.S. The company uses automotive components to build this tractor. We were interested in seeing whether it can be adopted to lowland rice requirements. In the area of seeding we have a number of devices which have been released. This is the simplest. We got a request from Africa about four years ago to design a seeder that could be built for less than ten dollars using only wood and simple, locally available materials. We took some old paint cans, cut some holes in the bottom, put some spring wires in those holes, the spring wires drag on the ground, and they shake and the seeds are dribbled into the furrows opened by these wooden furrow openers. This has never been popular in the Philippines, but it has been built to some degree in Africa.

To replace transplanting we have come up with a simple little direct seeder for puddled soils. This machine will seed about one hectare in one day, costs about \$35 and can be made in very small shops. This is what the fields look like about four to five days after seeding. They'll be subsequently flooded, and then treated just exactly as transplanted rice would be. Yields have been comparable to conditions where they have good water control. This is a manual transplanting machine, imported from mainland China. The story I hear on this machine was that it was developed in England about 30 years ago, and then it went to China and has been popular there. We have had some models come into the Philippines, and now it's going into production there. Our

interest in this was merely to evaluate its performance and see if we could get some local manufacturing under way. It looks like a simple machine, but the cams and the action that go into this are quite complex.

With the current increase in the price of petroleum products, we've been quite interested in seeing if we could increase resource productivity, particularly that of chemicals. Fertilizer is the biggest chemical used in rice production, so we've been investigating means of trying to reduce the requirements for fertilizer. This is an approach that's been quite successful. It's a method by which we implant the fertilizer in the root zone of the rice plant. By doing this, we can cut down fertilizer requirements by 60 percent without any effect on yields. This is one prototype machine we've been using. It's a slurry injector, where we put fertilizer in solution and pump it into the root zone, using a very simple peristaltic-type pump. This pump is most popularly known for its work in the heart-lung machines. Again, it's about as simple a pump for precision work as you can envision.

(Q: What was the percentage of savings?) Where before we were broadcasting 100 kilograms per hectare, we can reduce that requirement down to 40-50 kilograms per hectare, without any reduction in the yield. The other effect that's important is that we can mix insecticides with that fertilizer, put them both in the root zone at the same time, and get an interaction effect where the rice roots will grow towards that fertilizer and absorb that insecticide at the same time, more efficiently than if we spray it on the surface. So we found that we can reduce the use of insecticides considerably also.

Now this is the machine that we think will enter production very soon for implanting the fertilizer/insecticide mixtures. Here we don't have to put the fertilizer into solution; it uses granules. It's a simple push-type device, where there is a little throw opener under there that opens it down to about 10 centimeters; the fertilizer drops in there, in the root zone, and it can be made for about \$15.

Going to the post-production state, we know that there is tremendous scope for improving the yield, both at the field level and at the mill or processing stage, by more timely operations and more efficient machines. This chart on the top, Figure 1, shows you the range of losses that we know occur at different stages in the post-production sequence. The largest loss, we think, occurs in the handling stages when they are picking up the paddy or the pili, hammering it repeatedly before it's actually threshed. There are other losses that occur in threshing, and then if there's a lack of dryers available, you get more there. The bottom chart merely shows you some of the magnitudes that are involved. If you delay harvest so that moisture content drops appreciably, you get higher shattering losses, and so on. So we begin to get some feel here for the potential benefits of introducing innovations into this post-production sequence in terms of actually saving grain.

This is a traditional method of threshing. This is a western-style combine being used in the Moodist scheme in Malaysia. They imported a dozen of these machines about four years ago, but they currently have only one which is in operation. When they planned this scheme, someone overlooked the fact that the

bridges had to be wide enough to drive these machines over; consequently, there is a problem of mobility. The plots in some cases are quite small, so this type of technology is just not very suitable for their needs down there yet. We have recently released a small threshing machine which we think will overcome some of the limitations of this larger model. The machine has an output of about one ton per hour and takes three men to operate. It can be towed behind the little power tiller which you saw previously working in the field. You can use the same engine from the tiller on the thresher; take it off and put it on the thresher. We have been using this primarily for threshing paddy rice. We hope with some refinements that we will be able to use it for a wide range of crops, such as sorghum, soybeans and possibly, in the future, wheat. To extend the utilization of these larger tractors in the Asian region, which currently are being used for land preparation and transportation about 90 percent of their time, we are developing a larger thresher which can be attached to the rear of the four-wheel machine for custom operations. This is still in the prototype stage. It's been in development for about five years now. We still have some problems with the cleaning and separation.

On the subject of drying, we took this idea from a combination of about four Japanese designs, simplified it, took all of the electronic controls off of it, and introduced some simple fabrication techniques. They have been able to reduce the cost from around 8,000 pesos down to about 4,000 pesos, thereby broadening the market for the product and insuring that a good deal more local production is possible. These are some of the components of the blower-burner assembly on this dryer. This is not quite as simple to manufacture as some of the other devices. It does require a little bit of precision in the balancing and configuration of the blades. In meeting the oil crisis, we've developed a small rice-hull furnace which can be used with this dryer to produce the heat that is necessary to bring the moisture content on the grain down to a suitable storage level. This is quite applicable when you're doing the drying at small rice mills where the hulls are readily available. It has the same heat output an hour of about two or three litres of kerosene. One of our more exotic projects is the conduction dryer, parboiling machine. We've been working on this for some years. We think the concept is fairly well proven, but the economics as yet need to be worked out. It's a process where we run high moisture paddy rice, at about 28 percent moisture, through a machine where it is mixed with hot sand, kept in contact for about 25 seconds, during which time the hot sand gelatinizes the starch in the rice granules, and we get a parboiling and a very rapid drying effect. The rice when it goes in is about 28 percent; when it comes out it's about 16-18 percent. It only takes 20 seconds to do this. This is the laboratory model; we only have an output of about 200 kilograms an hour on this. However, in the U.S. they have been working on similar devices for roasting soybeans and sorghum which have outputs up to around three to four tons per hour. So the concept appears to be quite viable for other processes as well.

This diagram merely shows you three types of technologies that are available for milling and processing: the traditional, the commercial, and the modern technology. The percentage points are the important figures because they indicate that the small traditional-type technology gives us relatively low recovery rates in terms of total rice outturn, while the commercial and modern versions do provide higher recovery rates, higher head yields, but at higher

cost. This scrap merely shows some of the potential embodied in the small mills for improving recovery. We get about a 60 percent recovery rate; we potentially can get 70 percent recovery rates. We are working on small-scale mills; this is the small-scale mill that mills about half of the rice consumed in the Philippines and many of the other Asian countries. It has a very high utility because of its simplicity and ease of maintenance, low investment cost, and its ability to mill very small lot sizes, as opposed to the larger mills, which cannot handle this kind of household-subsistence milling requirement. So we think there is some scope for improving the small mills. We are working on some simple adaptations where we will merely take one part off and put another part on. Another concept here is to disaggregate the process, where we do the hull removal in one stage and the polishing in another stage. This is a centrifugal huller we have been working on. It merely uses an old car tire carcass as an impact surface. It takes the hull off through shearing action created as the paddy passes through the machine.

What has been the effect of this program in quantitative terms? This shows the sales patterns for four-wheel tractors and power tillers in the Philippines over the last few years. You'll note since 1952 there has been a very rapid increase in the sales of power tillers. About 70-80 percent of the market for power tillers in the Philippines is being covered by designs produced by local shops. Some of them are our designs, other are copies of our designs. Last year they sold in excess of 5,000 units of this small machine. This is an attempt to quantify the total impact of our program since 1970, in terms of some of the specific projects we have under way. This draft here is perhaps the most important one because it shows the number of units sold throughout the Asian region, for those manufacturers with whom we have direct contact. We feel that our sales have been around \$8 million. We spent a little in excess of \$1 million during the progress of the program, so we have an R&D cost of somewhere around 12 percent. That's going to go down as we get more items into production.

These are the kinds of shops we work with--very simple, very labor intensive. This is a small-engine manufacturer in Thailand. This man builds about 1,000 engines a month. He employs 200 people, produces five different sized models, and he sells those engines for about 70 percent of the cost of a Briggs and Stratton or a Clinton engine. We talked about economies of scale. The manufacturers will tell you that engines can not be built unless there is a volume demand for them. I think this particular entrepreneur here disproves that particular point. He uses untrained farm girls to run the machine tools. It's a very impressive operation. We've done a little work to determine the impact on labor plant utilization. We find that plants we've been working with were running normally about 60 percent of capacity. By introducing the simple designs, they are able to increase plant utilization about 15 to 20 percent with very, very low investment cost. In other words, the machine tools and equipment are there; it is just a matter of adding labor and some raw materials to get these designs into production.

In the impact on labor: this is a survey of five firms that was done last year. We increased their labor utilization by over 200 full-time employees, and we just completed another survey of nine companies in the Philippines about

a month ago. Those nine companies, over the last year alone, have added over 500 full-time employees to their production and marketing sides. So it has had a relatively good impact. We're looking forward to an even broader impact as soon as we get our technology transfer problems ironed out. I will bow out graciously.

CASE HISTORIES OF SUCCESSFUL
OPERATIONAL PROGRAMS
CASE NO. 3

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Actually, this meeting is of special significance to me personally, because as I've been introduced, I am working for the Korea Institute of Science and Technology. This "Science and Technology" bothers me quite a bit, because I am an economist by learning and I'm a business administration major in practice, so a lot of people came to my Institute and started asking me a question like, "What is a nice boy like you doing in a place like this?" And I always say that I had a very unhappy childhood, or my wife doesn't understand me! But anyway, it is a great pleasure and honor for me to attend this seminar and to have an opportunity to speak to you on the techniques and the methodologies employed by KIST to stimulate small-scale industrial development.

An official definition of a small-scale manufacturing industry in Korea is a firm with less than 200 people employed and with less than \$100,000 of total assets. Currently, we have well over 96 percent of the total number of manufacturing firms in this group and about 45 percent of total employment. Thus, the importance of small-scale industry development in the Korean economy is too obvious to mention. And at the same time, the problems of small-scale industry in Korea are neither neutral nor limited to Korea. The problems of small-scale industry, rising from insufficient capital, inefficient production methods and a lack of management know-how, are worldwide problems for developing countries.

The Korea Institute of Science and Technology was established in February, 1966, as a not-for-profit judicial entity existing for the purpose of conducting applied research and providing technical service to industry and government and for the general benefit of the Korean economy. KIST is a multi-disciplinary independent contract research organization emphasizing the transfer of technology to local industry. At the end of 1974, the total assets

of KIST were estimated to be \$17.6 million, and in 1974 KIST carried out over \$5.8 million of contract research, 52 percent of which came from industry. Currently, KIST has 57 PhD's, 65 Master's degrees, 310 B.S.'s, and 453 technicians and supporting staff, totalling 885. The major research activities cover the fields of electronics, chemical engineering, materials science, mechanical engineering, food and feeds processing, and techno-economics. And to support these activities, KIST has computer services, chemical analysis laboratories, a technical information service, a machine shop, a pilot plant area, and material testing laboratories. Thus, KIST has the capabilities and the desire to help small-scale industry in Korea. But from the point of view of project development as a contract research organization, the small-scale industries are not an attractive customer for KIST because they are too many in number and too small in size, and their technical problems are not challenging to engineers and scientists of KIST. Furthermore, small-scale industry often cannot identify their technical problems, and they feel that they cannot afford the services of KIST.

Today I would like to talk about the techniques and methodologies employed by KIST to improve the cooperation between small-scale industry and KIST by presenting case studies selected from the records of KIST and by emphasizing the project-development method of approach to small-scale industry. I will start out with examples of the techno-economic survey of the Korean Export Industrial Estate. In early 1970 the Ministry of Commerce and Industry--we call it MCI for short--of the Government of the Republic of Korea had asked KIST to render technical services to several firms in the Korean Export Industrial Estate. But based on the preliminary survey, KIST recommended that instead of providing technical services to several firms in the estate, KIST would like to conduct in-depth techno-economic surveys for all 55 of the firms in operation in that Estate. The cost of this survey was equally shared by MCI and KIST; due to budgetary constraints of MCI, KIST financed this project with in-house research funds. It took about three months to survey 55 firms, and more than ten laboratories with 35 staff members of KIST were involved in this project. In this survey KIST found that, contrary to our previous notion, helping small-scale industry can be very interesting professionally as well as rewarding personally. And the 55 firms in this Estate learned of KIST's willingness and capabilities to help them effectively. In this survey KIST identified those technical problems with which KIST could help and decided to take two companies' case studies to demonstrate how KIST, or technology, can help small-scale industry. Following is a summary of one case.

Korea Optical is a consumer optical equipment manufacturing company. This company was selected after considering three points: (1) the capabilities of KIST--whether we could help; (2) the demonstration effect--whether it might be successful; and (3) the willingness of that recipient company. Thus, KIST felt that technical as well as managerial problems could be solved by KIST. The difficulties faced by this company were not alone in the business community. This company was the only consumer optical manufacturing company in Korea. And furthermore, the Korean government was very much concerned with this company as a potential exporter and as a defense-oriented industry. We found also that the top management of this company was more than willing to cooperate, and several key technical staff members were young, ambitious and

competent. So, when we took this case, we were fairly sure that it was going to be successful!

KIST devised the production plans, based on the technical level, market situation and availability of raw materials. And also, we improved the quality control process; improved the production techniques, such as plating, lens grinding, etc.; improved the inventory control, and reorganized the company management systems. Before KIST took up this assignment, this company was exporting \$611,000 worth of goods and losing \$590,000 a year. And after we took it up in 1971, this company started exporting \$1,415,000 worth of merchandise and losing only \$80,000. Last year this company exported \$5,251,000 of merchandise and showed a profit of \$354,000. Currently this company is employing 1,500 people, but this is no longer small-scale industry.

The result of this progress pleased MCI so much that they arranged a meeting, presided over by President Park, where we had an opportunity to present the case study of this company. At the end of this meeting, President Park asked KIST to tell this story to the business community through several meetings sponsored by the Korean Chamber of Commerce and instructed the Ministry of Commerce and Industry to finance the cost of these meetings. This was how KIST became deeply involved with the seminars for top management on The Role of Technology in Business. For this seminar KIST organized a team of experts headed by the Vice-President of Research and consisting of experts from five major disciplines: chemical engineering, mechanical engineering, food processing, electronics and techno-economics. There were five separate seminars in Seoul, in which participants were mostly from the large industries. Four more seminars in four other major cities were attended by the top management of small-and medium-scale industries. In this seminar we emphasized the purpose of KIST, its mission to help industry, its potential capability to help them, and the case history to demonstrate how KIST solved this firm's technical problems. In these seminars KIST was successful in stimulating the attendees' interest; the question-and-answer sessions often lasted longer than the actual presentation.

Since these seminars, the usefulness of KIST's services has been well recognized by the industrial community, especially among small- and medium-scaled industries. It seems to be a pleasant surprise for small-scale industry to learn that the chemical analysis laboratories of KIST could tell them the composition of a chemical supplied by a company abroad and could teach them how to make this compound easily. Since these seminars, the relationship between KIST and small-scale industry has improved considerably. In 1974, KIST estimated that between 20 and 30 percent of total contracts were related to the problems of small-scale industry in Korea. Following are two examples; one for technical services and the other a new product development for small-scale industry.

The first example is of technical assistance for small-scale industry. It was sponsored by the Association of Small and Medium Industry during 1973 through 1974 with a \$50,000 budget. Forty-three firms were selected, based on the technical problems submitted to the Association by its members. Based on the requests received by the Association, the team of KIST experts made a

preliminary survey to select 43 firms. Again, the selection criteria were KIST's potential capability, the demonstration effect and the willingness of the entrepreneurs, because we feel those three elements are most crucial to success in the extension service. There were about 300 separate cases of technical assistance provided by KIST. These were, in general, short-term research topics such as providing technical information and drawings, laboratory tests, and research for solutions such as plastic information processable materials, heat treatment for dye making, sand casting, and welding and plating techniques. A typical example was a bicycle pedal manufacturer whose problem was that the pedals made too much noise when they rotated. KIST found the reason to be a bent pedal shaft caused in the process of a core extrusion. We introduced a guide attachment for the die and improved the die for ball-cap press forming. And now the bicycle pedals don't make any more noise, so we now have a nice, quiet bicycle.

Now I will give you an example where we actually developed a new product for small-scale industry. This example concerns a flexible straw for soft drinks; I'm sure most of you already know what I'm talking about. A straw normally is straight, but this one has some bending device in the middle so that you can bend it; so that you can even lie down and drink the soft drink. In 1971 a man who had one sample of a flexible straw in his pocket visited KIST and told us that he obtained this flexible straw from abroad and that he had tried to duplicate this flexible straw but had failed. So he asked us if KIST could duplicate the flexible straw and how much it would cost him, because he was worried about the money. So between KIST and this new entrepreneur it was agreed that KIST research would cover: (1) the identification of the material, (2) the design and fabrication of a production machine, and (3) the preparation of a work manual for the production. But because this entrepreneur didn't have enough money, he insisted that the project be spread over two years to avoid simultaneous research in several fields. In other words, he wanted to save more money than time. Secondly, he said, "Aim for the designing of the production machine to be under \$100 per unit, with manual operation, because I don't want any fancy gadgets! All I need is somebody who can twist the levers and then come up with a product." So, at the end of the contract, ten machines were delivered for the training and the market testing of the flexible straw. Later KIST delivered 40 more machines for the first stage of production. In the first year of operation, in 1973, over \$20,000 worth of flexible straws have been exported. And in 1974 this figure went up to \$44,000. Currently, this company has moved from the backyard of his house to the Korean Export Industrial Estate and has 80 machines, 30 of which were fabricated by the company itself from the drawings provided by KIST. This company is planning to ask KIST to develop automated machines when the export volume will reach \$1 million. We estimate it will be next year. And at that time I have to take out this example from this kind of meeting, as then he will be trying to save labor.

KIST is a contract research organization and each laboratory of KIST is operating under its own accounting system. Any laboratory cannot function effectively unless there is a source of funds to support such activities. Realizing this problem, KIST has set up several systems through which the burden of financing KIST projects for small-scale industry can be reduced. And following are the examples: The general service contract, under which

any client can deposit \$250 to set up his account with KIST. Then, this client can ask KIST for any kind of technical assistance which is short-term in nature, such as material testing, chemical analysis, or technical advice. And KIST charges its service fees against this account and notifies the client regularly as to the balance of his account. By doing this we can eliminate any red tape or administrative expense. Also, it is a lot easier for the client to visit us without each time making up a new contract for a small amount of research. Currently, KIST has general service contracts with 132 clients, out of which over 100 contracts are with small-scale industry. The second approach is the installment research fee. KIST often allows its clients to pay research fees on an installment basis, 30 percent down when signing the contract, and the balance spread over the period as agreed at the time of signing the contract. For such cases KIST does not charge interest. The third approach is the joint project. When KIST feels that a proposed project is considered to be of national interest, such as those having an import-substitution effect, KIST can offer partial financing--not more than 50 percent of the total cost. For this share of KIST's contribution, the client must sign an agreement of royalty payments beginning with the implementation of research results. There are now over 20 such projects either underway or finished. The fourth method is a package-deal contract to assist small-scale industry. This is an annual government appropriation for KIST. It usually runs over \$1 million a year, to conduct research on specific subjects for the purpose of fostering an industry or industries, based on the overall economic development plan. These projects are usually of such a nature that no single company or group of companies could afford to sponsor them alone. The results of the research are sold to any company willing to implement them under the royalty agreement. One such project was synthetic fibers for wigs. It was aimed at the import substitution effect for the small-scale wig makers, making it easier for them to secure raw materials. Another example which can be cited is ceramic cores for carbon film registers, developed to improve the quality of electronics products. Another one would be an atomizing process for metal powder which was developed to improve quality of oil-less bearings which are used in consumer products--in fans, small motors, and domestic appliances.

Thus far I have tried to describe the techniques and methodologies to stimulate small-scale industry development, emphasizing how we contact these customers and let them know the capabilities and willingness of KIST to help them and what the financing arrangements are to support the activities of KIST for assisting small-scale industry. Through these approaches KIST has enjoyed an amiable relationship with small-scale industry in Korea. But very recently KIST has introduced new systems which we hope will work for the Korean industry, especially for the small-scale industry. And I am happy to describe this system for the first time in public.

In general, when a technology becomes really productive in economic activities it normally goes through the following steps: (1) research, (2) development, (3) engineering, (4) testing, (5) production and (6) marketing stages. KIST has learned in recent years that one reason for delayed implementation of KIST R&D results is insufficient support in the areas of engineering, testing, production and marketing. Especially for the small-scale industries, such phenomena became so severe that good research results

often remain in the vault of a company for several years. There is a common mistaken notion that a good R&D result would result in the form of a profit right away. Small-scale industry generally fails to recognize the importance of engineering, testing, production and marketing stages, where a great deal of additional money and effort, as well as patience, are needed before such R&D results become really profitable.

Realizing these problems, KIST set up a separate corporation on September 9, 1974, called the Korea Technology Advancement Corporation, so we call it K-TAC in short. And I was named the president of K-TAC. The purpose of establishing a separate corporation, K-TAC, by KIST was to facilitate the implementation process of R&D results, which is one of the major roles of KIST. As specified in Article 4 of the KIST charter, the activities of K-TAC include: (a) the promotion of R&D results to be implemented, (b) sales of by-product results of KIST research, (c) sales of patents and know-how, (d) sponsoring KIST R&D activities, and (e) other related activities, which can cover anything and everything. Now KIST is, through K-TAC, in a position to help small-scale industries, not only in solving technical problems, but also for launching businesses with the research results developed by KIST. K-TAC can assist small-scale industry which is interested in implementing R&D results in engineering and testing as well as financing for production and marketing. In return, K-TAC would receive either equity participation in that company or royalty payments.

An applied research institute has to learn to live among local industries with an open mind. To deal with small-scale industry, an applied research organization must learn to listen and solicit opinions from them. For an applied research institute, its willingness to change and adopt new ideas is a basic and necessary condition for the improvement of its relationship with small-scale industry. What I have presented to you today as the methodology and techniques employed by KIST to stimulate small-scale industry development is subject to change. In fact, it is changing at this very moment, because we are living in such a dynamic society. I thank you.

SESSION CHAIRMAN'S
INTRODUCTORY REMARKS

Thomas C. Niblock
USAID Mission Director--Philippines
Manila, Philippines

I am very glad to be a part of the conference. A couple of weeks ago I was in Washington and Bill Littlewood asked if I would be able to come back for this conference. It so happens that I was able because I'll be in Washington for a few days later this week. But after having agreed to come, I've been a little bit puzzled as to just why I was invited. I kept expecting somebody to ask me to make a presentation and to give me a topic and they didn't do that. I have been asked to preside over this afternoon's session, but I still am puzzled. I think I know the answer or I know several possible reasons. One, institutions such as Georgia Tech and other colleges trying to do business with AID always have trouble with AID Mission Directors. So it may be that I'm the AID Mission Director most in need of an education on small-scale industries. It may also have something to do with the fact that we are currently in an advanced stage of negotiations on an institutional contract between AID, the Philippine Government, and Georgia Tech. This gives me an opportunity to become better acquainted with the Institute here and to get this particular program into its final stages.

And then perhaps, more seriously, the Philippines is taking small-scale industries quite seriously these days. There have been a number of institutional developments over the years in which AID is fortunate to have had a part. But there are many exciting things happening in the Philippines these days on the economic development front, including small-scale industries. I know that the afternoon session is to be cut short by about half an hour in order to allow time for questions and answers, but I do want to take just a few minutes to say a word or two about what AID is doing in the Philippines and hopefully this will be of interest to you.

I'm reminded that this very hour a week ago in Manila, we were having one of the most interesting conferences, before this one, that I've had the pleasure of attending. A number of prominent Filipinos and some outsiders were gathered together to think about the year 2000--the year 2000 in the world, featured by presentations from the Hudson Institute, and the year 2000 in

Southeast Asia and in the Philippines, largely by Filipinos. The Hudson Institute was being, perhaps provocatively, very optimistic about the future and they projected a supra-industrial development. The developing countries of the world would see industrialization occurring almost universally in these countries, much faster than it had occurred in the currently-developed world. Some of our distinguished Filipino panelists said, perhaps more realistically, that 25 years from now the Philippines would continue to be agriculturally based; much of its employment would still be agricultural. Industry will have developed, but as the Secretary of Agriculture said, "As agriculture goes, so will the Philippines." Anyway, there was broad agreement that afternoon--and I think there will be throughout this session--that industry will need to grow to provide substantial employment for the growing populations.

Now the question really will be how all of this will come about, and that is the subject of this conference. Now, saying that I was not assigned a topic, I want to indicate that in anticipation of possibly being assigned a topic we had prepared a paper that tells you, if you are interested, what the US Government is doing through AID in the Philippines these days. The topic of this paper is the small farmer and the rural poor. It talks about the program that has developed in the Philippines in the past four or five years, resulting in a dozen projects. Eight of those are directly related to food, and food and nutrition. The others are related to health, family planning and population control. But the one point I would like to leave with you, briefly, is that from our experience and perspective in the Philippines, the development of the hinterland or the rural areas, including rural industry, is a very complex program that involves a number of things which happen more or less simultaneously.

We, working with our Philippine friends on eight rural development projects, believe that the foundation for the expansion of rural industry is developing there. I would like to mention one or two of these very briefly.

The largest project that AID is supporting currently in the Philippines is rural electrification. So for Georgia Tech, having been in the heart of the development of the REA system of electrification via cooperatives of thirty and forty years ago, that very pattern is being repeated, adapted to Philippine conditions today, with AID support. There is also a major program of strengthening local public administration to improve infrastructure, local training and management, and all rural services so that there will be a better foundation for the next stages in development to include industry. It's interesting that, today, while AID does not have a major program in support of small industry, a decade or more ago very interesting foundation work was laid. AID participated more than a decade ago in the establishment of the Private Development Corporation of the Philippines. We participated after that in the foundation of the Industrial Guarantee Loan Fund. We have been in a continuing cooperative relationship with the Rural Banking System in the Philippines. So that, over the years, the financing institutions for support of rural industry have been building. This has gone back in some cases 15 years, so that now, the Philippines is in a much better position institutionally, mainly through their own efforts but with support of AID, to support industry. This is not a short-term instant process.

The other area that AID has made a contribution in, of direct relevancy, is on the technical assistance side. The current activity that Georgia Tech is involved in under the 211(d) Grant in the Philippines is working with the Institute for Small-Scale Industries. You'll be hearing in detail about that from Mr. Chico and associates later, but there are other institutions that will be contributing to this new emphasis. One is the Economic Development Foundation, which was set up to provide technical assistance, essentially in management, in the Philippines. Another is the development in the private sector of the Philippines of the Asian Institute of Management, a very fine institution modeled after the Harvard Business School but increasingly focused on the requirements of the small businessman in the rural area.

I want to conclude--because I don't think Mr. Parker's presentation this morning stressed this quite as much as we feel it in the Philippines--that all that we are doing today in the Philippines is essentially under new legislation. AID has been directed--we operate in accordance with law--to focus on rural development, nutrition, health and family planning. These are the areas that the Congress, since December of 1973, has directed the Administration to concentrate on in economic development. And nothing is more relevant to that than providing jobs for more people through the creation of small and medium industries. I also had very much in mind, hearing Mr. Yun this morning, experiences of my own going back nearly 20 years when there were beginning developments in small-scale industry. There were investments by AID that resulted in perhaps more failures than successes in the early stages, so that icing on the cake that we all heard discussed before lunch with the very sophisticated development of the Korea Institute of Science and Technology and its sister institutions, has followed a good many stops and starts that many of the countries that have not yet reached this particular stage in the industry field will be going through. While we are a pioneering institution, by nature we have concessional aid, or grant aid in some cases, and the fewer mistakes that come out of our ventures, the healthier it is for all of us. And this conference will facilitate that.

CASE HISTORIES OF SUCCESSFUL
OPERATIONAL PROGRAMS
CASE NO. 4

Ross W. Hammond
Chief
and
Nelson C. Wall
Head, International Development Branch
Industrial Development Division
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Georgia Institute of Technology
Atlanta, Georgia, U.S.A.

I can promise you three things about this presentation because we do want to leave some time for questions and answers at the end of the afternoon session. First, we will be brief; second, we will not be profound; and third, we will probably not tell you anything that you do not already know.

Our Division has been in existence for 18 years, performing applied research in the economic development field in Georgia and in the Southeastern United States, and for the last 11 years internationally. It has conducted a large number of projects in this period, worked at problem solving with about 4,000 companies, and published a great many diversified reports. And to us, what happens as a result of reports is what is important, not the reports themselves. Anyway, the main focus of the Division has been employment generation, the strengthening of existing industries, and the creation of new industries. We have had our share of successes and failures. Out of our recent international development activity has come some clearly focused procedures and some techniques and methodologies which seem to work well domestically and internationally. My associate, Nelson Wall, and I will discuss some these procedures and techniques. One of our basic beliefs in this business of international development is that we must have partners wherever we are active. So we actively seek out organizations around the world who have the same organizational motivations; a desire to help the economies in which they exist through an optimum utilization of the resources of the country. We seek to link with these organizations and to join in programs of mutual benefit. There are a number of organizations involved in the counterpart network and we feel privileged to be a part of this network. Let me show you some of the network organizations very quickly. (Slides shown at this point.)

One of our counterparts is CENDES in Ecuador. We have visited a large number of small industries in Ecuador. This, for example, was a woodworking shop which did, in my opinion, very good cabinet work for the domestic market. The problems in Ecuadorian small business and industry are pretty much the same that we have encountered here in Georgia.

Another counterpart is the Educational Foundation of the South of Santa Catarina in Brazil, and the president of FESSC is here with us at this meeting today. This is the main building of FESSC. Interestingly enough, this picture was taken in March of last year. Ten days later a disastrous flood hit the whole area. The water rose about as high as the wall you see there, swept away this bridge, destroyed a great many residences and businesses in the city of Tubarao. It took them three months or so to recover from that disaster.

The University of Ife in Nigeria has two representatives here from the Industrial Research Unit. An extremely interesting organization, it has gone out and personally interviewed 30,000 or 40,000 entrepreneurs in Nigeria, and they have great volumes of information about small industry. They're housed on a very modern campus. This is one of the buildings on campus.

Another counterpart which is not represented here today is Kenya Industrial Estates. They are primarily concerned in Nairobi with building industrial estates for small industries, and out in the hinterland are building 12 rural industrial development centers.

Soong Jun University in Korea is a very active counterpart. Dr. Pettit made the commencement address in January. This school has a good proportion of engineering students. That's one of the engineering buildings in the background, and this is one of the hard-working staff men, Yoon Bae Ouh, who is sitting in the audience out here.

The Institute for Small-Scale Industries is at the University of the Philippines. It has just moved into a spanking brand-new building, a very nice facility on the University of Philippines campus. This is Mrs. Fajardo, who is in the audience and is an engineer by background and an administrator in that organization. The Director of ISSI has so far eluded our camera, but he is in the audience and I hope that Edwina gets his picture before he leaves.

We also interact with such organizations as the East-West Center in Hawaii, the International Rice Research Institute in the Philippines--which builds the kind of machineries that Bart Duff talked about--OECD in Paris, Cornell University, MIT and Arizona. The last three all have 211(d) grants from AID. Cornell's is in science policy, and Frank Ahimaz is here. MIT's is in public technology. Arizona's program is in arid land development, and Jack Johnson from Arizona is here and has brochures for anyone who might be interested. Basically, the point we would like to make is that we are interested in interacting with organizations wherever we work overseas. We believe in the institution process, and as our partners build their institutions overseas, we build our own as well.

One of the first things we were asked to do in this process was to set up a delivery system, and preferably this is to be what we call "eyeball-to-eyeball." So, starting in 1964 when the International Development Branch was established at IDD, one of the first things we did was to strive to create this system. Some of the earlier concepts were field tested in Venezuela and Central America and later in Paraguay. And out of about ten years of trying, testing and falling flat on our faces, we were able to isolate a few things and develop four main areas of this concept which we still believe make the system viable. We are talking about information and technology transfer, adaptation of product and process information, training and associate materials, and field trips or on-site assistance. Briefly, I would like to review these four basic areas of the "eyeball-to-eyeball" delivery. The information and technology transfer--we find that in the less-developed countries this is a very high priority area. There is a great lack of information that is relevant to industrial processes and, furthermore, the technology transfer is usually very limited and found only when technology is purchased. The IDD approach has been twofold in this area. We have 1) tried to create information centers that were viable and effective to provide the needed technology and industrial data that the small-scale industries require and 2) we try to provide the necessary technology transfer as the project develops. We also find that the information has to be pertinent to the needs of the area. At this time, prior to the 211(d) grant, IDD had already established information centers in such places as Tegucigalpa, Honduras; Valencia, Venezuela; and Paraguay in such cities as Asuncion, Villarrica, Concepcion and others. Now, assisted by the 211(d) grant, we have been able to expand this. We are presently working with information centers in Korea, Nigeria, Brazil, Ecuador, and the Philippines. The technology transfer has to be of such a nature that it is accepted by local conditions. In most instances, the technology is unsophisticated and adapted to whatever the local needs might be. We tested this in Paraguay and it is shown in the field cases that were reported between 1970 and 1971. Today this is being implemented in a much higher degree in the counterparts where we are working--especially in Korea and Brazil. But we find that the main points necessary in technology transfer are as follows: We have to have an acceptance of the technology by the local environment. We have to have an adaptation of the technology to solve whatever the local needs might be. We need a simplicity of the system which allows the user to understand this technology. We have to have a knowledge of the local language by the person that is trying to carry out this transfer. And we need an availability of products to provide the system that supports the technology.

Another of the areas that I mentioned earlier is the adaptation of product and process information, which really is a follow-up step to a previous one that I have described. Once the technology and the information become available, the delivery system then focuses on the area of adapting the existing products to improve them, reduce costs, or whatever we're trying to do. To do this, a substantial amount of additional information is required. The industrial engineer is needed constantly in this portion of the delivery system. Under the grant, we're having the opportunity to assist in the adaptation of product and process information delivery in several places which have been highlighted in reports.

Another area is that of training and associate materials. Training has been an ongoing activity of IDD from its inception. The simple provision of funds and technical assistance to small-scale industry is not enough. One also has to provide training for the small-industry operator, owner, entrepreneur, whatever his name. Over the years, experience has shown us again and again that training programs are more effective if they are carried on in the native language of the participant and at his level of technology so that it's acceptable to him. In the future we will be expanding this activity, following some of the work that we did in 1970 in Paraguay.

The last point which I listed was field trips and on-site assistance. A successful delivery system needs to have on-site activity. Past experience has proven that short field trips do not do the job; they are not meaningful. In order for assistance to be meaningful, we have to talk in terms of several weeks--and sometimes several months--of constant, on-site assistance. This provides for the formation of a team where the man carrying out the assistance and his counterpart get to know each other, work together and understand each other. And, hopefully, then you get some of this performance at the level that one wants. In summary, these four concepts have formed the basis of the system that IDD has been applying internationally, and up to now this system has proven successful.

We would like to discuss some of the specific techniques that might be applicable in various places. None of them is likely to be news. None of these is likely to be new to a sophisticated and knowledgeable audience like yourselves. Central to all of our activities is the concept that the organization has got to deliver certain services to the ultimate users. We took a page from the book of the agricultural extension people back in 1961 and set up seven industrial extension offices around the state, staffed with professional and support personnel. Basically, our industrial extension service has offices around the state, and the people in those offices are charged with speaking to industry and working with industry in identifying problems and helping in the solution of these problems. They also work with area development organizations. We have a female industrial extension agent in our Augusta office. All of our people are constantly going out to industry to go through this process that I mentioned: to transmit technological information and to adapt it to the particular needs of the manufacturer, in much the same way that the agricultural extension people used to go out--and still do, I guess--to visit the farmers and provide them with individual assistance.

One of the specific techniques used in this is what we call "community profiles." Through this technique, one is able to find out some of the things that are usually important to the project. One is able to collect the available data on the area in which one is working. One has the opportunity to order this data in a systematic way which allows comparison with other known areas. It establishes the advantages, and more importantly, the disadvantages, of the area in which the project is located. It provides a basis for creation of long-range and short-range goals for that community. It generates the interest of and involvement by the population in the community during the preparation of the profile and the implementation of the long- and short-range action programs. And it motivates the community to unite and creates a sense of community pride.

One of the programs that we are particularly proud of is the Certified City Program. We are much concerned with community development, especially in the rural areas, because industrialization is likely to take place in the communities in the rural area rather than out in the middle of a field somewhere. The whole program is based on a set of standards against which communities can measure themselves to determine what the community potentials are for growth and development. Each year communities are asked to enter this program. They fill out a set of standards, and they document their statements. The community submissions are then evaluated, and those that meet certain levels of achievement are certified for a five-year period and receive certain promotional devices which permit these communities to advertise that they are Georgia Certified Cities as they seek to attract industries and other elements of the diversified economic base. Most communities do not achieve certification because they are deficient in certain aspects. Each community which enters the program receives a critique of its strengths and weaknesses, and many enter into programs of work to overcome the deficiencies that have been identified in the program. This program has resulted in many hundreds of self-improvement projects in communities in this state, and these projects have markedly benefited the communities and advanced their potential for economic development. This program has been adapted and adopted by a number of other states in the U.S.

In a similar way we have, out of a concern for the proliferation of industrial districts or estates in Georgia, where many of them are poorly designed and financed, devised a set of standards and a program called "A Certified Industrial District Program." This was devised to insure that industrial districts within this area meet certain criteria. And those that do meet these criteria are identified as Certified Industrial Districts. This has resulted in the upgrading of many such districts in Georgia and the better design of new projects. A number of other states now have similar programs-- Michigan, for example.

Another area of activity is that of directories and manuals. Once the information centers have been organized and become operational, it is often desirable to use this particular technique--the production of such things as directories, manuals and others. Through this technique we can accomplish any one of these or more: publication of useful documents relevant to the pertinent target area, initiation of a systematic classification of the available information, determination of missing data and generation of additional material, establishment of a research procedure within the organization and initiation of pragmatic action, and demonstration of the capability of the organization through its publications. And I think it is quite important that the end products, these publications, can be circulated to wider areas and used as professional promotional documents.

We also are involved, as I guess everybody in this room is, in feasibility studies and market analyses. We have produced about 100 published reports in this area. These range from simple market potential studies to rather detailed feasibility studies. For example, when Southwire in Georgia decided to build a copper refinery, they wanted to borrow \$6 million from the U.S. Government.

The Economic Development Administration asked us to make a feasibility study. We found that it was feasible and a copper refinery in West Georgia resulted which employed 1,200 people initially and is larger than the companies that we usually work with. But this is one example of the use of one of our studies. Overseas, working with partner organizations in other countries, other similar studies have been prepared. In Venezuela an economic profile of the community and a feasibility study for manufacturing porcelain insulators for power systems were prepared.

We also get involved, as you all do, in pre-feasibility studies which require less time and resource allocation but provide a go or no-go indication whether a full-fledged feasibility study is desirable. These types of studies are produced universally and I make no special claim for ours, other than to say that they have provided considerable impact on industrialization and employment generation here and elsewhere. They are important, we believe, in the industrialization process.

Earlier we mentioned training programs. We try to do this with the concept of providing real-world situations to the persons who are in training with us. Since 1965 we have been conducting 13-week internship programs for counterpart staff. This is a rather lengthy program, though it's not very rigid. We provide a core of about four weeks, which is common to everyone taking it. From there on the thing becomes tailor-made to the person's needs, the type of job he will be dealing with when he goes back home and whatever particular interest he may have. We have been able to carry these sessions out in Spanish or Portuguese as needed. At present we've had about 125-130 persons complete this 13-week internship. Right now we are updating some of this material, hopefully to make it shorter and to try to take it out in the field and use it as field training rather than bringing people into Tech for this type of training.

One of our concepts, hardly original, is that a picture is worth a thousand words, so we rely rather heavily on audiovisual presentations in whatever we do. The printed or spoken word is still the basic communication medium, but it certainly helps to visualize something if you've got a photograph of whatever it is you're talking about to go along with the words. So documentation of projects is a kind of obsession with IDD. We believe it betters communication, betters understanding, and can serve a number of other technology transfer and training purposes. So we are particularly gratified at the number of program participants and the organizations represented here in this meeting which have seen fit to bring with them photographs, slides, films, and videotapes to illustrate their presentations.

Lastly, I would mention that we are fortunate in the Industrial Development Division to have the backup capabilities of the Engineering Experiment Station, where there are hundreds of scientists and engineers, extensive laboratories, machine shops, and other facilities. I will mention two short examples of what can be done with that kind of backup. A tire retreading

equipment manufacturer came to us, and they were having problems with their metal retreading equipment. The Station people who were assigned the task of helping them out decided that maybe they ought to try a new material-- substitute material. So they built a prototype of this same tire retreading equipment out of fiber glass, and it turned out to be competitive in cost with the metal casings. It was easier to attach the handling devices, didn't have the breakage problems, and was better in appearance. As a result, that company utilized this concept for a substitute material transfer. Also, one of the basic problems in Georgia, as it is in many parts of the world, is what to do with agricultural waste. One of the big crops in Georgia is peanuts or ground nuts. The shells from these nuts have traditionally been burned in open incinerators, and they add to the air pollution. The Station built a prototype of a machine which will take peanut shells and, through a pyrolytic-conversion process, change them into charcoal for energy or activated charcoal for water supply systems. It also has applicability in many of the countries represented here for the pyrolytic conversion going on in utilizing agricultural wastes. This project now has resulted, in at least one place in Georgia, in large installations. One operates using wood waste to produce the same end product.

So, we don't want to belabor this thing. We have deliberately chosen just to talk about some techniques and methodologies.

CASE HISTORIES OF SUCCESSFUL
OPERATIONAL PROGRAMS
CASE NO. 5

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and
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The views that will be conveyed in this paper are essentially those that have been derived from our observations in dealing with industry throughout the past 25 years. This is, in fact, the period of life of the Mexican Institute of Technological Research with which the speaker has been associated since its foundation.

First, I would like to touch briefly on the circumstances prevailing in the early forties, during which time the need for an organization like IMIT was clearly recognized in Mexico. In those days, several of the Latin American countries were accruing important monetary reserves as a result of substantial exports of raw materials in response to demands brought about by the Second World War. Then there was also a question of the many products traditionally imported which became increasingly scarce in those days. Because of these factors, there seemed to be the opportunity and the need to embark upon an industrialization program.

Among the many considerations that were made in those days for the proper implementation of such an industrialization program, there was the matter of developing proper financial and tax incentives as well as sufficient tariff protections for the new industries. Of less concern, but still important, was the need to provide such industries with local services of specialized technical organizations to aid them in their development.

It was felt that among the various needs to be covered was that of a centre which could assist industry in the development of new products, in the proper utilization of local raw materials, in the adaptation of industrial

processes and in other related endeavours. Right or wrong, the nature of such a centre came to mean in many ways an R&D organization similar to those which had successfully started years ago in the United States. In essence, the model of a nonprofit contract research institute was sought, and the operation of institutes such as Armour Research Foundation, Batelle Memorial Institute, Stanford Research Institute and many others served to illustrate it. It was believed that, at least in principle, their structure and ways of operating could be adapted to the local conditions prevailing in Mexico in those days, but there were already some reservations as to the amount of support which industry would lend to the project through an initial phase of an undetermined length.

As a first step, ARF (now the IITRI) was commissioned by the Central Bank of Mexico through its Department of Industrial Investigations to carry out a technical audit of existing industry and, later on, to plan, organize, and technically manage IMIT for the first five years of its operation.

To start, a selected staff of U.S. research men was sent to IMIT to coordinate and guide the technical programs, and a carefully assembled group of Mexican professionals, with training in the United States and/or Europe, was assigned to self-selected projects having a visible effect on the economy. The buildings and laboratories were adequately planned and excellent equipment was installed. These included some of the first pilot-plant units purchased, on the assumption that the research would be carried all the way into its final stages. It was thought that pilot-level work was a pre-requisite for the proper planning of some of these industries, and that it would be applied in those cases where it was warranted.

It may be of interest to point out that prior to all of these efforts, key men from government and industry had visited some of the best-known laboratories and research organizations in the United States to acquaint themselves with the concept and meaning of research and development. Upon returning to Mexico, very few, if any of them, had serious reservations as to the feasibility of a similar organization, even though it would obviously have to be much smaller in size. The general thought was that it would stimulate the development of industry, and its potential as a useful mechanism to implement the much cherished industrialization program was recognized.

I must now say that for the first five years, very few people or groups of potential entrepreneurs and very few of the existing industries found any use for the newly created laboratories. In spite of the many efforts and incentives offered and of the many modifications introduced in the basic scheme of operation for providing technical advice, industry limited its requests mostly to analytical and testing services and at times to obtain information on products or processes of particular interest to them. Hardly ever did they seem interested or prepared to indulge in true R&D projects but, most probably, their attitude in this respect was very often fully justified.

Fortunately, the support to the Institute remained solid throughout that five-year trying period of formation, which was mainly devoted to the acquisition of experience through self-sponsored R&D projects of national interest. No doubt that the Institute's founders felt that, sooner or later, IMIT would

be recognized as a useful organization and bound to contribute in an important manner to the national economy. By then three of the main national credit institutions of Mexico were providing their support and encouragement to IMIT.

The year of 1955 marks the beginning of a promising response from industry to the foundation of IMIT, as at this time the first truly important R&D project was entrusted to the Institute.

Based partially on this broadening of activities, a very wise decision was made--that of carrying out a well-conceived and heavy program of training of young professionals which assured a good selection of the technical staff that would be needed in later days. There was also the idea that this program would be valuable from the standpoint of making available to industry professionals with a broad technical background and with a significant exposure to R&D. In time, this training program was extended to other Latin American countries, and we have kept it going to our present day. Around 1,500 professionals, now with industry and government, have made use of these training facilities in R&D for periods of at least one to two years.

For the proper utilization of its overall resources, IMIT went simultaneously into a long period of internal research, mostly oriented to the evaluation of locally available raw materials, and worked very hard in many self-selected practical cases of process development. In time, this work provided an excellent base from which to tackle the more realistic problems of increasing complexity presented to it by industry in years to come.

During the period of intensive internal training, and subsequently, the main questions in our minds have been how to reach a proper understanding of the needs of industry, and how to evaluate and define the type of services we should provide to it. Was it entirely a matter of the research costs involved which inhibited industry's participation or was it something else possibly related to the relative inexperience of small- and medium-size industry in using R&D? Was the type of R&D we were doing a real tool for the solution of their problems? Why was there really little interest in the subject?

In time we learned that the R&D aimed at new products or processes was meaningless in most cases in those days. It slowly became evident that the type of R&D to be encouraged should be adapted to the more pressing needs of industry and that, at any rate, it should be linked to visible short-term economic advantages. Within the scope of the many facilities offered by government to industry in several different ways, the possibility of additional advantages through research was hard to substantiate for most of the new industrial projects under promotion. Risks are important factors to consider and, in fact, we found it necessary to carefully analyze them at length and to adopt suitable mechanisms to minimize them. Most probably, the very privilege of the tariff protections and other incentives prevented serious pressures within industry towards improving their processes and products.

Moreover, there was the fact that most processes and the equipment attached to them were obtained through direct arrangements with know-how and trademark sources from abroad. This, by itself, heavily reduced their interest in doing the necessary studies and research work for optimizing their

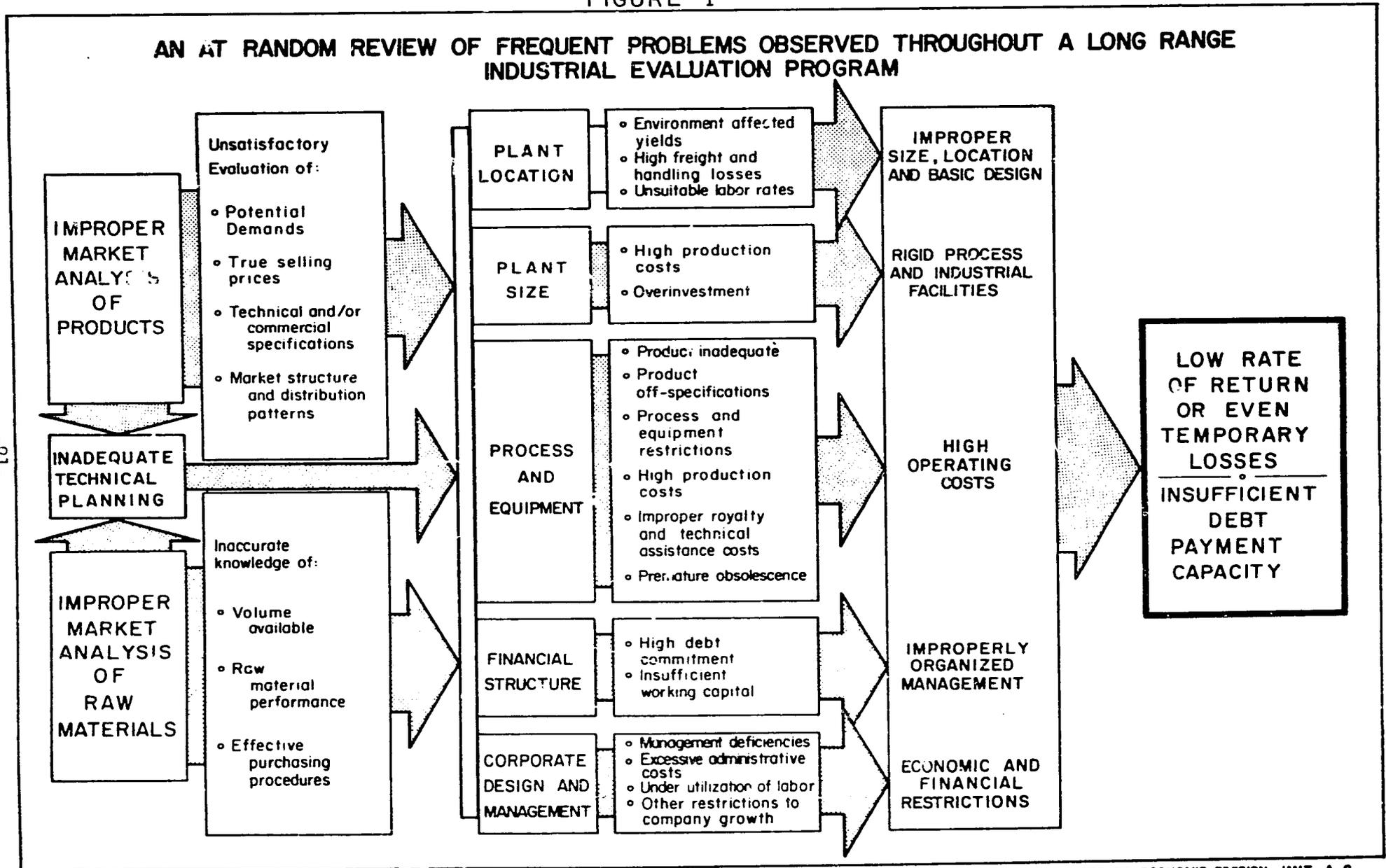
investments, reducing production costs or improving products beyond a given point. After a few years of the industrialization program, it became evident that within the frame of the direct technical transfer procedures, industry could avail itself of alternative processes and equipment to reach their goals. The R&D path was, in this context, the least attractive in terms of risks, time, and possible costs involved.

The prevalent thought after a few years was that, since the Mexican industrialization program had been brought about in an extensive manner by providing important mechanisms and incentives such as the tariff protection for the new products, the long-range loans and several others, industry did not have to engage in serious technical efforts and much less in those involving R&D. As a matter of fact, industry was purchasing their processes and plants often as a package, and this diminished the need for any specialized form of technical aid from a local centre. More often than not, industry could adapt these processes to local conditions, at least to an acceptable degree, so that the kind of assistance to be provided would at best involve some forms of engineering help, mostly at the construction stage. Attempting to develop a process or equipment of their own would mean spending perhaps a large amount of money and taking the added risk of possibly obtaining an unsatisfactory product. There were so many advantages from proceeding through the straight technical transfer that industry could hardly see any value in approaching problems in any other way.

As shown in Figure 1, industry can certainly experience a variety of problems, as our frequent surveys would show. In part, some of these problems arise from inadequate market studies, but certainly a number of technical problems and others are bound to play important roles as well. Very often it is the combination of technical and economic constraints which influence adversely the overall results. For these reasons, we found it necessary to examine cases from all possible angles to improve the chances for an effective application of the Institute's efforts. In time, it became evident that competitive mechanisms were starting to play an ever-increasing role, which meant the need for carefully planned and better adjusted industrial projects. On many occasions, the problems clearly showed the presence of interplaying factors which demanded some form of integrated approach. It was then more and more evident that we could not address such problems from a strictly technical point of view. It was necessary to take into account the various factors simultaneously and to handle technical aspects in harmony with economic and financial factors as well.

The need for redesigning the Institute's operations quickly defined serious limitations. One such limitation was the observation that an R&D organization with a heavily scientific and technical outlook was not sufficiently trained to understand and handle economic and financial matters at the specialized level required. There was also the question of the proper interpretation of the process at the engineering level, an area of activity which institutes generally find hard to develop to a satisfactory point for any number of reasons. Thus, it became evident that IMIT would have to introduce in its operative scheme suitable means to produce an integrated formulation of projects with the proper engineering treatment and in the frame of satisfactory economic and financial models. This was essential if sponsors were to benefit

FIGURE 1



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from the Institute's efforts to any meaningful extent. As all this was implemented, the number of calls from industry started to grow, and these brought about an accelerated exchange with industry. In turn, this gave us an additional insight into how to continue adapting the Institute to fulfill its best objectives. Figure 2 illustrates the need for a systematic approach to cover the intermediate study area that lies in between the initial planning stage at the industry end and the efforts that are to be carried out later on at the other end by consulting and engineering firms or similar entities.

In time, opportunities also arose to link the activity of IMIT with the efforts of industry in the pre-investment area, which gave us a first opportunity to gain inside views on the ways and manners by which the banking system participates in the financial backing of new industries and in the expansion of existing ones. Even though initially we were mostly asked to provide information and opinions generally restricted to processes and product matters, we more and more had to consider the economic factors involved. It became clear that the meaning of processes, equipment, and products would vary greatly, as one would bring into the picture the economic parameters which restrict their application and use. An increasing number of questions pertaining to markets had to be answered as projects became more sophisticated, and it was clear that all these aspects had to be analyzed if we wanted our technical opinions to be of any real value to industry and to the sources of finance.

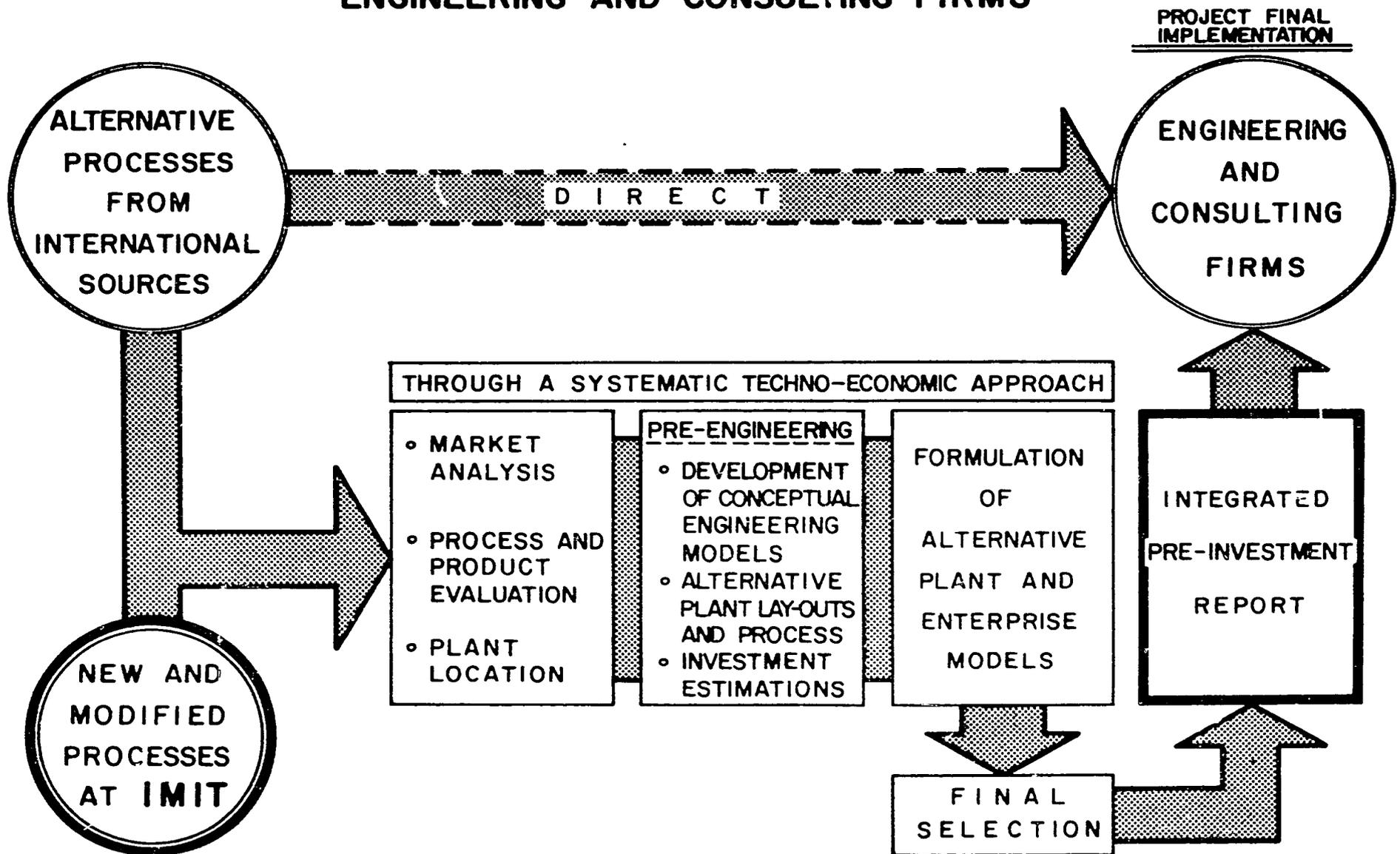
As we moved in the directions indicated, we have constantly been discovering the many prerequisites that an institute such as IMIT must fulfill to be prepared to provide sound and useful services. It all has to meet the actual needs of industry at the time it calls for assistance, and the technical problems involved often become only one aspect of the overall matter presented to us. These services are broken down and illustrated in Figures 3 and 4.

At the present time we no longer lack sponsors and, in fact, we do not find enough man-hours to be able to do all that we are asked to do. The change in the outlook has been substantial, and the problems we now have to deal with no longer match the objectives of those we used to self-select in the first years. Figure No. 5 shows the type of trend found when comparing a relatively large number of projects as presented to us for evaluation and further development. The small percentage of fully successful projects is an indicator of the drive into industrialization, but it illustrates as well the enormous risks involved.

IMIT, as it stands today, is basically composed of three different groups who have learned to work together. One is our R&D group, which we have tried to strengthen to the best of our knowledge and resources. We still believe today, as we did 25 years ago, that it is through this group that we can make our best contribution to industry and to the national economy as a whole. This group is the one which has been contributing to the basic technical solutions of problems entrusted, and we are glad to see that they have also learned from the other groups that there are specialized ways and procedures of analysis which are conducive to the proper evaluation of significant

FIGURE 2

INTERMEDIATE APPROACH BETWEEN R & D EFFORTS AND ENGINEERING AND CONSULTING FIRMS



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FIGURE 3

MAIN STEPS INVOLVED IN THE TECHNO-ECONOMIC FORMULATION AND DEVELOPMENT OF INDUSTRIAL PROJECTS

— SIMPLIFIED SCHEME —

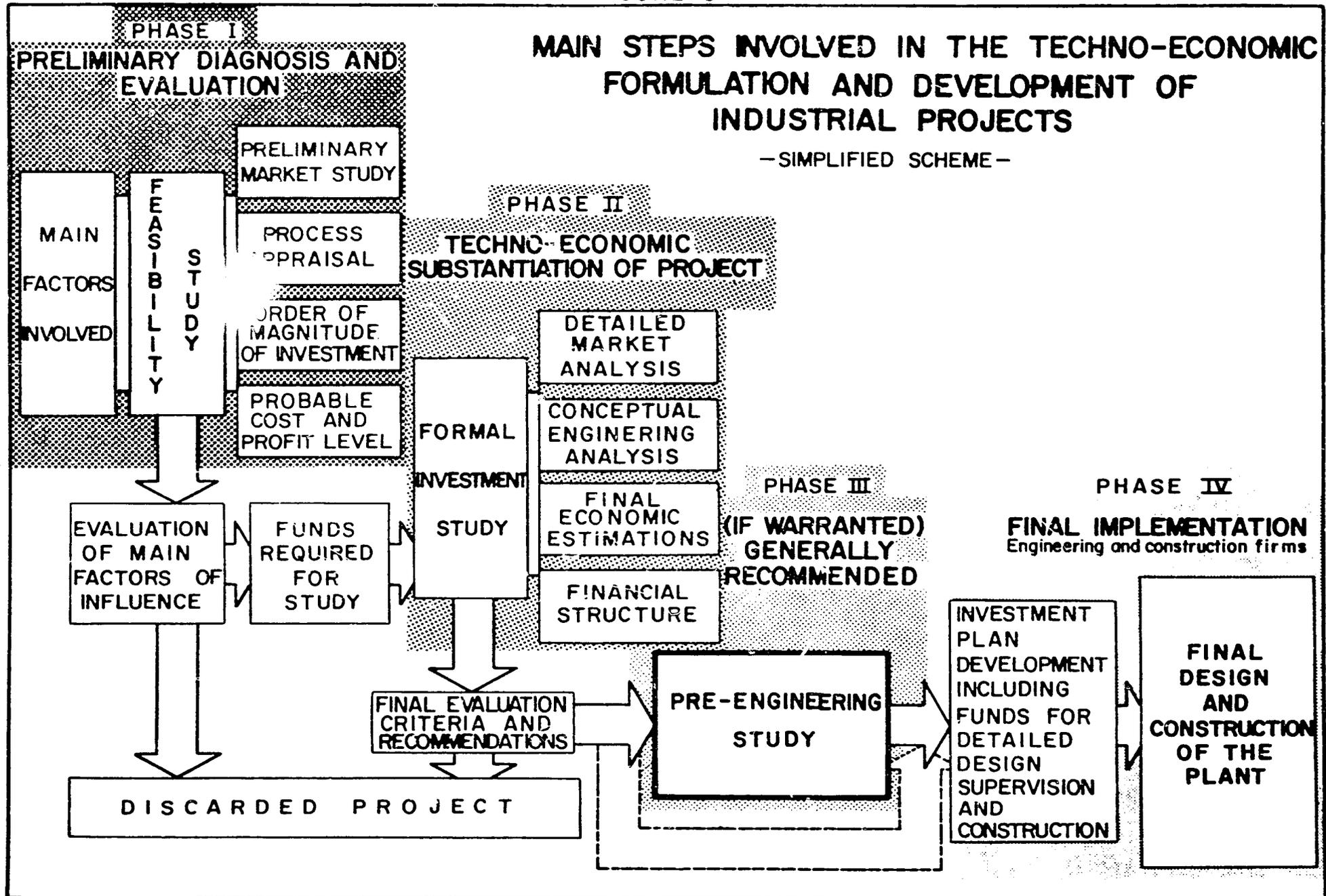


Figure 4

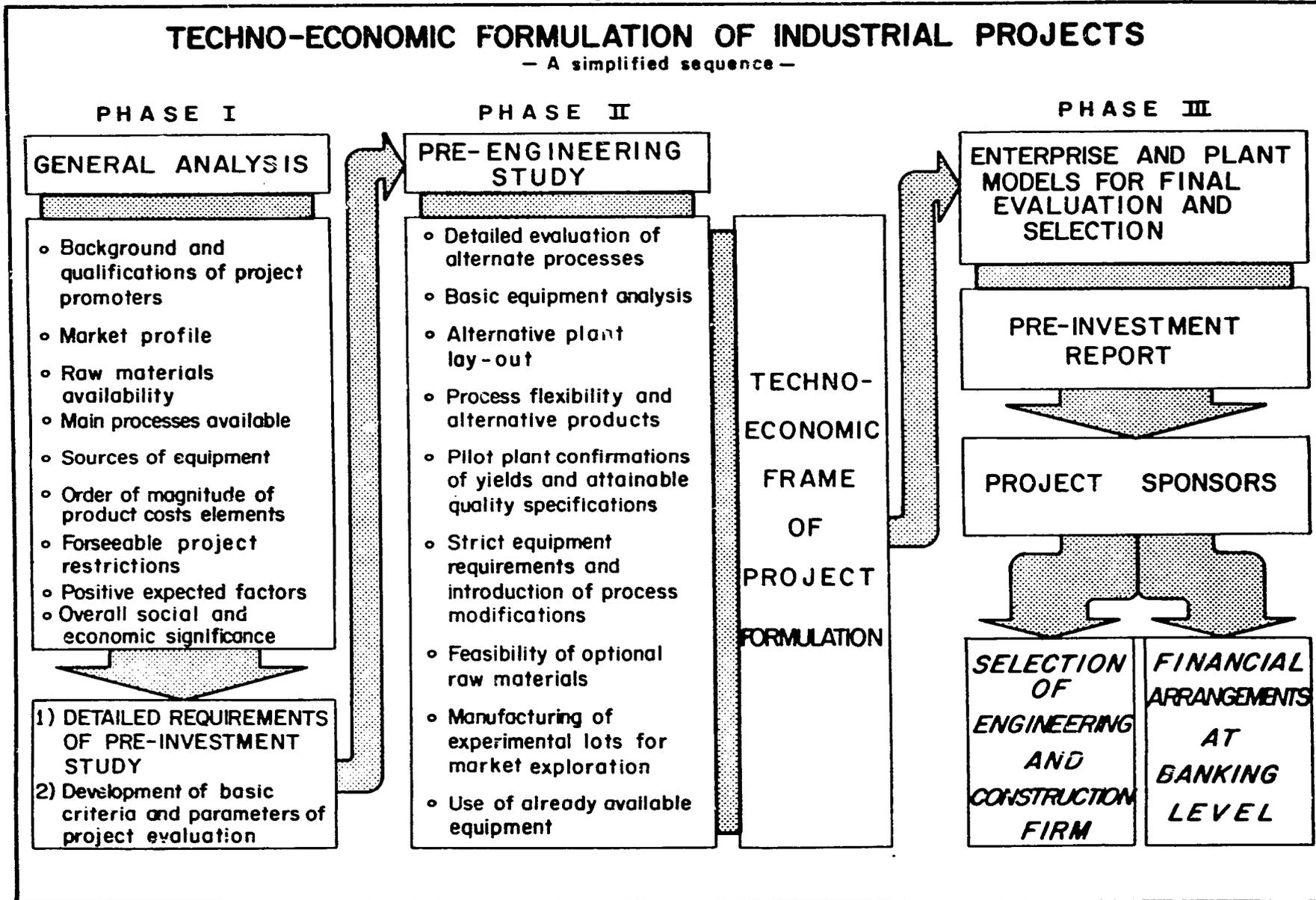
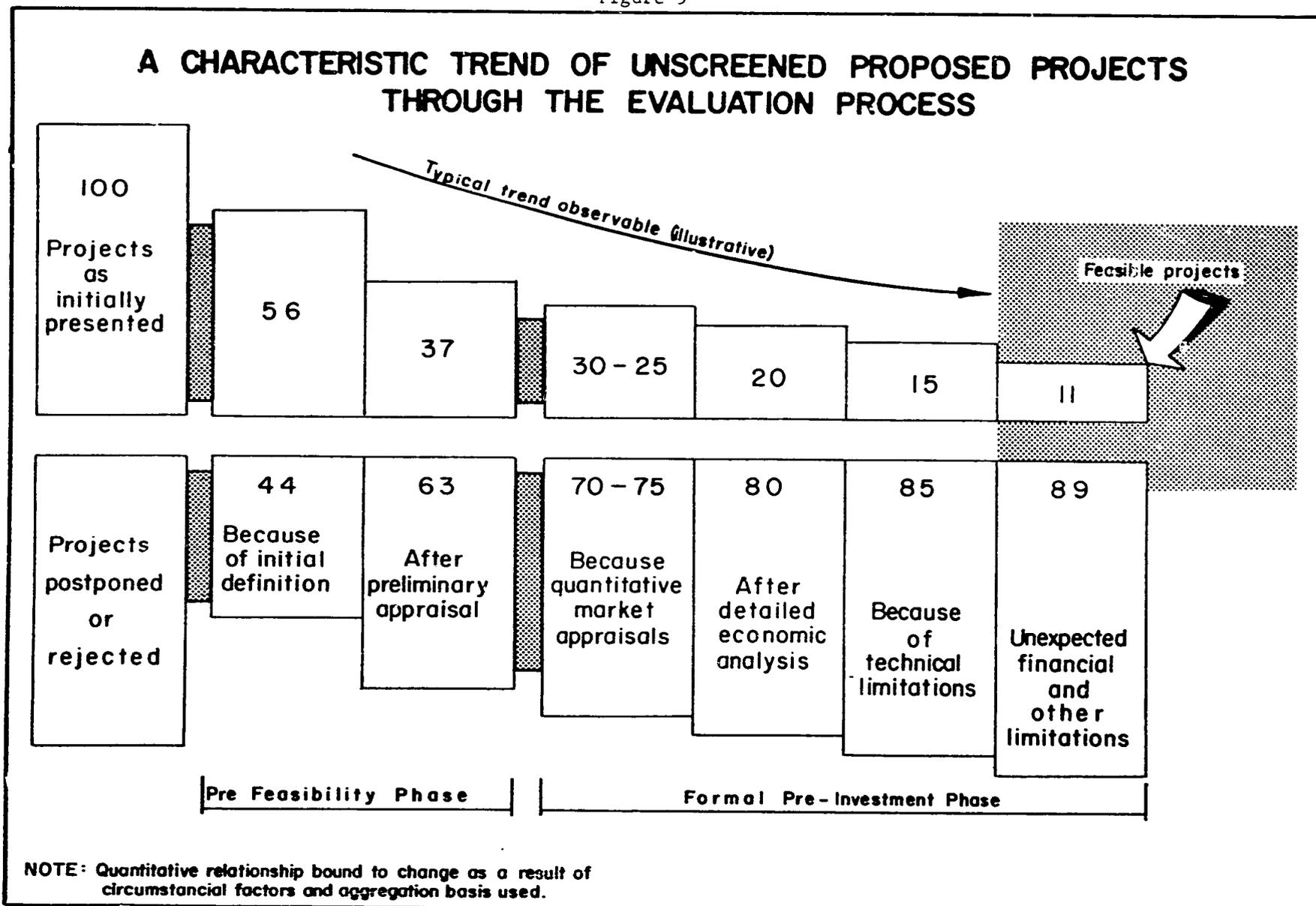


Figure 5



factors, and that decisions of a technical nature must first be screened by such means. In this manner, a suitable techno-economic diagnosis must precede and then go hand in hand with any laboratory and engineering effort to be made.

The second IMIT group came into existence around 1955 and was organized to provide competent services for the evaluation of process alternatives in the frame of those available from international sources and to aid effectively in the introduction of process modifications which might have been generated separately by the R&D groups. Because of the often intermediate position of its activities in regard to either the know-how source from abroad or with respect to our R&D group and those which correspond to the engineering and construction companies, these activities have been referred to by us as of a pre-engineering nature. We have found industry to accept this terminology and generally to appreciate it. In our views, pre-engineering studies really offer a way to properly bridge the initial plans and studies carried out by industry with its own staff and the efforts that will be later on carried out by engineering firms. We have found IMIT's pre-engineering services most important in helping industry to substantiate and optimize their industrial projects and to facilitate in an important way the role of the engineering and design groups that come later.

The third and most recent technical group in IMIT is our Techno-Economic Division, which has surely contributed immensely to the integrated approach being followed today. With their participation we can now properly balance the technical, economic, and financial factors of projects in the right perspective.

We have confirmed that, after these many years, industry now appreciates the use of meaningful economic models expressed on a quantitative basis and often observes how these models allow them to clearly view and fully understand the main factors of influence and their interplay. (Figure 6) Such models may readily show the consequences brought about by changes introduced in the technical schemes implicit therein, and this certainly is of value when attempting to justify such changes. As a matter of fact, we found this type of analysis was, in effect, a true door into R&D and a sensible way to detect and define fruitful research opportunities.

Through the efforts of this Division, industry can see the importance of reducing investment figures and/or production costs and how the size of the plant and other factors affect the profitability of the enterprise. By so doing, we provide ample means to facilitate the proper judgment of projects, something which industrialists seek for their own benefit. Similarly, such projects will often demand financial support from the banking system, which is increasingly interested in receiving sound pre-investment reports on which to base their decisions.

Even though now a number of sponsors do call on IMIT to invite its participation in problems of a strictly technical nature, we make certain, even in these instances, to develop the proper economic perspective of the problem to be sure that our efforts will be meaningful as the project is turned to the engineering firms. Whatever the case in point, we find it extremely

FIGURE 6

MODEL FOR THE ECONOMIC SENSITIVITY ANALYSIS- THE CASE OF AN ORANGE JUICE CONCENTRATE PLANT

Impact on gross profits from main operating factors as anticipated for any given year

ALTERNATIVE B

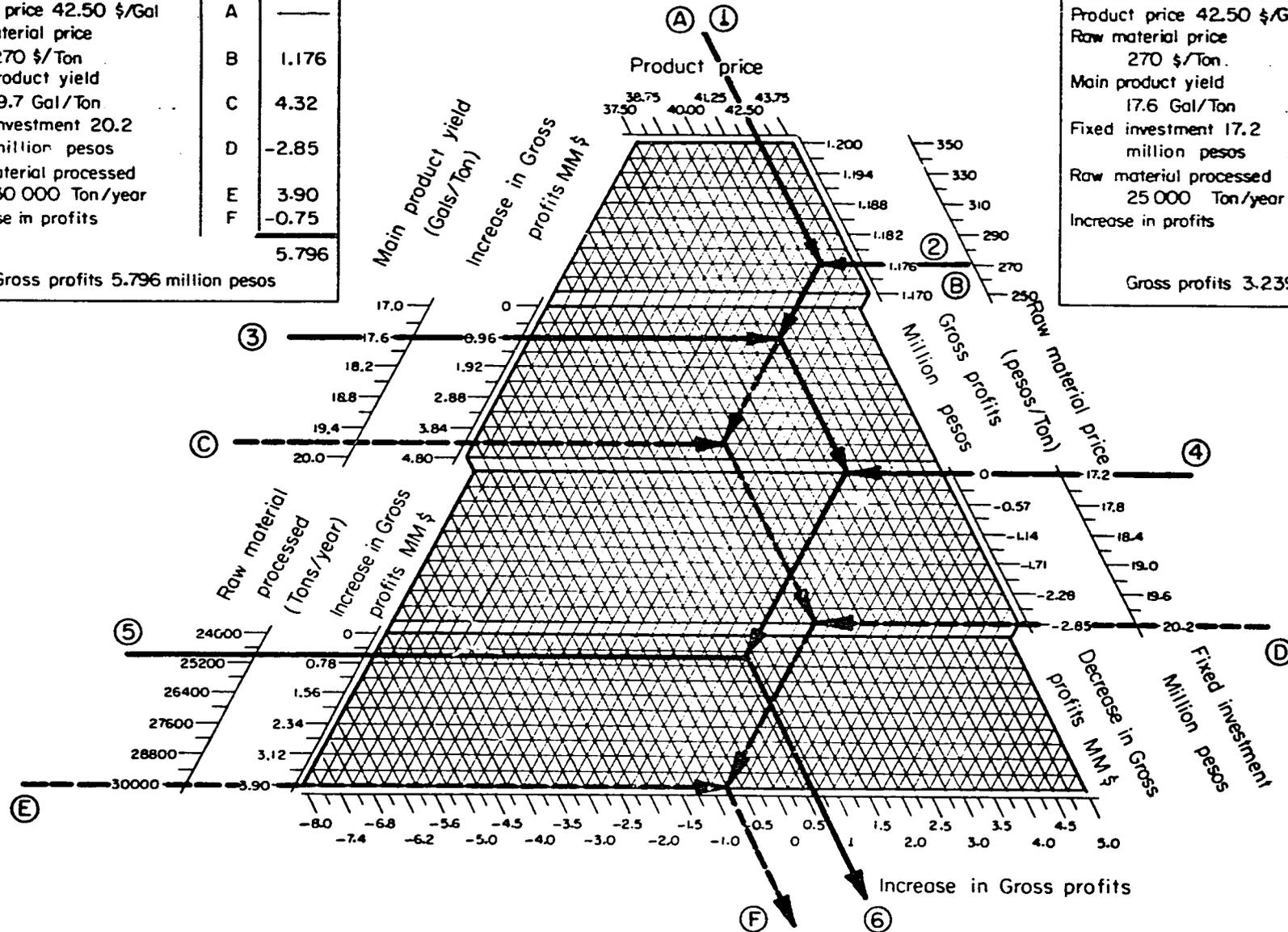
Conditions	Point	Profits
Product price 42.50 \$/Gal	A	—
Raw material price 270 \$/Ton	B	1.176
Main product yield 19.7 Gal/Ton	C	4.32
Fixed investment 20.2 million pesos	D	-2.85
Raw material processed 30 000 Ton/year	E	3.90
Decrease in profits	F	-0.75
		5.796

Gross profits 5.796 million pesos

ALTERNATIVE A

Conditions	Point	Profits
Product price 42.50 \$/Gal...	1	—
Raw material price 270 \$/Ton	2	1.176
Main product yield 17.6 Gal/Ton	3	0.96
Fixed investment 17.2 million pesos	4	0
Raw material processed 25 000 Ton/year	5	0.52
Increase in profits	6	0.583
		3.239

Gross profits 3.239 million pesos



useful to properly orient all technical efforts so that they will be conducive to a higher level of profits, greater flexibility and reduced risks. (Figure 7).

The final observation that I would like to make is that, in all probability, there is no simple way into industrial development and that, for this reason, technical transfer is in no way as straight a process as it often seems to be. In fact, one should realize that it is increasingly bound to highly specialized efforts to be performed locally and cannot be detached from the proper type of studies and research needed in each case.

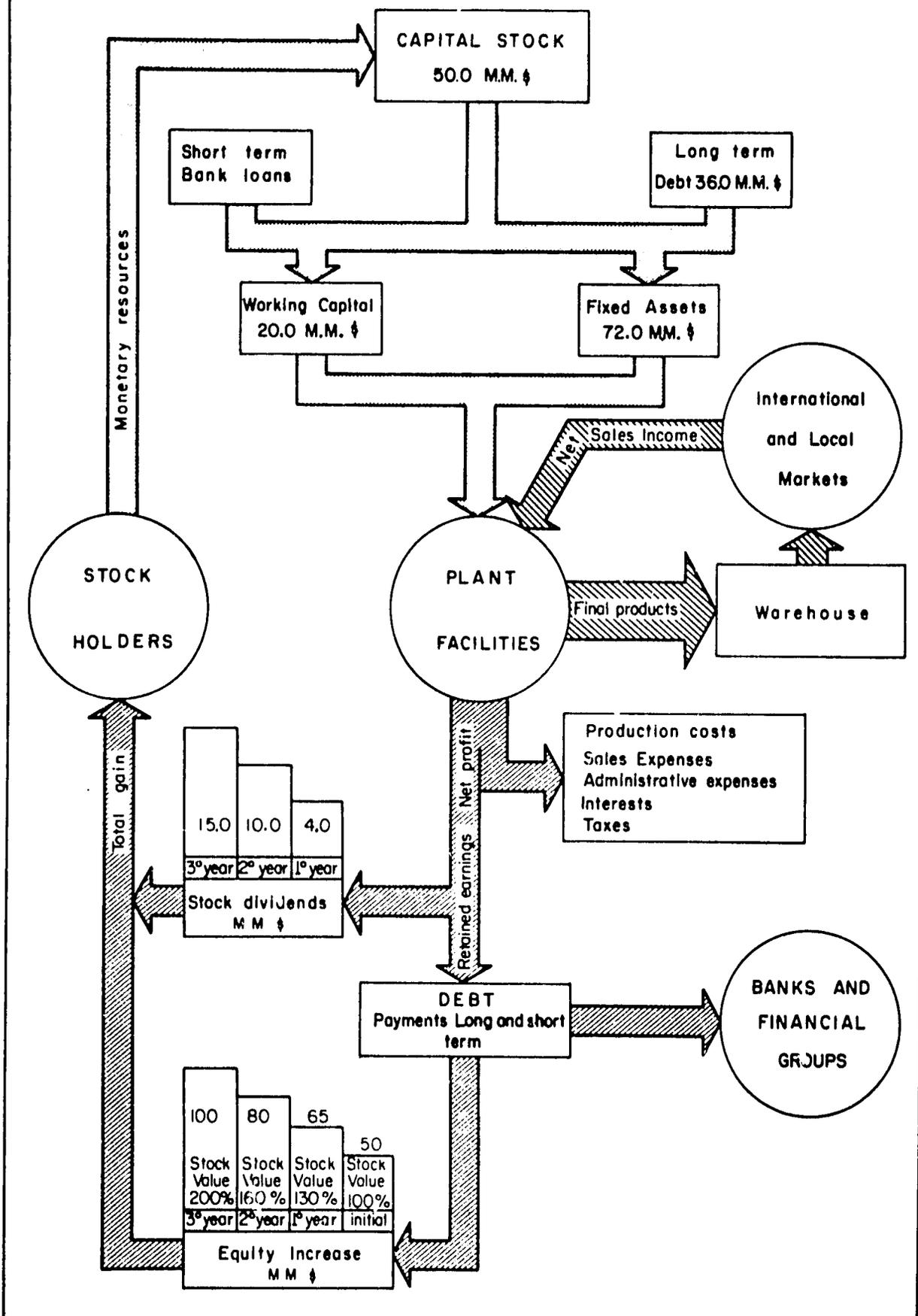
Technical information transfer into less-developed countries has always been available and it indeed plays an important role, but one cannot in all good faith believe that such a mechanism will satisfy by itself the complex requirements of many industrial projects, especially as they reach their pre-investment stages.

To sum up, IMIT has learned its lesson the hard way; it took us many years to find the proper manner in which we could serve industry and contribute to the development of the industrial sector.

For all we have learned, it is clear to us that the true secret of industrial development lies within the country itself, no matter how useful the help and assistance coming from abroad may be. Internal scientific and technical competence is, in this context, a must which should be encouraged in every possible way as a true answer to development needs.

FIGURE 7

FINANCIAL SOURCES AND CASH FLOW APPLICATION OF AN INDUSTRIAL PROJECT



CHARACTERISTICS OF SUCCESSFUL OPERATIONAL PROGRAMS

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National Academy of Engineering
Washington, D.C., U.S.A.

Actually, I have a rather interesting assignment from Ross Hammond today, and that is to listen to all of these case histories which have been presented so far to see if there are any generalizations which one might make concerning criteria for successfully operating programs. Essentially what I've tried to do is to listen and take notes. Then I went back and compared what each of the speakers has said. Then I quickly checked against Dr. Deschamps' paper, because I know he has a successful program, and added those to my list. I'd like to give these back to you in a very short, summary form because I think it's rather interesting.

The first thing one has to ask, of course, is what criteria does one use for a successful program? This always gets one into difficulty because the obvious problem is, how does one set up criteria for judging a program? Ultimately, it affects other people, and if they're not involved in setting the criteria, then problems arise. What I might consider a successful program, you may think, "He's full of boloney!" In any case, this is one of the things that we have to look at.

I asked one of my friends, Mr. Ted Davis, who is here from the World Bank, earlier this morning what sort of criteria they use when they set up a project to be financed by the Bank. He says that there are a number of things--of which I'll just tell you a part. They build these into the program as they give a loan to a developing country. Part of the loan is to be used and spent on the evaluation of the performance, or the impact, the feedback, and then the corrective actions that one might take in order to use these criteria usefully; otherwise why do it? Some of the things that they look at are financial rate of return, the economic rate of return, employment generation, and the timeliness of the project. I think that's extremely important because one can start out on a project, and if enough time passes by, everything else

will pass you by and then it becomes an academic exercise. But in his forthrightness he says, in spite of these very excellent criteria which they have designed, there are problems with this. One of the problems is the evaluation. Who does the evaluation? In their case and I know in other cases-- AID uses this technique also--independent groups make the design. There are always difficulties in this because it is virtually impossible to put down on paper what the real criteria for the project were in the first place. And then to communicate this to an independent group and expect this to come out useful to both the people who are making the loan and the people who have the loan is the problem of evaluation again. As a matter of fact, there's another even more practical problem in that people find, in spite of the fact that there are funds available for evaluating the program, the people who have the money would much prefer to use it for some other project. This quite often happens. Somehow we just don't really appreciate what this evaluation can do for us. And then there's always the problem that we really don't want to know whether the program is successful or not. Quite often this gets over into the political realm; loans are made for various reasons and sometimes for not obvious reasons. Therefore, the political consideration comes into the evaluation of the program.

Well, as I mentioned earlier, I have set down a list of criteria which I have heard from the speakers this afternoon. I don't maintain that these criteria or characteristics are complete. So, I'll just go ahead and read the criteria which I heard this afternoon. These are characteristics of a successful program, and since Mr. Hammond chose those which have been successful, we know we're on reasonably safe ground here. The first thing I heard was the statement by Mr. Parker in terms of programs of an appropriate industrialization. Now I make no claims at being expert in this area, and this is the first time I've heard that term used. We talk about appropriate technology all the time. As a matter of fact, the National Academy of Engineering has a program which has gone on too long already in terms of taking a look at appropriate technologies for the developing countries. But in this case, he is talking about appropriate industrialization, which I find is a fascinating term. Fascinating because, in his words, "It would permit the poor majority to actively engage in their own economic development," and I think this has tremendous implications! Mr. Parker also pointed out that the application of better management techniques through R&D, or the use of management techniques, or new uses or new innovative ways of doing these are usually characteristic of successful programs. These management techniques may be applied to the research and development process and, I would add, research, development and engineering which Dr. Deschamps described, and better management techniques in production, distribution and marketing. As a matter of fact, not only did Mr. Parker talk about that, but so did Mr. Yun, Ross Hammond, and Bart Duff.

One of the characteristics which came up most often, and there were so many people who talked about this I didn't give any attribution to it, was the problem-solving networks. Or as one of the speakers called it, an effective delivery system. I guess it was Georgia Tech talking about this. In other words, create networks which would permit one to generate R&D or, as they said, "generation of knowledge through R&D." All types of linkages are involved, whether with public, academic, or private sectors; with customers, marketing, economists, or engineers; or between organizations such as Georgia Tech, those

in Korea, Ghana, Nigeria, and South America. As a result of these networks, invariably the speakers talked about the fallout of training or training as a major fallout benefit or characteristic which indicated success. And I suppose you can stand back and look at any of the programs and say, "If training is not a part of it, then is it really successful?" In other words, whatever we do, do we transfer that knowledge in the way of training to other people? They talked about the network providing a means of drawing on science and engineering. As a matter of fact, I wrote down "theoretical science and engineering," and then I scratched out "theoretical" because so many of the problems that we've heard about today and which we're talking about are applied science, but I won't quibble over that because, indeed, we do use theoretical science in the developing countries--new means of communication by way of satellites in teaching, for instance. Nevertheless, this is quite appropriate in the context.

One of the things that struck me as Mr. Lofthouse spoke, which indicates success at least in my book, is the replication of projects. That is, as he was describing some of the programs for building the equipment for the hospitals, he said that there had been six other places set up to do what they had started out to do. Surely this must mean a successful characteristic of those programs. Additionally, he also spoke about spin-off activities in which people leave the project and set up their own company or set up other companies or do similar type activities. You could lump this with the role of that institution as providing a catalytic means of creating new projects, new industry, new ways of helping, new ways of training, and so forth. So if you lump those two together, replication of projects or spin-off and catalytic, then I think these have the characteristics of a successful program.

One of the things that Bart Duff, Mr. Yun, Ross Hammond and Dr. Deschamps talked about is the programs which link the activities with the market-place. I don't see how you can possibly talk about small-industry development unless you underscore that and put exclamation points after it. Otherwise, one indulges in an academic exercise.

One of the other characteristics which I heard about from Mr. Duff and Mr. Lofthouse was the innovative means of the transfer of technology. How does one get the designs and the equipment, which I know Bart takes through the prototype stage, into the hands of the manufacturer and then ultimately into the hands of the farmer? If it doesn't go to the farmer at a price that he can afford, then I'd say it's a total failure. I think Bart would agree. Therefore, that must be a successful characteristic.

I should link back earlier to the training aspect of these programs. Is this aspect of the program having an impact on the development of local capability? Mr. Lofthouse talked about this; of how people would see what they were doing and would get ideas and through the training aspect they were able then to go off on their own to do other things which created small-industry developments.

Well, one of the other characteristics was the use--I think this was Mr. Parker's--of adaptative applied research and development, using innovation

as required. This goes back to this whole business of appropriate technology. We have been struggling for two years trying to make some sense about what this appropriate technology business is all about in terms of general principles. But in a sense this is what we're talking about: the use of adaptive and applied R&D, but salt-and-peppering it and using innovation as required.

One of the other things which I heard quite often as part of their programs and as part of a successful program was the need for surveys. Georgia Tech, for instance, issues all of these publications as part of a survey of economic conditions. And in Nigeria they have done one of the most complete surveys of the small industry in that area. The information which these surveys can provide apparently has been of great use to the people. Therefore, that becomes a successful characteristic.

Now, one of the other things I kept hearing was the ability to select projects which not only have a reasonable chance of success but will also have some impact if they succeed. This goes back to the original design of the projects, institutions, etc.

And I heard from Dr. Yun of KIST one of the things that they felt you should start with, because it did have impact and a chance of success--that is to take a look at the quality control aspect of small and medium industries. The improving of manufacturing processes, which Dr. Deschamps talked about, and--this vital ingredient which we all talk about--the management procedures and techniques. Also, Dr. Yun tickled my fancy, too, in terms of the concern over the elimination of red tape by new, innovative means in order to provide services to the companies, both small and medium, which KIST services. That is, the \$250 deposit, the installment payments, the joint projects, and so forth.

Mr. Niblock also brought out an important point which I'd like to call to your attention, and that is continuity of programs; the continuous support by AID of the banks which were involved in industrial development. We have been asked, at the Academy, to take a look at a number of these programs, and time after time we see failure all over the place, purely and simply because of a lack of continuity. People will give up too soon, assuming that the project was well conceived in the first place, all because of the mistaken idea of time scales. It's very difficult. I worked very hard once to get a little company going. It took me seven years, and only at the end of the seventh year did it take off. I would have never believed it at the end of the sixth-and-three-quarter year.

One of the other things Ross Hammond and Doctors Deschamps and Yun talked about was the field contact with the people whom you're working with. I know that in the Georgia Tech Extension Service this is vital. As a matter of fact, as far as I'm concerned, it's one of the most vital points of all. And I think, also, if I know Dr. Deschamps' program, that these people talk the language; each of them understands the industrial people. If we're talking about small industry development, I think this is an absolute necessity. One of the other successful criteria is that when your industry begins to sponsor the research and it is no longer a governmental project; then I think that is

real success. As a matter of fact, I heard from Dr. Yun that 50 percent of the income from some of their projects is now from industry. This is a very strong sign of success.

Another thing that Dr. Deschamps talked about was the type of R&D being sponsored, and this is where the need is being met. When he talked about adapting R&D to pressing needs with short-term economic advantage, that just smells of success to me. The other thing Dr. Deschamps talked about, which is very impressive, is the willingness to continually adapt the institution to meet new and changing needs. This he pointed out vividly to me. He talked about originally working on products and processes and then taking a look; having to go to the techno-economic problems, and then even evolving further and further. Then the last thing that Dr. Deschamps stated, which is certainly a sign of success, is that the demand for services is so great that he now doesn't have enough people or time to do what he intended to do. That surely is a sign.

That is the list that I have. There were two other comments that I'd like to bring up. I heard an academic presentation of the Georgia Tech Extension Service today, and I'd like to tell you how it really works. Georgia Tech has seven field stations, but the important thing about these stations is that they are located out where the needs are, the problems are, the people are, and the small industries are. Secondly, they have selected bright young men and women who know the people whom they are involved with. A year ago I had the good fortune of saying, "Take me out, I want to see one of your field offices." Now my good friend, Ben James, took me out there. We spent two days and they dragged me all over the country. We talked to people who were making plastic bathrooms or sinks or showers and so forth. And it was quite obvious that the young men who are out in the field stations know the people there. There was excellent communication between the two of them, and whenever these people had problems, they called the field office. When one of the young guys had an idea for something, they called the industry. So I'd say that the magic ingredient is the selection of the right types of people to be involved in this program. I know you know that is true at whatever level you go. Also, they have access to technical and management information back there and they know how to use it effectively.

The other comment I wanted to make was that three years ago, AID asked the two Academies to take a look at the need and the feasibility of an industrialization institute. We pulled together a distinguished group of people who are involved in industrial development in the developing countries: scholars, engineers, scientists; people who are expert in trade, economics, etc. Dr. Deschamps is one of them. Dr. Stepanek is another one. And we took a look at a research institute which would focus on the process of industrialization. The panel recommended that such an institute be formed, but as an international organization, because the issues at stake are highly volatile, as you might imagine, whenever you talk about an industrialization process. The Academy report recommended that this be an international organization, made international by its staff, by its funding, by its trustees, and by its location. The idea has been talked about for three years now, both in the developed and the developing worlds. I just wanted to give you a slight progress report. David Hopper, who is President of the IDRC in Canada, has

agreed to take the lead and proceed with this; to bring together a group of people in midsummer to discuss the founding of such an institution. Basically, the institute would have a small research core group, located someplace in the world; we're not sure where yet, as the trustees would decide that. But it would have linkages with all types of institutions in the developed and in the developing world, and it would work on real problems of the developing world. Dr. Deschamps insisted on that and I'm pleased to say that that's in there. Thank you very much.

QUESTION AND ANSWER SESSION

William Mallory:

Being from the profit-oriented part of business, most everything has been from the nonprofit type organizational structures here. One of the comments you made about successful characteristics concerns the shift in funding of the project from governmental to industrial. This facet of public and private interests me, and I'm curious about the various policies these organizations have taken in terms of how they deal with specific businesses who are in business to make a profit.

Ignacio Deschamps:

This question seems to concern our case, and maybe I should give my observations about it. I think much depends on the original purpose the founders might have about the institute to be created. In our case, I can assure you that there were many many trials to find if there was a possibility of private enterprise taking over from the very beginning. With the overall costs of an institute like IMIT, this was found really impossible. I think even today in 1975, in Mexico and I'm sure in many countries with the same relative degree of development, it might be very difficult to launch a project of this calibre in terms of 100 percent private support. But the question, of course, is a very complex one because if you start the institute on the lap of the government, then there would be serious difficulties in bringing it to the other position where it would serve industry and still cover such important aspects as confidential agreements, patent and industry property rights, and so forth. But in our case, it was found very useful that the Central Bank launched the project, because the Central Bank in many of these countries has a very neutral position in politics and in many other aspects of the life of the country. It was then feasible that, slowly, this Institute would pick up more and more private projects and reach the point, as we now are, with 60 percent private funds and 40 percent funds coming from the banks. So I agree that it is a very difficult question, but it can be solved, if one starts on the right foot. I don't know if I answered your question, by the way. I hope I did. Thank you.

David H. Scull:

I guess this has to be a little bit of a rhetorical question. Not until Mr. Miller spoke just now was reference made to knowing your people. While I

don't know Mexico and Korea and the Philippines, I have a strong suspicion that the people in those countries are rather different. I know very well that the people in Tanzania and Nigeria are. Development programs face a great many constraints. There are cultural, sociological, psychological problems, many of which undercut or would be in direct opposition to some of the purely technical, managerial and financial kinds of inputs that we have talked about today. I have gained a great deal, enjoyed the meetings, and yet I'd have to ask--in terms of my own program--where in these programs that have been described is the consideration of the particular attitudes, level of development, level of understanding--whatever you want to call it? Where are the human considerations? I got just a little bit of it in the talk from the Philippines where our friend spoke of some of the problems of technological transfer. And this, of course, is the guts of it. We, ourselves, have found that we can put American and European people with practical business experience right up against African entrepreneurs who, presumably, want exactly what they have. With good will on one side and eagerness on the other, we assumed, when we started five years ago, that something will click; pretty soon, we thought. And it is very disappointing to recognize the fact that there are serious constraints. All I can do is toss this out now; I'd just like to stress the need for someone to recognize the human and peculiarly national characteristics with which we have to cope. Thank you.

Ross Hammond:

It's a very well-taken point, Dave, and I guess, while we didn't discuss it, anyone active in this field certainly has to take the social and cultural aspects into account. Are there any other questions?

(Question from the Audience)

Dave took the words out of my mouth! We've been watching the effort to try to transfer technologies over the years now. Of course, in the last five to ten years it has been an aggressive effort to transfer industrialization with very limited success. Still, we are not reaching the poorer majority that we are talking about, and it has occurred to me, listening today to the very impressive statements made, that the mix is so great we are talking about, that there is very little we can grapple with. I don't think that you can apply the technique, no matter how excellent it is at IMIT, to raising the level of the poorest majority in the agricultural sectors. This is a different ball game entirely; and yet, perhaps, it might be extremely useful if we could talk about that part of the problem because that is a very great problem now, in trying to raise productivity, to reduce the growing inequality of income and to prevent the influx of people from the agricultural areas to the cities. There are ways of doing it. It's as if all that we have learned in the extension service of agriculture somehow or other doesn't permeate the industrial sphere. And yet Mr. Miller alluded to it very briefly, and very satisfactorily I thought, talking about the extension service in Georgia. That also is a new ball game. In providing extension service in industrial development to those levels, what you may be trying to do in the beginning is establish a darn good blacksmith who can deal with problems that arise now and can't be referred to in a sector maybe in Seoul or Los Banos or elsewhere. But what

I'm trying to get at is that maybe we can make a little more progress in this terribly important sphere if we break it up into different areas which will require different approaches.

Ross Hammond:

I guess one of the most important attributes that hasn't been mentioned is the need for flexibility in approaching the problems that you find in different places.

Frank Ahimaz:

I was listening to all of the countries that you've selected, like Nigeria, the Philippines, Korea, and I think that one thing in common with all these countries is that they are all in an advanced stage of development. If you want to use a cross indicator of per capita income, I would imagine they are in the \$200-300 range. I'm concerned about the roughly 30-40 countries with per capita incomes of less than \$100 that form the fourth world or least developed countries; whether or not such industrial activities should be started there or is it still appropriate? What would be the criteria of the established industrial activities in countries and of what stage of their development?

Ross Hammond:

Well, that's up to you. That's up to the individual organization, I think. But you can say, "Here is a country with \$300-400 per capita income; yet within the confines of that country there are many areas with much less in the way of per capita income." Our experience is that we rarely work in countries in general; we work in some specific area of the country where our counterpart might have a specific interest. But, again, I think it would be difficult for me or anyone else to design criteria for some other organization.

Bart Duff:

I guess I'll just add to the frustration! I think when we look around, what we've been aware of is that a lot of these organizations and activities are being very helpful to somewhat established, small-scale, or medium-scale industries and generally, I suppose, are producing items which the poorest of these developing countries probably won't be buying anyway. I wonder if there were individuals or organizations who actually attempted to stimulate some of this small-scale, labor-intensive industrial work by creating, or helping to create, new organizations, new firms, instead of building up, making more efficient, more productive those that already exist. Because certainly in the poorest of the Asian countries this is the pattern.

Ross Hammond:

There are a lot of organizations here, I suspect, that have been involved in the creation of new industries.

BANQUET ADDRESS

Dean Rusk
Samuel H. Sibley Professor
of International Law
The University of Georgia
Athens, Georgia, U.S.A.

Greetings! President Pettit, distinguished guests from across our frontiers, fellow Americans. I'm delighted to have a chance to be with you this evening and to extend my congratulations to the Agency for International Development and to Georgia Tech and a word of welcome for all of you who come from a distance to be here for this important conference. Now that I'm very much a private citizen, I don't take introductions for granted any more. Not long ago in the Atlanta Airport a man came up to me and said, "Aren't you John Foster Dulles?" I said, "Well if I am, there's been a great miracle!"

I've often been asked what it's been like to move to the campus from those hectic days in Washington. I've usually made a comment about the delight in moving out of the rigorous world of decision into the luxurious world of opinion. Today it doesn't make any difference what I think, and I can have any opinion I want for any reason whatever. I don't even have to have an opinion. But I emphasize this point because I would want to caution my friends from other countries that I'm speaking only for myself this evening, and I'm under no circumstances speaking for the government of the United States; they have enough problems of their own. There has been one problem about transferring from Washington to the campus. I was trained by men like President Harry Truman, Secretary George Marshall, Secretary Dean Acheson and many, many committees of Congress to say what I had to say as quickly as possible and then shut up. Well now that I'm back on a campus, I find that whatever I want to say is expected to last for 50 minutes. Well, I'm not going to do that to you this evening.

I thought that I would make some comments about the policy environment within which you are addressing yourselves to small-scale, labor-intensive industries in developing countries; leave some time for you to make your own comments, because you will disagree with some of the things I say, and answer any questions which you might wish to ask. I do not pretend to be an expert on your particular topic, although I have been deeply involved with development

since 1909 because I was born here in a pre-scientific, underdeveloped part of the United States. As far as international development is concerned, I went through three presidential administrations and through those eight very interesting years of the Rockefeller Foundation.

We will get out of here promptly, partly because I have to go back to Athens; but if any one of you has a commitment which causes you to withdraw don't worry about me. I've been walked out on by Mr. Gromyko, and it won't bother me at all.

When one looks ahead for a few decades, if one dares to, one is startled, perhaps frightened, by the prospect of mass in our problems. One thinks of the population problem, for example. I understand that if the developed countries achieve a stable population by the year 2000, which is possible, and the developing countries do the same thing by the year 2030, which is rather unlikely, even then the world's population will level out within the century at about 13.5 or 14 billion people. Now it boggles the mind to think of the implications of such figures for food, education, jobs, housing and amenities of life, health care, peace and all the rest of the problems that go with that many people on this small globe. From the long-range point of view, the problem of development worldwide is certainly beyond the capacity of the United States and perhaps beyond the capacity of what are now called the developed countries. My guess is that we shall move into a period where there is no longer a sharp division between the developing countries who are below this particular per capita and the developed who are above a particular per capita income, and that we shall all have to accept the responsibility for aiding each other across national frontiers wherever we can. We know that there are some developing countries these days who are rendering extraordinary services to fellow developing countries by what is going on within their own borders. I'm a little biased on this because of my previous association with them; but I think of, for example, the extraordinary work done on maize and on wheat in Mexico and Colombia; of the extraordinary work done on rice in the Philippines. But wherever there is a need that someone can fill, an obligation may attach, whether one is called developing or one is called developed.

Although the mass in the long run is very discouraging, I do believe that my own country has a strong obligation to do what it can and to do more than it is now doing. There's a little figure that nags at the back of my mind. In the middle of the Korean war, at the height of those hostilities, we came up with 3½ percent of our gross national product for foreign aid and that included, but was not entirely, the Marshall Plan. And for substantial years thereafter we came up with very significant funds for foreign aid. Today it is difficult to get one-half of 1 percent for foreign aid, even though our gross national product is very much larger. Why? Part of it is, I think, that there is a mood of withdrawal from world affairs among the American people these days. I think it is a little too early to know whether it is an understandable, but temporary reaction to the agonies of Vietnam; a response to the acknowledged, important, and urgent problems that we have here at home, or whether we're drifting into a cycle of isolation comparable to the twenties and thirties. If the last of these three, then my country is in serious trouble, because in this world today there is no place to hide and all of us, all 140 governments of the world, must play an active and responsible part in the international community.

I think part of it is a sense of boredom. In eight years I went down to testify before committees of Congress 32 times on foreign aid alone because each year you had to appear before foreign committees--two for the authorization and two for the appropriation. Each time the committees wanted me to come. They wouldn't take a substitute. It was a matter of committee prestige, and each committee wanted a new, fresh, different speech on foreign aid. Now the reasons for foreign aid can be put on one sheet of paper--one sheet of paper. And they haven't changed very much since Harry Truman first talked about Point Four. So when the Congress hears the same things year after year after year, I think they just get bored. "Oh, we've heard that before. Yes, they said that ten years ago, and we don't have a heaven on earth yet." It isn't easy politically.

But I think also there are certain things which our friends in other countries could do that could help a little. Because any nation--whether you like it or not--any nation that receives significant foreign aid assistance from the United States has a political constituency among the American people which needs a bit of nursing. We're a democratic society and what our people think will turn out to be, in a general sort of way, what the Congress will think. I realize that the relationship between those who provide aid and those who receive aid is a delicate one, both in our personal relationships here within our own society and among nations. I would myself like to see as much as possible of our foreign aid channeled through international organizations, in order to relieve some of the tension which occurs between lender and borrower or giver and receiver. But I think there are some things which other countries could do that would help. For example, I think they could do more in making this matter of aid a two-way street. Not necessarily in comparable scale, but at least to the extent that there is a gesture of good will coming back in the other direction. I have in mind, for example, books for our colleges and universities. I have in mind specimens for our zoos. I have in mind local fellowships with local currency, to assist Americans to study in colleges, universities and technical institutes in the developing countries. Not large in terms of finance--no great burden--but a little bit of a relief with respect to this tension that I talked about.

There have been times when a little silence would help. Back in the early days of the Kennedy administration, President Kennedy authorized a three-year, several-hundred-million-dollar food program for Egypt. At one time we were told that we were feeding about 40 percent of the Egyptian people. Now we did not expect President Nasser to get up on the platform and say, "Oh, thank you, America; thank you, Uncle Sam"; that sort of thing. But it would have helped if he would have just been silent because he would get up before these crowds and he would say, "Throw your aid into the Red Sea." Well, he persuaded the Congress to do just that. And that was the end of the aid program. We don't want to buy friends, but we could at least exchange courtesy, and that would ease the problem we face politically in this country in getting support for our aid programs.

I myself feel that it is appropriate for every developed country, including my own, to try to provide not less than 1 percent of its gross national product for foreign aid through governmental or multilateral channels. When we look around us now to the scale of the capital that is required, public

funds cannot meet the problem. And here I think our friends in a good many of the developing countries will have to make a decision as to whether or not they want capital for their development purposes. Most of the capital, in any event, will come through the internal accumulation of capital within their own countries. But broadly speaking, there are two major sources of capital from abroad. One is through the channels of private investment. At a time when we cannot get, comfortably, a billion dollars for economic aid, we're exporting about 16 to 17 billion dollars of capital each year through private channels. There's enormous capacity in most of the free-enterprise economies to mobilize capital for export abroad. Now I realize that there is bargaining to be done with respect to the nature, direction and regulation of private capital. But if a country decides that it does not want foreign private capital then it cannot turn around and call upon the foreign governments to provide the corresponding amount of capital through tax money. In a society like ours, it is not politically possible to substitute government money for private capital in the investment field, so that if a developing country wants private investment it must create the climate, as the expression goes, that will attract private capital investment. But if it decides that it is going to close the doors to private investment, it can do so as a sovereign state; no question. Let's not argue about that. It can do so as a sovereign state.

But we, too, are sovereign. We, too, are sovereign, and that action cannot impose upon us a duty to tax farmers in Kansas and steel workers in Pittsburgh to raise the same capital to be provided through governmental channels. I'm a little concerned that there has not been more attention, more ratifications, to the Convention on the Settlement of Disputes between Investors and Governments sponsored by the World Bank. Because that is one of the pieces of litmus paper, one of the signs, whether or not private capital is involved or is welcome. But this is not a question for us to decide. That's a question for our friends in the developing countries to decide: whether or not they want private capital. Looking back on our own experience, a very large part of our own development in the nineteenth century came about through foreign private investment. If a country could get along without it, I wish them well; but if they want foreign capital, then they have some decisions to make as to how they expect to get it.

I think there's much less of a problem in the transfer of technology, because most of the developed countries are open societies where education is open, foreign students are welcome, and where technology is relatively easy to come by, except for a period of time if certain things are covered by patents, copyrights; things of that sort. I think we here in the United States should keep the doors of our colleges and universities wide open for those who wish to come here to study at great institutions like Georgia Tech, where so much technology is here for the asking. I think we ought to encourage teams of bi-national groups to arrange for the transfer of technology. Teams such as those which have worked over the years at Chipingo in Mexico or the International Rice Research Institute of the Philippines, or teams from our universities under contracts with AID or with foreign governments, or teams from business firms on a contract basis, or whatever else may be required to take advantage of those voluntary services of business executives who are available to invest time in developing countries to share their experiences. But also education the other way around, in order that we ourselves may more promptly understand

the problems that we're talking about and may better understand how we might be helpful. There's a big difference between a willingness to help and a knowledge of how to do it. I've always felt that we should begin our discussions with any of our friends abroad in this aid field by asking them to forgive us for our mistakes because they were mistakes of the mind and not mistakes generally of motivation or purpose. So technology is very important; but I see the channels for the transfer of technology opening up rather rapidly through all sorts of devices, including those provided by the international organizations.

I am a bit concerned, when we look at labor-intensive industries in developing countries, about the question of markets. Industries producing for what? There has been some tendency on a good many countries to think that, for example--and I exaggerate in order to speak briefly--the most convenient, attractive way to start a labor-intensive industry is in the textile field. Well, now there's a very severe limit to our ability to accept textiles from all over the world on a scale that would seriously cripple our own textile industry here in this country. I fought this battle from the other way around. I can remember when during the sixties, for example, our own cotton textile people had 93 percent of the American market reserved for them, and the foreign producers shared the 7 percent, and still our own cotton textile producers grumbled about competition from the foreigner. So, we have some problems of our own. But I would hope that our expectations would not be too high when one hears that the developed countries are to provide non-reciprocal tariff and other trading preferences to the developing countries. Because at the back of that proposition is always the notion that it must not be, because of too much disruption in the economy of the developed countries. It simply is not possible politically to take that kind of injury, whatever we professors say about the theory of international trade.

I would hope there would be an intensification of both national and regional analysis of long-term market prospects among the developing countries. I think there probably could be additional funds made available from the developed countries to assist in that process. No one is going to accept the proposition that the capacity to produce imposes upon someone else an obligation to buy. Unless there is a serious interest in the product, the market will not be there. Now I don't think this is as serious a problem in scale as it might sound from some of the public discussion about it. Because surely among the developing countries, the largest market, the most urgent market, the market which ought to be prepared to suck in as much product as one can produce for a long time to come will be the domestic market, in the rising standards of living of the home market. We shall have to talk a good deal about which parts of the product can be profitably used in earning foreign exchange in the international field.

I hope my Brazilian friends here will forgive this remark, but throughout the sixties, every year I would have a good talk with my colleague, the Foreign Minister of Brazil, and every year he would press me very hard to get the United States to buy more coffee. And every year I would point out to him that we buy and drink 50 percent of the coffee consumed in the world! How much coffee can we drink in this country? There has to be some relationship between productivity and people's ability and willingness to consume if we all

are going to try to make sense out of our economic situation. I think we can do better than we have done before, both in the developed countries and in the developing countries, in a frank examination of market possibilities. I would urge that we give attention to it.

Now, one final word before I take your questions. There has been developing a kind of confrontation between the North and the South, between many of the developing countries and some of the developed countries, on some ideas that have come to be called a New Economic Order. My own hope is that we can approach these issues with very considerable care. On the one side, if cartels of primary products are to be organized beyond oil--but with oil as an example both to the developed countries and to the developing countries--then, unless we arrange those matters equitably and peacefully, there can be trade war, despite the call for no retaliatory action taken with respect to cartels contained in the resolution of the recent U.N. General Assembly on the New Economic Order. I think those of us in the developed countries can recognize that there has been an imbalance in the terms of trade for a very long time. And you have some sympathizers in this country, because down here in the Southern part of the United States we felt for many years that there was an imbalance of trade between our own Southland and those Yankees up North. So we know what you're talking about, but confrontation is not likely to be the best way to solve these matters.

There's too much to be done; the stakes are too high. I close with this reminder: Since 1945, no nation, whatever its ideology, has based a policy of territorial expansion upon what Hitler called "lebensraum," living space. We all apparently have been relying on the possibility that President Pettit, his scientists and technologists here at Georgia Tech and other institutions around the world will somehow find a way to meet our essential requirements. Now depending upon the person you talk to, the prospect is that somewhere around 1985-1990, that hope or prospect may give out; may expire; and once again exploding populations could become a cause of war as has been the case throughout the course of human history, but this time with its dangers multiplied many times over by the thousands of megatons that lie around in the hands of frail human beings.

So I think you're dealing here with a pretty important subject. As a minimum, how to gain some time? But if we are more successful, how to solve some problems which at the moment seem not to be easily soluble. Great matters are made up out of a lot of little matters, little things. And I have no doubt that labor-intensive industries in developing countries are one of those pieces in the puzzle out of which a piece can be built, and so I wish you well.

Now maybe I can take some questions from some of you for a few minutes, or some comments if you disagree with anything I've said as well.

(Inaudible question)

The question was, "What do I really mean when I said there won't be any government aid unless they take private investment?" I want to clarify that point. I don't know what our economic aid is for this year. What is it roughly?

Curtis Farrar:

About a billion dollars outside of the Middle East and Indochina.

Dean Rusk:

All right. Now, I don't anticipate that we would withdraw that foreign aid if other countries refuse to accept private investment. What I'm saying is, that if they refuse to accept private investment we cannot make up the level of investment which they need by official tax money. For example, in the original--correct me if I'm wrong on this--Alliance for Progress scheme adopted at Punta del Este, Uruguay, in the early 1960's, 40 percent of the capital that was to be a part of the Alliance for Progress was supposed to come through private channels. I'm simply saying that public money in some countries, certainly in the United States these days, cannot substitute for the 15 to 17 billion dollars of private investment that goes out through private channels if those private channels are not permitted to operate. I did not mean that we would cut off aid; I certainly do not believe that we should cut off our governmental aid flow if they refuse to accept private investment. Now there is, as you know, a little bit of a controversy as to what happens after private investment has been made and various things happen to it. Well, that's a different question than whether you accept it at all or not.

(Question from the Audience)

Sir, you made the comment about other nations being sovereign and we being sovereign. Would you mind a candid forecast of the future--from your own perspective--as to the probabilities of these sovereignties being reduced or tempered in the future in some way?

Dean Rusk:

Yes sir. The question had to do with whether I see the tempering of the jagged edges of sovereignty in terms of international cooperation. You know, I don't know of any country which is less sovereign than the United States. To start with, we have over 5,000 treaties and agreements with other nations, each one of which is a voluntarily accepted limitation on our freedom of action. And then our very wealth and power limit our sovereignty. Nuclear weapons don't liberate you; they imprison you! So I think that we are inclined to pay less attention to the concept of sovereignty than do many of those who only recently became sovereign. You know, back in the fifties when I was in the Rockefeller Foundation, I went out to Texas to talk to a newly rich oil man. He was reported worth somewhere between 100 and 200 million dollars. My task was to try to persuade him to give a million dollars to a university if the Rockefeller Foundation would at the same time give that university a million dollars. And he heard me very politely. When I got through he said, "Give them a million dollars? I've only had it for two years!" Now bear in mind, and I say this with great respect, many of these countries who are newly independent on the world scene have fought for their independence and sovereignty. People sitting here in this room have done that. So, I think we can understand that they want to take this seriously until they know everything

that's involved in limiting sovereignty in terms of international cooperation in different directions. So we still have some negotiating to do.

I use that statement in order to point out that when Country A decides its own national policy, we have no lesser right to decide our national policy than do they. And so the problem is not which one is sovereign; the problem is how do you get two common nations working together for a common goal? And the more you talk about that, then the issues of sovereignty are, I think, a little less difficult. Yes sir?

(Question from the Audience)

Ambassador Moynihan recently mentioned a kind of a revolution of the Second International. Basically he is referring to the fact that the developing countries are now in a majority and that the United States and other developed countries are in a very awkward position getting used to the status. And this kind of a majority is now being pressed upon the reform of international systems like the IMF and the JAPT; which says that there is some form of symmetry with international systems in terms of the discretion on the part of the developing countries to affect the decisions, which after all affect them in the final analysis. How do you view these new kinds of relationships?

Dean Rusk:

Well, let me remind you again that I'm speaking purely as a private citizen and not for the government of the United States. In 1945, when the United Nations gave instructions to its architects as to the basis for planning the new headquarters there on the East River in New York, the United Nations then had 51 members. And they told their architects, "Prepare for 60, with a possible expansion to 75." There now are 138 members and there are another 12 or so at least coming down the track, you see.

Back in those days, you know, we thought maybe there was going to be a West Indian Confederation; there was going to be a West African Confederation, an East African Confederation--these things didn't happen! Now at the present time less than 10 percent of the world's population and less than 3 percent of the financial contributions to the United Nations can cast two-thirds of the votes of the General Assembly. We never know how to rewrite history, but my guess is that if those who had written the Charter had anticipated that development, we would have had two houses rather than one house in the General Assembly. We would have had a bicameral General Assembly.

I think there are several problems that arise from this. No one is going to change one nation--one vote in the General Assembly. That's there; it's going to stay that way. But when you get into the development of new international law--whether it's the law of the sea or of these commercial trade investment matters or whatever--there really isn't going to be new international law without the Soviet Union and Western Europe, North America and Japan. Votes are not going to create new international law unless the major political and legal systems of the world participate.

So I would hope that this majority would not be overconfident about what votes mean and would be a little more ready to negotiate seriously in the

corridors and behind the scenes to try to find some agreed solutions and not to rely upon votes to pass resolutions, because that's the surest way to inflate, or rather to deflate, the meaning of resolutions of the United Nation's General Assembly. Now I'm talking to you very straight and there are people in the room who won't agree with me on this, but we'll just have to see how it turns out.

Thank you.

SESSION CHAIRMAN'S
INTRODUCTORY REMARKS

Curtis Farrar
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This morning we're going to hear from representatives of a number of organizations telling us about the programs they are involved in that are relevant to the subject of the conference.

I might assert the chairman's privilege of saying a couple of words myself. As most of you, I think, know, the Technical Assistance Bureau of AID is not really the technical assistance bureau. Most of the technical assistance that is conducted by our Agency is managed by our field missions and backstopped in Washington by the regional bureaus. Those are the kinds of programs that Tom Niblock described briefly to you yesterday. Our Bureau is concerned primarily with research and development; with building a response capability in the Agency and outside the Agency in the U.S., and in some instances, international organizations; a capability to respond to the needs of our Missions and, much more importantly, in the countries in which they are working on the areas that have been set out for the AID program to follow.

Our bureau, therefore, covers a great many fields. Agriculture is the largest office. We have groups working on health, education, development administration, and an Office of Science and Technology, about which you'll be hearing something later in the day from Bill Littlewood. One of our new responsibilities has been to provide a staff capability on the subject of rural development, which is a central aspect of the mandate we have from the Congress to concern ourselves with the rural poor. I think two points about the way that group of people is going about its work are relevant to our considerations here. One conclusion they have reached is that we know a good deal more about how to help small farmers increase their agricultural production than we do about helping them find employment off the farm. Yet, clearly, that is an equally important aspect of promoting rural development, and it really refers back to Dan Parker's words yesterday. It illustrates how important the subject of this conference is for us. But if one thinks about the problem that way, you

do come to the question that was raised at the end of the day yesterday, "How small can one start with small industry?" And to the second question, whether our experience in industrial promotion--as it was described by several people yesterday--is really continuous with the problem of trying to find opportunities for the small farmer, the landless laborer, who really at the moment does nothing else but agriculture, to use his time and the skills that he can gain in nonfarm employment.

The second point I'd like to call to your attention relates to the approach to rural development. One approach, which goes by the name of integrated rural development, says that you must really concern yourself with the whole situation and try to develop a program that covers all aspects of the economic and social situation in a particular area. Another approach, which is the one we tend to prefer, one might call the entry-point approach of trying to find a particular line of activity upon which other programs can be elaborated. Such a line might be a package of agricultural technology that is significantly more productive than what is now being practiced; or a program to provide health services in areas where those health services are not available. Tom Niblock, I think, would say that rural electrification can be such an entry point, and, in fact, is turning out to be such in the Philippines.

My question arising from this is, is the generation of small industries in a rural area an entry point--or is it actually a second phase; something that comes after the beginnings of a process of economic development in the particular area being addressed? It's clear that small industry development is critical to the success of the program. I guess my own inclination, partly on the basis of what we've heard so far, is to say it is not--as we now know it in terms of the present knowledge we have--a point of entry, but must be seen as something that begins a little later in the process. I don't want to say that is the question or that these are the questions that the conference needs to address. There's always a tendency in the development business to try to identify the question when we all really know there are always many points that need to be covered in any program or in any discussion. But I think it is an important one.

TECHNOLOGY AND DEVELOPMENT INSTITUTE
THE EAST-WEST CENTER

Manuel Alba
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I'd like to paraphrase my friend, Dr. Yun, in terms of his comment yesterday about what's a nice guy like him doing in a place like KIST. In a sense, the question often raised about our institution is, "What's a nice institution like the East-West Center doing in a tourist haven like Honolulu?" Well, if you look at Hawaii, you find that in more than just the geographic sense it is strategically located in the center of the Pacific Basin, which includes among others, two of the world's most industrialized countries--namely, the United States and Japan.

Developing countries, during the last decade, have achieved some commendable progress in aggregate economic growth expected by the targets of the United Nations. Mostly, this has been achieved by a developmental strategy that emphasized capital-intensive industrialization. However, the expectations with respect to the achievement of social progress as a concomitant of growth have not been met, and the prognosis that growth and social development can be attained through such a strategy did not come to reality. Apparently, the assumptions of capital-intensive, urban-based industrialization strategy did not hold. It was hoped that as long as the growth per capita in gross national product was sustained at rates of about 2 or 3 percent, the benefits of such growth would spread throughout the economy and deliver the standards of life for all groups in the economy.

To sustain growth on this basis, aggregate demand must grow. However, such was not forthcoming, since the income of the large mass of the population did not rise significantly. The displacement of labor brought about by the application of "imported technology" further depressed effective incomes. In addition, the output generated by the capital-intensive industries had, consequently, been priced above the reach of mass consumers. Governmental policies had aggravated the condition by favoring import substitution that called for supportive measures of high tariffs, import restrictions, overvaluation of currencies and related devices. Even developmental financing policies had "pampered" the large industrialized enterprises which, because of modern

technology, were productively efficient. Yet the local demand or market did not effectively materialize, due to the combination of high prices and low incomes on the part of the large sector of the population. The late sixties saw the manifestations of the adverse effects of the capital-intensive industrialization strategy given the developmental needs of the developing economies.

A contributory factor in the failure of the past developmental strategy to achieve social progress with growth was the failure to take into account the development of social and institutional infrastructures essential to provide the mechanism for effecting redistribution of wealth and income as well as generating the necessary leverage of nonurban sectors to initiate development. Primarily, this was due to failure in planning.

The last decade, however, up to the early seventies, has witnessed a new ferment on the part of the developing countries to alter the developmental strategy and consider new priorities in terms of developmental directions. An inventory of development plans would clearly indicate the emphasis on the achievement of growth with social progress or social justice. A "new" developmental strategy calls for emphasis on employment generation that logically lays stress on the development and promotion of small-scale industrialization, the application of appropriate technology, the dispersal of developmental efforts through regional decentralization, the priority for rural development and the laying of social and institutional infrastructures that would guarantee the widespread sharing of the benefits of growth and the sustained participation of a large portion of the population in the achievement of growth. Necessarily, the desired policy framework must be present to provide the incentives and conditions for development to take place.

Given the developmental scenario as sketchily described above, it becomes easy to appreciate the program concept of the Technology and Development Institute (TDI) of the East-West Center as this is particularly articulated thematically. The themes, as these have been evolved through almost five years of problem-oriented existence and with the benefit of a synthesis and integration of the insights of hundreds of experts and scholars, many of whom had congregated at the East-West Center, deliberately address the developmental problems and priorities as these are presently recognized by the developing countries.

As this is currently implemented by the Institute, the "thematic framework" may be understood in the following context (see chart 1):

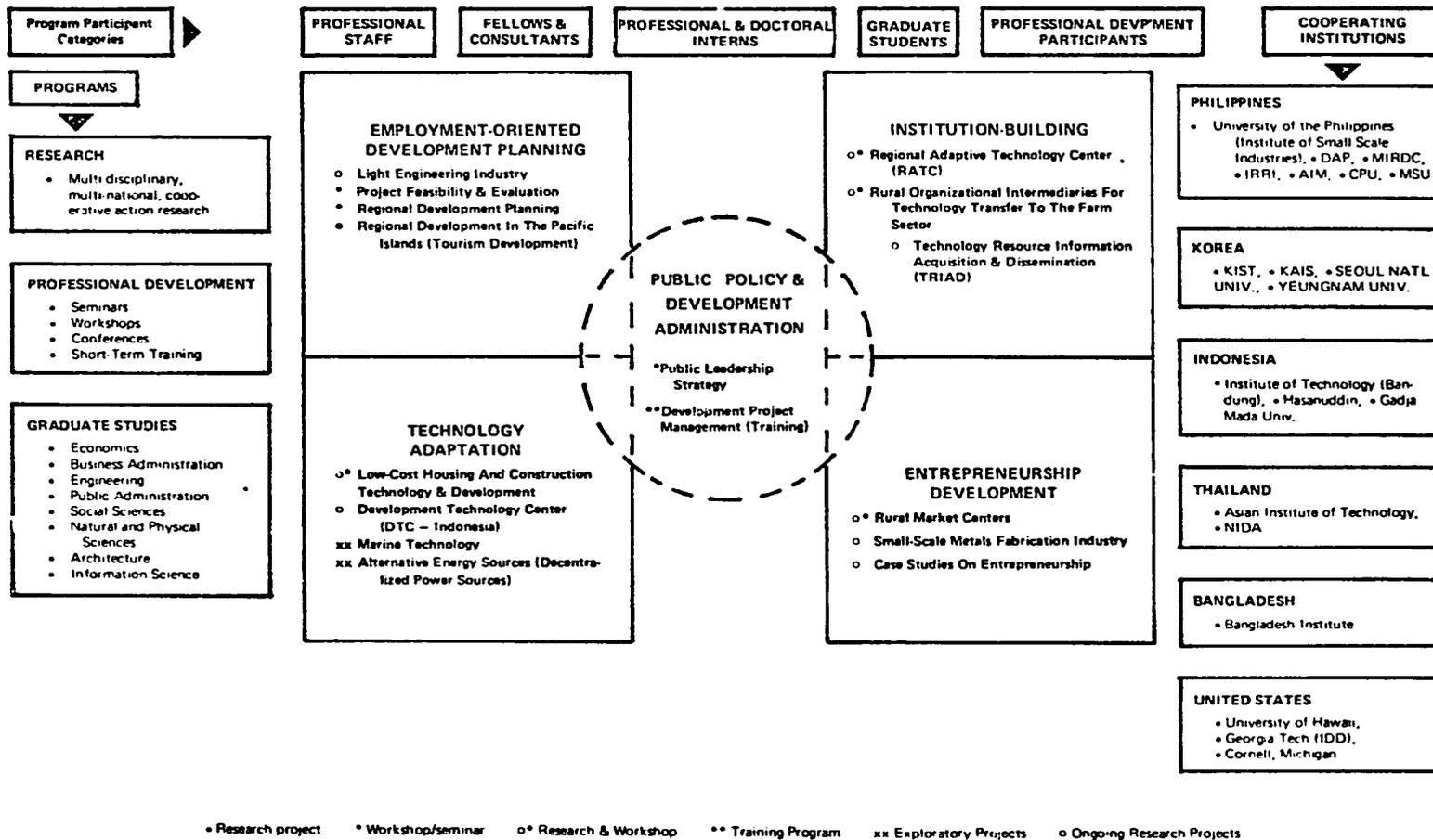
A. Employment-Oriented Development Planning. Developmental failures of the past can be accounted for partly by the failure to plan for employment generation. The stress on growth resulted in low priority for labor-intensive strategy--not only as a means for realizing widely dispersed development, but also as a process of income redistribution. In the context of the developmental setting for most of the developing economies, development planning must recognize the priority for small-scale industrial development as "appropriate" given the population factor, scarcity of developmental capital and the inappropriateness of large-scale enterprises to penetrate the massively undeveloped rural sector.



The EAST-WEST CENTER

CHART 1.

TECHNOLOGY AND DEVELOPMENT INSTITUTE PROGRAM MATRIX FY 1974-1976



The need for dispersal of developmental efforts necessitates integration of regional planning in the overall planning framework. Regional planning, among other things, must consider the identification of the industrial base as the developmental leverage, the institutional mechanisms for implementation, the mix of resources that can be exploited and applied and the essential linkage to national efforts.

B. Technology Adaptation. Technology is the motive means that keeps the development process ongoing. But in the context of the developing countries, it must be "appropriate technology." Thus, the emphasis is not just on adoption, but on adaptation. The choice of technology becomes a crucial decision in this respect. In the context of developing economies, appropriateness must satisfy, among others: (a) low-investment compared to local income; (b) employment-generating; (c) minimum dependency on complicated infrastructures; (d) high local content, i.e., utilizes local raw materials; (e) compatibility with local sociocultural environment; and (f) easy operation and maintenance of the hardware component.

C. Entrepreneurship Development. Development, by definition, means change. To initiate change, there is need for change agents. Entrepreneurs perform the change agent functions, among which are: the development of market opportunities, the decision and commitment to enter into an industry or development sector, command and marshalling of resources and all the functions that generally require the assumptions of risks--including technical, engineering and managerial functions.

It takes entrepreneurial initiatives to apply new technologies for improved productivity, just as it takes entrepreneurial initiatives to search and develop new markets. In the context of developing countries, the entrepreneurial functions must be viewed in terms of limited resources and limited markets. As a policy consequence, entrepreneurship formation must be based on the development of small- to medium-scale industries that not only conform to the criteria of appropriate technology and alleviate unemployment, but also provide the wider opportunities for entrepreneurial challenge.

D. Institution-Building. The new priorities for development on the part of the developing economies, among others, call for some degree of self-determinism in planning and administering developmental programs. However, a crucial bottleneck in this regard is the lack of indigenous institutional capabilities in planning, research and administration of regional (i.e., sub-national) developmental programs. Developmental implementation is a multi-institutional undertaking calling for an efficient networking among the governmental agencies, the research and educational institutions, local community bodies, private business enterprises, professional groups, labor associations and others. Networking, however, is still an awkward, if not an incomprehensible, arrangement in many developing countries. In this regard, the aim of institution-building must not only be the establishment of viable institutions, but efficient linkage among institutional units in a common unified effort at development planning, programming and implementation.

E. Public Policy and Development Administration. The task for development administration and public policy is to integrate the various developmental elements into a functionally interacting and synergistic system--where the separate parts become a much more productive whole. Public policy functions set the initiating guidelines that identify roles and contributions of resources, entrepreneurship, technology and institutions, given national development goals and objectives.

For both administration and policy formulation, the essentials of public leadership must be present. In the final analysis, public leadership is more than just a catalyst that must bring about the action and interaction among developmental agents; it is also a unifying and energizing force that will interpret the national will and exercise the political and economic decisions. In carrying out the functions of public leadership for administration and policy formulation, the existence of adequate and competent manpower at all levels of the administrative machinery is a sine qua non if development is to take place at all.

Viewed in its substantive context, the problem-oriented thematic framework of the Technology and Development Institute appears to portray a world view of development, as it should. But it does imply a necessary task of narrowing and focusing, since the risk is there of interpreting the framework in terms of an ambitious global view of development and, therefore, the necessary prescription of a global solution. However, by both substantive and geographic mandates, the Institute's programmatic foci must come to put priorities on a number of problem areas that are obtained in the countries defined by the geographic mandate--heavily made up of the developing countries of Asia and the Pacific. The Center's programmatic strategy and criteria call for multi-national, multi-institutional and multidisciplinary collaboration in the design, planning and implementation of projects to carry through its functional objectives of research, professional development and graduate studies.

Given the wide range of problem-oriented concerns as defined by the thematic framework and the constraints of institutional resources, the logical program implementive strategy for the Institute to adopt is institutional networking--the process of effecting cooperative linkages among the institutions in the developing countries comprehended by the geographic mandate entrusted with implementing an aspect or aspects of a project activity or activities that address themselves to the relevant problem areas identified. The essential ingredient is the commonality and mutuality of interests in the problem. Necessarily, the networking framework calls for a coordinative system that operationalizes the linkage. In this context, the role of TDI has often been that of a combination of catalyzer that induces action and interaction among the cooperatively participating institutions; of a coordinator that insures communication among the participant institutions through information dissemination and discussions; a broker that attempts to match relevant participant institutions and their interests with potential collaborative counterparts; and most of all, as an institutional "entrepreneur" that initiates proposals, ideas, concepts and schemes that may be presented as a basis for collaborative efforts.

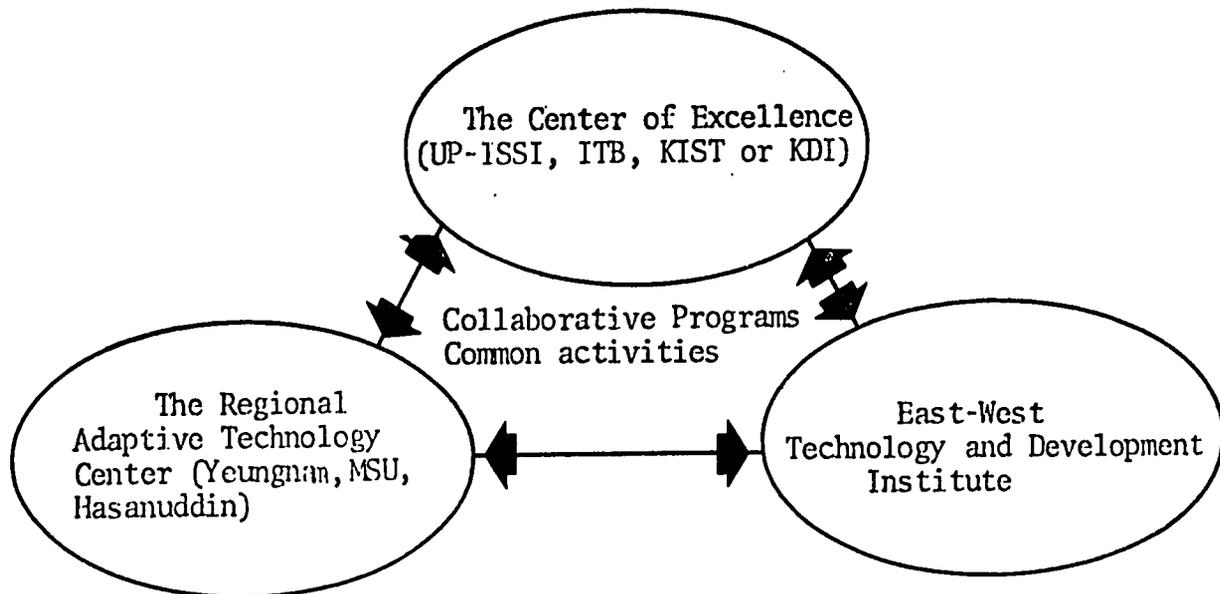
Given the Institute's substantive or problem-oriented concerns and its implementive framework, we have come to the logical focus of this presentation: TDI's own contribution and approach to the techniques and methodologies of stimulating small-scale industry development. It is appropriate, for this purpose, to highlight only a set of selected projects that have been developed for implementation by the Institute for the next two fiscal periods. It is to be understood that a "project" in this respect is a set of activities addressed to a particular problem within a given thematic concern. It is an attempt at focussing around a specified problem which is broadly defined by the thematic concern. However, the projects that are described here are specifically selected for their thematic comprehensiveness, i.e., they all relate to a combination of themes--employment-oriented development planning, technology adaptation, entrepreneurship development, institution-building, and public policy and development administration.

The main objective of the Regional Adaptive Technology Center (RATC) is to maximize the potential contribution of nonmetropolitan universities to local and regional development through the establishment of Regional Adaptive Technology Centers (RATC) in such universities, which are conceived to accomplish through systematized programs of research, consultation, training, industrial service extension and information exchange: better adaptation of appropriate technologies, skills and policies; generation and improvement of efficiencies of small- and medium-scale industries with strategic value for generation of employment and raising the level of income of the population; and in general, the improvement of the universities' capacities to be of service to the community and, in turn, to receive the support of the community.

The "network" in this respect includes three nonmetropolitan universities--Yeungnam University in Taegu, Korea; Mindanao State University in the Philippines; and Hasanuddin University in South Sulawesi, Indonesia--and a "center of excellence" in each participant country. Thus, Yeungnam University in its institutional efforts must relate and establish some linkage or liaison with either Korea Institute of Science and Technology, Korea Development Institute or Seoul National University; Mindanao State University with the University of the Philippines, particularly the Institute for Small-Scale Industries; and Hasanuddin University with the Institute of Technology at Bandung; and the Technology and Development Institute. Schematically, the network is presented in Chart 2. Linkage or liaison in this respect may mean cooperative efforts between the two national institutions and with TDI, such as in research on technology application or research on the attitudes of local small-scale entrepreneurs. It may also refer to the fact that the center of excellence assists the RATC institution in training the latter's staff, or it may include technical assistance from the center of excellence to the RATC with respect to institutional organization or staffing. And as will later be explained, the linkage is established by mutual sharing of relevant information on small-industry development.

In this basically institution-building effort, TDI's input to the network has been a continuing one--right from initial effort of project conception to what is currently referred to as assistance and collaboration in the "operations" aspects of the RATC. After two years, the three RATC's have had the institutional

Chart 2. THE RATC NETWORK



mandate "to go"; that is, some recognition from the national governments--in the case of Hasanuddin, recognition in the national plan--and the strong funding interest on the part of at least one foundation--the International Development Research Centre of Canada.

At this stage the RATC organizational set-ups are being finalized, the staffs have been identified, and proposals for funding have been formulated, not only for the consumption of the respective national governments, but for the foundations as well.

At this time four RATC teams (the fourth is that of Khon Khaen University in Thailand, under consideration) of four members each (the core of the respective RATC staffs) are at TDI going through a six-week "operations" training in three areas: entrepreneurship research methodology, industrial extension and information systems.

The long-term concern of a viable RATC is assistance and contribution to the development of local small and medium industry in their respective locales. The initial exercise that each RATC has gone through is a feasibility study of some developmental aspect of a relevant industry in the area. Thus, Yeungnam University has directed its attention to the development of the auto-part industry around Taegu; Hasanuddin University to the development and motorization of the sail-ship in South Sulawesi; and Mindanao State University to the improvement of the quality and productivity of the brassware industry. Each industry has strong potential for increased output and, therefore, the generation of employment and the raising of the level of income of the local population. Already, each RATC is looking forward in terms of broadening its industry concern. Thus, Yeungnam considers the ceramics and electronics industries as its next project interests; Mindanao State has already looked into housing materials development and food processing; and Hasanuddin considers low-cost housing development as a next priority.

By mutual interest and common link to the Institute, the three RATC's thus constitute the initial institutions of this emerging network that addresses itself to the development of small and medium industry as means to community growth and development.

Another project concerns rural organizational intermediaries in technology transfer to the small-farm sector. This project is substantively concerned with the acceleration of rural development and the contribution of technology in raising productivity, employment and income in the rural sector. There is sufficient and mounting evidence that greater attention needs to be devoted to the design of policy and institutional mechanisms which, in their performance, serve the twofold function of making advanced technology more accessible to a larger proportion of the rural population and conducting the processes of technology diffusion in a manner which is transmuting rather than destructive of basic and traditional social and economic structures. The role of intermediary organizations has long been recognized as an important element in development efforts. Governments in developing countries continue to undertake a number of programs and experiments to create local level organizations as a strategy for improving rural conditions. In Asia, farmer cooperatives, farmer unions, credit and savings associations, rural banks and agribusiness units constitute some of the more notable examples.

The primary objective of this project is to work cooperatively with institutions in Asia in developing their abilities to undertake research into the role, formation and organization problems, leadership requirements and improved effectiveness of rural intermediary organizations with respect to rural development. The rural sector remains to be the primary developmental frontier--a Fourth World unto its own. Identified as a developmental bottleneck is the lack, or underdeveloped state, of institutions that could perform essential functions to assist in the viable operations of farm enterprises--in this context clearly viewed as small enterprises--and, therefore, to improve productivity and even initiate forward integrative activities such as food processing and agricultural produce marketing.

A collaborative network is being launched with initial participation of three institutions: Gadjah Mada University in Indonesia, Central Philippine University and Rajshahi University in Bangladesh. Since the project thrust is rural development through the instrumentalities of the rural intermediaries, the institutions were selected on the basis of the environmental setting--the locales of the three universities are heavily rural/agricultural--and also the locales of current government efforts at rural development experimentation involving the development of farmer-owned enterprises with support from governmental institutions and agencies. The cooperative has been the predominant form of such intermediary, and each of the three universities will focus attention on the role, organization and operations of agricultural cooperatives--not only in terms of the role in farm enterprise financing and marketing, but more relevantly in terms of their contribution to the application of technology as exemplified by the small farm implements developed by the International Rice Research Institute.

Just as in the case of the RATIC institutions, the above-mentioned institutions expect to establish some linkage with the relevant center of excellence or government agencies carrying on functions in the same problem areas. Thus, in this respect, the College of Agriculture, University of the Philippines at Los Banos, will come into the picture in terms of its relationship with Central Philippine University. Gadjah Mada and Rajshahi Universities, however, do

not have their counterpart center-of-excellence institutions and are likely to plan their cooperative linkage with some appropriate government agencies. TDI, in this respect, jointly works with each institution in exploring this linkage as a necessary effort to effect collaborative inputs to doing something about the relevant rural development problems.

Two conference/workshops had been held at the Center participated in by these three institutions, representatives from national government agencies from the three countries and representatives from foundations. As a result of these two workshops, a collaborative design of research projects is now being undertaken by TDI and the three institutions, and a complementary feature project is a training program designed to develop the research capabilities of the staff of each of the respective institutions.

As in the case of the RATC's, the future plan is to expand this rural development cooperative network. Given the high emphasis being placed on rural development by many national governments, the expectation is for a good number of other Asian institutions to explore cooperative participation. Outside of the three Asian institutions, three mainland U.S. institutions are indirectly involved through contributing research staff and graduate students to the project. These are Cornell University, Michigan State University and Ohio State University, each having sent a "doctoral research intern," through TDI, one each to the respective institutions.

Another project is that of the emerging networks. Two emerging project networks may be described briefly--each concerned with small-scale industry development. The first is in the area of entrepreneurship development. TDI's emphasis will be on rural entrepreneurial development, oriented especially to small farm investment, employment and income expansion, and on entrepreneurial specialization and expansion directed at strengthening entrepreneurial capabilities for the expansion of small-scale productive units and the creation and generation of new employment opportunities. Research on the factors that contribute to enterprise expansion will be undertaken as a basis for strengthening entrepreneurial-managerial training and collateral manpower development.

For this purpose, a research planning workshop is now scheduled with participation of 40 participants from at least 12 countries in Asia and the United States. Exploratory efforts have been exerted to effect future collaboration among such institutions as UP-ISSI in the Philippines, Development Academy of the Philippines, Urban Development Authority and MARA Institute of Technology in Malaysia, Institute of Technology at Bandung and Institute for Industrial Research and Training in Indonesia, and Small Industry Extension Training Institute (SIET), India Institute of Management and Gandhian Institute of Studies in India.

Another network possibility concerns the light engineering industry. This is a research project directed at providing a framework for determining products and technologies appropriate to the light engineering industries of low-income economies. A three-country (Philippines, Malaysia and Thailand) comparative study is oriented to development of an appropriate methodology for planning future developments in these industries. A pilot study has been completed in

the Philippines that involved the collaborative participation of three Philippine-based institutions: Metals Industry Research and Development Center (MIRDC), the International Rice Research Institute and the School of Economics, University of the Philippines. Among others, the Philippine study will help identify the demand on the part of the light engineering sector for specific services such as those provided by research and development institutes such as MIRDC.

It may also be worthwhile to mention that another ongoing network on a TDI-coordinated project is in low-cost housing. The project is concerned with R & D efforts in the development of low-cost construction materials and low-cost construction technology for housing development and, at the same time, with policy concerns regarding the development of housing programs designed to cater to the needs of low-income families. While not particularly directed to small-scale industry development, development and production of low-cost construction materials see the participation of small "factories" and engineering shops in the three developing countries participating in the project-- Thailand, Indonesia and the Philippines. The U.S. and Korea are the two other participating countries.

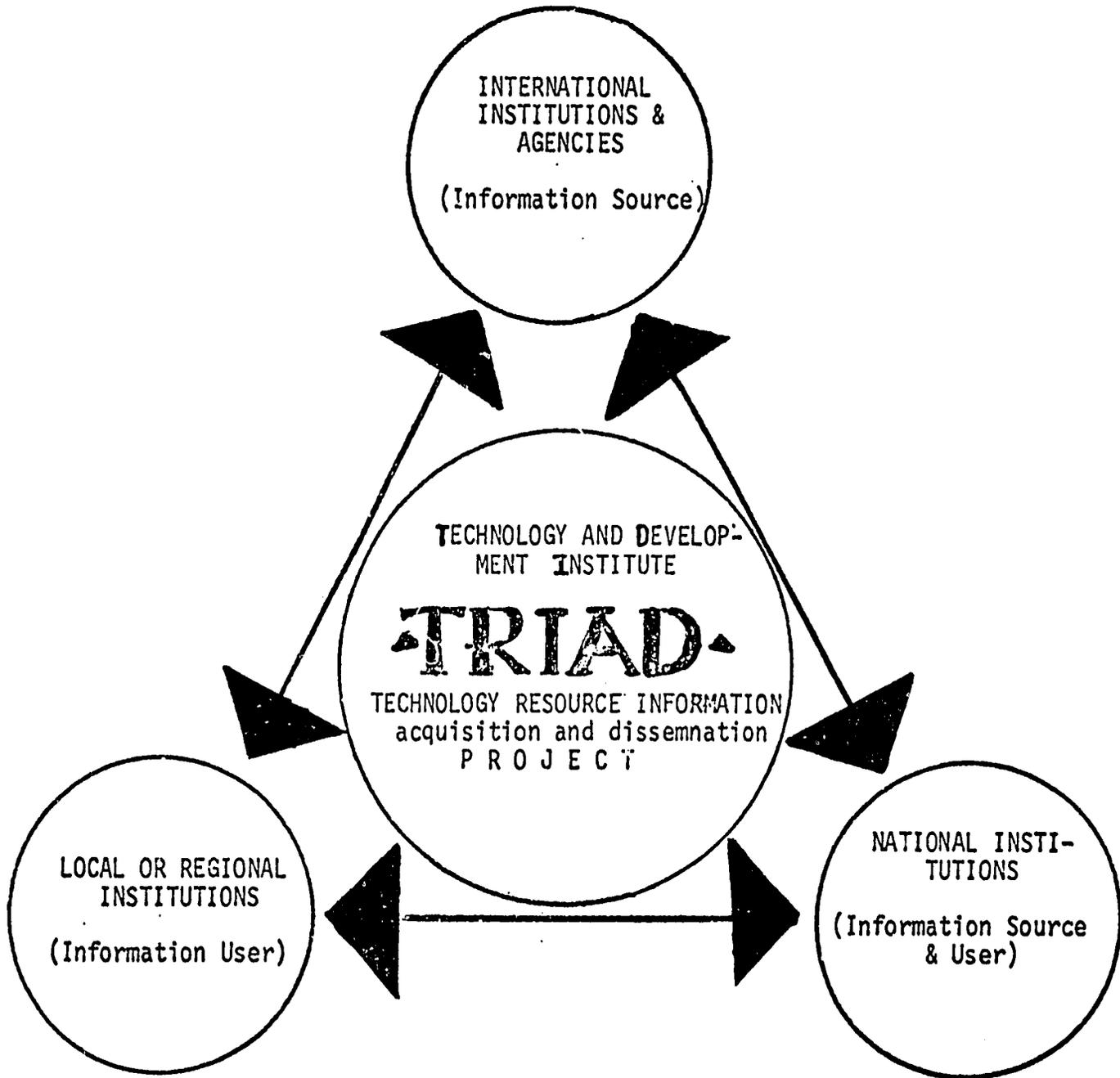
Realizing that long-term collaborative effort is desirable and that the "operationality" of the institutional networking is to be made more effective, TDI is instituting an information dissemination project--the Technology Resource Information Acquisition and Dissemination or TRIAD--designed primarily to effect a mutual exchange of usable information, i.e., the concept of "resource information," among the participant institutions of a given network while, at the same time, effecting a wider dissemination to the general audience of interested information users. The schematic diagram shows the relational framework among the participant institutions and the flow of information. (Chart 3)

Part of the effort is the systematic coordination of documentation of institutional activities--such as training and workshops--as well as of research results in multimedia packages that could be convenient not only for retrieval purposes but for more effective communication. In this respect, the new medium of video has been effectively utilized in recording and disseminating information on research, training and industrial extension activities. A library of video tapes is now being developed at TDI, serving as "masters" from which copies can be developed for use of interested audiences.

Such a TRIAD effort is now ongoing with the RATC program as well as with the Low-Cost Housing Development Project. For the RATC, the Institute's efforts are currently being directed to improving the capabilities of the RATC's to develop their own information systems that could be linked not only with the other RATC's, but also with that of TDI and with their respective national centers of excellence. A documentation workshop is now under planning.

A further supportive effort with respect to institutional networking strategy is the Project Management Manpower Development project which the Institute is launching next fiscal period. The lack of project management manpower is a recognized bottleneck in development management. In response to this need as has been identified in many of the participating countries, TDI has

CHART 3. THE TRIAD
FRAMEWORK



designed a project management training program of four-month duration; three months of intensive course program and one month of observational field placement in a project environment in a country other than the participant's own. The program will particularly cater to the immediate needs for project management training on the part of the cooperating institutions identified in the networks described in the preceding sections.

The attempt at describing the institutional networking strategy as this is implemented through TDI's programmatic efforts is to show that long-term institutional cooperation on common interests, such as the development and promotion of small-scale industry, can bring about synergistic results with relatively small investment of resources on the part of cooperating institutions. It also insures the beneficial mutual exchange of developmental experiences that can be effected among developing countries generally constrained by resources and institutional capabilities to pursue developmental efforts.

At TDI, with the cooperation of at least 23 institutions in six countries, the possibilities of institutional networking for developmental efforts have been demonstrated.

(Question from the Audience)

I would like to know if you have some kind of a basic agreement to accept students from other countries?

Manuel Alba:

Right now the Center is limiting its coverage in terms of student representations to only 32 countries, although, actually, in terms of other areas like invitational fellowships, we do invite people from other countries. I think the Center is, for a number of reasons--primarily budgetary--, limiting itself to the mandated geographic area. But in the long range it doesn't intend to limit itself to these 32 countries.

(Question from the Audience)

What are your sources of funds?

Manuel Alba:

This is primarily a federally funded institution, and as such, it's sort of unique in the United States. There is a small proportion of funding from foundations and AID, which is still a federal source.

(Question from the Audience)

That confrontation session between various levels of the administration that you mentioned was very interesting. Is there any way in which TDI could cooperate with someone else in pursuing that confrontation further in the home country, so that something constructive could emerge in terms of continuing relationships for dialogue locally?

Manuel Alba:

The attitude of the Institute in this respect is that, hopefully, the participants from these various countries would bring home this insight and do something about it. But this will be a regular program and in the sense that, hopefully, we might bring the same group of people, but generally we would like to spread out, because there are certainly other regional, sub-national areas in many areas of these countries. But we might vary the representation. In the forthcoming conference, for instance, we would like to have representation in terms of our focus on rural development; so we would expect, for instance, that in countries like the Philippines and Korea, where they have village movements, we would hope to bring to the Center the regional directors in this respect or the village directors as they may be called in some of these areas.

INTERNATIONAL BANK FOR RECONSTRUCTION
AND DEVELOPMENT

by

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First, I want to convey Fred Moore's greeting and regrets for not being able to be here. I talked to him on Friday, and he was sure that he was going to be here. And then when I arrived at the airport on Monday morning, I got instructions to call him back and learned that he had been taken sick. So I'm here to speak his words for him.

The first thing to say is that the Bank's program of small-scale industry is expanding very rapidly. From a very small base two years ago, when we had virtually no projects in small industry, we now have a pipeline of projects involving virtually all the continents. Now, I'm going to talk mostly about the projects that come through the Industry Projects Department, which is Fred's department. There are also other departments which are involved in a more peripheral way in small-scale industry and I will mention them peripherally. The guiding principle for most of our small-industry work is that a lack of finance is probably not the major limitation. This has been the first fruit of the first two years of experience. In other words, it's Fred's philosophy that just the provisions of finance--a few development banks--is not going to solve the major problems of small industry, at least not by itself. The major need, therefore, is for a package program, which includes technical assistance across the board. Now, I'll describe seven things sitting on that board.

The first is promotion. They found that there is a need for a promotional staff because potential entrepreneurs are ignorant of where their major opportunities lie. The second area where technical assistance is needed is in the preparation of the investment plan or, if you like, the feasibility study. This feasibility study for small industry is not as full or complete or elaborate as we would want in a full-size World Bank project, but it still must include the industrial costs, the selection of equipment, the plant layout, the likely sales and projected cash flow. Third, technical assistance is needed in production and production techniques. It's been the experience that even after they start producing, entrepreneurs run into production problems which they don't know how to handle. Fourth, technical assistance is needed on a whole range of financial matters, starting with the setting up of books and the carrying out of ordinary business accounting. Fifth, there is a need for help in marketing. This is often the key area. The entrepreneur doesn't know his market, especially if he is in the export business, but even if he is catering to a domestic market. Sixth, there is a need for technical assistance in other aspects of management, including the training of the labor force and the management of the labor force, especially for the purpose of raising productivity. Finally, if the small business is ultimately to expand and become a medium, and ultimately a large, business, there is going at some point to be a need for technical assistance in product design. If you like, this is an integrated industry development program, at least at the firm level, and it's been the experience so far that these projects often fail if they do not include all these elements. The critical years for the mortality of small firms, in both developed and developing countries, is the first couple of years.

Now another guiding philosophy has been that the development of large- and small-scale industry should go hand-in-hand. Large and small industries should be complementary to each other. Large-scale industry is going to require specialized components, pieces, repairs and other things which small industries can and should provide, and this is the strategy for the development of a modern small-scale industry. This philosophy is now being carried out in a couple of Bank small industry projects in South Asia, India and Pakistan.

Now our projects often support industrial estates. This technique enables you to take advantage of economies of scale in the provision of basic infrastructure for industrial development: standard buildings, electricity, water and other services which small industries need and which can be provided more cheaply and efficiently to many industries at the same time than to but a single industry.

These principles or ideas are being embodied in projects, and there is now a substantial pipeline of projects which either have been approved, which in our organization means have been approved by the executive directors, or are projects in an advanced state of preparation. Countries in which the projects are quite far along include Nigeria, Nicaragua, Jamaica, Indonesia and Thailand; those are all in our Industrial Projects Department. And I know of one project in Colombia where the handle on the project has been through a financial institution, but where technical assistance is included in the plans for the project, and also another in the Yemen Arab Republic. There are discussions being held with the governments in Tunisia, Morocco, Ivory Coast and the Philippines

which hopefully will also lead to projects. I can also add that there are projects which affect small industry that come out of other sections of the Bank. The main one would probably be in livestock, in West Africa and in other places, where small slaughter houses have been included in projects which are mainly focused on livestock production.

After all this talk about small industry, you're probably curious about how we define it. And the answer is that we don't have a fixed definition, having said that small industry roughly includes industries with more than five and less than 100 employees, using powered machinery. We specifically exclude cottage industry, or at least cottage industry that wants to remain cottage industry. If a cottage industry has potential for expansion by provision of additional capital and can also use technical assistance in the other areas which we described, then there's no bar to considering it small industry. But if it's the kind of cottage industry that wants to stay cottage industry, either because it's appropriate for that kind of development, because it is artisan craft and it's okay to do it with one man, or because it's limited by other factors to be an artisan cottage industry, God bless it! It's okay, but it's not the kind of thing we can get involved with. This goes back to the very considerable economies of scale that we have institutionally. The Bank is set up to handle large amounts of money, and when we try to deal with intermediate amounts of money, we have to deal through immediate retailing institutions, and when we have to deal with really small amounts of money, it's just not the kind of thing we're well set up to deal with, and we shouldn't do it by reasons of comparative advantage.

Another point to touch on briefly is whether small-scale industry is, in fact, labor intensive. This has been assumed in the definition of the subject of this conference. I think it's a subject for some investigation. It's possible that, because of lumpiness of capital investments or for other reasons, there are small industries that aren't labor intensive at all, and that talking about labor-intensive industry and small industry might not be the same thing.

Finally, the main policy conception that we have at this point in our experience is that the major reason why small industries do not grow in most countries is that the government has not properly taken into account their needs; that small industries need access to capital and to raw materials. They need it on a more or less equal basis to large industries. And the essential policy objective should be to remove the impediments that have up to now made it difficult for small industry to get an even share. Especially in the fields of credit, it's our feeling that small industries don't need access to subsidized credit. What they need is access to credit at all, at any time. It may turn out later that this subsidy wouldn't hurt, but at the moment the major problem is access on any terms.

Now I'd like to encourage, in the discussion of this paper, remarks that are addressed to the general theme of the conference, because, since I'm speaking the words that Fred asked me to take, I'm afraid that I will not be able to describe the program in much more depth than I have done already, and this might be a good opportunity to get in some general comments. Thank you very much.

David H. Scull:

In western Kenya there are one to two large industries which have been set up, and in at least one case, and possibly both, with some World Bank or World Bank affiliate financing, but no planning or forward movement at all in the point you mentioned--which I'm very interested in--the linkage to small secondary enterprises. It may be that you are now doing this. We've been concerned that nobody seemed to be asking the questions--is the capital available, is the entrepreneurial spark available to maximize the number of jobs, since the purpose of putting the paper mill out in the rural area was to create jobs? So I'm very much interested in knowing the present state of the policy and whether this is indeed a pretty well-rounded program.

Charles Weiss:

Well, I'd say that there are two sides to it. I don't know the particular Kenya project, but I can address it in general. I know of cases where the shoe was on the other foot, where we've been trying to influence the country to consider smaller-scale, less capital-intensive technologies. I think there is some question about whether the government is interested in this sort of thing. So, I think that there are two sides to this, but you are right in saying that this is a set of issues which the Bank has addressed itself to, I think, relatively recently. And I'd be glad to learn the details of the Kenya project, which I'm not familiar with.

ORGANISATION FOR ECONOMIC CO-OPERATION
AND DEVELOPMENT

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Let me tell you what the Organisation for Economic Co-operation and Development, Development Centre is. OECD itself, as you know, is composed of most of the Western capitalist countries--the European countries, the United States, Canada, Australia, New Zealand and Japan. It is conceived basically as an intergovernmental forum, concerned with all sorts of policy matters related to economic growth and cooperation among the members. The Development Centre was set up in 1962 as a sort of "window" for communication between member countries and the nonmember world, particularly the developing world. We have a special autonomous position within the OECD in the sense that we do not operate under a specific intergovernmental committee, but enjoy intellectual, though not financial, independence in the execution of our task. It's a very hard job.

The main, although not the only, activity of the Development Centre of OECD is research on development problems, mainly in global perspective. A distinctive flavor is that our research, in part, is policy-oriented; that is, we want to deal with the problems which will be useful for the consideration of members' development-assistance agencies as well as various multilateral development assistance agencies. The second characteristic is that we wish to involve the developing countries' own research institutes and make research meet the expressed needs of specific developing countries. We have not been very successful in this because, due to the emphasis on research, we tend to find our immediate collaborators at the level of academic circles, and we always find difficulty in transmitting the results of our research to the developing countries' own governmental organizations.

Although we are very small in scale, it is intentional that we remain small since our primary characteristic may be said to be that we engage in research on critical policies which other international bodies might find too controversial to handle. We have to handle a lot of sensitive issues. As our format of operations, we combine research and studies with fairly extensive information and communication programs, holding seminars and stimulating cooperation and

coordination among developed and developing countries' researchers in the field of development. Right now we have three broadly framed programs. One relates to a rather classical area of development research--economic development and statistics. Second is technology and industrialization; this since 1972. And the third area is demography and social development.

Now, small industry programs have long been taken up in the Development Centre. Under the new technology and industrialization program, we have also continued to take it up as an important sector in which some more imaginative interface between science and technology policy, on one hand, and industrialization policy, on the other hand, could be evolved. The earlier emphasis was on such topical issues as corrective action, and there was a series of seminars held on this. The latest efforts are concentrated to see if any important gray areas around small industries exist from the standpoint of technology policies. We have done recently, during a little less than two years, two meetings. One, entitled "Transfer of Technology for Small Industries," was held in 1973, in Hernstein, Austria. The results were just published. I think I have sent some 25 copies or so to Ross Hammond. Those of you who are interested may be able to obtain one from his office. Just about one-half year ago we followed up on this earlier seminar--which was rather a brainstorming session on the technology aspect of small industry development policy--by organizing the meeting of practitioners on low-cost technology--or intermediate technology, or appropriate technology, or progressive technology, or correct technology, or whatever term you wish. The report has just become available, and that's why I wanted to speak about this, because it is so new. It's entitled "Low-Cost Technology, an Inquiry into Outstanding Policy Issues." The report is preliminary, but there are some copies available.

Now, what are we saying in dealing with the outstanding policy issues? It reads something as follows: The problem of technology choice under the traditional view seems to be typically presented as one of capital-labor intensity, not necessarily always, but very often. Whether technology should be transferred in capital-intensive form, which in a way corresponds to advanced technology in developed countries, or in a labor-intensive form, which is becoming rather archaic in developed countries and is neglected in recently established new industries in developing countries, or in intermediate technology, so to speak, which implies either just treading along the measure of noncommitment or question-begging polemics about the appropriate choice of technology. We think that these choices would be, perhaps, false ones, if based on an entirely static view of the world. In a dynamic setting, the key question is not the level of the capital intensity of a particular production process, but the appropriateness of the whole policy environment and economic-social mechanisms as a carrier of self-generating institutional and technological transformation. When we move from the perspective of development in the conventional notion of a process of capital accumulation to that of a progressive transformation of sort of a system structure, the notion of transferring technology, which used to be emphasized, as an international movement of saleable commodities or disembodied ideas and methods seems to fade away. It is replaced by the question of how more quickly the developing countries can build up the basic institutional structures on which technology rests. Or to put it more precisely, how to articulate or integrate those important elements or

nodal points of institutional structure which happen to be administered separately and that remain quite ineffective in generating the desired macro-social process. Coincidentally, much of the institutional framework or parts of framework of developed countries happen to be transferred or copied by many developing countries, and these seem to have been, in a way, wrong.

In developed countries, where science, technology and industrial institutional structures are highly diversified and sort of densely stuffed with numerous variations of prototype components of various vintages, the question of interinstitutional links or multidisciplinary approaches has become so intractable and also almost beyond the capacity of any single specialist or any micro-project approach based on any single institution-building effort. As a result of the transfer of readily copiable models from developed countries, the many developing countries seemed to have ended up with a set of unrelated institutions or nodal points, each appearing quite well designed and well intended, on paper at least, but still too few in number and, substantially speaking, still hopeless in articulating themselves into an organic whole that can support the country's technological and industrial development. That is our general feeling as we try to see what sort of gray areas invite further policy research.

Since there is not enough time (I could go on in detail), if I can just mention a few points raised in the earlier seminar, "The Transfer of Technology for Small Industries," I recall that at the discussion at the Herstein seminar there was a strong emphasis from the outset on the theme of integration. Although there were quite a few people, especially from the developed country aid agencies and industrial associations, who were interested in the problems of direct intercountry cooperation in such forms as joint ventures, subcontracting, licensing agreements, management contracts, etc., the emphasis was generally on how to stimulate the progressive assimilation of technology in relation to the underprivileged. This happens to be our favorite term in defining what is small industry; so far underprivileged, and hence, often excessively capital-poor and too labor-intensive or too primitive in terms of technology.

There is a unique contribution by a Japanese scholar about the physiology of the technology diffusion mechanism in Japan. The only thing was that the data presented there related only to two recent years in Japan for the purpose of deriving meaningful lessons for developing countries. To enable our advancement from a mere physiology to an anatomy of the transformation process or the diffusion mechanism, particularly stimulating, I recall, was Ms. DiTullio's contribution (she was then working at the World Bank on small industry problems) about the economic policy instruments which affect favorably, sometimes, but in many cases unfavorably, small industries. These protection systems for privileged modern industries--direct and indirect tax systems, credit policies, production licensing systems, standards, industrial estates, etc.--all seem to be desired if we stress the new role for small industries in development.

I also recall that a Korean expert, Mr. Ip San Kim, who is vice president of the Federation of Korean Industries, gave us an extremely revealing account of Korean industry development after the 1950-53 war. The national goal of constructing the nation by exports, for this was a slow one, seems to have

helped considerably in streamlining the promotional policy measures for industry and circumventing the well-known pitfalls in the administration of priority policies, and thus in shortening the time required for moving through the number of development stages or sequences needed for technology advancement of the Korean industries. It has, however, yet to be seen how Korea will be able to succeed in bringing into a similar dynamic process the rural, traditional sector of the country, which the export-g geared strategy seemed to have left behind.

I also recall Ross Hammond, our friend who is now our host this time, gave an excellent review of the Georgia Tech program for industrial development, setting right on the problem of a delivery system to effect the transfer of knowledge to potential users from the standpoint of micro-development projects. I remember Ross said that successful technology transfer to small industry wasn't an easy thing. He may have said the same thing yesterday. But it would be achieved with knowledge, communication, explanation, interpretation of the information, continuity of the program, considerable time and money, and a great deal of patience. A lot is required. He also implied, if not trying to cheat us, that the impact analysis of project assistance in the form of cost/benefit analysis was rather encouraging. But he admitted that, in the delivery process, small industries themselves are not quite transfer agents for knowledge and technology and that they have to be helped by those who have the patience, money, knowledge and time to do the job. Thus, the Hernstein seminar laid down some useful perspectives and concrete elements for further research into bigger mechanisms and policy instruments for small-industry development.

What is precisely the scope open for industrialized countries to help the developing countries in this field--or at least not to disturb the ongoing efforts? That is, however, not yet very clear to us. To be more specific: for example, they're having some thoughts about successful scaling-down of the developed countries' industrial technology. But we do not seem to know enough yet how scientists and engineers could be guided or reoriented to take up this challenge more systematically after having been so long preoccupied by the economies of scaling up. Still another issue is related to the fact that policies for technological development are often just the other side of the same coin, that is, the policy for selection of priority industries. For example, very often emphasis was laid on the importance of repair and maintenance shops which could be a promising starting point for cultivating the machine-building industries in developing countries. Architectural and civil engineering capabilities in the form of specialized professions or businesses seemed to have developed rather quickly in many developing countries, particularly due to the massive public-works expenditures of governments as well as the help provided by international development banks, such as the World Bank. But the industrial engineering capability, which is so much needed to articulate more diverse scientific technological disciplines at the level of industrial production--small or large in scale--is not growing equally rapidly. We could think of the backward linkages of infrastructure investments to supply industries, such as cement, building hardware, communication apparatus, equipment, etc. These are important from the technological-development point of view as well as from the economic point of view. But this involves policies for procurements and these are tricky issues, and we feel that much more attention should be paid in

programming the public-works sector from the standpoint of developing local industrial engineering capabilities.

The integration field, too, seems to be very much in the air when we come to see the actual state of the arts. Within the limited operational framework of the micro-project approach, an integrated approach that pulls together all sorts of efforts for financing technical assistance, fiscal policies support, marketing assistance, etc., may be organized as a model case in a particular spot. However, if the total system characteristics remain unchanged and persistently bog down in interinstitutional rivalism and bureaucratic conservatism, then they'll still be a serious limit to what one could expect as a spontaneous demonstration from one or two well-designed micro-pilot projects. Take, for example, the discussion currently going on among the transport planners for development, even with the World Bank. They are all aware of the needs for a concept of sector lending; namely, to look at the transport requirements of all modal characteristics in giving vision as a whole, instead of looking at the specific or the conventional project approach--that is, to see a project connecting point A to point B and to evaluate accordingly. However, it is a very difficult thing to go back--to get involved in the sector approach, or the systems approach because it requires a much longer run, a much more vague project concept, which does not meet the conventional banking principles. We are now thinking of the developing country's food problems. While nobody denies that marketing is of crucial importance in awakening the rural subsistence agriculture for increased food production, few people would deny the built-in bias of most marketing agents who care mostly about how to make richer people buy more and are seldom motivated to think of how to feed the poor. The so called agro-industry in developing countries also seems to be rather ambivalent, particularly with regard for whom they are to improve their processing and technology: the urban supermarkets and the export markets or the small, localized markets in rural towns and villages. We want to look into the state of the arts in this area as well.

Well, that much was, in a way, a reflection of the Hernstein seminar. Now I intended to talk longer about the matter discussed and studied at the meeting of practitioners we had on low-cost technology. Obviously, it takes more time. In that meeting we assembled a number of different kinds of change agents who are interested in or, rather, active in pushing this low-cost technology movement in the developing world. First, there are universities and their technological experiment and development institutions. Second, the technical training facilities for farmers and small industrialists. Third, the information centers and related technical consultation services. Fourth, governmental small-industry promotion agencies. And then we added, further, some non-practitioners who are concerned with a rather macro-science and technology policy, who didn't know very much about what the low-cost technology was but are very much interested. Also, we invited some development economists, socioanthropologists, etc., who'd keep in sight the broader policy issues which interact with the practitioners' preoccupations, which happen to be rather narrow. We have attempted a synthesis, and we do realize that it is still too early to produce a full synthesis as to the experiences and lessons and messages for policy-makers. But I think that we can continue this activity for some time. In fact there are more specific and interesting findings from this meeting which I thought to speak of...but time is running out.

INTERNATIONAL DEVELOPMENT RESEARCH CENTRE

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You'll observe that I'm described as a special advisor. An aunt of mine once remarked, "I have two nephews. One of them went to sea and one became a special advisor, and nothing was heard of either of them again." Dr. Yun of KIST seems to have made history at this particular seminar. He says that when someone asks him, "Why is such a nice fellow at KIST?" he receives the reply that Yun must have had an unhappy childhood or perhaps his wife does not understand him. Now I, personally, had a very happy childhood and my wife understands me rather too well. Hence, I suppose I'm with the International Development Research Centre because this was the only place where I could find a job! But to more serious business.

By the late 1960's there was worldwide concern about the gross imbalance between the large expenditure on research in the industrialized countries and the small allocations in the low-income nations. An estimated 98 percent of all research is undertaken in the industrialized countries. More is spent on research for synthetics in the rich countries than on all types of research in the poor countries. The income gap between the rich and the poor countries is, to a large extent, a science and technology gap. The IDRC was conceived, therefore, as an organization to help correct this imbalance and to support research designed to reach specific needs of developing countries. However, only in rare circumstances has the IDRC support been given for research in uniquely national problems. This policy has enabled the IDRC to be truly international in its concerns and its endeavors.

The International Development Research Centre was established as a public corporation in 1970 by Act of the Canadian Parliament, and here I quote, "to initiate, encourage, support and conduct research into the problems of the developing regions of the world, and into the means for applying and adapting scientific, technical and other knowledge to the economic and social advancement of those regions." The IDRC has, for the most part, concentrated its efforts on trying to improve the well-being of rural peoples. Projects of research are being or have been undertaken in some 75 countries. This means

that there is a wide spread of projects throughout the developing regions. But agricultural projects, in particular, have been concentrated in the poorest of regions, the semi-arid tropics. The IDRC is funded by appropriations voted by the Parliament of Canada and is governed by an international Board of Governors from ten countries besides Canada, six of whom are from developing countries. The Governors meet twice yearly, and the Board's executive committee meets four times a year. The Governors establish priorities for the Centre and approve all major projects. During the three-and-a-half years from the inaugural board meeting in October, 1970, to the meeting held in Dacca--one of our other regional offices--in March, 1974, 200 projects were approved which called for appropriations of \$28.9 million. The great majority of these grants have been made to institutions in developing countries to enable them to do their own research. This is in line with the emphasis placed by the Governors and the officers of the Centre on the second objective laid down under the enabling act, and I quote again: "To assist the developing regions to build up the research capabilities, the innovative skills, and the institutions required to solve their problems."

There are five separate divisions in the IDRC. These are agriculture, food and nutrition sciences; information sciences; population and health sciences; social sciences and human resources; and publications, which has been recently formed as a separation from information sciences. One of the now numerous publications of the IDRC, entitled "The First Two Hundred Projects," lists these projects by geographical area and by subject in an index. In several of these projects, there have been other donor institutions with whom the Centre has joined in partnership ventures. In nearly every case, there has been a substantial contribution also from the recipient government or institution in the developing country, either in funds or salaries or facilities. This is an important element in any project. The total value of all contributions from recipient institutions in these 200 projects is the equivalent of nearly \$13 million. The IDRC maintains an Office of Public Information from which more information on any particular project can be obtained.

Now these few words are but an introduction to a film, consisting of slides and commentary, which I now propose to show you. Although our President is not able to be present here in person, these slides will make it possible for him to talk to you briefly about the inspirations and the aspirations of the IDRC. After the slides are finished, which takes about 17 minutes, I propose briefly to describe a major undertaking of the IDRC in the field of technological transfer to small industries in the developing countries.

Taped Slide Narration:

An important trend in development today is for the poorer countries to find means of cooperation among themselves, look for solutions to their own common problems, and pool their experience for their mutual advantage. The Andean Group, formed by six Latin American countries, is an example of this trend. In 1970, the Commission of the Andean Pact started planning how to encourage local industrial skills and performance. To help launch the research that was needed, Canada's new International

Development Research Centre contributed funds of over \$400,000. The Andean countries are not trying to exclude foreign technology, but only to build up a system geared to their own needs by sorting out the most appropriate forms of technology and finding ways to bargain more effectively with the international corporations for the best possible terms on whatever technology they have to import.

Very basic questions are being raised today about development assistance. For instance, it is really helpful to concentrate exclusively on the direct transfer of capital goods and specialized knowledge to developing regions? This reevaluation of development aid was partly triggered by the Green Revolution which showed how scientific research can solve major problems of the poorer countries if it is designed properly to fit their particular conditions. It also proved that peasant farmers are not, as some people have said, stubborn traditionalists, but will pick up new ideas as long as they fit their needs.

In line with this revised approach to foreign aid, a new institute was formed in Canada to pioneer a different style of development operations. Established in May, 1970, by an Act of the Canadian Parliament, the International Development Research Centre is supported by Canadian funds and submits an annual report to Parliament through the Minister for External Affairs. While its objectives are set by the Canadian Parliament, the Centre is a public corporation and, therefore, has a great deal of autonomy. It is headed by a board of 21 Governors, with the Chairman and 10 members from Canada and the other 10 Governors from various parts of the world. Six of these non-Canadians came from developing countries. The board meets twice a year. The first Chairman of the Board was the late Lester B. Pearson, who was Chairman of the Commission on International Development set up in 1968 by the World Bank. The Board is now headed by Mr. Louis Rasminsky, former governor of the Bank of Canada. The international flavor of the IDRC is noticeable, not only in this Board of Governors, but also in its staff, which is quite cosmopolitan. As an extension to its Ottawa home base, the Centre opened three regional offices in Bogota, Dacca and Singapore to keep in touch with the changing needs of developing regions and with the conduct of its projects.

The president of the IDRC is a man who is one of the prime movers in the Green Revolution, David Hopper. Speaking recently about the goals and the mode of operation of the Centre, Dr. Hopper used these words: "What are the functions of the IDRC? At least with that small portion of Canada's aid budget that it receives, it is to let the developing countries undertake the research. Let them do the job, recognizing that it may involve risks and a few mistakes--but only by making the mistakes can the developing country researchers eventually learn to solve their own problems. It is they who must articulate the problems.

It is their priorities that they must follow. It is their perceptions that must guide their research. It is their understandings that must be fostered, nurtured, and assisted through a process of learning by doing. This is the fundamental concern of the Centre's Board of Governors. It is through this philosophy that the Centre's Board gives content to the Parliamentary mandate that calls upon the IDRC to use its resources to build within the developing countries the institutional structures, the research capabilities, the innovative skills that will leave a legacy of trained people in the developing countries who are capable of solving their own problems."

The Centre's status as an independent corporation rather than an arm of a national government gives it several advantages. First, its priorities are set by an international board which may better reflect the true priorities of developing regions. Secondly, it has no vested interest. In other words, it provides untied aid. Thirdly, it can place strong emphasis on training scientists in their own developing countries and on research that is done in developing regions. Fourthly, it can sponsor the creation of worldwide networks to strengthen the research being done and to disseminate the results. The Governors of the Centre very quickly agree that the main priority for IDRC work should be the well-being of rural peoples. Their reasoning was that rural peoples still comprise a vast majority of mankind and that on the whole they have benefited far less from technological and social changes than people living in urban areas. All the program divisions of the Centre accept the well-being of rural peoples as their major concern, but it particularly fits the work of the Division of Agriculture, Food and Nutrition scientists.

For instance, in the Andes region of Cundeamarcha, a team of Colombian extension workers and researchers have been working for nearly two years with small farmers to raise their production, both of livestock and half a dozen crops. They are also organizing better marketing arrangements and more agricultural credit. What's really important is that the Colombians are doing this work for themselves with a minimum of expatriate assistance. Foreigners are only hired in the projects funded by the Centre when they fill a crucial need which the developing region cannot supply. In total, there were only 15 expatriates working full-time on the first 100 projects. The Agriculture Division has concentrated particular support on research to help the people who live in the semi-arid tropics. In this belt that runs across the middle of Africa and India and through several Asian and Latin American countries, some 400 million people live off crops such as sorghum, millet and certain legumes on which comparatively little research has been done. And they are, of course, the people who have been hit by the present worldwide drought. In answer to the pressing needs of these people, the Centre has been supplying

funds for research in plant breeding, multiple-cropping systems, grain storage and post-harvest protection, forestry and the use of forest products. In addition, the Division supports action research to help the small coastal fishermen in Africa and is conducting projects in nutrition, home economics and food technology.

The emphasis on the well-being of rural peoples also guides the work of the Division of Population and Health Sciences. The staff in the Division are looking at population questions in the broadest possible way. Not only are they helping research to find new contraceptive methods and financing pilot schemes of family planning, but they are just as concerned about studying the economic and social factors that lead people into having children or not having children. They are also helping countries which want to articulate and implement population policies. Another important concern of the Division is the delivery of health care services in rural areas where the training of local people is given great importance, and research is being done into the prevention of some major tropical diseases as well. For example, there is a species of black fly which carries the disease that causes river blindness in many parts of Africa. A cooperative effort between African and Canadian scientists is under way to apply a method of biological control to this black fly which was successful in experiments against mosquitoes in North America.

A third division, the Division of Social Sciences and Human Resources, is putting particular emphasis on networks of cooperation and is using social studies to help ease the process of adapting to modernization and change, again with a focus on the well-being of rural peoples. For example, it has been supporting a study in 13 areas of Asia to examine the impact of rice farming changes after the introduction of high-yield varieties and gather facts on what these changes have meant in terms of land holdings, jobs and the income of the poorest farmers.

Besides worrying about the people who remain in the countryside, the Division has also been concerned about rural people who migrate to the cities. A study of rural-urban migrants has been carried out in eight metropolitan areas to look at the problems of urban slums and squatter areas. This study has identified some of the conditions that contribute to such large population movements and has made recommendations to governmental and other programs to help the squatters. These recommendations were discussed at a workshop that brought together researchers and policy-makers from all eight countries involved.

In a different kind of network, IDRC is helping to rationalize the vast amount of information that has been accumulated about development projects during the last 20 years. In a typical

project, the Division of Information Sciences is working with the United Nations family of organizations to collect information on development, combine the data of these agencies and provide a worldwide service of retrieval and dissemination of information about development to those who need it for their work. This Division is also helping to create specialized centers for information on particular crops, such as cassava and manioc, and on soil engineering and irrigation. It has been building an industrial extension service to support small industries in Southeast Asia with technical and managerial advice and back-up national extension services.

During the Centre's first two-and-a-half years of operation, the Board approved some 100 projects which called for expenditures of \$13.4 million. This figure breaks down into almost equal amounts that were spent in Asia, Africa and Latin America with the Caribbean. About one-seventh of the funds remained in Canada, to cover the cost of research that was done at several Canadian universities in support of specific projects in developing countries.

One question remains. On what basis does the Centre support some project proposals and turn down others? Broadly speaking, the projects answer to the following criteria. First, they fit a priority that has been expressed by a government or an institution in the developing countries. They are not imposed. Second, the findings are likely to have useful application outside the country or region in which the research is taking place. There is a multiplier effect. Third, they should contribute towards the task of closing the gap of living standards between the poorest and the richest people in developing countries. They don't just help the elite. Fourth, they are carried out in great part by personnel from the countries involved. Fifth, and closely linked with number four, they have a training component built into the budget so that the project leaves behind an investment in better-trained or experienced researchers. These criteria have given the Centre a new look among development organizations and may help in a modest way to bring some balance to our presently lopsided world. It is, in a way, encouraging to know that other countries besides Canada are interested to explore this new idea of a partnership in research between industrialized and developing countries. Sir John Crawford of Australia, an agriculturist of great reputation, said some time ago: "That is a unique piece of legislation. I know of none other like it. I know that many people in Washington, D.C. are rather jealous that Canada got in first with a very good idea. I'd be quite happy if my own country, Australia, is third. But I think it is a good idea and perhaps I ought to say why I do. If I might just take a simple illustration; those of us--and none better than Dr. Hopper, being associated with him in India--know just what a difference it has made to India to have

certain work done in India itself; certain work done in Mexico, brought together to get new varieties of wheat. But we have also learned that it is not enough just to find a new variety in Mexico, you have to work at it to make sure that it meets the particular soil, climatic conditions, consumer tastes, etc. in the country in which you want to use it. And one of the ways I've seen the International Development Research Centre contributing is helping countries get the full benefit of work done in the major centers of the world.

Most developing countries are facing problems of unemployment and of trade deficits. Many are seeking the establishment of industries that will be labor intensive, that will produce substitutes for imports or that will produce goods that will meet the standards of quality of international trade and can compete in export markets. Present industries are often ineffective because of excessive costs, particularly through the wastage of raw materials or because their products are of poor quality. To overcome these problems and to meet the objectives, industry needs technical and technological advice. Often the advice needed is at a very basic level. It is not generally a question of providing advanced technology, but of having an experienced technologist or engineer taking a look at the plant and making suggestions that would improve the processes or the product. For small industry, particularly labor-intensive industries, the situation is very similar to that which exists in agriculture, and the industrial extension officer can approach those he is helping in much the same way that the good agricultural extension officer approaches the farmer.

Industrial extension services in the Southeast Asian countries vary according to the level of development in each country and the types of organizations established to provide these services. There is, however, a clearly expressed recognition of the need for providing technical and technological advice on equipment, methods and processes, production techniques, and quality control and a determination to work towards a situation in which the industrial extension services will have the personnel and resources to provide this advice to production managers on the factory floor. People charged with the responsibilities for industrial extension service also recognize that the needs are greatest in the small industrial enterprises. Because of wide differences in language, cultural background, types of industry and levels of industrial development, it is clear that the industrial extension services must be staffed by indigenous technologists or engineers and be complementary to extension services in the field of management, marketing and financing, which are equally important. These should be organized nationally or perhaps even by provinces or cities. No service organized for a region as a whole could be expected to provide satisfactory service to individual factories, but a regional service could provide resources on which the various national extension services could draw. A regional service could also provide a focus that would facilitate the cooperation and exchanges between the national extension services and their linking into a functioning network.

Much of the last two paragraphs has been taken from a report made to the IDRC in August of 1972 by a team consisting of members of the staff of the IDRC and of the Technical Information Service of the National Research Council

of Canada. Following upon 20 years of close personal contact with industrial problems in Southeast Asia, this team had toured six countries of Southeast Asia--Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Hong Kong--during February and March, 1972, during which needs and priorities were discussed with local organizations and a number of typical factories were visited. An early draft of a proposal based on their experiences was submitted in May of 1972 to a meeting convened at the IDRC regional office in Singapore, which was attended by the heads of extension services from the six Asian countries principally involved. And the details of the proposed project, even the language of it, were developed jointly by the parties concerned during that meeting. One of those present was Leon Chico who is here today. Hence and thus, the project Technonet Asia was born. There were two parts, one to operate out of Canada and one to operate out of Singapore. The operation in Singapore, called Technonet Centre, needed support from Canada in the form of training facilities to supply current industrial information and to maintain a rapid answering service. The principal resources in Canada are at present at the Technical Information Service of the National Research Council of Canada. This is perhaps one of the finest technical information services in the world. Drawing upon the National Science Library, which carries nearly a million books and reference works, advantage can be taken of the 30 years of experience which the NRC-TIS has accumulated in service to Canadian industry. This service now costs the Canadian government \$1.5 million a year. There are over 70 industrial extension offices in the field for operating searches of the literature. The service is formally intended to assist Canadian industry, and the service is free. However, a considerable contribution to the needs of the developing countries has been made over the years. The eminently successful industrial extension services now operating in Mexico and in Brazil stem from engineers and technologists who were brought at IDRC expense to be trained with the NRC-TIS staff, then to return to their own countries to apply the new techniques they had acquired in Canada. As a part of Technonet Asia, the contract was drawn up between the NRC-TIS and the IDRC and \$300,000 was allocated to the training of actual and potential industrial extension officers, not only from Asia, but also from several countries in Latin America. To the project itself in Singapore, another \$88,000 was allocated to cover a current-awareness program, travel and living expenses for nationals to go to Canada or India for training, the promotion of cooperation between national services, translations, the establishment of a newsletter, the engagement of administrative staff in Singapore, the organization of the Council of Technonet Asia and provision for its meetings, the organization of seminars and information centers, the provision of consultants and training within the region.

U. S. AGENCY FOR INTERNATIONAL DEVELOPMENT

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In my first career as an oceanographer, I worked particularly in the Antarctic; among my other duties I had the job of observing the ice, and I just can't refrain from making a pun: what's an ice man like me doing in a place like AID?

We've just put out a new publication, Information on the Office of Science and Technology and Its Programs. I'll take a few more minutes to pick up a few highlights of our activities. Our program calls for science and technology programs in AID and really, as you all know as well as I do, there is a lot of science and technology in agriculture and nutrition and health; and so these remarks are constrained to our particular Office of Science and Technology in the Technical Assistance Bureau. Generally speaking, the Office of Science and Technology is interested in innovative approaches which utilize some aspect of science and technology in three broad sectors of development. Now the first sector is reducing public investment costs; that is, improving performance and/or reducing cost in sectors such as housing, transportation, communications, water supply. We have five research projects at the moment. One is better roofing from local materials. Another one is design criteria for wind-resistant housing; the National Bureau of Standards has a Center for Building Technology that is very much interested in disaster mitigation from the typhoon and hurricane viewpoint and also from the earthquake viewpoint. We have another one, sulfur surface bonding, that concerns utilizing raw sulfur, melted with some additives and used as a surface coating for any wall, particularly low-cost housing. They have a new project concerning low-volume roads--a new project in East Africa. They also have a small project on refugee shelters made from indigenous materials; Carnegie-Mellon University is out in Bangladesh right now trying out their ideas. We also have an institutional building grant with MIT on the systematic approaches to public works.

The second broad sector is, and this is perhaps the main emphasis in our program, science and technology institutional and policy development; how a country organizes to make the best technological choices. The prime contractors

in this case are the National Academy of Sciences and the National Academy of Engineering. We have a major contract between AID and the Academies. They have worked in 13 countries in bilateral approaches to develop local policies and for institution building. In those workshops a local group appropriate to the subject that is going to be discussed sits down with the panel drawn together by the Academies from the very best expertise in the United States and abroad, because they do include international experts. They sit down face to face, and we see something that's been mentioned in earlier talks; policy developers in those countries that have never talked together find themselves at the same table and a lot of the discoveries made are really between different parts of the local government that just hadn't gotten to talk together before. The Academies also have completed some studies and are working on others on innovative approaches to numerous topics of worldwide interest. For example, some are roofing research needs; an international development institute concept, which was mentioned yesterday; water for arid lands; a publication on food and science; another study on solar energy; ferro-cement potentials in developing countries; and one just starting concerning water weed control and utilization. Cornell has received a five-year institutional grant. (By the way, if somebody mentions 211(d) grant, this is an institutional building grant; 211(d) is a section in the Foreign Assistance Act.) The Cornell grant is in the area of policies for science and technology in developing nations. Frank Ahimaz is here and is very much involved in that project. The Denver Research Institute has worked with 20 industrial research institutes in developing countries, and their activities include research manager training. The National Science Foundation had administered some grants which we sponsored: SEED scientists and engineers in economic development, linking U.S. institutions and developing country institutions and universities, research institutions. What that is about is to try to match up an American researcher or teacher who has a sabbatical year coming up with an opportunity in a developing country; it's sort of a joint application for this man to go down and spend that year, and the grant provides his travel money and per diem cost. They run about 30 a year, and of course over a broad spectrum of science and engineering. The National Technical Information Service of the Department of Commerce has a special program developed with us to select and bring U.S. government technical publications to the developing countries' attention and to make them more readily available to the developing countries. The National Bureau of Standards is also providing technical assistance in the standards field to a group of developing countries. Of course, last but not least, Georgia Tech's work on appropriate small industry development includes four items: the institution building grant, the 211 (d) grant in labor-intensive small industries, the synergistic small-industry contract to encourage a fuller relationship with their linkage institutions, the quarterly newsletter, which is an experimental approach seemingly quite successful, and then this conference.

The last and third category is Natural Resources Assessment and Management in Utilization, and we're including energy as a resource there in our present thinking. We have a program on remote sensing utilization, particularly defining what role ERTS, the Earth's Resources and Technology Satellites, would have in assisting developing countries such as in land management and resource surveys. A very recent research project is with the U.S. Forest Products Laboratory in Madison, Wisconsin, concerning utilizing the unutilized but renewable

tropical jungles of the developing world with full attention to the environmental impact and the resource renewability. Mr. Richard Auchter is leading that program at the Forest Products Labs and he is also with us today. We have an environmental training program which has gone for several years; we are preparing a guidebook on pollution control; we have an institution building grant with the University of Arizona concerning natural resources management in the semi-arid lands. We are also developing a modest program concerned with energy resources, and Clint Stone of our office has had a leadership position in this regard.

UNITED NATIONS INDUSTRIAL DEVELOPMENT
ORGANIZATION

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Some years ago it was the view of many economists that, as industrialization progressed, larger industrial complexes were developed and small industries would grow or merge into these larger units. The prevailing view was that small industries would, in the course of time, fall by the wayside under the pressure of technological progress and unbridled competition.

Events have not shown this to be the case. Far from dying, small industries are a permanent feature of the existing industrial society. Experience shows that they grow and thrive side by side with the development of large industries. Throughout the industrialized world, whether we consider the United States or the industrialized countries of Western Europe, we find in each country healthy groups of small industries whose number seems to increase from year to year. In particular, one may point to the example of Japan, whose miraculous industrial development is, in no small measure, due to the contribution of thousands of small enterprises to the national economic effort. Perhaps no other industrialized nation has managed to the same extent to utilize the potential resources of the small entrepreneur as Japan, and one may well learn in this field from the Japanese example.

Now, in the view of those economists who studied the problem and as the prevailing opinion of UNIDO (the United Nations Industrial Development Organization), there are several reasons for a government to support the development of small industries. The following are such reasons:

- (1) Small industries require less capital investment to absorb a certain amount of labour. While a large enterprise using modern technology may require a capital investment of the order of \$50,000 or more to provide employment for one worker, small industries usually have a capital ratio of around \$2,000 or even less per worker. Thus, in situations where capital is a scarce commodity and where there is a

need to expand the number of places of employment, small industries can play a useful economic role in this respect.

- (2) The development of small industries can act as a convenient instrument for channeling local initiatives and capital. Since they require only modest investments which can be obtained through the mobilization of individual or family savings, small industries development can, therefore, serve as an important lever for the dispersal of industries away from the main metropolitan and urban centres.
- (3) Small industries can provide services and products to satisfy local needs, in conditions where transportation costs are high, where communications are not very well developed and where, for various reasons, local demand for the product or service is limited.
- (4) Small industries have the advantage in that they are able to operate efficiently with comparatively low overheads. They, therefore, have a greater flexibility in their production programmes, which means that they are able to produce profitably products or items in small series. This is important when the nature of the product is such that it requires frequent changes in types, models or sizes; or because of the very nature of the production process, this can make it advantageous to produce it in a small factory. This clearly may also apply to the manufacture of all those products where, because of its limited use, the demand for the product will be limited and production on a large scale would not be economically justified.
- (5) Small industry can be encouraged to act as a means of developing local managerial and technical skills. This may be particularly useful in areas where there has, previously, been little industrial development or experience accumulated. In such circumstances, the development of small industries can be a useful pilot stage as a prelude to larger, more ambitious industrial projects.

These are some of the reasons why small industries deserve the consideration of economic planners as being capable of playing a significant role in industrial development in general.

Looking objectively at small industries, it can be said that all such industries will fall into three major categories or types.

- (1) There are those industries that are small because they are in the early stages of their development. With success they will grow into medium- and possibly into large-scale industries. Let us not forget that some of the world's largest enterprises, such as Ford and Sony, started as small backroom workshops.

- (2) Those industries that are small because they have failed to grow. Just as in the world of human beings there are people that, because of the afflictions of human nature, remain small and do not grow to maturity; and so there may be a parallel in the industrial world. Certain enterprises, through inept management or failure to take advantage of opportunities or because the very nature of the product being manufactured is unsuitable to small-scale production, remain industrial dwarves seeking to struggle and compete, accomplishing not more than survival and never able to advance and grow.
- (3) There are those industries that remain small because the nature of the product or item or service makes it advantageous for it to be produced on a small scale. Such products or items may have a high labour content, may need special manual skills, may have a very limited demand, may be bulky for transport--to mention only some of the reasons why small-scale operation may be profitable. This does not mean that these items are necessarily of a low technical standard. On the contrary, it has been shown that certain industries with high technological content can operate very successfully and profitably on a small scale. In some highly sophisticated fields such as electronics and the manufacture of precision instruments, small plants have achieved notable success.

In the examination of the three categories mentioned above, it is important to be able to differentiate between those enterprises in categories one and three as distinct from those in category two. Clearly, it is in the national interest to provide help and encouragement for those plants in categories one and three, while there is no similar justification for assisting those in category two. While no one would suggest in a private enterprise-oriented economy that public action need to be taken to eliminate those in category two, one can leave the forces of economic competition and necessity either to drive them out of business or to force them to mend their ways and adjust, and thus enter into one of the other categories.

There can be no justification for using public funds or national resources to aid these small plants until they themselves have made the necessary adjustments, even if this may prove painful.

This having been stated, one may add that today, with a wider recognition of the significance of the small industry sector, it is the view not only of UNIDO, but also of most governments throughout the world--both in the advanced industrial countries and also in the developing countries--that small industries need and deserve to benefit from special measures of assistance. It is recognized that most large enterprises today have a widespread system of functional management which provides the firm with specialists able to handle all the different complex managerial and technical aspects of operating a modern industrial enterprise. A large enterprise today probably will have its own

specialists in financing, marketing, production, engineering; special persons to investigate and determine the viability of new product lines and others whose specific management responsibilities are concerned exclusively with such functions as purchasing, sales, public relations, etc. The world of technology moves so fast today that most modern large enterprises, in order to survive and prosper, need to keep themselves informed of new developments and to maintain a specialized group for this very purpose.

The small enterprise has no such managerial talents or staff assistants. In most cases, the firm is operated by a single self-made individual who is generally the proprietor who has built up the factory from its early beginnings almost single-handedly. At most, the enterprise will be owned and managed by a family group or a few partners. The limited size of the operation does not permit it to maintain in its management the specialists with the technical and managerial skills it needs for its successful and profitable operation. For this reason, it is recognized that small industry should benefit from outside assistance in a suitable form, to enable it to overcome its disadvantages compared to large industry. However, again--even at the risk of repetition--one should repeat a word of warning at this point. It is not intended that public institutions, governments or any organization or association should assist small enterprises just because they are small. No less than a large enterprise, a small enterprise must prove that it is viable, that it deserves public help, and that the giving of such assistance is in the national economic interest.

What are the primary fields in which the small enterprise usually needs assistance? Briefly stated, these fields will probably be the following:

- (1) Financial assistance;
- (2) Technical, managerial advice and assistance, including information;
- (3) Assistance in the provision of physical facilities;
- (4) Help in carrying out economic studies in relation to new investments or projects;
- (5) Assistance in working out relationships with larger enterprises.

No one would suggest that this list is by any means exclusive and that these are all the possible fields in which small enterprises may need assistance, but experience in most countries shows that these are the main fields.

UNIDO recognizes that if assistance is to be provided, it becomes important to specify which enterprises are eligible to receive assistance and which are not; and this, therefore, requires a definition of what is a small enterprise.

As this subject has been discussed at various meetings and seminars dealing with small-industry problems throughout the world, the only real conclusion is that there is no suitable worldwide or even regional definition of what is a small industry. Generally, we in UNIDO would agree that a small enterprise is one that lacks functional, specialized management and needs assistance to overcome deficiencies due to its limited resources. While this is an acceptable definition of small industries theoretically, it is most important to apply quantitatively, and so the search goes on in each country to find a suitable definition which would give assistance to those who need it and yet reduce the number of recipients of assistance so as not to impose too great an economic

burden on public resources. Experience shows that every country must reach its own definition.

Some countries, notably in Latin America, make further definitions of industry into small, medium and large. This raises the possibility of the government providing assistance on a larger scale to those that they define as small and on a more limited scale to those in the medium category. This is usually possible in the more developed countries of the developing world.

In the least-developed countries of the world there is, in fact, the danger that small industries will include handicrafts and artisan activities. Although governments should have schemes to assist handicrafts, there should be a distinction between such programmes of assistance and those programmes that are meant to help real small industries.

In general, the experience of UNIDO is that it is a mistake even in less-developed countries to impose too rigid a definition at too low a level, because this has the danger of retarding the growth of certain enterprises and even their desire to grow, so as not to lose the privileges accorded to the small enterprises. Experience has also shown that there are defects in operating a definition according to the number of workers employed in the enterprise. In some cases, national interests require that enterprises should employ as many workers as possible, in order to overcome national, regional or local problems of unemployment or underemployment. In such circumstances, a rigid upper limit of the number of workers employed will obviously discourage these enterprises to employ more than that number of workers. In such situations, a more appropriate definition would be based on capital invested in fixed assets--equipment and buildings. In general, land is not included because of the fluctuating character of its value and of the difficulty of applying an evaluation of land as a fixed asset. Little use has been found in applying the criterion of annual sales. Again, this would tend to penalize the efficient enterprises that are able to generate a large volume of sales from a small number of workers and capital invested. The only drawback against utilizing only a limit of capital investment is that in some cases this is more difficult to apply than the number of workers employed.

The final conclusion must be that each country require a definition appropriate to its stage of industrialization, its social and economic policies and its resources available to provide assistance and supervise eligibility of those receiving the help.

We can now return to look a little closer at the different types of assistance that should be given to the small enterprise. There is no doubt that every small enterprise is in need of financial assistance. The large industry, because of its size, importance and large financial turnover, can answer its needs for capital through the commercial banking institutions and channels. Not so with the small enterprise. The limited capital on which the small enterprise operates and its restricted financial resources make it an unattractive borrower to the large commercial banks, which find the handling of finances of the small enterprises too complicated and unprofitable. For this reason, it is important that there should be a loan or credit programme which can assist the small

enterprise to obtain the capital it needs in a form convenient to it. The small enterprise should be able to receive both long- and short-term financing without having to provide guarantees beyond its capacity and without involving itself in lengthy procedures to convince the institutions that its situation and potentiality deserve the financial assistance that it seeks. In most industrial countries, and in many developing countries too, there exist funds or credit schemes for this purpose either through a special bank for small or small and medium enterprises, or through special arrangements with existing banking institutions. These funds are usually offered at a favourable rate of interest and on easy conditions to those enterprises that are eligible to receive such help. Such assistance should cover both capital needs for acquisition of fixed assets and working capital needs.

The second type of assistance which nearly all small enterprises require, although they are not always aware of it, is technical assistance and advice. This includes help and advice to the small entrepreneur to overcome the problems of operating his enterprise and to improve its efficiency and profitability. The possible range of such technical assistance to a small enterprise may be very wide, indeed, and it would be beyond the scope of this paper to cover this in detail. Such technical assistance may include advice in selecting new equipment, direct help in overcoming a particular production difficulty; it may involve solving problems related to the development of new products, or it may concern much wider problems of the low efficiency and nonprofitability of an enterprise due to outdated technology or poor working methods of an enterprise.

In many cases the type of assistance required, more often than not, is not in the technical, but in the management field. Small entrepreneurs are usually more able to cope with the technical side of their operations than with the managerial side. There are many institutions throughout the world which try to assist the small entrepreneur with management advice on how to better organize his factory, how to cost his product, how to manage his finances, and how to improve his purchases, his stockkeeping or his sales distribution. This is done both through training courses for small entrepreneurs and more effectively--but more costly--through direct advice and assistance in the enterprise. The main objective of this type of assistance is to put the small entrepreneur at a lesser disadvantage in relation to the large enterprises that have functional management specialists to deal with all these problems.

The third type of assistance that is required by small industries would concern the preparation of economic studies or feasibility reports to assist small industrialists to decide on projects for expanding into new product lines or for starting new factories. Most small industrialists have neither the ability, nor the time, nor the personnel needed to advise and help in these fields.

There are, of course, other fields--perhaps less pronounced, but nevertheless important--where the small industrialists may need to be helped. This would depend on local conditions. For instance, in a given situation small industries may be inadequately housed in areas of the town which are scheduled for residential development. The physical premises may not permit rational layout and efficient production, let alone extension and modernization. In

situations where land values are high, assistance may be needed in the provision of terrain or actual physical premises on an industrial estate. In most cases the establishment of an industrial estate would lie outside the competence of an institution providing assistance to small industries. In general, an industrial estate would be developed by the municipality, a local or regional development corporation, or perhaps by a public or private body in the form of an industrial estates corporation. However, the institution assisting small industries could advise municipalities or regional organizations on the need and feasibility of developing an estate and could act as the liaison in selecting entrepreneurs for occupancy and could advise them on the size of the premises and facilities they need. Sometimes industrial estates provide common service facilities to be used by a group of small industries having a common need, and then the institution concerned could be instrumental in promoting the development of such facilities.

There is the interesting question of the interrelationship of small and large industries which could provide an important field for assisting small industries in countries that have reached a certain point in industrial development. In the industrialized countries it is more and more apparent that small industries thrive and flourish very often alongside the large industries. However, in many situations, this process of subcontracting does not develop of its own accord. It needs to be stimulated, and work has to be done to bring the small industry in contact with the large contractor and even to assist it to meet the requirements of the large enterprise with regard to price, quality and delivery time. In some cases this can be achieved through a general institution for assisting small industries, but in some cases specialized institutions may be needed. Such specialized institutions are now being developed in Europe and elsewhere, known as "subcontracting exchanges," with the specific purpose of promoting these relationships between large and small enterprises. In Spain, such exchanges function in Barcelona, Valencia, Oviedo and Sevilla.

UNIDO believes that the most effective forms for assisting small industries in developing countries are projects of an integrated form combining the different types of assistance. Experience shows the mere provision of financial assistance without technical assistance may lead the small-scale entrepreneur into investments and projects which are either not feasible or which he has not the technical or managerial competence to implement. Likewise, many efforts to introduce technical or managerial improvements may require some additional investments calling for financial assistance. This may also apply to economic studies that identify new, suitable projects for small industries. They often cannot be acted upon unless some form of credit is made available to carry through the recommendations. For all these reasons, assistance should be given in an integrated form, but this should not be interpreted as advocating that in all cases all forms of assistance should come from the same institution.

UNIDO mostly promotes projects in developing countries which assist in the setting-up of small industry development corporations, institutes or centres, usually located in the capital city and endeavouring to provide all types of small industry throughout the country with different forms of assistance. In the less-developed countries of the developing world, there is a great deal to be said in favour of trying to do this in a centralized organization, as this

may be the most efficient way in the use of limited human resources. However, in many cases a bank may be the most appropriate organization for the provision of financial assistance. When making a loan to small industry, the bank can link up with a programme of technical assistance and advice to the firm concerned. Such links between financial assistance and technical assistance are most important but difficult to achieve. The same could be true in relation to a programme of marketing assistance or other forms of help.

There are some developing countries of a more advanced type that have succeeded in creating a single centralized institution for all forms of help to small industry. The Servicio de Corporacion Tecnica of Chile is an example of such an institution, but in the case of a large-scale project of UNIDO to assist the Organization of Small-Scale Industries and Industrial Estates of Iran, in Teheran, financial assistance is not provided directly by this institution. An interesting example of UNIDO assistance to a financial institution in order that it can develop extension or advisory services for small and medium industry is the project of help to the Medium Industry Bank of Korea. In this case, the International Labour Organisation and UNIDO are both assisting in improving the loan appraisal programme and developing a technical assistance programme for the enterprises who receive financial help from the Bank.

There are cases where technical assistance of a more technological nature is provided through a research institute or a technological centre. An example of such an institution, being assisted by UNIDO, is the INTN, the Instituto Nacional de Tecnologia y Normalizacion, in Paraguay. In these cases, very often management assistance is provided by a different centre, usually a management development institute or productivity centre. Financial assistance may be given through a development bank. Coordination presents a major problem, and more often than not the financial assistance is not closely linked to help in the managerial and technological fields, and so proves less effective.

Countries that are more developed and cover a larger area geographically, such as Brazil, Mexico, Argentine and India, find that one single central institution is inadequate. It is usually necessary to meet the needs of promoting small industry development by assistance programmes through regional or provincial institutions. An interesting project where UNIDO provided assistance for more than three years was to such an institution, Centro de Desenvolvimento (CEDIN), helping the small- and medium-industry sector in the State of Bahia in Northeast Brazil. Other states of Brazil have followed this project with interest, and some have already set up their own units of technical assistance for small and medium industry. UNIDO has now been requested to provide similar assistance for a centre in the southern Brazilian state of Rio Grande do Sul.

UNIDO's assistance to these institutions has generally been in the form of providing experts or advisors able to train local staff in such activities as identification of small industry opportunities, preparation of feasibility reports, loan appraisals, selection of processes and equipment, installation and running-in of plant, provision of common services and marketing and management assistance. In addition, UNIDO has assisted governments and institutions in assessing the feasibility in establishing industrial estates and in planning such facilities.

Industrial estates have had, in many cases, a special attraction for developing countries, particularly those seeking to spread out the industry and to decentralize industrial activities away from metropolitan centres. In many cases local and regional development corporations believe that the establishment of an industrial estate will automatically attract industry, both through the stimulation of local entrepreneurship and through the relocation of some small enterprises from the more established industrial areas. While, undoubtedly, the industrial estate has a significant role to play in the decentralization of industry, it has been proved over and over again that it can only be one link in a chain of measures to promote and assist small-scale industry. In particular, UNIDO has found this to be the case in the less-developed countries of Africa and Asia. Even in some more advanced developing countries of South America, such as Mexico, Argentina and Brazil where UNIDO has given assistance to public and private groups seeking to establish industrial estates, the same has proved true. However, some solutions have yielded a fair degree of success, in particular where a whole programme of assistance to groups of small and medium industries has developed around the project of establishing an industrial estate. This has been particularly effective in programmes of decentralization.

Before closing, it is worth adding a word on the problem of promoting small industries in the least-developed countries. UNIDO is now trying to concentrate more of its efforts in these poorest states, most of which are in Africa.

In the case of the least-developed countries, UNIDO has found that not only is a comprehensive programme of assistance needed, but also the degree of assistance must be in greater depth and over a longer period. Mass efforts in these countries are concentrated around the creation of small-enterprise development corporations. Although these may have different names, they are mostly concerned with establishing small workshops and small-scale industrial establishments through the direct provision of workshops, basic equipment and direct day-to-day help in running the enterprises. The technology used is of a most simple type. Many of these industries are artisanal activities providing basic services. In several instances the corporation is forced to set up direct operations; that is, establishing the small-scale industrial operation itself. Such is the case with the UNIDO-assisted corporation RUCOM, in Zambia, which has directly set up brick making, woodworking, tanning, metalworking and food processing plants in rural areas. Similar projects, although with variations, are in operation in Swaziland, Botswana and Tanzania. In the least-developed, French-speaking countries of Africa, UNIDO assistance has been mostly to promotion centres or offices with the aim of creating small enterprises owned and operated by indigenous entrepreneurs. However, here too the assistance is considerable, since help has to be provided in almost every step from the identification of the project to the final stages of marketing the products. In many cases the promotion centres or offices virtually run the small enterprises for long periods until the local entrepreneurs are able to manage on their own. In all these least-developed centres, progress is slow, and most projects require five to ten years to yield any substantial results. Even then there are many who believe that the actual achievements are small as a justification for the comparatively large investments made. However, it is UNIDO's view that this is the only way to promote small industries in these least-developed countries.

The small industry programme of UNIDO is growing in size and in the variety of its activities from year to year. The number of requests now being handled by the Small-Scale Industry Section of UNIDO is such as to ensure for many years to come an increased demand from developing countries for more and more help. In this respect, UNIDO also recognizes that it has to work closer with all other organizations. There has, in fact, been closer cooperation on many projects with the World Bank, regional development banks and different bilateral donors. It is generally agreed that this form of cooperation must grow in the future for the benefit of the developing countries.

GROUP SESSION REPORTS

Clinton Stone presiding
Technical Assistance Bureau
Office of Science and Technology
Agency for International Development
Washington, D. C., U.S.A.

Clinton Stone:

I thought we would take the questions in the order in which they were listed on your sheets, go through the rapporteurs' reports in succession without questions, and then open up the entire meeting to questions; hopefully centering first on the reports and then broadening out to any other topics that you wish to discuss. Manny, could you come up and begin? This concerns how industrial growth can best complement and promote agricultural development. At least that's how it started out--let's hear how it ended up!

Manuel Alba:

Thank you. Perhaps the best way to assess what the group was able to do is to desegregate the major issue into sub-issues, because we haven't had any time at all to generate much more operational recommendations. Hopefully these issues will constitute an agenda that can be thrown off to the plenary session here as a basis for policy program project recommendations or maybe as an agenda for further exploration in terms of research or further discussions. To the best of my ability to summarize, and hopefully not to interpret, what the discussions were, I have listed ten items. Since this is an open forum, I think the members of the group can very well raise issues against this.

How can industrial growth best complement and promote agricultural development? The first issue that was raised was an attempt to summarize what has been presented, the need for the generation of appropriate technology for agricultural enterprise, stressing what Mr. Bart Duff of IRRI had mentioned. The second issue that was raised was how to stimulate consumer demand for agricultural products; the issue of what would stimulate demand. Where does income level come in to stimulate demand or is it industrial production that stimulates demand for agricultural consumer products? The third question raised was the need to promote downstream sectors, such as the food processing industry, and a complementary issue in terms of how to make more efficient

use of capital in that sector: how to improve the efficiency of capital without displacing labor and how to improve the efficiency of labor in the downstream sectors. The fourth issue that was brought out was what would be the necessary mechanism by which some encouragement to capital formation can be promoted in the agricultural sector. The fifth is the need to assess resources in terms of both agricultural and natural resources, as well as the question of institutional capabilities that can sustain agricultural development. Then the issue of labor utilization was raised, considering the problem of underemployment and seasonality of labor in the agricultural sector: how to maximize the utilization of labor and how to relate industrial development in the context of improving labor utilization in the agricultural sector. A related issue was raised with respect to the quality and the quantity of the labor force and the concurrent issue of manpower development for agricultural development. A supplementary question raised was whether it is really a labor surplus problem or a land surplus problem; a factor-combination issue is definitely being raised here. And another issue is the need to examine possible mechanisms to enable the farm household sector to benefit from agricultural productivity. This was premised on the observation from one member of the group that the agricultural household sector does not really benefit from productivity in the sense that the consuming centers are located in the urban areas, so a mechanism has to be found by which some recycling process takes place. And, of course, questions about what mechanisms ought to be explored were directed to the matter of transportation and post-production activities in terms of stimulating agricultural productivity. And then an intriguing question which we didn't have time to resolve is the matter of identification of entry points; particularly in terms of some innovative efforts and activities to stir up or to stimulate home sector development. And there is a subsidiary issue in terms of whether agricultural and industrial development could contemporaneously take place and how to effect a spin-off from one to the other. Then the issue of the role of aid was explored in terms of what would be the best utilization of aid in respect to the entry point issue in maximizing the stimulus towards agricultural or community development. And the last is with respect to self-determination for agricultural development in terms of the formation of institutional organizational capabilities in the rural or agricultural sector. So, if any members of the group would want to contest what has been summarized and at the same time lay out for discussion to the entire plenary group, please feel free to. Thank you very much.

Clinton Stone:

We'll continue right on with the question of how the dispersion of industries from urban to rural areas can be accomplished, with Dr. Stepanek.

Joe Stepanek:

Thank you, Clint. I'm very happy to share the instant wisdom of Group Two. First, we agreed unanimously that the question, "How can the dispersion of industry from urban to rural areas be accomplished?" is relevant all the way from the Republic of Korea to Peru. Without exception, we couldn't identify a country that doesn't have a policy for dispersion of industry. However, effectively implementing the policy was another question.

Then we turned our attention to four groups of questions under the basic question, looking first at some basic assumptions and definitions. The word "dispersion" worried us a little because it might mean to you the lifting of a factory from a city and putting it into a village. We want to make clear we're talking about dispersion of economic activity, not the physical movement of factories. Also, the word "rural" caused some difficulty because, although the group was very much in favor of having small industry in small villages, we didn't consider it viable unless a base were to be established in a nearby market town or provincial capital. That is, you just can't move from a metropolis of 4 million to a village of 5,000 and expect much to happen. So, we prefer, in stating the question, the phrase "metropolitan and nonmetropolitan areas" rather than "urban and rural." But this, in no way, indicates a lack of interest in village industry. It's just that the direct jump is not practical. We tried to define what we meant by small industry, and shifted the base of definition from the amount of employment to the amount of capital, because if your objective is to employ people, then limit the scarce resource and let the abundant resource go as high as you want. However, we could not agree whether our concern should be the amount of fixed capital per work place or amount of fixed capital per value added. This we will leave to the large audience to decide. But we did agree, 100 percent, that any rural or nonmetropolitan industry had to be viable. We were not the least interested in subsidizing industry.

Then we looked, in our second category, at some of the development factors for nonmetropolitan industry and, of course, they are the location factors. Raw materials should be based on an ag surplus. If there isn't an ag surplus, perhaps there is an artisan or handicraft industry on which to base factory industry. We did agree that there must be some economic activity. You can't put small industry in an area and expect it to grow where nothing else is growing. In other words, we agree wholly that it is not the point of entry. From some of the infrastructure problems, we focused pretty much on highways and gave a number of examples where just opening a highway was sufficient to start the dispersal of industry, followed by industrial estates. And we stressed also the need for social amenities. Now, electric power is needed, not only to power factories, but as a social amenity. But we did conclude, and conclude very strongly, that it is very difficult to locate rural or nonmetropolitan areas which have a high potential for industrial development. For example, this is not butter or jam to be spread evenly over a country, but rather a device or development technique to be used cautiously.

Third, we looked at some of the development techniques and were instantly people-oriented rather than resource-oriented. And we conceived of something called a "touch-off organization," which we didn't define further, which has to be established in the rural or nonmetropolitan area. One of its main functions is to seek out entrepreneurs and to train entrepreneurs. We were very concerned with the design of extension services, which also might be carried out by this touch-off organization. Without going into details, we concluded very strongly that ag extension, as we know it over the world, is not--is definitely not--a model for industrial extension.

Now, we also looked at some of the techniques that could be used to start industry. We've mentioned that we're not in favor of moving factories. However, there was strong evidence among the group that companies thinking of expanding in a metropolitan city could be rather easily motivated to take their expansion in the form of a branch factory in a nonmetropolitan region. Also, we think that an unexploited resource lies in the fact that everyone in this room, without exception, has his roots so many generations back in a village. In many of the newly industrializing countries these roots are very strong, one or two generations at the most from the village. And while this urbanite may not move to the village, his interest and his capital and technical skills may move back to the village to stimulate industrialization by a cousin or a younger brother remaining in the village. We consider this an unexploited resource.

And last, our fourth point was to stress the need for continuing stimulation. That is, you don't induce a metropolitan investor to put his money in a village or into a market town without establishing the continuing organizations to protect that investment. In fact, we agreed wholly with something I think that Ross Hammond said earlier on, that it takes a considerable amount of patience to industrialize outside of the metropolitan region. Thank you.

Clinton Stone:

Thank you, Joe, it sounded like a very productive session. Next the question: How can we increasingly and progressively increase the skills of unskilled labor? Dr. Oguntoye, please.

O. A. Oguntoye:

Thank you very much, Mr. Chairman. Well, we were asked to discuss how can we efficiently and progressively increase the skills of unskilled labor. We found this to be a very awkward topic, and in order to make our work easy we decided to change some of the words. We didn't change the sense, but we did change some words. Instead of unskilled labor we put rural labor, so the question would be: How can we efficiently and progressively increase the skills of rural labor?

Well we tried to start by discussing the objective; what do we want to achieve? Just to increase the skill for increasing the state? No, we want to increase these skills so that the man may have some gain. Therefore, we start by saying we must have a demand for the improvement of skills. In other words, there must be a market which can utilize that improved skill, because if we just improve a skill and there is no demand for the utilization of that skill, then the man whom we have helped is not helped. Neither is his community helped.

After we decided on our objective, we then thought that we could discuss this topic on two broad issues. The first is training. We thought it necessary in order to improve the skill of rural labor to establish training criteria that will assist the laborer in improving or acquiring new skills. And the criteria should also include assistance in developing the right mentality

in respect to quality, marketing, production and management. What do we mean by this? We thought that, if you are going to ask for skills, skills mean certain ways of doing certain things. And if you are going to find a better way of doing it, you might as well tell us what are the component parts of this better way.

But that is not the only thing that is involved when you are thinking of rural labor. What is also involved includes the mentality of rural labor. When you are asking a rural laborer to become an industrial laborer, you are asking that laborer to make a change--a change that has to do not only with his attitudes but with his mentality also.

There were some examples given, but I just have time to give you one. We were told that an industry was established in a rural area and the peasants were recruited to work in that industry. But unfortunately, you know, on the farm you work according to nature. You can sleep and wake up at 10 a.m., go to work, decide to come back at 2 p.m. and join your family until the next day. In industry you can't do that. You must go when the employer orders you. You must be there at eight and you must not leave the machine until he tells you to leave the machine. Well, if you are going to use a rural laborer who is used to being his own governor, his own boss, and you want him to get to be somebody's employee, then you have to help that laborer to change his mentality. So we thought, in order to do this, not only the component parts of the new skills should be identified, but also we should try to use exhibitions and cinema shows and films about industrial life in the rural areas in order to help them to make the mental change--to tell them what the new life involves. I think you will see the importance of this in our final recommendation.

It was also decided that we must study the social structure of these communities in the areas where we want to improve skills. If you think of improving skills, how would that affect the relationships between the people involved? Let's say you take a married woman and you improve her skill and get her a good job. How will that affect the social relationship between her and her husband? These are issues that we thought should be looked into. Take another example, where labor is recruited in a rural area and a foreman is appointed. Unfortunately, this foreman happens to be the youngest among the group. Well, in this area they are used to having the eldest as the leader. Good or bad, that is the way of doing things. But the owner thought, "Well, this is a brilliant young man. He should have the leadership." But the others refuse to follow; instead of taking orders from him, they continue taking orders from the eldest. So we thought we shall have to study all the social structures and know how to utilize them, in helping the people to make the change.

Also, we thought the improvement of skills in the rural areas calls for the establishment of industries that would be based on local resources and local skills. We thought, if you want to improve the skill of somebody or teach somebody something new, it is better if you start it from where he is, from what he knows rather than from what he does not know. And we thought, therefore, that an inventory of all the local skills and resources available

in the area is needed. And, as much as possible, industries to be established in that area should be based on those local skills.

Then we thought, as Mr. Parker said in the key address, that we should also think about the creation of more job opportunities in the rural areas. Well, the creation of more job opportunities in our opinion would involve the introduction of new industries which may not be based on locally known skills. In other words, new skills will have to be introduced. We are of the opinion that here we are going to meet with a different set of problems. The first problem is introducing people to this new skill--we have to train them how to do this new job. We talk about vocational training and non-vocational training. We seem to agree that there is a need to train these people on the job; in other words, how to do the job well. We do not think that there is a need to take the people away from their environment. You don't have to take them to school in the town; you can teach them how to do these things within the factory itself. Here you are not going to get any certificate, they don't give you any diploma after. It is just getting you to know the essential movements associated with the making of that particular product. Well, there are two advantages to this. The first one is that you can learn how to do the job in less time. Within three or four months you are already on your way to becoming an expert in doing the job. The second advantage is that you don't have a diploma, so you can't get away. You see, if they give you a diploma or a certificate, you can run to the town and get a good job. But if you don't have a diploma, you don't have a certificate, you are bound to work and stay in that rural area.

Well, we then agreed also that in addition to this one, which we thought was the best way of learning the job, that we shall have vocational training centers. But we agreed that training centers should not be established in every village but rather for a series of villages.

The other aspect which we think is as important as training itself is the creation of the necessary environment for the man to benefit from his training and to give the man the necessary incentive to train. At first we discussed the need to organize more adult education so that the people will know how to read and write. It is an advantage that the man can know what is going on around him, so he will be able to appreciate why he should improve his own skills. Then we also thought of the provision of incentives for people to train. We were of the opinion that the people should be asked to become partners in their enterprise. Our friend told us of a case where the people were asked to be part owners of a business and they really contributed very well and they improved their skill thereby. Also, there were some examples given of joint ownership; in other words, cooperative industrial organizations with the people working together and owning the products and selling them. What I think is meant is to give a man the chance to be part or to feel that he's part of an establishment; then he has an incentive to improve himself and to contribute more. As a second means of giving incentive; we are of the opinion that the people should be asked to market the product. In other words, it is no use helping them to produce without helping them to market the product, because if they don't market the product they won't get money, and if they don't get money the whole exercise will be useless.

The final point which was discussed was that improved skills should be associated with a relatively higher status, both financially and socially. For the rural people, as with all of us, it is not only the financial return that matters; the social status in the community also plays a very important role. If, as a result of improved skill, a man finds that he becomes somebody or is all right, as we say in Nigeria, then he is likely to make more efforts to improve his own skills. But if he knows that as a result of his improved skill--even though he may have more money--if his social standing is going to be very, very low, then he won't do anything to improve his own skills.

I think that is all; thank you.

Clinton Stone:

Thank you very much, Dr. Oguntoye. I think you gave a marvelous introduction to the next subject: How can the practicing development organization best deal with the social and cultural differences in the developing countries? Mr. Lazaroff.

Louis Lazaroff:

One of the problems, of course--as was pointed out by some members of the group--is the great variety of cultures within a given country; not only between the urban and rural sectors, but within the rural sector and within the urban sector as it has become even more impacted over time. It was pointed out that you have a very great problem if there is a direct confrontation between the technology which is supposed to be imported and the culture within the country itself. If, for example, the technology--as was pointed out by Mr. Levitsky--calls for assistance being provided to all members of the society, this might come in direct conflict with the cultural proclivities in the society which would expect the assistance to go only to the members of the given tribe or the tribe in power. How do you deal with this particular problem when this direct confrontation exists? Well, you certainly don't ignore it, and that was one point that was made.

Dr. Lewis of Nigeria made the point that the technology which is being brought in is itself a reflection of a different culture and that this must be borne in mind in considering the degree to which the cultures must be reconciled or the degree to which the practitioner agency tries to develop a program which is consistent with or reflects the existing culture in the country involved. Well, then, how do you deal with it? The one easy answer that was given, but we never had time really to go into it, is that you tailor the modern technology or the know-how to the culture of the receiving country. Well, that's easily said, but this is an enormous problem by its very nature, and I'm sure everyone in the group felt this, but we bowed in that direction, and we then passed on to the next point.

Mr. Scull made a very important point that those people who are trying to be of help to developing societies need very much to have answers, multidisciplinary answers, to the problems that may exist within the particular society; namely, a multidisciplinary approach to the culture as it presents itself to

you as a foreigner trying to be useful in that society. He says that in his experience he's found that he can't find this multidisciplinary answer. Instead, if I'm interpreting what he said correctly, he will get individual, discrete answers from the individual disciplines. In some cases, these discrete answers really reflect the particular axe that discipline wants to grind, and he can't use it, in effect. Yet that is an important point, he feels, that an agency wanting to be useful, wanting to reflect the cultural differences, does indeed do that. Well, where can you get it--where can you get this kind of an answer? Again, the point was made that you need trained people. Trained in what, trained where; we never had a chance to talk about. And we never had a chance to find out if we could even do that.

I confess one of us, namely me, was a little dissatisfied with the whole conception of multidisciplinary because it's used so loosely. We don't know what we're talking about so frequently. Another member made the point that it was extremely important for people who would come into the receiving society not only to know something about that society, but also to be sympathetically responsive to it; to listen to what the society had to tell and then to wait before he talks--and talks too fast and too much--before he is prepared to provide some suggestions as to what might be done. But, basically, the point was that you have to have a sympathetic person and a person who is prepared to learn from the society where he is going.

Mr. Shouman pointed out that there has, unfortunately, been only a minority, but a minority of people who have come in who are technologically very skilled but, as he put it, who turned out to be a disaster because of the conflict which they engender reflecting their own lack of sympathy and lack of understanding of the local culture.

A point was also made that wherever possible the operating agency ought to try to work with persons or a person who has his feet in both traditions. There are such people. That is, a person who not only has a strong feeling and a foot in the traditional culture, but also a strong feeling and a foot firmly planted in the modern culture. Now this rather schizoid person does exist, but he's really not schizoid because he's an amalgam, and this person can be extraordinarily useful to the person who comes from the outside.

We finally decided, I think, that basically our knowledge of the cultures of these countries is very superficial and it's difficult to go beyond that. We're really on sort of terra incognita when we talk about this, even though we're sympathetically oriented to look in that direction and see what we can do.

Well, Mr. Clement came up with a very interesting approach to the problem which was more or less accepted by the group. What he was telling us about was another very interesting activity by this very interesting organization, the IDRC, in trying to approach the problem of data in a more scientific fashion. Please correct me if I mistake you, Mr. Clement, but what IDRC is setting up is an international system to collect, retrieve and disseminate whatever is available in the world on the social and economic aspects of development. This unit, in which I think six organizations will be associated, including UNESCO, will

bring together all of these data in as scientific a fashion as possible so that people who want to know some answers might have some answers. The answers won't all be there, but it's as close an approximation to dealing with this problem as we can get. Well, some very interesting comments were made on that. Mr. Levitsky pointed out that the data change continuously and are changing while we are talking now. But I imagine that Mr. Clement, if there would have been enough time, would have responded, "Well, we expect this to happen, and we expect these people to be sufficiently insightful to keep on adding to it." But this is a gleam of light in the darkness, so to speak, and you might be interested in following this as it develops.

Then we came to recommendations. Well, we have made some recommendations already in dealing with this rather spongy issue. One recommendation, which no one would object to, I imagine, except perhaps AID, was that AID in particular might consider making grants to universities in developed countries to prepare materials in cooperation with institutions in developing countries. This, I take it, would complement some of the work being done by the IDRC but would deal more actively with the training aspect of it. It was clear, everyone said, that you need more men who not only have technology but also have this capacity to understand cultures and their collision and how you work with in them. And somehow you've got to get them. What was clearer than anything, it seems to me, in this discussion was that the group felt they never really had enough time to deal with it. We had just a very little bit of time; not enough time for an unskilled chairman to bring all the people out into the discussion, to give them a chance to talk. The group, it was clear, felt that a meeting of this kind should have given a good deal more attention to this particular problem. If I have done violence to what we thought, I'm sorry, but you can correct me.

Clinton Stone:

Well I think you now understand why I said the question is the questions! I would really like to open it up at this point to questions, and I'm sure a few statements. For convenience, if we could have the initial questions directed to the rapporteurs, who can then refer them to members of their group if they feel it's appropriate. It seems to me that's a good place to start. Does anyone want to pose a question for any individual group?

(Question from the audience)

One thing we tossed around in the first group--that is, with respect to how can small-scale industrial growth best complement agricultural developments--was that of various specific activities versus macro activities. I think, at least to me, we're tending more towards the area of specific approach, which means, I think, an integrated approach as opposed to getting involved in industrial development or small industrial development on a broad scale unrelated to other activities taking place in a given area. I wonder if there might be some discussion of the area of specific approach versus the scatterization approach in terms of small industrial development?

Clinton Stone:

Well, I heard both Dr. Stepanek and Dr. Oguntoye say that training in the

latter case was really a mixture of things involving social problems as well as classical training. Joe Stepanek listed a number of inputs. I don't know who wants to respond to the question of integration versus. . .

Joe Stepanek:

Let me make just one point in answer to that. Generally I lean to the integrated approach, but let's not lose sight of the potential for subcontracting, a la Japan 30 years ago. There is evidence that you can mobilize inexpensive village labor to make components for an urban factory. This has nothing to do with agriculture; it's highly desirable, you see. With that, and a few other exceptions, I would say the best strategy is the integrated approach that you seem to lean to.

(Question from the audience)

During the conference only one speaker addressed himself to those countries in which there is practically no industrial base. I was hoping that somebody else would talk about it, at least the gentleman from UNIDO. All he suggested was that UNIDO is interested to the extent of helping small-industry development corporations and similar groups get started. I'd like to hear any of the other participants or speakers tell how they view reaching these countries; countries like Laos, Afghanistan, Chad, or Mali, which have no industrial base and yet need this kind of development at some point.

Clinton Stone:

Does anyone want to accept that challenge? I think you've created an agenda item.

O. A. Oguntoye:

Well, I would like to give an example of what is being done on the West Coast of Africa. There is no doubt that you cannot have the same level of industrial development in all countries. Some countries have the resources for rapid and early industrialization. For example, Nigeria has a good population, and we have the resources, and we also have oil. I don't know whether they are making good use of the money from the oil, but they are earning some good money from oil. But if you compare Nigeria with Chad, it's absurd! Chad also has good land area but is very poor in resources. It will be foolish that they should waste their efforts and the little money that they have on having industry for industry's sake. I believe that there is now a move to have the West African economies form some kind of organization. There is a legend of some form of economic cooperation between Chad and Nigeria, and some of the efforts are intact.

Take, for example, fishing. The fishing industry is not developed, as such, because the greater part of the lakes belong to Chad, and the lakes that belong to Nigeria are drying up. So, we can't do this. I don't see any reason why we can't help Chad to develop its fishing industry instead of asking Chad to develop industries for which it has no resources.

So I can foresee this sort of tendency; that all these small, small countries which we are talking about are likely to collaborate with those countries around them and combine those areas, see the resources they have, and try to make the best use of these. And that's what I tried to tell Ross yesterday by saying, "It is a small man in Paris, in Nigeria; it is the same thing in Chad. If there is one small industry that has the resources to establish, then they should be happy to establish it."

Clinton Stone:

Mr. Levitsky.

Jacob Levitsky:

There's only one problem, there's nobody from Chad here. I want to make one thing clear. UNIDO is not going into Chad. Chad asked for UNIDO to come and the Chadians don't agree with our friend from Nigeria. They want their own industry. I live in Austria at the moment. Austria, why does it need industry? It's got Germany at the north and they can provide all the industrial products that Austria needs. But Austria has established industry. There is an old story that one time, before Nigeria had oil, they got the Western African countries together and suggested that they make one fertilizer plant for all the West African countries. They all agreed, with one condition; each one said it should be in his own country! And that's the situation we have. We face a reality. These countries want their own industry; they come to UNIDO and they insist! Chad and the other countries want industry. You can not turn around and tell them "I'm sorry, go buy your industrial products from Nigeria." They don't accept it!

(Question from the audience)

This is sort of a general question and perhaps a bit naive. I'm learning a great deal at this conference which I'm later going to use in the seminar I'm going to run at my own university. But, no one here has mentioned very much about the role of labor as an institution in this process. And I really wonder--Mr. Oguntoye perhaps would be the most likely one to respond--are there other attitudes on the part of labor and other collective bargaining arrangements, union operations, that affect the industrialization process and development of industries in rural areas? Could someone respond to that, because I haven't heard much about it during the whole conference.

O. A. Oguntoye:

Well, I think I will try to answer that question, because it is a question that is worrying us. I do not think it is labor alone! The levels of social, economic and political development in the developed countries are often big problems for the developing countries. Remember that you (the U.S.) have more area, that you also have all these things which you have already. And there's so much for the rich. The Nigerian worker wants those advantages. They want good-quality salaries. Because, you see, America is already on its way to the moon; and you have gotten there. Nigeria has not taken off the ground.

And so, there are now problems, because when you are talking about labor-intensive, you don't know the problems that are associated with labor developing countries. Soon a party will include unions, and before you know where you are, your labor cost is going to be so great you won't be able to pay for this machine.

So, these are some of the problems that affect us. I know it's not only in the form of labor, it also affects our students. Our university has been closed down for the past five weeks, simply because the students in Nigeria have been following the students in California, who can afford to go off on holidays for more than five weeks. They have enough, so they close down. We haven't got this. And yet we are copying all these things, and they are affecting us.

And I believe that when we are thinking about small-scale industries, we are talking about labor-intensive. It is only because we have such big problems that it is better to kill flies than to swat them.

Louis Lazaroff:

There aren't very many organizations of labor in the rural areas of Asia as far as I know; the only one I ever heard of was the Organization of Gandhi in the northern part of India. And then, for that matter, as far as unions in general are concerned in Asia, I have a feeling the cemeteries are now full of the trade union movement. It's gone. The free-trade union movement doesn't exist in the Philippines any longer; it doesn't exist in Indonesia any longer; it doesn't exist in Korea any longer; and excuse me if I put it that way, it's so! There aren't very many places where you have strong union movements. Wouldn't you agree that most nationals are making this pretty difficult with their higher wages and greater benefits which do filter down into domestic industry?

Clinton Stone:

Well, I think you've just opened Pandora's box, and we are two minutes from our appointed closing hour. I would ask that you help me with the last task that I've been charged to take care of, and that is the evaluation of the meeting. I suggest a round of applause for our hosts from Georgia Tech. Would you like a parting shot, Ross?

Ross Hammond:

Thank you sir. All things come to an end ultimately. I would, of course, like to thank all of you who have participated, and we appreciate your coming. We hope that you've gained something out of this meeting. If you just get one idea out of a conference, I always thank that's a worthwhile result from attendance at such things. Particularly, we would like to thank AID for making this conference possible. And I would hate for all of you to leave thinking that Georgia Tech was wholly populated by engineers with hairy ears.

I would like to terminate this affair on a sort of up beat cultural note,

and so I would like to recite a little poem which I understand the past President of the Kimberly Clark Corporation used as his favorite; and it relates in essence to the nature of the work that you all are doing. It goes like this: "Isn't it strange that princes and kings and clowns that caper in sawdust rings and common folks like you and me all are building for eternity? To each is given a bag of tools, and to each is given a set of rules, and each must build before a life is flown, a stumbling block or a stepping stone." And I think that the types of activities that the people who have attended this meeting are involved in are the building of stepping stones for other people, and I commend you all on it.

SEMINAR SCHEDULE

Wednesday, March 11

- 9:00 a.m. Introductory Remarks, Ross W. Hammond,
IDD, EES, Georgia Institute of Technology
- 9:10 a.m. A. O. Lewis, Acting Head
Industrial Research Unit, University of Ife,
Ile-Ife, Western State, Nigeria
- 10:00 a.m. Coffee Break
- 10:15 a.m. Jorge L. Trujillo, Economist, Center for Industrial
Development in Ecuador, Guayaquil, Ecuador
- 11:00 a.m. Discussion
- 12:00 noon Lunch
- 1:00 p.m. Leon V. Chico, Director, Institute for Small-Scale
Industries, University of the Philippines,
Quezon City, Philippines
- 2:00 p.m. Video-Tapes of Small-Industry Activities Conducted
by Educational Foundation of Southern Santa Catarina
(FESSC) and Soong Jun University
- 3:00 p.m. Coffee Break
- 3:15 p.m. Discussion

Thursday, March 12

- 9:00 a.m. Rufino S. Ignacio, Vice President, Mindanao State
University, Marawi City, Philippines
- 10:00 a.m. Coffee Break
- 10:15 a.m. Yoon Bae Ouh, Director, Integrated Development Center,
Soong Jun University, Seoul, Korea
- 11:00 a.m. Discussion
- 12:00 noon Lunch

Thursday, March 12 (continued)

- 1:00 p.m. Osvaldo Dela Giustina, President, and Jose Muller, Economist, Educational Foundation of Southern Santa Catarina (FESSC), Tubarao, Santa Catarina, Brazil
- 2:00 p.m. J. W. Powell, Director, Technology Consultancy Centre, University of Science and Technology, Kumasi, Ghana
- 3:00 p.m. Coffee Break
- 3:15 p.m. Discussion

Friday, March 13

- 9:00 a.m. The Regional Adaptive Technology Centers at Mindanao State, Yeungnam, and Hasanuddin Universities, Manual Alba, Director, Technology and Development Institute, The East-West Center, Honolulu, Hawaii, U.S.A.
- 10:00 a.m. Coffee Break
- 10:15 a.m. Issues and Problems
Joseph Stepanek, Consulting Engineer, Boulder, Colorado, U.S.A.
- 12:00 noon Lunch
- 1:00 p.m. Adjourn



SEMINAR
WEDNESDAY A.M.

Ross W. Hammond presiding

This seminar is intended to accomplish a number of things. One, of course, is getting to know each other better. And we would hope also that some interaction between the various organizations represented here might result, because to date the communication has been largely between Georgia Tech and the individual organizations represented here. I think that you each have a lot to talk about with each other, and we hope that it will result in getting to know each other better. I don't know any way that we can get to know each other unless we talk about what we're doing and react to what is being done, so we have here representatives of six of the network organizations that IDD has been closely associated with. In addition, we have a number of other invited people, such as Mr. Littlewood from AID, the source of most of our funding for international development at this point. We have Dr. Powell from Ghana; Rufino Ignacio from Mindanao State in the Philippines, which is part of the RATIC project of the East-West Center; Bart Duff from IRRI; Paul Lofthouse from the Intermediate Technology Development Group in London; Manny Alba from the East-West Center; Yeo Yum from KIST; and Joe Stepanek, who has just recently left the staff of the Asian Institute of Technology. Joe is a man with great experience in the industrialization process. These latter people whom I have mentioned: we have invited them as resource people to react to the programs being presented and to give us any comments and suggestions they might have. We are not going to talk about ISS, for a change, here. It's really your meeting. We won't go into long introductions of the people.

Professor Lewis from the University of Ife in Nigeria will lead off with a discussion of what the unit there is doing and the motivations and interests of the organization.

THE SMALL INDUSTRY ACTIVITIES OF THE
INDUSTRIAL RESEARCH UNIT, THE UNIVERSITY
OF IFE.

A. O. Lewis
Acting Head
Industrial Research Unit
University of Ife
Ile-Ife, Western State
Nigeria

Thank you, Mr. Hammond. Good morning, ladies and gentlemen. My assignment this morning is a very simple one. It is to talk to you about the small industry activities of the Industrial Research Unit of the University of Ife. Now, before I say anything about what we have been doing in the Industrial Research Unit, I would like to give you a brief background of Nigeria and the University of Ife in which the Industrial Research Unit is included. Now a few years ago, when I was a student in the United Kingdom, a gentleman asked me where I came from, and I replied, "Nigeria." Then he asked, "Nigeria in Ghana?" So, I want to assure you that Nigeria isn't in Ghana. Nigeria is on the west coast of Africa. It is the most populated country in Africa, with an area of about 350,000 square miles and a population which is thought to be over 70 million. We say this with some reservation because over the past 10 or 15 years there has been some controversy about the actual size of the population of Nigeria. We've been having some censuses, but we never actually succeeded in resolving what the size of the population is, but I think many observers believe that the population is around 60 million. Now for administrative purposes, the country is divided into 12 states. As you can see, this map shows the 12-state structure of Nigeria. There are six states in the southern part of the country and six states in the northern part. The northern states are North-Western, North-Central, Kano, North-Eastern, Benue Plateau and Kwara. The southern states are Lagos, South-Eastern, Rivers, East-Central, Mid-Western and Western. Actually, the dividing line is more or less the rivers, Benue and Niger. The University of Ife, where I come from, is situated in the Western part of Nigeria.

Nigeria is a country with vast human, natural and mineral resources, only a little part of which has been mobilized for the social and economic development of the country. We are now in the process of mobilizing these huge and

and vast resources to bring about rapid development of the country. We are trying to do this by periodically publishing and implementing the development program. Nigeria is still predominantly an agricultural country. Agriculture produces about 42 percent of the gross domestic product. But mining and quarrying, especially petroleum extraction, is becoming important. Mining and quarrying contributes just about 19 percent of the GDP, and manufacturing just about 9 percent, so manufacturing industries are just now being established. But I should add that when we started some 20 or 30 years ago with the industrialization process, we started by emphasizing import substitution. So, for many products--cement, textiles, shoes, beer, soft drinks and so forth--we are more or less self-sufficient. What I want to draw attention to therefore, is that the country we are discussing this morning is basically an agricultural country with vast resources for development. As I said, the University of Ife is located in the western part of the country. This University was established in 1961 by the then Western regional government. Now, this might create some confusion. Before 1967, Nigeria was divided into only four regions. We then talked of regions, not states. Later on, the Mid-Western Region was carved out of the Western Region so that the University of Ife was set up by the Western regional government. But since 1967, the University has been regarded as being owned by the Western State government. Now it is financed by the federal government and the Western State government on a 40/60-percent basis. The University of Ife is situated in the agricultural hinterland of the Western State, and because of this, the University is committed to a close identification with the improvement of the agricultural, commercial, industrial and cultural activities of the people of the state as well as to the general social and economic uplift of the people of Nigeria. As of now, we have nine faculties. These are the faculties of agriculture, arts, social sciences, law, science, education, pharmacy, technology and health sciences. There are departments in the University. We have six institutions and four research units. These research units are the Industrial Research Unit, the Drug Research Unit, the Drug Production Unit and the Technological Planning Unit. Now the student population is just about 5,000 which is small in terms of student population in countries like America or Britain, and the academic staff is just about 700. So that, in brief, is the background of the University of Ife and Nigeria.

Now, what about the Industrial Research Unit; that is, the unit of activities we shall be discussing this morning? I would like to say that the Industrial Research Unit was set up in 1969, some six years ago, by some staff of the Department of Economics. Now, the decision to set up this unit in 1969 and the decision to concentrate the activities of the unit on the development of small-scale industries was made as a result of the realization by some of the staff and members of the Department of Economics that both the federal and the state governments in Nigeria at that time were neglecting the small-industry sector of the Nigerian economy. At that time, all the government assistance programs concentrated on promoting the development of large- and medium-scale industries, and many of these large- and medium-scale industries were largely owned by expatriates, whereas the small-scale industries, which were almost entirely indigenously owned and controlled, were neglected by the federal and state governments. Now, those faculty members who decided to set up the Industrial Research Unit realized that obviously this was a mistake in policy

and a mistake in the sense that if one is really interested in the overall development of Nigeria, one must take into consideration the role which small-scale industries have to play. For instance, the development of indigenous entrepreneurships, which was then, and is now, of crucial importance; in Nigeria today, we are all talking about indigenizing the Nigerian economy; that is, transferring the ownership and control of various sectors of the Nigerian economy into the hands of Nigerians so that developing indigenous, small-scale industries in a sense is in terms of capital to set up small-scale industries. We also realize that in terms of stemming or reducing the flow of population from the rural areas to the urban areas--which was then becoming, and is now, a common and important problem in Nigeria--small-scale industries also have an important role to play. Also, we realize that in terms of reducing the level of unemployment--which was then, and is now, an important program in Nigeria also--small-scale industries have some part to play. And, of course, finally we realize that when one is interested in industrialization--especially in a capitalistic colony like Nigeria--one must of necessity take into consideration the roles which small-, medium- and large-scale industries have to play because we know that each different scale of manufacturing industry has a vital role to play, depending on where the competitive advantage lies. So, for these reasons, we felt something should be done, and that the best way to do this would be to set up a unit whose activities would be confined to promoting the development of small-scale industries. This was the idea when we decided in 1969 to set up the Industrial Research Unit. We had very little support from the University authorities when we decided to set this unit up. Initially at that time, we felt that if the unit was to succeed in this assignment, it would be necessary to adopt an interdisciplinary approach. For this reason we tried to get faculty members from different departments in the University interested in what the unit is interested in, and I'm happy to say that as of now the Industrial Research Unit draws its membership from seven departments in the University: the Department of Economics, the Department of Geography, the Department of Agricultural Economics, the Department of Chemical Engineering, the Department of Industrial Management, the Department of Electronics and Electrical Engineering and the Department of Pharmacy. So, these are the various departments which collaborate with the Department of Economics in carrying out the activities of the Industrial Research Unit.

You might be interested in the objectives of the Unit because, when we started, we had clearly at the back of our minds some of the things we wouldn't want the Industrial Research Unit to do. Now, we did set out about five important objectives which we felt the Unit over the years should try to accomplish. The first objective which we set ourselves was to conduct research into various aspects of industrial development, especially the development of small-scale industries in Nigeria, and to disseminate the results of this research to all those who seek industrial research information. So, that was the first objective of the Unit. The second objective of the Unit, as then conceived, was to develop an effective industrial management development and training program to assist both existing and potential or prospective indigenous industrial entrepreneurs. Then the third objective was to encourage and assist community industries to a close liaison between the Unit and the local communities. Now, the fourth objective was to provide teaching and lecture materials in such fields as industrial and business economics. Then,

finally, we felt that we should be ready always, depending on the time at our disposal, to undertake, from time to time, consultancy work in those areas in which the Unit would have ready expertise. So, these were the five objectives which the Unit set itself when it was established in 1969.

Now, I was telling Mr. Hammond this morning that, having been in existence for some five or so years, we've now decided to reorganize the Unit, and this reorganization proposal has been approved by the University authorities. Beginning in September of this year, this reorganization will go into operation. The name of the Industrial Research Unit will be changed to the Industrial Research and Development Unit. We want to include the work "development" to emphasize the point that we are not concerned alone with research, but we also want to see the development of small-scale industry. So from September on, the name of the Unit will be Industrial Research and Development Unit. The Unit from September will now be divided into three divisions. First, there will be the research division. Now, this research division will be concerned with carrying out fundamental and applied research into various aspects of industrial development in Nigeria with particular emphasis on the development of small-scale industries. We emphasize development research so that research which is of interest and importance to Nigeria will be the work of the research division. Now, the second division will be the training division. This division will be charged with responsibility for running short, intensive training courses for small industrialists as well as for government officials concerned with the promotion of small-scale industries. Presently, I will talk about training courses which we now organize. There will be a management development division, and this division will provide management assistance to existing prospective entrepreneurs, with a view to improving the small industrialists and enhancing their contribution to the level of employment. So, from September these will be the three divisions of the Industrial Research and Development Unit.

Now, having given you this background, you might be interested in finding out what exactly we have done since our establishment. As I said, we decided to confine our activities initially to promoting the development of small-scale industries. During the first few years of our establishment, we decided to concentrate within the overall objectives which were set out earlier. We concentrated on doing three things. First, we decided that it was necessary for us to carry out general service to small industries in different parts of Nigeria. Second, we decided that we should undertake an in-depth study of selected industrial enterprises with a view of identifying the problems and the needs of these enterprises. Third, we decided that, having done this, we would then embark on providing industrial extension services in such areas as economic and technical assistance, management, development and product improvement. So, these are the three main things we decided to do within the first few years of establishment.

Now, obviously, if we talk about the small-scale industries, one must determine what exactly we mean by small-scale industries. Yesterday or the day before yesterday, it was pointed out that the definition of small-scale industries differs from country to country. We also face this problem of arriving at a definition which would be acceptable to everybody in Nigeria.

Now, the definition which we eventually decided on was to regard as small-scale industries or enterprises those which are engaged in manufacturing, processing, and technical services which employ capital investment of not more than 60,000 naira regardless of whether such enterprises use factory methods of production. Sixty-thousand naira is approximately \$90,000. The official rate of exchange is \$1.50 to a naira. So, that would be about \$90,000. So, this was the definition of small-scale industries which we decided upon when we started out in 1969. I must add that recently, because of the rapid increase in the quantities of imported commodities, we have been considering whether or not it would be desirable to increase the ceiling of this capital investment, and I think the National Advisory Council on Small Industries Development in Nigeria has already started to look into this matter.

One might be curious, I said earlier, why we decided to carry out the general survey of small industries in different parts of Nigeria, and some people might find this somewhat surprising. Now, we decided to do this because at that time there was very little information on small-scale industries in Nigeria. I suspect that one of the reasons why federal and the state governments did nothing to assist small-scale industries was because we were not, in fact, aware of what these industries were doing, how many there were, and so on and so forth. So, the Unit felt that in order to provide more basic information on the operation of small-scale industries, it would be necessary for us to embark on this. In addition to that, we also felt that it would be necessary to publish a directory of small-scale industries, especially in the Western State. Now, those who are interested in locating small-scale industries in one state or those who, for one reason or another, want information about different industries in the various states can always consult the directories that we started with the Western State in 1969. When we completed this service we knew that other states would want us to do similar surveys for them. The Mid-Western State did ask us to do the Mid-West, as did the Kwala State and Lagos. So far we've done five states: the Western State, the Kwala State, the Mid-western State, the Lagos State and, of course, the North-Western State. Apart from the Western State, the federal and the state governments did provide some of the resources which we required to conduct these surveys. So, as Mr. Hammond mentioned, we have identified over 30,000 industrial units, and we've published new directories for the Western State, Lagos State, Mid-Western State, Kwala State and North-Western State.

Now, I have some materials here from these surveys. On this part of the board the first table shows the distribution of small industries according to industry classification in the Mid-Western, Kwala and Lagos states. Now, one highlight of this table is that the bulk of the small industries which we have been able to identify are concentrated in the production of garments of various description. Another important area here is bicycle repair and another is carpentry, including furniture-making. So, this is the distribution according to industry classification of the enterprises which we have identified. Now, in terms of ownership, the table below this one shows small-scale industries by types of ownership. As you can see, the bulk of the enterprises are sole proprietorships; that is, they are owned by one man. Partnerships are not important, the cooperatives also are not important, and the registered limited-liability companies are also relatively unimportant. Most of the small industrialists in Nigeria prefer to go it alone.

If you look at this part of the board, the first table here shows the sources of investment finance. Here again, one important highlight of this is the fact that commercial banks and other financial institutions have played very little part in the development of small-scale industries in Nigeria. As you can see, the most important source of finance is the owner's capital; that is, a man raises his own funds from his own savings or from the savings of his business to finance his business, and the relatives play little part. And finally, the other table here shows the educational background of the entrepreneurs. Now, as you can see, nearly 20 percent of them are illiterate; that is, they have no formal education of any type at all. About 48 percent have a primary education. Primary education in Nigeria goes on for about six years. Modern secondary education--which is about two years after primary education--just about 7 percent have that. About 0.2 percent have gone through teacher training colleges. Now, those who have been to technical institutes are just about 0.4 percent. Those who were only in industrial education--we were only able to identify five of them. Those who have gone through some form of adult education classes--just about 1 percent. So, what that table shows is that the bulk of the entrepreneurs in Nigeria have very little formal education; and this is of importance when one is thinking in terms of the type of training program which one has to organize for these entrepreneurs. So, this is the type of information which we have been able to collect from these general surveys which we have carried out.

On the basis of the data which we collected from these general surveys, we then decided to select, on a stratified sample basis, some industrial enterprises for an in-depth analysis with a view to really finding the problems of these entrepreneurs and the type of assistance programs which one can usefully work out for these people. Now, we also confined ourselves this time to the Western State, and we interviewed a number of industrial entrepreneurs. From these in-depth studies we found that, contrary to what was then popularly believed in Nigeria, the most important problem confronting the small-scale industrialists and preventing them from expanding was not financial problems but, in fact, a number of problems which tended to inhibit their development. There are various problems, but I will just introduce you to some of these.

The first problem area which we found from this in-depth study was what I call manpower problems. Now, these manpower problems consist of about four areas. First, you have the problem of training. As you know, training is very important; important in the sense that as an organization changes the training needs change; the need for improving the skills of the employees also changes. Now, what we found was that in many small-scale industries, apart from the apprenticeship training system, there were no training programs. So, as the industries, as the enterprises develop, as they introduce more machinery, as they introduce new products, the employees find it difficult to cope with the new skills which are required if the products are to be produced and the new machinery is to be used. So, this was a very important problem. Then another problem is that of recruitment. Now, when we talk about the problem of recruitment, what one means here is the ability of the entrepreneur to attract to his enterprise well-qualified and experienced personnel. We found many small industrialists are not able to attract capable personnel to their enterprises for the simple reason that the conditions of work are rather poor;

conditions in terms of wages and pay, in terms of prospects for promotion, in terms of providing a pension, providing medical services and so on and so forth. So, any qualified Nigerians with experience would rather work for the medium- or large-scale enterprises for the simple reason that the conditions of service in these enterprises are far superior. Another problem we also found is the problem of selection. When we talk of selection, what we mean here is the ability of the entrepreneur to select the best candidate from among the people who have applied for work in this enterprise. As you know, now the process of selection is becoming more complex. In the large enterprises there are personnel departments whose function is to find out how the best candidate for any particular post can be identified. Now, in many small industries the entrepreneurs rely more or less on their own subjective judgement. Finally, on this subject of manpower problems, there is the case of the inability of the entrepreneurs to delegate responsibility to their employees. Now, this has two important consequences. First, because entrepreneurs are unwilling to delegate their responsibility, they have to do everything at the same time, to be everywhere at the same time; which is not possible. So, when they have to go out to attend to other duties, personal or official, some of the activities of the enterprises usually suffer. Then the other aspect, the other consequence, of this inability to delegate the responsibility arises from the fact that he does not provide enough motivation to the employees to give of their best to the enterprise in the sense that, apart from financial rewards, if one is going to give of his best to an enterprise, one wants to be involved; to be identified with the enterprise; to assume responsibility for whatever it is one is doing. I know this, that unless people are given responsibility, it will be difficult to get them to give of their best for the enterprise. So, this was the first problem which we identified.

Then second, we also saw that there were what could be termed marketing problems. Now, there are two sides to these marketing problems. The first one being the limited demand--the problem facing the products of many small industries. This limited demand arises from the simple reason that many small-scale industries are set up to meet local demands for particular products. An enterprise is set up in a town, in a locality, and that enterprise is concerned with meeting only the demand emitting from that locality. Usually this demand is small, and the one important consequence from this is that when it becomes necessary for the enterprise to grow and develop, the limited market facing the products of the industry hinders the growth. The second of these marketing problems we notice is that small-scale industries, in fact, do not know how to cultivate the market; how to attract people to their products; how to display their wares. Usually what happens is that many of them just produce--they are more interested in producing rather than selling what they produce. We felt that one important assistance which we could render to small industries in Nigeria would be to teach them how to be marketing conscious; how to attract the consumers to their product.

Then there were the technical problems; what we described as technical problems. There are, in fact, about three aspects of these technical problems. The first one--a very important one--is in getting machines of the right specification. As you know, in Nigeria, for the simple reason that the process of industrialization started only recently, the machine fabrication industry

is highly undeveloped and, as a result, industries in the country have to import their machinery from abroad. Now, small-scale industries usually do not have the necessary contacts abroad to place orders for their machinery. So, what happens is that most of them invariably just get the type of machinery which is sold to them by local representatives of foreign manufacturers. Frequently, the industrialists find that the machinery which they bought is the wrong type. Then there is also the question of installation. When you import machinery, especially those made abroad, you need to get someone from the selling organization to help with the installation. Usually, small-scale industrialists find it difficult to get people to come out from abroad to help them with this installation. Then there is the question of repair and maintenance, because you cannot hire skilled technicians from time to time. When machinery does break down, you find that for a very long period of time it remains unused until it is repaired, mostly because they cannot quickly get those who will repair the machine.

Finally, we find that many small industrialists do not keep any records. This problem arises from the fact that, as was pointed out, many of them are illiterate. This is of vital importance when it comes to making applications to commercial banks and financial institutions for the granting of loans, because before a commercial bank or any financial institution will give credit or an advance to an enterprise, obviously the institution would like to go through the books to make sure that the venture is profitable. Because many small-scale industrialists do not keep this type of continuing record, showing their incomings and outgoings, they find it difficult to persuade commercial banks to give out loans.

And, of course, there is the question of deficient physical infrastructure in terms of roads, water supply, electricity and so on and so forth. So, these are some of the problems which we did identify.

By identifying these problems, we are also almost simultaneously placed in a position to determine the type of assistance problems which could usefully be given to small industrialists. In the light of these problems, some of which I have just discussed, the Unit decided to embark on the provision of industrial extension services. Now, the management development assistance program emphasizes about five or six important areas. First, we want to go out to seek out the prospective entrepreneurs. Second, we would be concerned with advising on the choice of plants and the location and the installation of these plants. Third, we would be concerned with preparing feasibility studies. Fourth, we would be concerned with advising on the acquisition of industrial sites, factories and plant layout. Fifth, we would give advice on all matters which can lead to the establishment, modernization, classification or expansion of an enterprise. And finally, we would give counseling advice on all areas of management activities. So, what we are now doing at the moment is concentrating on the industrial extension services.

Now, because the resources at our disposal are rather limited, we decided to concentrate our activities to start with mainly on the Western State and on the Lagos State. We are planning to have five field offices, four of them in the Western State and one in the Lagos State. One of these field offices

was recently established at Ile-Ife, the site of the University of Ife. All of these field offices will be manned by staff members of the Industrial Research Unit, and they will be posted to the various field offices where they can, on a continuing basis, render necessary advice and assistance to deserving entrepreneurs. So, this is a very important area on which we are now concentrating our activities.

Then second, another important area of activity is the field of training. I think I mentioned earlier that there is going to be a training division of the Industrial Research Unit. Now, at the moment we are concerned with providing two types of training programs. The first type of training program is what is known as a program in export promotion for indigenous businessmen. As I said, one of the problems which we found when we carried out this in-depth study was the inability of industrialists to sell some of their products. We felt that there is a good opportunity in the foreign market for the products of some of the industrial enterprises. If we can train these indigenous entrepreneurs in the techniques of export promotion, maybe they will be in a better position to export their products. The second type of training program which we have so far conducted is a training course on the development of small-scale industry. Now, the participants are drawn from two broad areas. First, you have the government officials who are concerned about the development of small-scale industries in Nigeria, and the second broad group of participants comes from the small industrialists themselves. This is a short, intensive training course which goes on for about a week. During this training course, all participants attend a workshop. The objective of this workshop is to provide a forum with the government officials who formulate government policies for the development of small-scale industries and then can exchange ideas, especially on the effectiveness of the government assistance program. We found that this training course has been very useful.

Then, finally, one thing which we have been doing, and hope to continue to do in the future, is to prepare area profiles, feasibility studies, market surveys and so on to insure that these studies are made available not only to government officials, but also to private businessmen and businesswomen who may want to make use of the results of these studies.

This is what we have been doing, and we believe that we have, in the past few years, achieved some success. I would believe that I have listed two important areas: First, in the area of creating a better awareness among the people and state governments in Nigeria of the important role which the small-scale industries have to play in the social and economic development of Nigeria. We have succeeded in doing this. Our one sign of this is that, unlike the situation five or six years ago, the federal and state governments in Nigeria are now more willing to provide more resources for the development of small-scale industries. As I said, we now have the National Advisory Council on the development of small-scale industries, set up by the federal government, and our Unit is a member of this Council. The state and federal governments have also set up various institutions--industrial development centers, financial institutions--to help the development of small-scale industries in Nigeria. And now to a more personal level. We have also been able to assist new entrepreneurs to set up small industries in Nigeria, and we have also

helped existing entrepreneurs to become more efficient so that they can expand and grow in the future. Very briefly, therefore, ladies and gentlemen, this is what the Industrial Research and Development Unit of the University of Ife in Nigeria has been doing. Thank you, ladies and gentlemen.

THE SMALL INDUSTRY ACTIVITIES OF
THE CENTER FOR INDUSTRIAL DEVELOPMENT
IN ECUADOR (CENDES)

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English presentation by
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In a brief manner we shall try to present a frame of reference that will assist the participants in understanding what the Centro de Desarrollo Industrial del Ecuador (CENDES) is.

In Ecuador, the National Planning Board is responsible for all industrial programs and economic development programs for the country, and it is the National Planning Board that determines the priorities of the different industrial activities. Controlling the industrial program we also have the Ministry of Industry, Commerce and Integration, the Industrial Development Law and other existing laws which provide the legal framework for the implementation of these activities.

In a general manner, the following types of projects are considered of importance:

1. Industrial projects that are oriented to supply the market created by the Andean Group and that are part of the integration scheme.
2. Projects that will develop intermediate and basic industries and provide raw materials to the industrial sector.
3. Industries generally oriented to exporting goods on the basis of processing our natural resources.

4. Industries that will produce goods that may be considered import substitutions, thus utilizing our native employment and our industrial structure.

High priority is also given to those projects that will create industries outside the existing population poles and will use available local raw materials and will also supply our internal market.

To stimulate these activities, and in order to motivate industries for these national priorities, incentive laws have been established. Briefly, one may say that the following incentive laws govern the area: the Law for Industrial Development, the Law for the Development of Small Industry and Handicrafts, and the Regional Promotion Law.

Under the Law for Industrial Development, three special categories are designated as "A," "B" and "Special"--all of which are part of the general development plan. The law under given circumstances will limit the importation of similar products that are being manufactured nationally and will provide benefits to the companies that are manufacturing these products. Furthermore, tax incentives are also offered, and special concessions are provided for the importation of equipment, tools and accessories. The tax incentive is equivalent to 7 percent and up to 15 percent of the F.O.B. price of the exported production. This law provides fiscal incentives at four different levels: (A) provincial and municipal taxes, (B) duties on imported raw materials, (C) duties on machine equipment and parts, and (D) taxes on real estate.

The Comprehensive Law for the Development of Small Industry and Handicrafts was established in August of 1973 to motivate the creation of small industries and handicrafts in areas normally considered rural. All of the national territory is benefitted by this law with the exception of the provinces of Pichincha, Guayas and Galapagos. As you perhaps know, the first two provinces contain the cities of Quito and Guayaquil.

Generally speaking, the law offers incentives to newly established enterprises and shops and to existing industrial activities that undergo modification or growth. Benefits are mostly in the area of special tax dispensations, and more so in the case of handicrafts. It has been a prime interest of CENDES to work in these areas of expansion of existing industries and creation of new industrial activities.

The Regional Promotion Law was established in November of 1973. Its objective is to develop all provinces of Ecuador with the exception of Pichincha and Guayas. Under this particular law additional benefits and incentives are offered over and above those indicated by the Law for Industrial Development, as long as the plant location is outside the two major geographic areas. The purpose, obviously, is to decentralize industry and make rural locations attractive to future entrepreneurs.

Several mechanisms are in existence to provide funding to the industrial sector, and this funding can be long-term, medium-term or short-term. The main institutions providing this funding are the following:

1. National Finance Corporation (Corporacion Financiera Nacional)
Responsible primarily for the financing of industrial projects and participation in the establishment of capital for industrial activities that are considered priorities.
2. National Development Bank (Banco Nacional de Fomento)
Dedicated to providing financial assistance for the development of small industries and handicrafts.
3. Industrial Finance Fund (Fondo Financiero Industrial)
Established in 1973 to provide financial assistance to the small industry sector and the handicrafts.
4. Other institutions, including the Preinvestment Fund, Export Fund and others too numerous to mention.

It is well known that a bridge must be established between the plan and the objectives of the national government and the real industrial world. The bridge, in this case, is the Centro de Desarrollo Industrial del Ecuador (CENDES), which has the responsibility of promoting those industrial activities that the government wishes to establish and assisting the entrepreneur in the implementation of the project. Briefly speaking, one finds the following main areas of activity within CENDES since its inception in 1962. These activities are outlined in the law that created CENDES.

1. Carry out the necessary studies leading to industrial projects that are considered of a national priority and are within the national development plan. In doing this, the project will attempt at all times to use national resources and native human resources.
2. Identify investment opportunities and prepare the necessary industrial projects that will allow the best use of the regional integration concept and the world market.
3. Promote the installation of new manufacturing activities, making use of national and foreign investments.
4. Provide technical and management assistance to industrial enterprises in an attempt to develop them and increase their productivity.
5. Coordinate the implementation of technical assistance programs that are being carried out throughout the nation.
6. Act as a consultant, if necessary, in the preparation of studies and the review of industrial investments.
7. Collect, process, and diffuse technical information relevant to industries.
8. Sponsor the specialization and upgrading of native technical staff.

9. Cooperate with other organizations in the public and private sector related to the industrial development objectives of the nation.
10. Carry out a program of conglomerates or industrial parks in an attempt to create an equilibrium in the industrial development of the nation.

In an attempt to carry out the previously indicated activities, the following functions have been established and are at present operating within CENDES.

1. Studies Division
This group performs the traditional prefeasibility studies, feasibility studies, market analyses, regional studies and others. It also hires external consultants, when needed. At present, the Division is subdivided into the following major groups: chemistry, petrochemistry, electronics, metal-mechanics, automotive and steel.
2. Agro-Industry Division
This is interested in sectorial studies, market and prefeasibility studies leading to agro-industrial projects.
3. Technical Assistance Division
Working closely with the United Nations, this Division for the next four years will provide technical assistance to industries, utilizing consultants provided by the U.N.
4. Promotion Division
It is the responsibility of this Division to promote the studies carried out by the other groups and, specifically, to try to generate industries that are being assigned to Ecuador under the Andean Pact.
5. Technical Information Service
This provides the scientific and technical information required by industry in their attempt to develop and better their productivity. The information that is provided often encompasses the results of basic research or applied research carried out in other nations, as well as information on manufacturing processes, quality control, industrial engineering systems and maintenance.
6. Industrial Parks Division
A fairly new group is the Industrial Parks Division, and this has the responsibility for developing industrial parks. These are small parks; we would not call them industrial parks in the U.S. But these are oriented to be developed in rural areas in an attempt to conglomerate industries around central services, thus lowering the cost of provision of this infrastructure.

7. Demonstrative Industrial Shops

The last, and not least but definitely the most novel, is the Demonstrative Industrial Shops or workshops. In this program they are attempting to provide demonstrative workshops for handicrafts where artisans can come and learn to use simple machines that will in some manner better their production. And at the same time, they can use this equipment as part of their production while they're learning how to use them. So really, their industrial demonstrative workshops are doing two functions: (1) a typical training function and (2) a limited production function.

In the last 13 years of its existence, CENDES has been a positive factor in the industrial development of the nation and has assisted the government in implementing its national program. To date, CENDES has completed and published 172 studies; 26 are of the sectoral type, 55 have to do with the national or international market, and 91 are prefeasibility studies covering food industry, chemistry and wood products. The total investment required to implement the 91 prefeasibility studies is in the area of US\$438 million, and this would create over 10,000 jobs. It is our estimate that 90 percent of the projects covered by these prefeasibility studies have been carried out or are being considered for implementation. So, one can safely say that most of them are in the process of being implemented or will be implemented shortly.

There is a tremendous amount of additional data available that Mr. Trujillo was kind enough to provide, but since we will have a long period of discussion between now and lunchtime, I will be more than happy to work with Mr. Trujillo and try to provide answers to any questions that you may have at that time. Thank you.

DISCUSSION SESSION

Ross W. Hammond presiding

O.K. We're ready for a discussion and I guess Nelson and I are the only two in the room who've had the occasion to visit all of our counterparts.

There has been much interest in the Ife report. I'll introduce one subject thereon and perhaps others in the seminar can respond to it. It strikes me that, from reading the Ife report, Nigeria has a rather unique entrepreneurial development system. The statistics indicate that there are, as I recall some of the reports, more apprentices than there are entrepreneurs in the country, or at least in those areas which have been surveyed. These apprentices--correct me if I'm wrong, gentlemen--generally are given room and board and that's about it, and they're not salaried, frequently. They spend a few years finding how the particular activity operates and then they are in a position to get out and start their own activity. As a result, there is a tremendous number of apprentices, at least as recorded in the University studies, who ultimately have a potential to be entrepreneurs in themselves. I don't know of any other country that we're working with where quite that situation exists.

Nelson C. Wall:

We have a similar situation in Ecuador, not as heavy as in Nigeria, where they do still use the apprentice system and we have just completed an 18-month study of small-scale industries in Ecuador which was financed by AID and OAS jointly. My draft is now being typed and it should be published next month. This is a very good look at all of the activities of the small-scale activities in Ecuador and where it is going within the CENDES program and within the national goals. I think we'll find that this is similar to the situation in Nigeria, where they're developing their entrepreneurs through the apprenticeship system.

J. W. Powell:

I wonder whether the apprentice system is the same in Nigeria as in Ghana, because it doesn't work quite that way there. The apprentice scheme is essentially a scheme whereby the entrepreneur gets very low-cost labor and very often they take good care to prevent the apprentice, so called, from understanding the really essential features of the business. They don't really want him to become an entrepreneur in his own right and to create any competition. What generally happens is the man works as an apprentice for four or five years, then he goes to his master and says, "Well, haven't I served my apprenticeship; couldn't I be paid a salary now?" And he's usually told, "Well, you can go and find employment elsewhere or settle on your own," and he's replaced by another apprentice. So, I don't know that this is a very good scheme for entrepreneurial development.

A. O. Lewis:

I think there is a difference between Nigeria and Ghana. In Nigeria the apprenticeship system is not controlled by the government but is subject to control, depending on the industry. There is a minimum and a maximum period of apprenticeship. You are supposed to stop the apprenticeship after two years. Now at the end of the two to three years you have to undergo a test, which is more practical than theoretical, and if you pass, then the owner of the business will certify you as being fully competent to work on your own. Now what happens in Nigeria is that many people undergo this treatment, principally because of the unemployment situation. If a young man or woman completes primary education, it will be difficult for him or her to get employment. So, what happens is that most of them go in for apprenticeship training with the understanding that when they do complete their employment and training they can do either of two things. They can either continue to work for the enterprise that trained them or move to another firm to work as paid employees or, if they can raise the capital, they can go and set themselves up as entrepreneurs.

Cornelius Otiteh:

It is not only due to lack of employment that people go into apprenticeship training. Many people find that they cannot support their children when they pass out of secondary school and the only avenue open to them is to send them somewhere where they can get some basic training, in the hope that they can find a job. Invariably, in this system the apprentice enters into an agreement with the proprietor and in addition to the agreement the apprentice is asked to pay a certain sum of money. They agree that this money will be used in training him over a period of years--sometimes two years, sometimes three years, depending upon the nature of the industry. So this is a system, that the apprentice and the proprietor are tied up by some form of agreement.

J. W. Powell:

I'm very pleased that there is becoming formalized in Nigeria some agreement between apprentices and entrepreneurs.

Ross Hammond:

In other words, there is no formal agreement between apprentices and employees in Ghana?

J. W. Powell:

Not to my knowledge, no. It seems primarily a form of cheap labor, and I've read about the same system operating in southern Italy where there is a conscious effort on the part of the entrepreneur to prevent the apprentice from acquiring any knowledge which would enable him to become an entrepreneur in his own right. I'm afraid that this system seems to be more prevalent and, as I say, I'm very pleased that perhaps through government influence and by other means the system can become formalized so that the apprentices do benefit in some material way from this system.

Oswaldo dela Guistina:

We are anxious to learn what social-cultural factors exist in Nigeria that you feel might set your country apart from those being represented here, factors that might act either as constraints or as assistance to the development of small industry. Those of us who have little knowledge about Africa keep hearing about tribal affiliations and family affiliations; that obviously these factors have "washed" themselves into the economic life. Are there any factors, social-cultural factors, characteristic of Nigeria that affect the development of or assist the development of small industry? That is the first question. The second has to do with whether you have had enough time in your program to develop a generalization or a profile of what a small-scale industrialist is. Is he a person who comes from the merchant sector; is he an agricultural person; is he a young professional; or is he a technician who comes out of the factory system who decides to go on his own?

A. O. Lewis:

Yes, thank you. To attempt to answer the first question; social-cultural restraints. Now like any developing or developed country, obviously there are certain social and cultural characteristics which can either assist or hinder development and I will only give you one. Whether this one assists or hinders development depends from what angle you look at it. For instance, there is what is known as the extended family system. Compared with people in a developed country, you have just a nuclear family system. When the person grows up, he or she marries; he has only the immediate family; whereas in the traditional Nigeria you have the extended family. In other words, when you begin to work, you marry; you have children; you are not only concerned with your immediate family. You also have some responsibility to members of your extended family-- your cousins, aunts and so on. Now, many people believe that this can act as a constraint on the worker; constraint in the sense that it could lead to the inability of an entrepreneur to raise the rate of his savings. As we showed earlier, most entrepreneurs have to rely on their own savings in order to establish or to expand their businesses, and some people might believe that if you have to cater not only for your immediate family but for members of this extended family that this would prevent you from increasing the size of your

savings. But there is another way to look at this, in the sense that the extended family system acts as a form of a social insurance in that once you belong to this extended family system at least you can be sure that even when you are not employed that someone could take care of you. That is, to provide you with the basic necessities of life: shelter, accommodations, and personal clothing. Because you belong to this extended family system, the head of that extended family can from time to time call upon members of that system to assist. Ordinarily, the small-scale industrialist--if he needs assistance from the members of this extended family system--can easily call on them, especially when it comes to mobilizing savings. Because he has to rely on his own savings he can easily occasionally call on the members of this family to contribute towards the development of the enterprise. As I said, it depends from which side you are looking at this. Some of these cultural factors can serve as an impediment; in another aspect it can also assist in development.

Now, to the second point about the profile of the entrepreneur. What we found from our studies is that the entrepreneurs in Nigeria are actually heterogeneous in characteristics in a sense that there are some of them who became entrepreneurs after they worked in the civil service. For instance, some of them might be clerks who feel that they are not gaining well enough in the civil service and feel that probably by working on their own they might achieve success in life. We also find that some of them might formerly have been in commerce and say, "I want to make some money," and feel that they should spread their wings and move into the field of manufacturing. Some of them were formerly farmers who were making some money in farming and decided to move into the field of manufacturing. The group is not homogeneous in their background; rather they are heterogeneous. Now, if my colleagues from Nigeria would like to add to what I've said.

Cornelius Otiteh:

I can only suggest that this extended family has been used as a form of security for loans from banks. You see, before the crises they used to give loans to people from certain areas. For example, in the Eastern State the extended family unit is very, very strong. A family unit is so strong that, because you have the backing of your clan, you will no doubt receive a loan, you see, because of the censure that could come from the group if you defaulted.

(Question from the Audience)

Mr. Lewis mentioned in his presentation that the faculties of his organization go and seek out entrepreneurs. How do you motivate these entrepreneurs you sought out to take heed to advice, whatever it is? They don't like to change the way they have been doing, accepting your advice in terms of technology or technicality or whatever it is. Second, you are seeking out some men--some businessmen--who give the apprentice the training or some information. Haven't you run into conflicts with these businessmen who give this service to apprentices, because many businessmen like to keep apprentices untrained so that they may be able to keep them at low wages for a long time? This is the situation that we have experienced. Now, you said apprenticeship has not been controlled by the governments at all--they are left to accept it or reject it--then how do you

go about this situation? You don't like to keep all these apprentices trapped in the conditions that they may not escape from; it is almost slave conditions. These are my questions.

A. O. Lewis:

In answer to your first question, it is true I said we do seek out prospective entrepreneurs and then give them advice on what they can do to set up their own businesses. Now, it is one thing to go out to identify an entrepreneur and give him advice. It is something quite different for that prospective entrepreneur to accept your advice and act on this advice. All that I can say is that our experience so far has been that there is in Nigeria a very good awareness of the important role of entrepreneur development. There are many Nigerians who, having seen the opportunity which exists in the country, feel that if they can get the necessary support or report advice, they can probably do well in business. When we identify persons who feel that there are industries in which they would like to participate and we give them the necessary advice, telling what they can do in order to become successful, what we find is that many of them usually rely on this advice. We cannot force someone to become an entrepreneur. We can only advise and tell him what he should or should not do. Now, whether he accepts that advice or not depends on the individual.

Now, with regard to the second question on apprenticeship, as I said, there is no formal control by the government. But, it has also been pointed out that you have this informal arrangement between the apprentice and the trainer or operator of the business. Before the beginning of the training, both the owner and the trainee agree not only on the duration of the training, but on the type of payment that will have to be made. In other words, before you begin your training there probably are certain fees which you must pay to the owner of the business on the understanding that on payment of that fee he will agree to give you the necessary training. And what happens in the apprentice system is that the training is more practical. At the same time as you undergo your training you participate in whatever it is that the business does. For instance, take an auto mechanic. You start with the lowest type of the operation and gradually you graduate to the higher level, so by the time that you have completed two or three years of training, you are in a position to take a car that has some complaints and not only will you be able to identify the complaint, but you will be able to effect the necessary repairs. One point which I would emphasize is that in Nigeria apprentices are not usually paid regular wages. If the owner of the business is doing very well he can undertake to give him regular pocket money or occasionally take him to live with him. So, in addition to working as his apprentice, occasionally he will also perform some household duties, in which case the man will give him clothing, housing, and occasionally food. Everybody--trainer and trainee--agrees that at the end of the specified period the apprentices will have to go. That is, they will have attained their freedom and they will be able to work as a paid employee or go and set up their own enterprise.

O. A. Oguntoye:

The apprenticeship system does not develop with the modern industrial process because it took over from the traditional way of training people. So,

there is that traditional control in it, you see. Before you started the modern system of industrial production you had the craft system--the craft association. You had to take in your own brothers and train them, or the father took in his own son and trained him in the profession. You still have this being used by the modern small-scale industrialists. So, the apprentices don't get money; it's a form of training from the word "Go!" and the traditional control is there, and it does give you an example, as Mr. Lewis has said.

You see, in 1969 when we were doing the survey of small industry in Ife we sent out boys and girls to all the people and they went to meet the Captain. The Captain told the boys, "Look, I'm alone. I have nothing." Well, they recorded it and brought the questionnaire back. After about two days, word got around as to the importance of what we are doing. So, he came to us himself and said, "Look, I've given wrong information. What I've told you is not right. I want your boys to come." So, we sent two people to go with him. They went behind the bush, where he has got his work, and found that he has got more than 18 apprentices working for him. So, he gave them all the information and if you look at our publication on the Western State of Nigeria you will find that this man is listed in there. We asked him, "Why did you do that?" He said, "Well, we thought you were connected with tax," and that he does not want people to know because then they ask him to pay tax. So we told him, "Look, take the bush away and put on a good show." We got him interested in going to the bank and he decided to make money and to develop, but what if that did happen? After about a year the tax people would have descended on him and asked him to pay something like 500 or 1,000 pounds tax. So, the man ran to us and said, "Look, now you've gotten me into trouble." Professor Aluko had to write to the governor, to the commissioner, to everybody in the ministry, and everyone said that they didn't know what to do with the man, so they just left him alone. As a result of his own case now, the Ministry and the Board of Customs and Inland Revenue are now discussing with the National Advisory Committee how to excuse these people. Sometimes you get into a situation where you have somebody and you reach a point where you won't be able to go again; you have to leave him, and afterward he just might not take your advice. But we have so many success stories that now they realize that it is better for them to work with us than to run away from us.

Nelson C. Wall:

This is a point that Mr. Trujillo would like to interject. In Ecuador the small handicrafts, the artisans, may employ up to four trainees. If he has more than four, then he is no longer classified as "handicrafts" and he has to apply for a small industry license. So, that's one way of limiting this problem. Too, in the area of training it's very difficult for an artisan to become a small industry; he doesn't know how. That is why they are trying to experiment with these demonstrative workshops, where hopefully the man will learn industrial processes, but on a very small scale. And he will learn how to use raw simple tools, and hopefully this will create an involvement. As I said, the demonstrative workshops are now just being started, so we really don't know what the outcome will be. But I think it is something that is worth looking into and keeping your eyes on for the future because this may be an answer to it.

(Question from the Audience)

But the government-controlled system is there, right?

Nelson C. Wall:

It's a government-supported system, but the apprenticeship is controlled in the sense that if you want to have more than four, then you have to go to the next level of license. You are no longer "handicraft"; you're a "small industry".

Ross Hammond:

Organizationally, I understand CENDES has a main office in Quito and another office in Guayaquil, and do you not also have regional development offices?

Nelson C. Wall:

They've already set up an office in Cuenca. They are trying to open more offices, but one of the problems they are having is staff training. They find it difficult to train a person and then leave him by himself in this regional office. For instance, right now they've had to pull a man in from Manabi for additional training in Guayaquil. But they are in the process of setting up additional regional offices throughout the country.

Ross Hammond:

I'd like to ask the resource people here whether they have any comments.

Yoon Bae Ouh:

This is not a comment, but I'd rather like to raise a question for all of the participants here. Since we are talking about this, we are in a position to help small-scale industries here. That is, by definition our activities concern helping somebody. That means we have to be a little bit better than the person who would be getting help. I'd like to know, how do you maintain the staff who are capable? I'm sure they'd have to have more of a devotion than all of this energetic attitude that is necessary to be a teacher or a partner. In our own experience we have had to have very young people as well. Now, what kind of incentives do you provide them so that they can pick this occupation, which is very unique, as a permanent occupation or lifetime occupation--to devote his entire life to this kind of activity? Are they willing to spend their entire lives in this kind of a thing they are doing or do they consider this as temporary, as a stepping-stone for future advancement into some other organization? Can you get the capable staff whenever you want it and how do you finance this? And what kind of benefit do you provide to those people? I'm talking about your staff. So far, from our two speakers I haven't had a clear picture as to the scope of their activities in terms of budget. Financing; how do they get the money, and what are the future plans? So, if you gentlemen would make some comment on this, I will appreciate it. Thank you.

Cornelius Otiteh:

Thank you. The question is being tackled by the federal government of Nigeria through the Federal Ministry of Industries. All the staff working at the Industrial Development Center are recruited by the Federal Public Service Commission and they are civil servants, pure and simple. So, the responsibility for their salaries, their allowances, and facilities for transport and so on are provided by the federal government. So, it is a question of the type of job you want. The Federal Public Service is a pool where they recruit staff for all sectors of government ministries. If you choose to work at the Industrial Development Center, provided that you have the qualification required for the job, whether it's professional or technical management qualification, then you will so indicate when you're interviewed. If you're successful you are recruited and posted to one of the Industrial Development Centers. So, the question of finding the staff is not the problem.

Ross Hammond:

How big a staff do you have in your unit?

Cornelius Otiteh:

Well, for the Center at the moment we have a total of 125, including the supporting staff. The other aspect of the question about how you're going to keep this simple; well, in the first place we have civil servants and therefore they enjoy the same privileges as the other civil servants in the country. I think the important factor is to find out if this type of man is a man who is going to be dedicated to the job, because if he is not interested in the job he would not stay there very long. But, based on my own experience, over the last ten years, I should say that 99 percent of the staff have continued to remain there and they are enjoying the work.

(Question from the Audience)

In other words, the federal government each year in the fiscal consideration. . .

Cornelius Otiteh:

They provide funds for the salaries. They also provide funds for other facilities, if additional equipment is required, if new vehicles are to be bought, if new staff is to be recruited. These are prepared in the estimates and then the federal government approves it immediately. Use a blue or red pencil to scratch off some, but usually we add one or two drops each year.

A. O. Lewis:

We get the money we spend from different resources. The most important source is what is known as the National University Commission. This was set up by the federal government with the idea of controlling the development of the university system. Each year all the universities submit a detailed

budget of their proposed expenditures for the coming year. If the National University Commission approves this budget, then the federal government would release the money to the industries. Apart from this, since we are also a state university, we also get money each year from the Western States Government. So, we also submit another budget to them each year. Apart from these two sources we also rely on contributions from various agencies, both domestic and international. So far we have gotten money from agencies like the Ford Foundation, the U.S. AID, and money from private enterprises in Nigeria.

In terms of providing incentives for our staff, I think the same procedure applies in the civil service. The incentive arises mainly from the point of view that if you do your work well you might get a promotion after a few years.

Nelson C. Wall:

Insofar as the staffing, Mr. Trujillo indicates that their biggest problem is the fact that there is a limited pool of available professionals in Ecuador that are sufficiently trained for this type of activity at present. Therefore it's a very competitive situation trying to gain the persons that you want for your service, for your particular activity. Their solution to this is to try to maintain salaries competitive with industry. He recognizes it is not so; it is below industry, but still they try to maintain it as close to industry as possible. He thinks that probably the best motivation is that they provide interesting work which these youths prefer. Because they are a very dynamic unit and they're growing quickly, there's fast promotion within the system. Also, they can receive outside training; they are sent overseas for additional training, which again is desirable to this group. And even though he admits that industry does take staff away from them, maybe this is not a bad feature. This is part of their function; they recognize that they have a training function and the fact that you now have an ex-member of your staff in Mr. So-and-So's industry is really beneficial to the system.

Joe Stepanek:

I want to share a concern with you, and hopefully get the response. This morning and the two days previously, I have heard a great deal of interactions between the small factory that we are concerned with and artisan industry and very little of interactions between the small factory and the large factory. Now, I agree that if you're in Nigeria looking for entrepreneurs to help, you grab them any place you can and the most likely place is in artisan industry. But I would predict that in a surprisingly short time you will find industrial entrepreneurs for the small factory coming out of large industry--particularly foreign-owned industry where they have had sophisticated training. And you will find that the artisan-run small factory cannot compete with these more sophisticated managers. If you ally too closely to artisan industry, you are likely to fall into a trap because most governments are very eager to help artisan industry, more so than the small factory. If I may use the Philippines as an example; they were renowned 20 years ago for one of the most aggressive and best designed artisan industry programs in Asia. And my hypothesis, which may be challenged, was that those individuals who controlled large industry did not feel the competition of artisan industry, so there was no hesitation to

help. The exciting new thing in the Philippines is the work being done today on the modern small factory, which is entirely new, which can compete with large industry and provide a larger political base in expanding the middle class. So, the point I would like to make is--and a suggestion--that in looking at a vital, small-scale factory sector we pay far more attention than we have in the past to all types of interactions with the large factory, growing as far as possible away from interaction with artisan industry, which has a whole different set of problems and prospects.

Manuel Alba:

The discussions so far, possibly even including the last two day's plenary sessions, have demonstrated further that what we are concerned with in respect to our interpretation of what the development problems are simple is further amplified by the specific situations of Ecuador and Nigeria. I sense a lot of anxiety with respect to the problems regarding institution-building. The question about the lack of organizational capabilities on the part of these institutions concerned with small-scale development--the question of training--is cited as a serious problem in this case here. And yet, in terms of the report of Dr. Lewis, I am quite impressed about the scope of the study. Eight thousand five hundred entrepreneurs covered is quite a major study in this respect and I mentioned the fact that I am quite anxious to get a copy of the report of that major study you are doing there. But what is the national policy in recognizing this problem of education and training and what is the national policy in respect to the development-financing needs of the small-scale entrepreneurs? Somehow, this has not been emphasized, and neither has the question of linkages between the efforts, let's say, of Ife, and those of the other institutions all over Nigeria. I think the emphasis has been here in the Western State. I do recognize in the case of Ecuador that this is much more viable. There is a better national recognition, at least as has been presented. So I am quite curious, particularly with respect to Nigeria, how national policies are recognizing these efforts in terms, for instance, of training and education. Because to recognize, in terms of educational background--entrepreneurs are at least an educational attainment not well recognized on this basis. Although I was talking with Dr. Lofthouse earlier that formal education in some respect may be an antithesis to entrepreneurial development. That's a theory, but I'm quite curious in this respect, therefore, as to what is being done at the national policy level.

A. O. Lewis:

Can I just respond very briefly to the various points raised by Professor Alba? Now, on the question of national policy on education and training, it's a pity I didn't go into the details of these in my presentation this morning. There is a national policy on education and training in Nigeria. Both the federal and state governments realize the importance of education and training and there are various facilities for promoting education in Nigeria apart from the universities. The government also emphasizes management development, both in medium-, large- and small-scale industry. For instance, we have the Center for Management Development which is charged by the federal government with responsibility for developing managerial potential in the country. We also have

the Nigeria Institute of Management, which periodically organizes courses in various aspects of management development. We have the Industrial Training Fund, which provides funds for the training of not only managers but also employees of various areas of industries. In addition to this, of course, there are the activities of units like the Industrial Research and Development Unit of our own university, so there are various ways. The Industrial Development Centers at Owerri and Zaira also organize periodic training, especially for managers of small-scale industries, so that there are various channels for the development of skills of both the managers and employees of small-scale industries. Now, as regards the question of finance--well, both of the Industrial Development Centers in Owerri and Zaira are open to small-scale industry. They are concerned mainly with small-scale industries and what we have been doing in Ife; we have confined our activities mainly to small-scale industries. I also mentioned the Nigerian Institute of Management; part of their activities also relate to the training of small-scale industries. In other words, any small-scale industrialist who wants to develop his potentialities has various channels for doing this. Of course, periodically these training courses are advertised, both in the national newspapers and on television and radio. Now, in the question of financing, here again there are various institutions. The government realized the difficulty which commercial banks find in providing financing to indigenous businesses and various measures have been taken to alleviate these problems. For instance, we have the Nigerian Bank of Commerce and Industry, set up by the federal government. We have small-scale industries financing schemes in all the state governments, providing financial assistance to deserving small-scale industries. There is a provision that all commercial banks in the country would give a certain portion of their loans to indigenous businesses, including small-scale businesses, so that in Nigeria finance is no longer a critical problem. If you have a viable project and you can provide the necessary guarantees, there is very little difficulty in getting the necessary funds for your venture.

Now, finally, on this question of linkages between Ife and other organizations in Nigeria. Well, we do try to keep in close touch with what sister organizations are doing. For instance, I said that after we studied about five states in Nigeria, the federal government did commission the University of Nsukka in the East-Central State and the University of Ahmadu Bello in the North-Central State to conduct similar studies for part of the East-Central State and part of the North-Central State which we didn't cover. We worked very closely with these two universities. We did advise them on how to go ahead with their projects. And of course we do meet at various levels.

I would just like to comment briefly on the point made by Mr. Stepanek about the interaction between large- and small-scale industries. I think fortunately in Nigeria neither the federal government nor the state governments are confining their activities to any particular type of industry. The attitude is that any enterprise that is viable or can be shown to be viable should be assisted. The emphasis is on assistance to any industrial enterprise in Nigeria. We realize if we are going to foster industrial development in Nigeria we must encourage small-, medium- and large-scale industry, depending on where the competitive advantage lies, so we are not confining our activities to either large, medium, or small. All areas of these scales of industry should be

assisted as long as they are viable enterprises. We started out with small-scale industry because unfortunately, at that time, through the lack of information not much had been done with small-scale industries.

(Question from the Audience)

O. A. Oguntoye:

Well, this is a point to amplify a little further on what Dr. Lewis has said. I think perhaps we have not laid emphasis on what he called the National Advisory Committee for Small Industry Development. This is a national program established by the federal government in which all the states--all the 12 states of the federation--are represented. In addition, the university is represented by the University of Ife. The chambers of commerce for Lagos and Kano are also on this committee. One research organization, the Project Development Agency, is also on the committee, and the two directors of the Industrial Development Centers are on the committee. The chairman of the committee is the Secretary for Industry in Nigeria. They have a supporting staff and every four months this committee meets, and its job is advisory. They provide advice or recommendation to the federal government on policy connected with small-scale industrial development. This is really the pivot of all the efforts to develop small-scale industry in Nigeria. On the training aspect, Dr. Lewis has made some comments on that. The Industrial Development Centers do some training. The Owerri Center, before the war, made it a policy to invite the entrepreneurs who were in their own private businesses to the center every two months, depending upon their field of operation. We pick out about 15 or 20 people at a time in a particular field and give them some training. These are people who have already been trained and who are already working. What we do is to try to impart new ideas and skills so that they can improve their operation, and we find this quite successful. We have no problem in advising the people who come for this training because our program is such that the extension service covers the area; therefore, the entrepreneurs are known by officials of the IDC individually. We know their capabilities, we know their background, and we're able to try to develop those who would benefit by the training. We just don't invite anybody--it's only those who we think will benefit by this sort of training.

Seyeul Kim:

Since we are talking about small-scale industry, I'd like to ask two small questions. The first question refers to Mr. Trujillo from CENDES and Dr. Lewis from Nigeria. The first question is this: Could you tell me what the contribution is of small-scale industry in Nigeria in terms of percentage of GNP and employment? That's the first question. And the second question goes to Dr. Lewis again. You mentioned that in a certain region you found out there are several problems, especially the manpower problems. You mentioned that you had a problem of recruitment. Could you tell me what the main difficulties are you had, in detail, please? Thank you.

A. O. Lewis:

Thank you, Dr. Kim. Now to the first question, that is the percentage contribution to gross domestic product and employment. This is a question of quantification. At the moment, until the various studies that are being done in the various states have completed, it will not be possible to give a precise figure of the contribution of small-scale industries to GDP, but I will try to guess. As you can see from that table, manufacturing industries contribute just about 8.2 percent to the growth of domestic product, and medium- and large-scale industries contribute more than small-scale industries. I would say that this is just a guess; that probably small-scale industries will now contribute about 2 to 3 percent of gross domestic product. But in terms of employment, especially if we define employment to include not only paid employees, the proprietors themselves as well as apprentices, there is no doubt that small-scale industries are more important than medium- and large-scale industry. Incidentally, the latest estimate when one talks about paid employment in Nigeria--those who are in regular paid employment in Nigeria at all levels probably are now about 2 million, and I would say that probably small-scale industries would account for about 25 to 30 percent of this paid employment.

Now, the question of recruitment, where there are various problems. What I wanted to draw attention to here was the fact that small-scale industries usually find it difficult to attract qualified personnel to their establishments for the simple reason that the conditions of service are rather poor. For instance, in terms of wages the small-scale industries are usually lower for the same type of job than what medium- and large-scale industries are prepared to pay. When we talk of pension benefits, sickness benefits, even the work places themselves, you find that the conditions of service are rather poor as compared with medium- and large-scale industries. But those who are qualified in terms of educational qualification and experience usually prefer to work for medium- and large-scale industries rather than for small-scale industries. And I think that another factor is that many small industries do not want or are not willing to delegate responsibility. Many people, apart from the wages or the salaries, also feel happy--they feel that they are making a contribution, when they are responsible for whatever it is they do within an organization. So, as I say, these are some of the issues involved in these problems of recruitment.

Nelson C. Wall:

Ecuador, as we all know, is basically an agricultural country. Therefore, your largest employment is in agriculture. The industrial sector--all of it--represents about 30 percent of the total employment at present. We are talking about a population of 6.5 million in the country. Small industry represents about 20 percent of that percentage and we know for a fact that in handicrafts alone we have somewhere in the neighborhood of 150,000 persons employed. Insofar as your question of contributions to GNP, we don't have an answer at this point, mainly because this figure has been changing so quickly with the petroleum exports, which are now up to \$900,000,000 a year, that they just haven't had a chance to figure it out, so we don't have an answer.

SEMINAR
WEDNESDAY P.M.

Nelson C. Wall presiding

Nelson C. Wall:

At this time it's indeed a pleasure to give our friends from UP-ISSI a chance to tell us a little bit about their activities, and it will be Dr. Leon Chico who will be doing this as Director of UP-ISSI, whom many of you already know. So Leon, it's all yours.

Philippines' and Netherlands' flag colors are red, white and blue. After the three-year project terminated President Marcos signed into law the Charter of the Institute, making it a permanent Institute within the University of the Philippines in 1969. Incidentally, we started in 1966. Our main functions are training, research and consultancy services; the third function sometimes referred to in the University as community service. In training, one of our very first courses was the management consultancy course which is a seven-month course at the international level. We have had many participants from Asian countries and, looking back now, it was a good start in the sense that most of the graduates of this course are now in top-government level positions. They are the ones who are really involved in the small industry movement. We have also the regional industrial development course which was started five years ago. We have the low cost automation and production management course which is also international and, all modesty aside, we have perhaps the most modern, low-cost automation laboratories in Asia. One 40-year old machine was automated at a cost of about \$100. We have also a managers' course, which is three months, part-time in the evening, wherein we train managers of small and medium industries. There are special courses for institutions geared specifically for their own needs. We have trained also some foreign institutions. We have trained some consultants for Malaysia, Indonesia, and other countries. We have also short term seminars which we run every year to the extent of about 40-50 all over the islands. Our recent course was the entrepreneurial development program which was started only two years ago, wherein we are trying to select, train and provide a package of assistance to the course participants. We have gotten a grant of about \$150,000 a year for this program, and so far the results have been very, very successful in the sense that approximately 85 percent of the participants ended up having their own factories. We have an Industrial Technology Department and a Regional Development Department.

Our next function is research and consultancy, of which Mrs. Fajardo is the director. Incidentally, we have two directors; one for training and development and one for research and consultancy; and five assistant directors heading different departments. We have done about 50 research studies every year; some of these were provincial profiles or economic surveys. We also did several publications--the most popular of which is The Small Industry Journal.

We also have financing scheme tie-ups with other agencies; most notably the Industrial Guarantee and Loan Fund, the main funding source for small and medium industries. The Institute for Small-Scale Industries is one of the four agencies administering the program; the other three being The Central Bank, The National Economic and Development Authority, and the Department of Industry. The agency representatives sit on a four-man board approving the loans and policies. The Development Bank is the other funding agency for long-term loans. We have tie-ups with international organizations. We have had assistance from the Netherlands government, the Danish government, the Japanese government, the United States Peace Corps, UNIDO, ILO, IDRC, AID, and some foreign institutions--of course Georgia Tech being one of them, and the TDI of the East-West Center.

Well, as you know on September 21, 1972, the President declared martial law which, in a sense, speeded up development in the country for the next three

years. The topic of the day was rural mobilization which was also the main thrust of the proposal of the Ranis Mission report.* Presidential decree No. 488, which was only signed last year, established an inter-agency group to administer small- and medium-industry development. We have now a commission of twelve member agencies consisting of the Bureau of Domestic Trade, the Development Department of the Philippines, the Development Bank, the Science Center, the Department of Local Government, Food Terminal, the Department of Industry, NASIDA, the National Manpower and Youth Council, the Philippine International Trading Corporation, the Industrial Guarantee and Loan Fund and the UP-ISSI. The ex-officio chairman of the Commission is the Undersecretary of Industry and the Director of the Institute for Small-Scale Industries is the co-chairman. The other Commission members are the heads of the other agencies, all dealing partly with small and medium industries. Prior to the organization of the Commission 60 percent of our activities were in metropolitan Manila, but we have geared our activities lately towards the rural areas and, in a sense, also reoriented some of our activities. For example, in the area of research we are now involved mostly in policy-oriented research for the Commission. Now, instead of doing the promotion of small industries, which is being done mainly by the Department of Industry, we cater to the next level of consultancy; what that Department cannot handle. The Department of Industry has 15 teams of three people each, working in the Philippines promoting small industries. These are young people, not highly professional, whose only job is to promote. Once the entrepreneur is ready to go into business we come in for the consultancy work.

Some of the industries we have been assisting include wood carving, weaving, metal working, and the coconut industry. Right now we are using practically all the by-products of coconut, including the husk, which is converted into charcoal and activated carbon. The shoe industry is one of the most labor-intensive industries, and we have assisted two towns which are practically known for their shoe industry. In one town they had 600 small industries and in another town there were 800 small manufacturers which we tried to mobilize into cooperatives in terms of marketing and in terms of purchasing the raw materials. Other industries which we have assisted include furniture, shell-crafts, and ceramics. The brick and tile industry has one of the most abundant raw materials in the country.

Now, let me just take a few minutes on some of the problems and issues in the development of small industries. As mentioned this morning, we also have problems of manpower in terms of training entrepreneurs, managers, and skilled personnel and we are trying to solve this through an inter-agency group. Our task in the Institute is to train entrepreneurs, managers, and extension officers. The training of skilled personnel is taken care of by another agency, which is the National Manpower and Youth Council. We have a government policy problem in the sense that most of the incentives heretofore were capital-biased incentives. Many incentives were granted for large industries which import

*Sharing in Development, A Programme of Employment, Equity and Growth for the Philippines, the report of an inter-agency team financed by the United Nations Development Programme and organized by the International Labour Office, 1974.

mostly machinery and raw materials that they would be using. Therefore, we have been focusing our attention to change this balance so that there is more incentive for labor-intensive techniques, as long as they are viable and productive. We have been successful in introducing a decree which grants certain incentives for the use of labor in contrast to equipment. Decree Number 92* grants an incentive for the proportion between labor and capital. The higher the degree of the labor content, the higher the tax deductible incentive. It was passed just last year.

Third is the coordination of the concerned agencies. As I have mentioned, there are 12 agencies concerned in small-industries development. There has been the issue of whether there should only be one agency or a multi-agency commission as we are now constituted, and, of course, we hoped for a commission-type of development. Initially, before the Department of Industry was organized, which was only last year, the idea was to convert the Institute to the nucleus of the Department of Industry, but we sort of objected in the sense that we felt that we would be more effective within a non-political atmosphere. The compromise was that we are operating within a commission but administratively we are under the University of the Philippines. We have marketing problems, as any other country, which is in part, perhaps, one of the most difficult problems to solve. We really, quite frankly, have not found a complete solution for these. The Ranis Mission Report has recommended an extensive export promotion orientation, and we are moving towards that direction little by little. Then we have the problem of dispersal of industries. Heretofore, perhaps 60 percent of the activity in industry was within the greater Manila area and the rural areas were not properly represented in the industrialization process. The other problem was that most of the officers I mentioned in the commission were from Manila or nationally-based offices and, therefore, they did not have the capacity for extensive provincial rural development work. The move, therefore, has been to organize regional offices for practically all these agencies. The Department of Local Government has also been organized to see to it that the rural areas get their share of development. Well, I think that about covers my presentation.

Nelson C. Wall:

According to the program we are supposed to continue with the videotape on FEISSC and Soong Jun. Then, after the tape we will have a long period for discussion and questions and answers. Maybe Mr. Chico can take some questions at this time while the video equipment is being set up.

John Kaatz:

One question: Have they recently passed a law or decree stating that three-fourths of all bank deposits must be re-lent locally; is that correct?

Leon Chico:

Yes, that is correct. I failed to mention that this is another way of keeping the money deposited in the provinces in the area.

*See the Appendix for a copy of Decree Number 92.

John Kaatz:

One more question: How much of the deposits in the rural areas were typically re-lent in rural areas: was that a binding constraint?

Leon Chico:

Prior to the decree--oh, I would be guessing--but I think it would be no more than 30-40 percent which was going into Manila from the rural areas.

(Question from the Audience)

What sort of incentives--are they monetary incentives, are they tax relief--what sort of incentives?

Leon Chico:

For small industries: Well, let me explain a little about that. The incentives I've mentioned are administered by the Board of Investment, but these incentives are not limited in fact to small industries. In fact, they are biased towards large enterprises in the sense that, as I said, most of the incentives are for pioneering industries or industries which have larger economies of the scale. Therefore, the incentives are for importation of capital equipment, etc. There are really no incentives to speak of for the small industries, and we have not been really fighting for incentives.

(Question from the Audience)

What kind of policies have been set up to place new industrial plants in the rural areas?

Leon Chico:

One policy is that no new industry can now be set up within a 50 kilometer radius of the greater Manila area. Second, certain industries who want to enjoy top incentives would have to be in the rural areas. It is mostly through government control, but this is not completely attractive in the sense that if you don't desire government assistance, then it might just be possible that you can set up an industry in Manila without any government financing assistance. There is also the other question of pollution, and no industry with pollution problems can be set up within the greater Manila area at the moment.

(Question from the Audience)

Have you encountered difficulties with the cooperative movement?

Leon Chico:

Difficulties? Yes. The industrial cooperative movement in the Philippines, I would say, is not really very successful at this stage. I think Filipinos in general would like to be independent; entrepreneurs would like to be separate;

so, instead of forming cooperative factories and cooperatives we would rather form cooperatives on a limited scale. For example, marketing cooperatives; have each manufacturer still continuing to be independent, but on the marketing side they are combined, and on the purchasing of raw material they take advantage of economies of scale, but they retain their independent status.

(Question from the Audience)

Leon Chico:

The cooperative bank has been stopped already, closed already; The Philippine National Cooperative Bank. Yes, it has been transferred to the Philippine National Bank, about two years ago.

(Question from the Audience)

Leon Chico:

Well, right now the funds allocated for small and medium industries in terms of pesos is about a total of one billion. That would be about \$150 million between the two banks--the Development Bank of the Philippines and the Industrial Guarantee and Loan Fund. In the commercial banking sector there is not much going to small industries; it's mostly government financing.

(Question from the Audience)

Leon Chico:

As I said, we are a little bit unique in the sense that the whole University is a part of the Civil Service, but when we prepared the charter for our Institute we put in a provision that we would be exempted from the Civil Service regulations and exempted from the wage and salary administration of the government. So, in a sense we have certain exemptions which, in effect, now the whole university enjoys. The University pay scale is not part of the salary scale of the national government. So, while you have part of the civil service, some rules of the civil service do not apply to us.

(Question from the Audience)

How many staff are working for your administration?

Leon Chico:

As I said we now have 120 divided into about 70 junior and senior professionals and 50 at the administrative level. Our target is to be 180 by the end of the year, assuming of course that our budget is approved. I hear it will be doubled.

Herminia Fajardo:

Maybe you can mention the additional benefits of the staff in terms of consultancy.

Leon Chico:

Well, as I already mentioned, the duties of the staff of the Institute are training, research, and consultancy. All of the staff in one way or the other has to do one of the three functions. When they lecture in seminars or training programs they are paid approximately an extra \$15 per lecture. This is not much perhaps by U.S. standards, but by Filipino standards is good enough. They get extra for research work. They get extra for consultancy jobs. Some staff members perhaps double their basic salary through extra income. Of course in the other units of the University they have what they call professorial chairs, which is in addition to the income of the professors.

J. W. Powell:

Does your institute participate in any way financially in the operations that you support and advise, and is there any scheme for individual members of your staff to participate in these projects? Are they shareholders in the companies you advise?

Leon Chico:

Oh no, none of the staff can be members of the organizations that we assist. That would be in violation of the anti-graft law. I own a furniture company which is not benefitted in any way from the Institute. It would be in violation of the law.

J. W. Powell:

Your institute doesn't promote projects.

Leon Chico:

Oh it does, but we don't get financially involved. We only help start the project, help finance it through the guarantee fund and provide consultancy. As I said, our entrepreneurship development calls for three basic components. One is the selection process wherein we choose the person; determine whether he has entrepreneurial ability. This is done through both psychological and economic interviews. And second, he goes to a training program. Third, he is assured of consultancy assistance and assured of priority in financing. And that's why, as I said, it has been relatively successful in the sense that some 85 percent of those who were selected to undertake the program have really set up their own enterprises.

J. W. Powell:

But your staff doesn't officially become entrepreneurs?

Leon Chico:

Officially our staff can become entrepreneurs. There is no law prohibiting our staff from being entrepreneurs, but they cannot benefit from the programs

we have. What I mean is, they cannot borrow. For example, our company cannot avail itself of government financing.

J. W. Powell:

I have one more question. You said that some portion of the core budget comes from user fees.

Leon Chico:

In a way we have some criteria in charging based on the size of the project. In terms of training, we have a standard fee of charging, but we are liberal in granting fellowships. If the fellow cannot afford it but needs the training, I am authorized, for example, to waive the fee as long as we see that he needs the training.

(Question from the Audience)

In terms of curriculum development of the other units of the University, have you had any evidence of that yet?

Leon Chico:

Well, we were born out of the College of Business Administration of which Dr. Alba was the Director of Graduate Studies. We have very strong interaction with the College of Business Administration. We have recently just agreed to establish a Masters of Small Industry Management Program jointly with the College of Business. We avail ourselves of the services of the professors of the College of Business in addition to about 120 staff members. We have about 120 consultants from the University who work part-time with us either lecturing or doing project research.

John Kaatz:

How does your small business program differ from your general business program?

Leon Chico:

Well, 50 percent of the Masters program will be the general business program, but the other 50 percent will consist of a uniquely small-industry program. For example, we have added entrepreneurship cooperatives, financing arrangements for small businesses, sources of financing, consultancy for small industry and so on--subjects like that which are unique for small businesses.

J. W. Powell:

Can you tell me how many staff the University employs in the science and technology areas?

Manuel Alba:

The University is a widely comprehensive institution and it has a large unit devoted to RD&E--research, development and engineering. It works very closely with the National Science Development Board, which is the national institution in charge of monitoring and coordinating efforts in research and development. There is an Industrial Management Program that you did not mention that also works with the Institute in this case here. It has a large Natural Science Division, including an emerging Marine Science Program which would feed into the aquatic resource management effort.

Leon Chico:

I think the University would have a total staff of about 6,000 professionals. The ratio of faculty to students is very high; one professional staff to five students.

J. W. Powell:

You say you have about 120 consultants assisting in your programs? This is 120 out of approximately 6,000 potential consultants?

Manuel Alba:

Operationally the Institute can call on any part of the group within the University.

J. W. Powell:

But you're involved with about 2 percent?

Leon Chico:

Well, yes in the sense that the other professional staff have their own consultancy activities as well. For example, the Engineering College has their own big engineering corporation; the College of Business has also their own activities. And the other problem that we face is that since now most of our activities are out of the metropolitan Manila areas it takes at least one hour's plane ride to reach the areas and not that many professors are eager to fly out.

Seyoul Kim:

You mentioned that one of the fringe benefits that your group has is when they provide some consulting service they will get some extra income. You also mentioned something about waiving fees. Is it possible that your staff is more aware of where monies are; of who the customers are that will be able to pay for their service? It means more to big industry rather than to the small which cannot offer to pay for this service.

Leon Chico:

That is true, but that would not be within their own responsibility. What I mean is, the Institute accepts the consultancy jobs for certain companies and we assign the staff members to handle these jobs. We try to equalize opportunities. It's not an individual consultancy arrangement; it is more a group consultancy arrangement.

Seyeul Kim:

Then I can assume that you would have a contract, not on a personal basis, and you would give them some kind of bonus or reward. Is it by project basis or just a bonus type?

Leon Chico:

By project basis. We have criteria for that formula. It may not even be in proportion to what the fee is, but whether the fees are large or small, there are standard rates for consultancy.

Bart Duff:

Let me ask a very practical question, one for my personal benefit, I guess. We have many, many Filipino manufacturers who come to us for ideas and designs, most of whom are small. Many of them don't have any experience in producing or marketing farm equipment. Suppose we did have two or three that came in from Mindoro or Cotabato or Leyte that looked like viable prospects but didn't have any financing; didn't have any marketing experience. Could we recommend that they take this entrepreneurial course?

Leon Chico:

Yes. We have two types of entrepreneurial development. One where a participant is ready in the sense of education, etc., so he does not need to attend this training program. He is assisted also financially. The other program is for the one who needs managerial experience, motivation, etc., so the financing program is very, very liberal in the sense that we require only 20 percent equity and in extreme cases for priority areas 10 percent equity. This means that 90 percent of the project cost is financed by the fund. We guarantee the loan to the financing agency. We don't give the money directly. Let me explain that. It goes through a channel of about 600 banks, but we guarantee the payment of that entrepreneur up to 80 percent. It is partly funded by the U.S. AID.

Nelson C. Wall:

Thank you, Leon!

VIDEOTAPES OF SMALL-INDUSTRY ACTIVITIES
CONDUCTED BY FESSC AND SOONG JUN UNIVERSITY
WERE SHOWN AT THIS POINT

DISCUSSION SESSION

Nelson C. Wall presiding

At this time we will go into a general discussion period to cover whatever we may not have covered earlier in the day as we have now seen all of the presentations for Wednesday. So, at this point we'll just throw it open for discussion, questions, answers--if anyone has any.

Yeo Gyeong Yun:

We all know that there are many small-scale industries. In fact, every day new small industries are born and existing ones disappear or sometimes become large- or medium-size; a continuous dynamic process. And also we've seen in the video tape presentations this morning that this group is doing something for them. But those are the very limited cases to a very limited group of entrepreneurs. Maybe they like it very much and they did appreciate it and, in fact, they will be appreciating it forever as long as their business is continuing. My question is, what makes them tick?

(Question from the Audience)

George Morelos:

Yes, in fact we had some immediate results concerning the solution to that question that you've faced. It is really connected to what Ross was talking about; that there was some interest in helping small industries when IDD got there. They are interested in the know-how that we are able to transmit to those institutions, in this case a university; so, you are laying down a methodology there to start with. Already, in the case of Brazil other institutions have become interested; because in the case of Brazil if you do something and do it well, the other people are going to jump on the bandwagon. This has happened already. This other foundation; now they want to work in

coordination. Previously, they didn't do any technical assistance, so at least in the case of Brazil when we leave, there will certainly be a multiple effect in the number of institutions that are going to be doing this type of work.

Joe Stepanek:

If your countries realize the potential that exists in the small factory, you'll have at least one factory of over 10 workers for every thousand in your population. For Brazil you're talking about 100,000 small factories to be reached through some type of extension or consulting service. So it's going to take a foundation, another foundation, another foundation, multiplied many times; and I suspect in most countries you will end up with a wide spectrum of services including, probably, mainly private consultants. This has been the experience of more developed countries--Mexico, Japan--where the load started by institutions has been taken over by spinoff members of your staff who find that they have more liberty. They become entrepreneurs, you see, but in the field of service of consulting. So we have to think--if we're really serious about providing employment--in very big terms. For the Philippines you better start thinking right now in 50,000 viable factories, all with an expansion potential, you see. So your work has to be very catalytic, which is the direction it's taking. Leave the more detailed micro-level work to myriad institutions, universities, private consultants, foundations, etc.

George Morelos:

It seems that pioneer institutions definitely have a life cycle, and I think AID has experience with the productivity centers that they pioneer. In the last 15 years, from my personal experience, I've seen many of the personnel who worked in the productivity centers go into private industry or form consulting firms that are now providing that type of service. There's definitely a life cycle for these pioneer institutions, and later on they get out of this business altogether or they go into some more detailed, specific type of research.

Joe Stepanek:

May I throw out a suggestion? The French government did a very innovative thing in 1947 to help small industry by simply saying, "We not only will give you a loan, but we will give you a loan to hire a private consultant." They did two things. They developed an entirely new industry of consulting and they helped the small factory. I'm sure some of your countries are already beginning to explore that approach.

Nelson C. Wall:

In trying to get the question answered--since the two parties involved at this point are Brazil and Korea--let's hear what we have from the Korean side.

Manuel Alba:

With respect to the concept of technical assistance, one of the observations

that has evolved out of a synthesis of experiences of a number of people is the often ill effect of the development of what we call "the dependency phenomenon". That is where the recipient institution falls prey to the idea that the assistance will continue and, therefore, has not provided for the development of a supportive intra-institutional structure to get the benefit of the assistance extended by the cooperating institution. A number of instances could be cited, and the one I am familiar with is going back to the situation of the Institute for Small-Scale Industries. In the first two years of its efforts, there was a heavy input on the part of the Dutch government. It was a worry, of course, as to what ISSI would do after the Dutch assistance was withdrawn--both financially and in the matter of administrative and managerial competence. But I guess the record now shows that somehow ISSI managed to get through that difficult period of withdrawal or transition. This is also the kind of worry we have now in the Institute's efforts to cooperate with the three institutions in Korea, Indonesia and the Philippines. What if the Institute, for instance, in some form terminates its operational relationship now with these institutions--would they be able to carry on and, in fact, create some kind of multiplier benefits that would be necessary? It is because of this worry that we had launched an effort of encouraging each of the three institutions to establish an operational link with the center of excellence in the respective countries. In a sense it's a transitional effort to fill the void of what might be withdrawn as assistance in the case of some of the cooperating institutions. But this is primarily at the initiative of the institutions themselves. For instance, I mentioned yesterday that MSU is certainly encouraged to work out some arrangement with ISSI, University of the Philippines. Yeungnam University is encouraged to work with Dr. Yun's institution and with KDI to some extent, and Hasanuddin University is being encouraged to work with the Institute of Technology at Bandung as well as with governmental agencies. In the case of Hasanuddin University, they have managed to have their project recognized in the national plan, which is something big going for them in this respect.

Now the comment by Joe Stepanek with respect to thinking big is a question of how to effect a building block perspective; how small-scale efforts at the local level could be integrated in terms of really pursuing a national mandate to respect a policy guideline in this instance. Now, again I might mention that some countries have devised a micro-perspective mechanism or framework in which the efforts are encouraged to be integrated at a national level. Again, I am fascinated by the experience of Korea in this respect. I'm an avid career watcher for a number of reasons. They have the framework of the village movement, which is a national effort, within which framework the small-scale industry development is being devised. And again, in the context of this national movement, I am fascinated by the categorical planning strategy of Korea with respect to small-scale industry development. They have classified small industries into three categories. The first category are those small industries which will remain small. The second category are those industries which will be encouraged, promoted and provided incentives to work cooperatively, complementarily with the big industries on such arrangements as subcontracting. The third category are those small industries which will be encouraged to grow big. Now, if the planning is defined categorically in this respect, it suggests some operational ways by which financing and training could be worked

out. For instance, the small industries which will remain small basically would look toward the extended family system as a supportive mechanism by which this could be developed. Industries which will have to grow big will look forward to large-scale wage employment with a different concentration for programs in this case. And to some extent this is being implemented because the Medium Industry Bank of Korea was specifically set up to cater to the needs of at least one category of small industry. Now, in the Philippines there is a similar movement, although it's directed specifically to rural development. Yet it is broad enough to really integrate the strategy of small-scale industry development. In Malaysia they have a much more specialized effort, still at the national level, recognized in the national development plan. This is the entrepreneurial development for the sons of the soil in recognition of the cultural, social minority problem in Malaysia. Now it is on this basis that one could expand, for instance, a small-scale or micro-perspective of 100 employees, plan on the basis of being raised up to the 50,000 level for instance, the development of employment in small-scale industry. So I think these actual experiences to some extent have various degrees of success in a number of countries.

Yeo Gyeong Yun:

No, actually that's been bothering me for quite some time, and I was hoping I would get some answers out of this group and partially I've been getting it. But instead of answering the question, I'd like to throw in another question, if you don't mind. That is, so far I have the impression that when we are talking about helping small-scale industries we are assuming that the role of small-scale industries is passive. In other words we are visiting small-scale industries and are rendering the service, rather than them coming to us for our services. Now my question is, is it a necessary condition, or is it desirable, for us that someday these small-scale industries will come to us for help? If so, when will be the time; what will be the critical turning point when such a movement will occur?

O. A. Oguntoye:

If I might say something on that, based on our own experience. The Owerri Program started about 1962. At that period we had to look for small-scale industries where they were, which was not an easy job for us. But I'm glad to say that right now I am getting worried, because the inquiries are getting so enormous that the staff we have is hardly able to cope everyday. Some of my personnel travel 80 or 100 miles to consult. So that, at least from the Nigerian point of view, this awareness has been created, and of course, we still want to reach those whom we have not been able to reach. But I am getting worried about it, because unless we strengthen our staff very soon we will be getting ourselves into trouble.

Joe Stepanek:

I want to react to the problem of having more business than you can handle in Owerri; a country that's rapidly becoming as wealthy as Nigeria, if you decide that you want to develop fast, which apparently you have, you should then consider the recruitment of expatriates on your own, forgetting about

foreign technical assistance. Manny Alba and I were last week in Tokyo, and I learned something that was most amazing. Eleven years after the restoration, Japan was using 6,000 foreign consultants recruited 100% by the government of Japan. Not even having ambassadors, they were using the ambassadors to Japan as recruiting agents.

George Morelos:

Small industrialists mostly view the university as a place where you get a diploma and certainly not where you get technical assistance. And so there was a very intensive campaign where the work was passed on, and this is one case, I feel, where the gringo being present even had some mystique to the thing and some favorable reaction as immediate. At the end of one year, however, we found ourselves with a staff problem, because our experience in Brazil has been that once we decide to assist an industry, you cannot leave it by itself. It's very few isolated cases where you have a one-shot type of system. The problems are such that you had to solve some basic elementary ones first before you can really get to the guts of some of the more detailed technical problems. And as a result, this has created a mushroom effect because they have seen immediate results with this first technical assistance, and we went ahead and recruited. They have come back now with bigger problems, and we can say now, consequently, we are having a mushroom effect where more people are coming, and at the same time you have to take care of the ones you already assisted. But basically, how effective you are in this very critical period of your first year in operation is going to determine whether you are going to continue going out and trying to recruit industries or whether they're going to come to you.

Rufino Ignacio:

I'm just wondering whether some of the universities represented here have had the experience of getting an industry started from the university. In other words, based on some studies conducted by the university, certain industries are found viable because they could exist because of the presence of materials; the people are skill-oriented and all these things. I wonder whether any of the universities represented have had that experience. I am trying to get into the case of MSU, where we are now trying to start some industries with the University as the prime mover, and we would like--I would like personally--to learn from your experience.

Nelson C. Wall:

Scientific Atlanta has resulted from some laboratory work and research done at Tech, and as a matter of fact, the staff thought it was such a good idea that they split with the idea and set up their own company. It has been a very successful company to this point. So I know it's happened here. Now, I don't know if any of the other gentlemen have a comment.

George Morelos:

Going back again, the Brazilian project has only been on-line for one year, in fact less than one year. We're going to talk in much more detail about this tomorrow when the time comes. But I can advance the following; four industries have started out as a result of feasibility studies that were done at FESSC last year. Okay, right now financing is being sought; the entrepreneur group was identified and they got their feasibility study. Now they're trying to get financing and purchasing land. We are working for two other gentlemen; in fact we have 12 people, different groups, young professionals and some other merchants who have come, as a result of the four previous cases last year, and approached FESSC, some of them with ideas. I want to start producing nails--and then you run a prefeasibility study and realize that nails are not a good industry for the area. But they still have the money, and they want to go invest in some industrial activity. So part of our time has been diverted in what we call investment counseling, and we are searching for opportunities using indigenous raw materials. As such we're studying the utilization of fly ash for construction material. We're looking at ground shells to make feed rations for poultry. We have the group, they have the money and we're in the process of doing the technological research; the appropriate technology to use so that they can generate employment. In the case of Brazil, I feel that we're very, very lucky that we have an entrepreneurial group, or class if you wish, that are waiting in line for this program to provide them with some sort of alternative in terms of making an investment.

Rufino Ignacio:

The President of the Philippines signed a degree amending our charter so we can invest some of our funds in business enterprises, but primarily in tourism. Well, this was done because of the very distinct location and role of the University today; a place where social, cultural and even peace and order conditions do exist. Most development offices are centralized in Manila. Even, sad to say, the ISSI is afraid to come to us because of some of these problems. So we find the University as the only, I would say, government agency that is now operating in the area aside from the military. So, we get these projects, joint projects with the Department of Tourism, the Department of Industry, with the Local Government Center and the Department of Labor. They're all over the campus. We even have a Muslim Development Bank. So I think the case of MSU is quite an exception, and I don't know whether people will learn from our experience when I start to present this tomorrow. We are now allowed to invest some of our funds.

(Question from the Audience)

Rufino Ignacio:

We can choose our own projects. Right now we have invested about 5,000,000 pesos to put up a hotel, right in the university. It's actually a college-type hotel, and we did this with a private investor group. Actually, the management will be done by the Inter-Continental Hotel Group. But we did invest some money

there; we provided the land, and we are committed also to develop an 18-hole golf course. And eventually we are thinking of putting some funds to operating some weaving cooperative.

Nelson C. Wall:

We'll have a chance to hear more about that tomorrow, and I think we will answer another question and then we'll have to stop.

George Morelos:

Our experience at Tech was pretty much represented here. One of the things that, in the case of Georgia Tech--it took us several years to find out--is development business in this generation of new industries. It seems that previously the approach to development was in a massive, generalistic sense; it meant a bunch of consultants providing massive numbers of feasibility studies and then trying to have them as widely distributed as you possibly can to attract some investment in those areas. We ourselves used that technique in our earlier years. However, the probability that you'll have a success when you use that approach, we found out, is very low. We have found a much larger probability of success when from the beginning you try to identify an investor group or an entrepreneur group to carry on the project. That way, you get them involved from the beginning of the development project; you assign them a task. This gives you the ability of being much more realistic on the project itself. In other words, you have to know the investment capability of a particular group before you can know how much equity it is going to be able to provide. You have a thousand alternatives in terms of production capacity, the size of investment, etc. This is the sort of technique we developed through field experience, and it's paid off quite well. When you start entering the very early stage of the project, you start looking for who would be the likely candidate. Consequently, any time we go into any area we start looking for who the potential sources are of entrepreneurial talent. We go in and talk to the merchants' association. We try to identify; is it the successful agriculture people; could it be the young, professional people, etc? And then we try to build projects around them. We found that to pay off; it results in smoke stacks.

Number two, this implies the following. You can have excellent technicians providing technical assistance to this private sector, but you need at least the one person who's coming in contact with the private sector, the type of technical person who himself has some entrepreneurial talents because the communication is sort of a very special relationship. You can be the best engineer, the best economist--you try to do the best thing you can--but there's a tremendous communication gap and immediately the credibility gap is there; all your efforts are going to be wasted. I think one of the problems that international agencies of technical assistance should be careful of when they're providing the assistance is that of trying to utilize as front men those technical people who have entrepreneurial talents themselves; men who have proven themselves by having their own private businesses--a person who bears risk.

SEMINAR
THURSDAY A.M.

Joseph E. Stepanek presiding

I'm going to give you my version of what I have been hearing in the hopes that later we may build our discussion around major issues. After all, IDD has to write the proceedings of the conference and of the seminar, and it might provide a form of organization for the proceedings if we used a listing of the major issues. So, let me suggest this subject for later discussion today. First, I've heard a lot said about a very basic problem of industrialization policy as it applies to all industry. Second, we have discussed the interactions of the small factory with the large factory and with artisan industry. Third, we've said a lot about institution building, and I'm sure we'll hear a lot more in just a minute. Fourth, most of our time yesterday had to do with the provision of services, extension outreach services, to reach tens of thousands of small factories, and we gave some thought to how such services could be accelerated or expanded very rapidly. We have said a little about finance; perhaps not quite enough, but I agree with most of the opinions expressed that finance is not the most important major issue. Mr. Lewis yesterday brought up a question which we did not have time to discuss; how does one acquire the capital equipment--that is the technology--in the sense of hardware and software? I hope we will discuss that. Now, we turn our attention to a very, very special problem. I'm sure most of us realize the difficulty of stimulating the growth of the small factory. When you attempt that stimulation outside of the infrastructure of a metropolitan center, it becomes far more difficult. Furthermore, if you are working in small industry development in a non-metropolitan region in which there is serious social unrest, you add one other dimension to the difficulty. However, I suspect that the relationship between social unrest and small industry development is going to be high on our agenda, I would predict, for the next three decades.

THE SMALL INDUSTRY ACTIVITIES OF THE
REGIONAL ADAPTIVE TECHNOLOGY CENTER
OF MINDANAO STATE UNIVERSITY

Rufino S. Ignacio
Vice President
Mindanao State University
Marawi City, Philippines

The Mindanao State University (M.S.U.) is a fourteen-year old institution of higher learning located about 500 miles from the capital city of Manila. The University is in the midst of a culturally distinct and socially deprived area in Southern Philippines. The University is committed to the integration of the cultural communities in Mindanao, particularly the Muslims, into the national body politic, through education. The M.S.U. is also committed to providing the necessary professional manpower for the development of the island.

The growth of M.S.U. has been phenomenal. It started in 1962 with a collegiate enrollment of 282 students at a budget of P700,000 (\$1.3M) to its present enrollment of some 7,000 collegiate students and 8,000 high school enrollees at a total budget of P6,000,000 (\$10M). The University's main campus is located in scenic Marawi City, Lanao del Sur. In stages external units were established in Lanao del Norte, Cotabato (Dinaig and General Santos), Sulu, Tawi-tawi, Misamis Oriental and Davao. The external units have programs geared specifically to the education and cultural needs of the area they serve. The Illigan Institute of Technology (Lanao del Norte) offers various three-year technical programs for the burgeoning industrial complex of Northern Mindanao. The Sulu College of Technology and Oceanography (Tawi-tawi) primarily offers courses in deep-sea fisheries and oceanography. A string of community high schools exist at strategic locations to better equip the young Muslims for entry to college. Scholarship is competitive as students--Christians and Muslims alike--are well selected from different high schools in the region. Various remedial and special programs have been devised to assist the not-so-gifted students in their problems.

The M.S.U., young as it is, has proven its worth as a school of good standing in the country; and in some programs like engineering and education, could compare well with premier universities in Manila, using indices such as quality of faculty and students, faculty pay and incentives, research facilities,

scholarship, performance of alumni, and flexibility and relevance of its programs.

The M.S.U. is developing very well as an instrument, a venue, for the direct development of the region. Its informal programs, alongside and in coordination with the core academic programs, are designed to meet the immediate needs and demands of the region for development. M.S.U. has informal programs on tourism, adult education, executive development, public leadership, science training for elementary and high school teachers, manpower training in engineering, agriculture, forestry and fisheries, and others. Recently, an integrated program for small- and medium-industry development was established--the Regional Adaptive Technology Center (RATC).

The RATC is a university-based organization that has direct concern for the enhancement and growth of small- and medium-scale industry in the region. The Center develops its programs along themes of appropriate technology, entrepreneurship and public policy formulation on industrialization. The thematic thrusts resulted from a long association and interaction with the East-West Technology and Development Institute in Hawaii. Dr. Manuel Alba of TDI, in his paper, elaborated on the mechanics of interaction among the various themes. Activities of the Center include training, consultation, R&D, surveys, and setting-up of pilot and training plants to demonstrate the viability of the industry.

Organizationally the RATC is divided into a software and a hardware division. The software division works on the literature for the various training programs, conducts surveys and helps formulate the necessary delivery and functional linkages to the community and agencies. The hardware division undertakes R&D on technology and conducts the various training programs on specific industries.

As a RATC project there exists on the University campus a ceramics center that serves both as a training center and a demonstration plant. A brassware center is being set up in Tugaya, 50 miles from campus, in cooperation with government agencies like the National Science and Development Board, the Mindanao Development Authority, and the town council of Tugaya. A low-cost housing technology project, initiated by the MSU College of Engineering, is being spread out to the community by the RATC group through training and technical assistance in setting up low-cost housing villages on a self-help basis. An integrated coconut charcoaling and copra drying plant, invented by a local artisan, is further improved by the University through the RATC. In cooperation with private entrepreneurs, the Development Bank of the Philippines and the Philippines Coconut Authority, the installation of integrated charcoal and copra plants in feasible areas in the region is being worked out by the RATC. A marine fishery research unit of the University--the Naawan Fisheries Station--made a breakthrough in the spawning and culture of prawns (jumbo-shrimp) and conducts training to the local fishermen following the RATC concept of technology dissemination and entrepreneurship development.

As the RATC is a new organization, different techniques and methods of training are being experimented with; their effectiveness shall later be evaluated and compared. Several programs are now underway.

The Ceramics Center conducts training in family groups--children and parents working together. Lanao del Sur province, as revealed by a survey, abounds in cottage industries like weaving and brasswares that are family-owned and operated; the villagers, young and old, are craft-oriented. The ceramics industry is just being introduced by the RATC because of these basic artistic skills of the villagers, the presence of abundant sources of fine clay, and the projected demand for ceramics products. A family-based skills training program was thought to be reasonable. Thus, in the Ceramics Center groups are divided according to family groups where parents act as work leaders and duties are distributed among members. When participants do not know how to read or write, illustrations are used. Training is conducted in the dialect.

The first batch of trainees are still to "graduate". The RATC plans to loan out the potters wheel they are now using in the Center, and possibly to lend them some glazing materials also to enable them to produce ceramic wares utilizing their own clay deposits. They could then bring the un-kilned wares for treatment to the large kiln of the RATC. Fees shall be paid to RATC after the sale of products.

The longer-range plan of the RATC is to get the villagers to organize production and marketing cooperatives and to build community kilns of their own. The interest shown by families in their training and the quality of their products and designs give the RATC staff much hope for introducing the industry in the province.

Brassware manufacture is an old-age industry among the Mindanao Muslims but has always been fledgling due to several limitations like the low quality of products (artwork is excellent, though), lack of capital, faulty marketing and others. Using its own resources and a grant from the National Science and Development Board (NSDB), the RATC is conducting a research project to improve the brassware manufacturing process and to offer solutions to the problems of the industry.

A Brassware Development Center for training and production similar to the Ceramics Center is planned to be built soon in Tugaya, right in the locality of the brassware artisans. The Brassware Center shall demonstrate the new adapted and still simple techniques of brassware manufacture. Similarly, marketing cooperatives are in the process of formation. Resource inputs to the center come from the NSDB and the Metal Industries Development and Research Center. Training will be conducted in family groups.

The coconut charcoaling and copra drying plant in Iligan (45-minutes drive from the University) is a major industry of the country with tremendous domestic and foreign demand. The RATC, in concert with a local inventor of an integrated coconut charcoaling and copra plant, has been working on proposals to improve the invention and to disseminate its potential contribution

to the country. The RATC group discovered that the plant is the only one of its kind in the country and possibly in the world and had the plant patented in favor of the inventor, an unschooled but very experienced man in his fifties. The invention, according to experts of the Philippine Coconut Authority (PCA) and the UNDP, could revolutionize the coconut industry in the Philippines if used widely in the farms.

These manufacturing plants could be installed in strategic areas and operated on commercial levels. Proposals are presently being prepared by the RATC, in cooperation with the Department of Industries, to do just that. The joint staff has prepared the financial projections and plans and has even completed the incorporation papers of two groups of farm owners who wish to have the plant in their holdings. The PCA also plans to install a similar plant in its demonstration site in Leyte Island, 200 miles north of Mindanao.

Simple training packets on the maintenance, repair and upkeep of the plant and lessons on cooperative formation are programmed by the RATC in cooperation with appropriate government agencies.

The M.S.U. College of Engineering did research on low-cost construction materials for a number of uses, including housing, feeder roads and irrigation. The use of soil mixed with cement as building blocks and bamboo as roofing have been explored quite successfully in the laboratory. The RATC, in cooperation with the College of Engineering, actually built a ten-house village on the campus using soil-cement and bamboo. The idea was to enjoin the local people to use such materials. Students and trainees from the various localities did the construction, both groups got trained on the technology, and at the same time the project saved a lot of money for the University.

Presently, on a self-help project with the people, a much larger village of 50 cottages is planned to be constructed in the remote town of Lumba-Bayabao, situated 50 miles from the campus. Low-cost feeder roads utilizing the successful laboratory experiment service the area. The RATC staff and the researchers of the College are in charge of the project. Housing-related industries are made aware of the project.

The M.S.U. Fisheries Station in Naawan, situated 60 miles from the main campus, two years ago made a breakthrough on the spawning and rearing of the prawns under controlled conditions. The experiment has tremendous economic implications to the country as jumbo-shrimp is a major commodity food item with a demand that is much greater than the supply. The Fisheries Station has graduated to commercial-sized hatcheries that are capable of supplying the fry requirements of the region but, of course, the new technology has to be taught to the people. What the RATC is doing, concurrently with the Fisheries Station personnel, is to spread the good news, to convince pond owners to convert their present fishponds to prawn ponds or to open new ones, and to invest some of their money to the new technology. Eventually, marketing cooperatives would have to be formed and storage facilities would have to be built.

Incidentally, as an offshot of the above mentioned project, a much larger hatchery-research complex is being built by the Philippine government with resource inputs coming from six other countries in Asia. The complex is located on another island, Iliolo, 200 miles north of Mindanao.

Other specific projects being looked into are the manufacture of simple machines using junk vehicle parts, simple food processing apparatus and the manufacture of low-cost scientific instruments.

After more than a year of existence, the RATC could be seen as an active organization indeed. But it is not without its growing pains and problems. Some deans of the colleges think that the activities of the RATC could very well be done by other government agencies and not principally by the M.S.U. True, there are government agencies responsible for small- and medium-industry development in the country, but sad enough their resources are too centralized in Manila. There are not many meaningful projects in Mindanao. Added to this predicament, of course, is the precarious peace-and-order situation in the island. With this in mind it is argued that the University is duty-bound to do something for rural industrialization, and the RATC is it. However, linkages are being effected with Manila-based agencies like the Department of Industry, the National Cottage Industry Development Authority, the UP-ISSI and so on. On foreign soil, the RATC has tie-ups with the East-West Center and the IDRC.

The integration or introduction of courses on small-scale industrialization, entrepreneurship, etc. into the curricula of colleges is promising but not easily attainable. A headway has been accomplished, however, in this regard. The College of Engineering has for its research thrust that of the development of appropriate technologies in different disciplines. The newly-created Institute of Development has courses in small-industry development. What makes the curricula difficult to really re-orient towards the topic at hand is the characteristic of existing curricula to veer along standard university patterns, which for most part are Western-oriented. Engineering presupposes studies on big industrial plants, their design and efficiency, and not much on processes obtained in the region. The Curriculum of business administration deals with big companies and investments. The practice so far has been to plug in two or three courses on small-scale industry to the already heavy curricula of the colleges. In other words, small- and medium-scale industry development, as a target discipline in itself, is not so encompassing as to develop a complete curriculum around it.

Qualified staff members to develop, run and maintain the projects of the RATC are not readily available, mainly because of the newness of the program matrix. In this regard, a dynamic program of staff development (ten have so far undergone crash training programs in Manila and Hawaii) is resorted to. This has to be supported on a continuing basis. It is observed that staff turnover is fast, too; one principal staff member became vice president of a bank and one went to UP-ISSI.

Foremost among problems is the lack of finances to more fully support the programs. From the way it looks the RATC is an expensive proposition

indeed--publications, travels, seminars and conferences, etc. It is too premature at this stage for beneficiaries of the RATC to feed back some of their resources to the RATC; work is being done along this line, however.

At this early stage some assertions can be made. There are positive signs of the RATC's direct contribution to development. The Center is a viable and relevant program based on the University and the Center experiment could prove to be a useful instrument for science- and technology-policy formulation on the regional level.

THE SMALL INDUSTRY ACTIVITIES OF THE
INTEGRATED DEVELOPMENT CENTER OF
SOONG JUN UNIVERSITY

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Small industries in Korea have made a significant growth over the past decade or so, along with a rapid growth in the overall economy and in the manufacturing sector in particular. Whatever the nature, scale and problems of small industries may be, their roles in the progress of the nation are by no means small. For instance, they make up more than 95% of the nation's total business population and provide people with nearly one-half of all employment in industry. In 1973 their export reached \$1.2 billion, corresponding to as much as 37.3 percent of the nation's total export. Furthermore, they constitute a valuable tool for regional development and industrial decentralization as they provide greater employment opportunities for places outside the cities and thereby minimize the inflow of population to already congested conurbations of industrial centers.

However, small industries inherently hold many knotty problems which inhibit their expansion and growth vis-a-vis their larger counterparts, especially in relation to technology, techniques of management and organization of production, labor skills and training and access to financial sources. For this reason, the government has made continuing efforts to improve their conditions with policies and supporting measures. Its basic objective is to increase the productive efficiency of small industry, thereby making the sector more viable and more contributive to the national economy. The measures taken by the government to this end may be broadly divided into the following categories:

- a. financial assistance
- b. measures for developing small industries into export industries
- c. measures for promoting the structural modernization
- d. measures for promoting industrial cooperatives
- e. measures for fostering small industries in rural areas

It is not necessary for the purpose of this case presentation paper to attempt any more elaborate discussion on all of these measures, though they

should not be overlooked in any discussion on the small industry problems. However, the last of the above five measures is so closely related to our Soong Jun University's programs that it deserves a brief explanation.

Realizing that growth alone in terms of GNP and per capita income is no longer the indicator of successful development, the government policy-makers and development-planners from the beginning of the 1970's began to rechart the direction of development strategy. The main thrust of new conceptual thinking on development was to emphasize the importance of employment generation and income increase, especially in rural areas where the benefits of growth have been inadequately shared. Emerged out of this rethinking on development strategy was the so-called "Saemaul" (New Village) movement which has been implemented through various measures as listed below.

Types of industry to be developed:

- a. industries where it is possible to procure raw materials in the rural areas, such as food and beverages, wood and wood products, clay, stone products and ceramics, paper products, etc.
- b. industries where the production process is simple and labor-intensive industries, such as textiles, sundry goods, synthetic resin products, glass products, etc.
- c. industries where subcontract relations between small and large firms can be promoted, such as metal products, machinery and tools, parts and components, etc.
- d. others which may contribute to the increase of farm incomes.

Promotional measures to be taken:

- a. provision of equipment and working capital loans to finance the construction and operation of the "Saemaul" (New Village) plants
- b. subsidizing the construction of the "Saemaul" plants in model villages
- c. subsidizing the training of skilled workers and the development of technology
- d. concessions in property tax and acquisition tax
- e. assisting small industries through government purchases

- f. development of local industrial estates to relocate existing small industries or attract new industries to the rural areas.
- g. establishment of home industry centers to assist rural cottage industries by furnishing such services as training of skilled workers, joint purchase and sales, quality control of the products, information and so on.

No doubt the government policy to this direction is timely and deserves wide attention from those concerned with "development". Like any other development plans, this move should be viewed as a long-range activity requiring systematically organized knowledge and methodologies for successful implementation. In other words, few worthwhile results would be expected from a hasty, short-range approach. However, the government's preoccupation with rapid and visible results has rather caused in many cases irrevocable mistakes and much waste than has given to the full consideration of employment generation and income increase through labor-intensive industrial development in rural areas. As a matter of fact, it is clear that, even if the government moves toward the forementioned direction, it cannot achieve all as desired simply because of limitations in its budget, manpower, administrative structure and organization.

Not only with this in mind, but as a self-innovative effort, Soong Jun University has sought and attempted to explore and carry out problem-oriented interdisciplinary research and activity relating to small industries located around the two campuses of the University; the one in Seoul near the centers of small industries and the other in a rural setting in Taejon about 100 miles south of Seoul.

It was thought that Soong Jun University could undertake this activity, both because it has a reservoir of educational technology, facilities, and experienced faculties, all of which are readily made available to the local small industries, and because it has addressed itself to the innovative effort in making its educational programs relevant to the problems and needs of the community of which the University is a part.

SJU's present programs were designed to achieve the following objectives in collaboration with the Industrial Development Division (IDD), Engineering Experiment Station, Georgia Institute of Technology, Atlanta, Georgia:

- a. to develop programs which will accelerate the expansion of existing small industries and the creation of new small industries so that more employment opportunities will be created.
- b. to demonstrate and document the impact of alternative approaches to the stimulation of small industry.
- c. to create in the appropriate governmental, industrial and financial sectors of small industry an awareness of potentials and ways to maximize these potentials, and

- d. simultaneously, to build a model for other institutions to follow.

Our programs are composed of three activities: (1) technical information service; (2) technical and managerial extension service, and (3) technical training and education. Some detailed account of each of these will follow in order. Before going into detail, it should be noted that these programs have been carried out by the professors of the Mechanical Engineering Department at Seoul campus and by the professors of the Chemistry Department at our Taejon campus in their respective areas. But the management and coordination of the programs are the responsibility of the Integrated Development Center (IDC), an integral part of the overall educational program of Soong Jun University, which was set up in anticipation of the University's future course of activities before the SJU/Georgia Tech joint programs started.

The Small-Scale Industry Information Center (SSIIC) was established at the Integrated Development Center (IDC) during the second quarter of 1974. During the period from April 3 to 10, 1974, Mr. Richard Johnston of the IDD staff came to IDC to assist our staff in setting up this SSIIC.

The purpose of this Center is to provide a library of information to support our technical and managerial extension service. For this purpose the staffs of the Center made extensive surveys of small-scale industries in the two target areas to collect data on industry size, products, manufacturing processes and their problems, choice of techniques, background of the entrepreneurs, number of employees, marketability of the products, and so on.

Copies of technical and other information obtained while providing in-plant technical service has been subclassified according to industry type, and added to the Center for further use with other small industries with similar needs.

SSIIC also is maintaining files on each small industry to which technical assistance is provided. These files contain descriptive information as to the firm's production process, market condition, employment, management and technical problems that are covered by our assistance staff. This information is confidentially held by SSIIC and is valuable for work program-planning purposes and in providing future assistance to this firm. All firms, at the time they request our service, must complete a standard form which is later filed for future usage. This allows SJU staff to be able to answer questions instantly by phone or letter when they receive additional service requests from the registered enterprise.

In addition to these, material has been gathered from various research centers and public organization in Korea, the U.S. and other countries. This material has been classified into the following categories: (a) economic and statistical information, (b) professional material, (c) official material, (d) directory material and (e) technical information.

In the course of extension service activities we noticed that many of the small industries were desperately seeking some information on export opportunities

of their products. Also, some of them made inquiries into the possibility of obtaining the old blue-prints of some types of machines and parts which seem to be obsolete in the developed countries. By providing the small industries with information of the latter kind, we could possibly eliminate or decrease the time and cost which they may not afford in order to design or obtain such blue-prints.

The technical and managerial extension service has been the most demanding portion of our programs. During the last year, the SJU and Georgia Tech staffs serviced 18 small industries in either Youngdungpo area in Seoul or Taejon city. This represented some 78 visits by staff teams and about 183 persons were involved to provide well over 200 hours of technical and managerial assistance. A complete list of companies serviced is shown at the end of this paper. I want to mention some typical cases only to illustrate how our extension work helped solve technical problems which were chronic obstacles to these firms' steady growth.

Case #1: D.W. Cast Iron Foundry, Youndungpo, Seoul

This is a foundry that produces grey iron castings, such as valve handles. They export the majority of their products to Japan, but desire to export to the U.S. They employ primitive work methods with manual labor and they lack mechanization and instrumentation for quality control. The market for their products is growing, offering opportunity for a profitable operation.

Along this preliminary investigation, our extension team came to diagnose their problems as below:

- a. The primary problem is poor product quality due largely to lack of instruments to test the strength of castings and to determine the proper pour temperature of metal and poor quality sand for molds.
- b. Lack of capital resources to acquire needed machinery and equipment.

Customers of this and other foundries in the same area order castings which are required to have certain strength requirements. In order to test the strength of cast iron accurately, very expensive testing equipment is required which these small foundries cannot afford to buy. The usual results of this lack of test equipment are that the customers' specifications are exceeded, thereby losing profit for the foundry and wasting valuable high-strength material, or that the customers' specifications are not met, causing them either to reject the castings or to experience casting failure because of low strength.

When the technical problems are encountered in small-scale industries like foundries, techniques and solutions that are common-place in large, sophisticated industries very often cannot be used. The most common reason for this is the lack of funds to purchase ready-made tools and machinery and the lack of skills and training necessary to implement solutions requiring

advanced technology. In small-scale industry the solutions to problems must be compatible with available skills and funds.

Keeping in mind the two restraints, lack of funds and lack of skilled testing operators, Professors Yoon and Lim of the Mechanical Engineering Department and Mr. Ben James of the Georgia Institute of Technology investigated several simple concepts of measuring the strength characteristics of cast iron. This team of engineers ultimately proposed a simple device which would measure the cast iron strength to the degree of accuracy required by the foundryman at 1/50th the cost of a sophisticated testing machine. A prototype testing machine is being built in the Mechanical Engineering Laboratory by these professors and preliminary results are very encouraging. A simple diagram of the testing machine developed by the team of engineers is shown in Figure 1.

Molding sand samples were tested in the Mechanical Engineering Laboratory. These test data yielded recommendations to improve sand quality and produce better-quality castings.

Case #2: S.H. Machine Industry Co., Youngdungpo, Seoul

This firm manufactures wood-working machinery, including such items as planers, table saws, band saws and shapers. Their small planer's sales price is approximately U.S. \$500 and the value added by manufacture is high. The market is good and growing and the company desires to expand its export business.

This firm needs to develop a system for determining manufacturing costs for all of its products. The products have many parts, but they have no system of parts numbering, no parts engineering drawings, and they have not determined costs of manufacturing the parts. With a product cost system, management should have the information necessary to make decisions affecting the profit of company's operations.

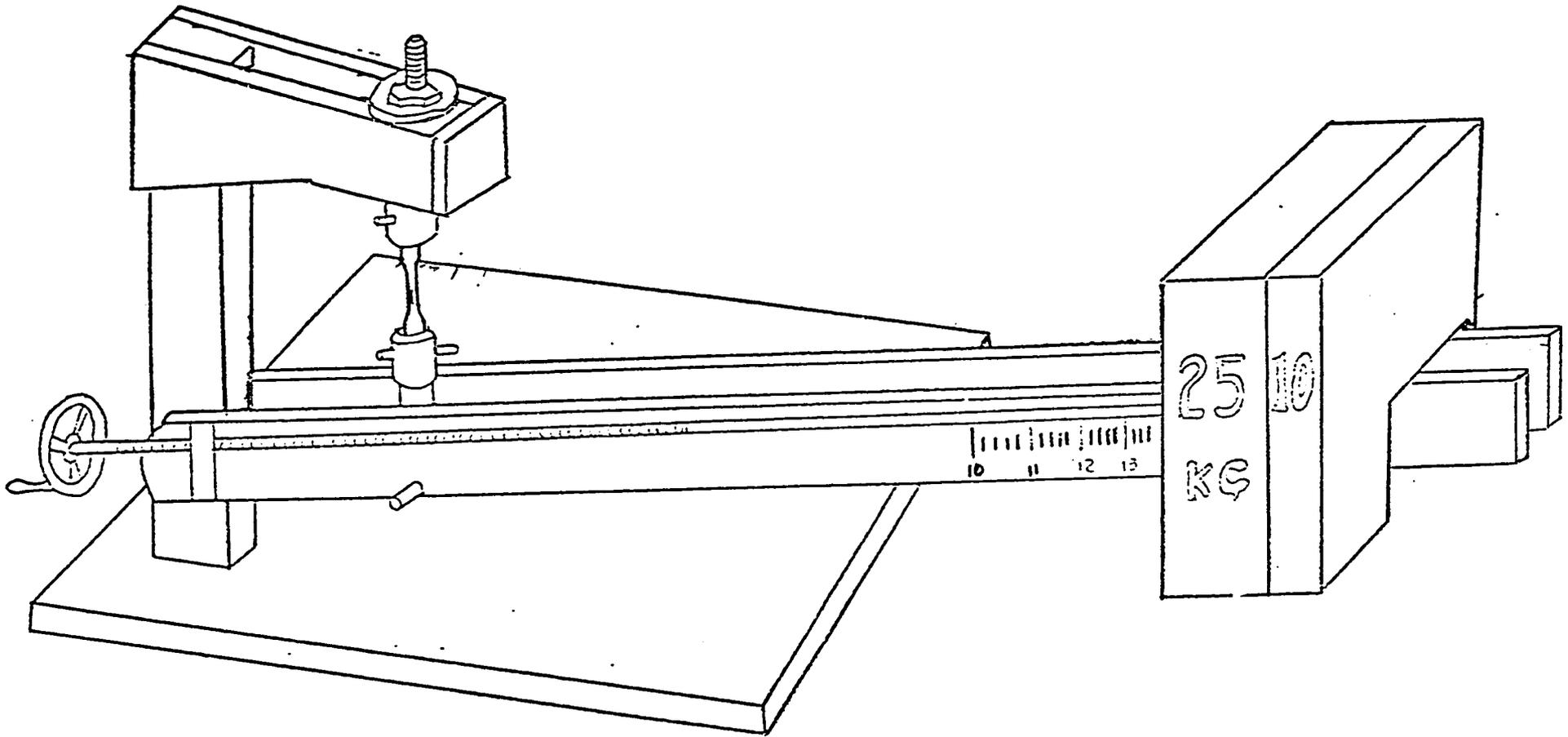
Their planer was selected to demonstrate the steps in developing manufacturing costs. Assistance was given in developing a parts-numbering system, part engineering drawings were produced and a cost accounting system was recommended.

As a result, the firm has adopted a parts numbering system and established numbered-parts bins. They have developed the cost of all purchased parts and the material for their manufactured parts, and they are in the process of developing their labor costs.

This firm will continue to need assistance in developing a cost accounting system for all of its product line. Then, assistance should be given to developing other management systems, such as inventory control, production control and scheduling and possibly work standards. The firm also should be given help in expanding its export business.

This firm is at the stage of development whereby good management systems are essential to the realization of growth potential. Experience gained by

FIGURE 1



CAST IRON TENSILE TESTER - CONCEPT

the Soong Jun University staff in working with this firm will be valuable in handling similar problems facing other small-scale industries.

During the third quarter period in 1974 a questionnaire was prepared for the purpose of determining employee technical training needs, as well as the interest of small industries in such a program. After the questionnaires were analyzed and follow-up interviews with interested companies conducted, a training course was planned and carried out in the last quarter of the year. There were about 50 participants in this initial course. SJU faculty members were the instructors, and the fields of training included machine tools, electricity, metals, production management, and industrial management.

It should be noted that this is a program having only a long-term payoff. We understand, however, that this program will become successful only if the skills and techniques it intends to teach are called for by the firms and used in practice. To ensure the maximum effectiveness of on-site training, follow-ups have been made by the faculty members involved in extension work. They visit regularly--at least twice a week or so--to inquire about implementation of the techniques.

I would like to summarize some of our experience gained in 1974 while offering technical and managerial assistance to small-scale industries in the Seoul and Taejon areas. First, the reaction of small-scale manufacturers to the interest shown in them by our University engineering personnel has been generally good. There is a distinct morale-building effect that takes place. We feel this should stimulate problem-solving attitudes.

Second, small-scale manufacturers have numerous problems with which to deal, both recognized and unrecognized by them. Outside, disinterested, and more objective analysis can help them discover real problem causes and lead to quicker solutions.

Third, distinct contributions by Soong Jun and Georgia Tech engineers were made in designing inexpensive testing instruments for foundries and other simple tools.

Fourth, it is felt that classical industrial engineering procedures in plant layout, materials handling, inventory control, work methods, etc. have high relevance to small-scale industries. These studies will help keep labor costs down and improve Korean industrial competitiveness.

Fifth, we find that not all problems can be solved by our Soong Jun people. We feel that other institutes and agencies can help, and thus we are expanding our view of possible sources of aid. As Dr. Alba raised the question yesterday, would there be any possibility of linking the extension service institution to other service institutions or research organizations? We are now seeking such linkages through official channels and through personal contacts. So KIST and Korean Advanced Institute of Science and many other national organizations have been brought into our formal contacts. We can't handle all these problems, for one reason or the other, so we have to get these other institutes and research institutions which are capable of solving technical

problems. This has been done in a small scale, really; not in a large scale.

Sixth, we find that small-scale industry in Korea desperately needs export market information and better quality control to meet international standards. Korean industries can progress quickly if suitable international contacts are made.

Seventh, we find it challenging for our engineering faculty to engage in industrial extension work. There is a possible need for some full-time staff in our industrial extension activity.

Lastly, we feel that our University educational system can be greatly improved by involvement of our faculty in this practical engineering work. The knowledge gained in this extension work and solutions will be of direct value in staff development and in feedback to the university education curricula.

I'd like to give you one happy story concerned with this extension work. Last year the Minister of Education visited the rural areas where we have been giving industrial extension services. And the company representatives replied to certain questions asked by the Minister. They said that Soong Jun University has come around and helped out. Help which otherwise would not have been available; made available to them. Then later the secretary to the Minister called me up, personally, asking for information on our activities. So we hastily provided a long description of our extension activities which were transmitted to the President himself. And later on we were told by the Minister of Education that Soong Jun University could be encouraged by the government itself in terms of financial support, which we declined at the moment. But later on we'll get in touch with this formal channel of government funding. Strategically, we declined for the time being the government assistance. We have a foundation called the University Industry Cooperative Fund which has funds collected from the local businessmen and exporters. Last year they supported our projects in the amount of less than \$10,000. Outside, the funds came from international sources, such as the Asia Foundation and the United Board Foundation in Hong Kong. But this is a happy story, I would say, because we have just gotten started, and it is resulting in lots of impacts on other institutes and educational institutions which were otherwise motivated to do this kind of work. Tomorrow morning you will see a Yeungnam University case by Dr. Alba. Yeungnam is another private educational institution which is located in a local provincial area. It's a newcomer to these extension activities. I hope these activities spread over the entire nation in the years to come. Then the government policy makers will pay more and more attention to these activities. Thank you very much.

Summary of Technical Assistance Cases

<u>Location</u>	<u>Name of Firm</u>	<u>No. of Visits</u>	<u>Hours of Assistance</u>
Seoul	Youngdungpo Machine Industrial Estate	4	6
Seoul	Tae Won Cast Iron Co.	9	26
Seoul	Tae Ga Ironworks Co.	7	21
Seoul	Sam Ho Wood Machine Co.	8	31
Seoul	Sam Jin Industrial Co.	4	11
Seoul	Jin Hung Cast Iron Co.	9	26
Seoul	Jung Poong Industrial Co.	1	3
Seoul	Sam Sin Sewing Machine Co.	5	15
Taejon	Shin Sung Paper Mill Co.	14	28
Taejon	Kook Ri Machinery Works Co.	3	9
Taejon	Dong Mi Chemistry Co.	1	3
Taejon	Shin Kwang Textile Co.	2	6
Taejon	Nam Ni Machinery Co.	3	9
Taejon	Hae Ryuk Machinery Works Co.	3	9
Taejon	Moon Kwang Towel Co.	2	6
Taejon	Dae Won Paper Mill Co.	1	3
Taejon	Nam Sun Machinery Co.	1	3
Taejon	Anjon Bicycle Mfg. Co.	1	3
	TOTAL	78	218

DISCUSSION SESSION

Joseph E. Stepanek presiding

Joe Stepanek:

Thank you, Yoon Bae. Before we initiate discussion on the two presentations, we're going to see a short case study prepared by IDD on a single enterprise. Ross, wouldn't you want to introduce what we're going to see now?

Ross Hammond:

Actually this was a joint effort of Soong Jun and some of our people who have been over in Korea from time to time. What you are going to see, in contrast to the Mindanao State tape which is a third generation tape and has been edited, is the raw tape that was taken inside this plant. I think both the Soong Jun faculty and our own people were fascinated by this rural industry in Korea. It's a fishing pole factory which takes bamboo and produces fishing poles. Basically, the tape was done in about 20 minutes; we just walked through the plant, set the camera up and I talked into a microphone. It's really a demonstration because the beauty of the thing is that you could do this in a plant somewhere and take it into the classroom an hour later and show the class the whole industrial process.

Videotape presentation shown at this point.

Joe Stepanek:

Ross, I think you demonstrated a dramatic way of arousing interest in the transfer of technology. I hope we can talk about it later. I've personally tried to do this by collecting over the years over three thousand slides showing technologies in small factories in some thirty countries. But you can not bring alive the technology that way as you can with this device and I'm sure some of us will be carrying your work further or encouraging others to do it.

Now, let's open the discussion, based on the two presentations this morning. I'd like to point out first that we have heard of small industry development programs in two countries that are quite dissimilar, and I'd like to point out how dissimilar they are. The per capita incomes of the Republic of Korea and of the

Philippines are surprisingly close together. Korea may be slightly higher, but certainly no more than five or ten percent. But the contribution of small industry in the two countries is in the ratio of two to one, being much higher in the Republic of Korea; the difference being that the Philippines is far more advanced in primary industry. Now, the indications are that on a per capita basis the relative contribution of primary industry in the Philippines will decline. In the future it's very likely that the Philippines will be following on the heels of the Republic of Korea with respect to the anticipated contribution of the small factory. Now, as we discuss the presentations from the two countries, I would like to keep in mind the major issues I mentioned this morning. I would like to try to relate our discussion to some of the major problems facing not only these two countries but all countries endeavoring to stimulate the small factory. The discussion is open.

Jorge Trujillo:

Well, I have a question. I have heard how the institutions here are providing technical assistance to small-scale industry. But I think that the promotion of small-scale industries needs a more aggressive and complete approach. We are aware that small-scale industries need technical and financial assistance, but this is a problem of the industries that are in existence now. I would like to know what the institutions represented here are doing to promote new industries, new small-scale industries. In Ecuador, for example, we have many projects, we have many financial resources; but we have a lack of entrepreneurs and this is our main problem. I would like to know how you are attacking this problem.

Rufino Ignacio:

As I was saying yesterday, we have encountered the same problem also. The training center that has been approved in the University is really a demonstration center; I could call it an experimental pilot plant. It's a pilot plant demonstrating the profitability of the project. You produce ceramic ware based on some of the actual production techniques that you would use in an actual plant. So the Center is both a training center and an experimental plant. Later on, in an extended service system when the trainees do finish-- incidentally, in my paper I describe the type of training that we have--we conduct the training with the whole family participating. The characteristic of the cottage industries in the area is that from children to the parents, they all work in the factory or the industry. So we think that this is a good training method to get the entire family in the University, and we divide the working groups according to families. The mother and the father sometimes bring their lunch boxes and work the whole day. The children are given the work, so they belong to one class. Most of them do not speak English, so we have to resort to drawings; we get some interpreters in the case that the instructors do not know how to speak the dialect. We plan to provide them with the potters wheel; the one that is used to throw clay. We will give them glazing materials also, because we know--and this is backed up by the necessary expertise in Manila--that there is a tremendous clay deposit there of very good quality. This is a good basis for the industry. Another good basis is that the people are practically all artisans; they are

good at this art work. And there's this tremendous demand for ceramics products, particularly those done by the natives. The people are curious about the native products coming from the mountains; coming from the hinterlands like this. This is a very expensive proposition because we gave out some materials and some of the equipment that they use. Then, later on, when the products have been finished they will bring this back to the University. They will be using our kiln. And we hope that they can pay us back when they have sold the products. We don't expect very much out of this; we hope that they will pay us back. But pretty soon they will be coming up with a ceramics town just like Tuqueqaro developed as a blast town. Instead of getting the people convinced from the figures, the numbers, that you produce for them, we actually show them that this can be done and how to do it. Train them, in other words. You give them everything for them to see. And then in this case, that entrepreneurial spirit is really awakened.

Herminia Fajardo:

I would like to explain that the situation of the Mindanao State University is not a nationwide system, because they are operating in a specific region where it would not be possible for the national program to operate because of the Moslem situation there. But in the national program for development of small- and medium-scale industries in the Philippines, the answer to your question is that we start off with a survey of specific areas to identify small industry potentials based on the available resources and facilities. We make a list of specific industries that could possibly be put up in these areas. And then there is a team tied up with the National Commission that goes to these different areas and shows these people what the different possibilities are. In addition to this, we have the National Program for Entrepreneurship Development which is being run by the Institute for Small-Scale Industries, tied up with the National Manpower Youth Council and the Development Bank of the Philippines. After the identification of the specific industry potential, the prospective entrepreneurs are identified, trained and shown the different industries they could go into. Sort of a man-to-man assistance is being given, whereby it is explained how they would go about starting the project, the preparation of the feasibility study, guiding them by hand to the financing institution--which is the Development Bank of the Philippines or the rural banks--and helping them fill out loan applications. Then technical assistance comes in, helping them choose machinery, organizing the new project, setting up the project and leaving them when it is in operation. This is how we start up new industries in our areas.

Joe Stepanek:

Could I interrupt here to avoid what I think may be an misunderstanding? We've been using the words "entrepreneurial training" in two ways. Some of us have been using it to include managerial skills needed by the owner-manager. But when you use the word "entrepreneur" you're talking about psychological or motivational training, which you treat quite separately from consultancy or managerial skills. I think it would be highly desirable if you went just a little further to illustrate that distinction and also to share with us any evidence you have that your pure motivational training has been beneficial.

Herminia Fajardo:

Based on our experience this entrepreneurial training is not just managerial training. We identify our trainees through psychological tests. Part of this entrepreneurship development is a motivational approach to being an entrepreneur eventually. The man who is trained has the basic potential for becoming a businessman; an entrepreneur. After he goes through that motivational aspect of the program the management training program comes in and then the last portion is the preparation of the project study, so that he goes gradually into the last three phases of the entrepreneurship development program. We have heard the experience that Mr. Chico mentioned yesterday--85% of the people that we have selected and trained in this manner have gone into their own businesses. We have a nationwide program. We started off in Butuan City in Mindanao. We have had one in Legazpi and Dagupan. We are not running this anymore in the greater Manila area; only out in the regions. We are supposed to have one down in Mindanao in Sanquanga, but at the moment we are pulling out of it because of the situation we have down there.

Joe Stepanek:

Thank you. Before we ask any more questions I'd like to say something about locating new entrepreneurs. I wonder how many ways there are of doing it. As we just heard, give evidence of new products that the market could absorb; and then we open a window at a bank and people queue up to get loans to manufacture those products. Now there's recently been a test made by the Gucharad Industrial Development Corporation on how to identify which people in this queue should receive the loan. And they recently tested in this way: they made a conventional decision as we normally do. Then, secondly, they used Mrs. Fajardo's approach of testing their motivation. In other words, they tested the feasibility of the project but they also tested the motivation of the manager toward entrepreneurship. The results were most remarkable; that is, there was a much higher return on the loan if you selected the person according to his psychological motivation toward entrepreneurial activity rather than using the standard conventional ways of testing people.

Yoon Bae Ouh:

Well, what we can do at best is to follow what has been successful in setting up new industries in local areas reflecting the existing entrepreneurs' experiences. Last year the government set forth the guidelines for the development of new native specialties. If one is interested in setting up one of these industries, then a government assistance team plus the small-medium-industry-bank feasibility study team come to the area and make a study and make a small loan available to the man who shows interest in this business. I will give you an illustration of such an industry to be assisted by the government: a native handicrafts industry, including dolls, handiworks, woodcarving, rush products, handmade silk favors, arrow root wallpaper, brasswares, custom novelties, smoky quartz, artificial pearls, etc. Thus the government has assisted these industries to be developed. In other words, the government has manpower as well as technical information with which to assist the people. The University may come into this arena of activities with a reservoir of educational technology and facilities.

Joe Stepanek:

Is there another comment on the question of how you find new people?

Manuel Alba:

Actually, the question of how we train entrepreneurs has never been answered satisfactorily because the fundamental question is whether entrepreneurs can be trained. Of course, it's not really a conflict in terms but of various perspectives of how to develop entrepreneurs. Joe has mentioned a couple of approaches. One found in the development literature is where entrepreneurs are provided encouragement; a kind of a spark, which will bring out the innate talents. The other approach is motivational. I believe that it is a combination of these different factors. That in fact, in the studies done in one place, the conclusion has been that there is no lack of entrepreneurial talent in that area. What is needed is the kind of spark or inducement that can bring this out. On the other hand, as McClelland found out, in some places there is really a need to develop this kind of individual psychological or motivational characteristic, and how to do that is really a question which calls for the experts to answer. It's primarily because of the difficulty of defining what the entrepreneurial traits are that there is a difficulty in training entrepreneurs. What has been considered entrepreneurial training is really managerial training. How do you train a person to be an adventurer, a risk-taker, to be an inventor, to be a creator of things? Now in the places we have been working, in the RATC regions for example, Rufino has identified the brassware industry in terms of the extended family system, through years, having had the insight of starting up something. Now that entrepreneurial initiative has come out. But whether it is adequate in the terms of reflecting some commercial success is something we hope the RATC would do something about.

On the other hand, Mrs. Fajardo has pointed out the fact that in some places, because of resources, because of potential markets, there needs to evolve some industrial liberation basis; and yet there are no takers because apparently the native population has not identified the market opportunities, the potential utilization of raw materials in that area, and in fact, the potential use of their own labor and skills. Now in that area you not only have the challenge of trying to provide that spark to bring out this initiative, but at the same time to actually help them to identify what the market opportunities are. Now that's a much more complicated function; much more complicated task for the RATC to do. How do you develop university capabilities to go around the region, identify potential individuals who have this, and at the same time, therefore, recognize what would be the necessary inducements to bring them above the thresholds in which they would be willing to make a venture into some commercial type enterprises? On a much higher scale, Bart Duff and Amir Khan of IRRI would say that as they go around regions in Asia to identify some possibilities in respect to small farm implements--innovative approaches to developing this complex of small-scale farm implements--at the same time they search for winning manufacturers to manufacture the small farm implements. They found this small shop on the outskirts of Bangkok, which I think was shown in the slide, set-up and operated by a dropout from grade school. This illustrates our theory that a person doesn't need formal education in order to be able to recognize entrepreneurial opportunities. The shop

has grown big enough for this guy to recognize that, in the long run, he is not going to be able to run it. But he is also entrepreneurial enough to recognize that he has to send his sons to engineering school because, in the long run, it will take much skilled managerial talent to run it. This shop has been making air cooled engines all along, but of a more crude design, actually, whereas IRRI has been spending R&D money for a long time to develop the same kind of engine. If they had surveyed the area they could have found this guy in the outskirts of Bangkok, and perhaps in some manner of assistance could have modified the air cooled engine; could have developed a much more efficient engine in a quicker time. So what is really necessary beyond recognizing that some of these enterprises need assistance in financing and management in some enclaves of development is to bring out these people. This is still the major challenge that, in fact, many institutions really cannot find an answer to. And to some extent it is why the concept of the RATC is a multi-disciplinary concept, because it takes more than just an engineering economist to identify who the people are with skills and talents and potential entrepreneurial skills. The RATC in Mindanao is headed by a political scientist. The Yonnam University is headed by an economist and Hasanuddin University is headed by an engineer, but I believe there is an anthropologist on the team. Because, in the long term, how do you communicate the technical aspects of setting up a firm? It takes maybe an anthropologist to do that; to be sympathetic and in rapport with the local population. So that, in one sense, is a practical, empirical answer to your question; it's a big task.

A. O. Lewis:

That is of no use to anybody in my own opinion, because you have to say, "What is an entrepreneur in the first place." Is an entrepreneur an imitator or somebody who innovates, or is it the classical definition of entrepreneur: somebody who is prepared to take risks? These are problems, really. If you are in extension service you don't look, you don't go in for that; this is academic advice which we can discuss with Yoon Bae Ouh here without arriving at a definite conclusion. Personally, I believe any extension man who wants to go in for practical or successful extension must ask himself who the agents are of progress. Who are the people who can do these things? These are the ones you want. And once you identify them, then you can really go on to help them do the job. I'll give you an example. I was doing a survey in the rural area and I met some of these blacksmiths who were producing primitive agricultural implements. So I asked them, "Why don't you try to produce something more advanced than what you are producing now for people to use in agriculture?" They said, "Well, nobody is asking." I said, "What do you mean, 'nobody is asking'?" They said, "Well, none of the farmers ask us to do it. If they ask us to do it, we will produce it". So I said, "Well, why don't you produce it for them; maybe they don't know that they can use it?" They said, "Well, if you can bring the money, I will do it, and I will give it to the farmer, and if he likes it he comes to me and then I can do it for him." Well, unfortunately what that means is that this man is prepared to do the thing that is good but is not prepared to risk his own money initially. But if he finds out that what I said is correct, that the farmers will pay, then, he's prepared to go on with it.

O. A. Oguntoye:

In Nigeria we import bicycles and parts from Japan, from Hong Kong, from all over the world. A group came to us and said, "Well, look, we don't want to manufacture bicycles." So I told them, "Why don't you start manufacturing the rings on the tires? These are easier things to do." They said, "Good, but how do we do it?" Well, we have to help them do it by asking where they can get the machinery, what will it cost them and how can they do it. Then we provided them with the technical information of what is to be done and how it could be done, and they decided to do it on their own. I believe that training entrepreneurs means asking them to become good agents of change; that's my own definition as far as that word is concerned. I can give several examples of how people can be helped to become good entrepreneurs, if you want to call them entrepreneurs.

But I have two problems which I want to discuss with my friends. One of the problems has been solved because of the information about the ventures they are taking in the small industry in Korea, because we have the same problem. And the presentation from Korea also showed that they are concerned, too. But the second problem is not solved. The presentation from the Philippines was not very clear whether they are concentrating on two areas, or they are just praising themselves about that particular region. When you start with industrial extension, I think the first thing with a university base is that you identify the sources, both with regard to finance and personnel. Naturally, you have unlimited resources with regard to facilities. What I mean is, you can call on any of the departments to help you with those facilities. But with regards to actually going into the field to do the job, and the money to be used, they are very limited. So we are faced with two problems. Either you spread these activities over a very big area and it becomes very thin, or you concentrate on certain areas where you think you can have the most effect. This is a problem in which I think one has to make a decision. As my colleague said in our presentation yesterday, you should concentrate on five, but not more than eight areas. But you see, it's not because we don't like to go out, but because we haven't got the resources. I don't know the intention of Korea; whether, although they are starting with two areas, they intend to spread throughout the country. I would like also to know the intention of our friends in the Philippines; whether they intend to go out in the rural places or they intend to work in closer to the growth centers. This is the second problem; at least I think it is.

Ben James:

I was just going to mention that sometimes you can stimulate an entrepreneur by irritating him. We told an entrepreneur in South Georgia, after doing a great feasibility study, that he would be utterly foolish to go into this type of business. But, being the good entrepreneur, he didn't listen to us. And today this is one of the most successful businesses that we work with! So, for the magic ingredient, we don't know what it is. We don't try to identify them necessarily, but to stimulate them, once they have identified themselves to us.

Joe Stepanek:

That very problem took me into the field of observation because I saw something happening over the world that I could not explain by any conventional approach. There is a missing factor here, which was existing in this chap, that in spite of your help, he succeeded.

Leon Chico:

As to the question regarding whether we should be limited to specific areas or on a national basis, in the case of our program it is a national program, duly approved by the President. It is a government program, and we are permitted to go to all the regions. The question of funding, from the point of view of the President, is not a problem. The Four-Year Development Plan was committed to the national development of small and medium industry, so we are dispersed all over the eleven regions. We may not be capable of doing it alone, that is why--as I explained yesterday--we have a twelve-agency integrated, coordinated commission; but it's a national program. I'd like to make another point on entrepreneurs in addition to what Mrs. Fajardo said. We are also undertaking what we may call a long-shot approach in the sense that we are also training business teachers in the spirit of entrepreneurship, if I might call it that. We have felt all along the business curriculum was lacking in entrepreneurship input and, therefore, slowly (but I think quite fast recently) most of the schools have included in their curricula topics on entrepreneurship. The UP-ISSI led the way; the Asian Institute of Management, the University of the East; we have been training business teachers in a summer program in these courses, and we have, of course, included also a few professors from the Mindanao State University, The Philippine Bank, and so forth. So this may be a long-term approach, but perhaps it will yield some multiplier effects in the future. We feel that the business curriculum should not be training employees and managers alone, but also future entrepreneurs.

Joe Stepanek:

There is a clue for us to adopt. Let me put it this way; fifty years ago the conventional wisdom was that you couldn't train managers. You are either born a manager or forget about it. And the Harvard Business School was questioned. Now we no longer question the value of management training. Now I don't agree that our concern with training entrepreneurs is only an academic exercise. What was a behavioral science a decade ago is rapidly becoming a behavioral technology. We cannot invent entrepreneurs, but if you have a tendency in that direction, there is overwhelming evidence from the Philippines and twenty other countries that you can enhance it. I'll give you an example. If you have a tendency to play the piano, you would all agree that there is no harm in giving that person lessons. No matter how good he is. You would also agree that if you are trying to give Stepanek piano lessons, you would be wasting your money! In other words, if you have a tendency towards expressing yourself through a certain avocation or vocation, then training will enhance that. That is where we are with entrepreneurship. Now it is relatively easy to identify a person with entrepreneurial skills. We don't have time now, but I can describe a game we can play here, which will show us all, whether

we are entrepreneurial or not. I put a basket in the center of the room and give us each a ball and tell you it is your job to put the ball into the basket and you can stand any place you want to. Most of us would say that's stupid, Chairman, and walk over and drop the ball in the basket because you don't want to take a risk, and the most intelligent people in the room would go over and drop it in. But once in a while there would be some irrational person who wanted to test himself, and you would find that he would stand a distance from the basket, he would do this subconsciously in which he had a fifty percent chance of getting it in, because he gets more satisfaction in taking a calculated risk. You'd find further that if he missed the basket the first time, and you asked him to do it again, he would stand a foot closer. Now this is the engineer who leaves a large company because you have encouraged him, invests money in his own small company because he is an irrational person and not very intelligent; he loses his money. He goes to work with you until he can save more; the next time he stands closer to the basket, takes less risk and perhaps succeeds. Now we know a great deal about this process. Now this is in part relevant to the question Paul raised. Shouldn't you on your staff have entrepreneurs, if you are going to advise other entrepreneurs? The answer is definitely yes; but as Mr. Chico knows, the more entrepreneurial the person is on his staff, the harder Leon has to provide an environment to keep him because he is a restless person who will seize an opportunity to leave. I can cite cases over the world in which the very success of your institution has made certain that it will be a failure, because the more successful you are in stimulating entrepreneurship, the more likely you are to lose your staff. And the problem is one of building long-term vitality. This is why I mentioned that institutional invention is urgently needed, so that you can design some type of organization that will hold the entrepreneurs to stimulate other entrepreneurs. That is a long-winded answer; Yoon Bae, I apologize!

A. O. Lewis:

I'm not yet clear. In that case, should I ask my wife to go into business, am I an entrepreneur? No. You see that gets you somewhere. In other words, you are saying that an entrepreneur is somebody, who on his own, without any idea, in a rash manner makes a decision to go into business. I don't agree. I say that an entrepreneur can also be a more rational man. I have seen women, illiterate women, who are making decisions that you would have never thought could be made because they are illiterate and because they don't have a formal education. But they have thought about the matter, they lose sleep for many nights, and then arrive at a decision. I think one of the traits of an entrepreneur is not rashness.

Joe Stepanek:

But you make a very good point, because conventional education preaches conformity. And there is good evidence that those of us who survived the educational system are perhaps poorer entrepreneurs than those who leave the schools. In fact, the Dean of Engineering at Soong Jun University pointed out to me the anomaly, that many of his students who failed and were forced out became more successful than his graduates.

A. O. Lewis:

It is possible, but how many of them? I would like to add a story. On the other hand, for example, in one of the states of Nigeria, we are aware of some transformation in agriculture, by those who were top members of the civil service who retired early, at 50 - 55--some at the age of 45--to go into farming. And they have made better farmers than the illiterate farmers because, you see, by the nature of his own education, the nature of his own training and the nature of his method of living, he is not going to use the rules of the poor classes. He is going to start with the tractor. Because of his own commitments to banks, to loans, he is going to be much more careful about how he manages that farm. That's why I don't think this question of entrepreneurship can be answered simply as somebody who rashly decides to go. I don't think so. I think an entrepreneur can be somebody who has the facilities to go in and then really thinks about getting something done.

O. A. Oguntoye:

I think we can leave this question of the entrepreneur alone and go onto something else. I would like to comment on two issues raised by my good friend, Mr. Ignacio. One point that interested me in his presentation was low-cost housing technology. As you know, in the process of economic development there is an increasing demand for residential accommodations, and for additional types of road construction. These two activities can be made labor-intensive, so there is a body of opinion now which believes that in developing countries where you have unemployment, one way of catering to this demand for more residential accommodations and road construction projects, as well as solving the problem of unemployment, is to build more houses and more roads. What the institution of my good friend is doing is very important. If we can adopt inventive technology, we can make it possible for us to build houses at the cheaper rate, construction at the cheaper rate; this is a good thing. And I would like to see about this idea of producing cement blocks; it is something which we have also experimented with in Nigeria. But what we do is to mix cement with sand which we get from the sea bed. And this produces a block which is fine quality. But now we are even going further to produce what can be described as clay blocks. You don't need to use the cement. As you know, cement is a bit expensive now, so we are trying to produce a new clay block which will make it even cheaper to build houses.

Now, the other part of your presentation which had my interest was what one or two of your inventors are doing. I think in developing countries that we need more of these indigenous inventors. One problem which normally faces inventors in developing countries is that the social and economic environments are not conducive to many of these people so as to develop their innate talents and I think one important function which governments can perform to these indigenous inventors would be to assist them to develop their potential. But in some cases--we found this out in Nigeria--some inventors might be precluded by their inability to tap necessary financial resources to develop their inventions. I believe that we should advise the governments to develop assistance policies and make it possible for the indigenous inventors to develop their innate abilities and to contribute in this way to the development of small-scale industries.

SEMINAR
THURSDAY P.M.

Paul Lofthouse presiding

Paul Lofthouse:

May we start now please? The first paper was prepared by Mr. Giustina, the president of FESSC and Mr. Muller, the director of FESSC and will be presented by IDD's Mr. George Morelos. I don't propose to go right through the resumes of the gentlemen who prepared the paper. I read them last night and I read them again this morning and I still feel that if I described all of their qualifications there wouldn't be time for the paper, so perhaps Mr. Morelos should start.

THE SMALL INDUSTRY ACTIVITIES OF THE
EDUCATIONAL FOUNDATION OF SOUTHERN
SANTA CATARINA

Oswaldo Dela Giustina
President
and
Jose Muller
Economist
Educational Foundation of Southern Santa Catarina
Tubarao, Santa Catarina
Brazil

English presentation by
George Morelos of IDD

Translated, "FESSC" means the Educational Foundation of Southern Santa Catarina. The first part of their paper deals with an introduction to Brazil. Brazil is the largest country in South America. In fact, if you take away Alaska, it is larger in land mass than the United States. Its population is approximately 105 million people. Brazil is a very dynamic country and it is quickly becoming industrialized; in fact, industrialized areas of Brazil compare favorably with similar areas in developed countries. However, the population is mostly concentrated in the coastal region. In Brazil, similarly as is the case of most countries, there are some areas that are very undeveloped. I will proceed now with the slide presentation.

We are going to be dealing with the State of Santa Catarina, which is in the southern region of the country. The southern sector of the state is composed of 32 municipalities and is the area of influence of FESSC and IDD's program. The western section of the State of Santa Catarina is mostly devoted to agriculture and livestock. In the northeast is where most of the State's industry is located; textiles, primary metals and metal fabrication are heavily concentrated there. Finally, we have the southern part, the area of concern to us, which is mostly a mining area. The major contribution to the economy is concentrated in two sectors; the coal mining industry and the ceramics industry. All of the Brazilian coal production that is converted into coke comes from the southern part of Santa Catarina. The coal deposits are the major revenue-producer of the state, in the sense of one industry. The coal reserves in Santa Catarina are something in the area of 1.2 billion metric tons.

The area we are talking about here is 9,500 square kilometers, which represents 9.0 percent of the state and 0.1 percent of the country as a whole.

This southern region has a population of approximately 550,000 people. In its early period, when it started being colonized about two centuries ago (this took place mostly in the coastal area), the people who colonized the area were Portuguese. Subsequently, a migration phenomena of several European ethnic groups coming to the state took place. Now the final equation is a mixture of three dominant groups of people; Germans, Italians and Poles.

The coal industry has given rise to a number of projects that are now being implemented. There are 50 industrial alternatives that were analyzed by FESSC, many of which are being executed at the present time. All these alternatives deal with large industry, taking advantage of various by-products that are derived from the coal industry and turned into a chemical complex. Given the industrial makeup of the state, many of the by-products of the coal industry can be utilized as inputs to the primary metal and textile industries, so the potential in terms of the principal minerals are very well-developed.

FESSC was founded in 1967 as an educational foundation. It has programs of university training; mostly in the social sciences. It also has a secondary (or high) school with about ten different programs. Along with its academic departments, FESSC, back in 1967, also instituted a special Department of Research and Development (DPD). The main purpose of this special department is to aid in the economic development of the southern region of the state by assisting industry in the area, as well as to help various governmental planning and development agencies that are active in Santa Catarina.

The DPD became the operative arm of a joint agreement of a Small- and Medium-Size Industry Program between FESSC and Georgia Tech, signed in January of 1974. In March, shortly after this agreement was signed, the most disastrous flood of this century took place in southern Brazil. The city of Tubarao where FESSC is headquartered was the community that was most heavily damaged by the flood. The infrastructure and the manpower that was available as a result of the FESSC--Georgia Tech Agreement was very valuable during the three-month emergency reconstruction period following the flood. During a four-week period FESSC, through its new program, assisted 40 small firms to assess the damage caused by the flood and helped these firms to apply for emergency industrial loans. The program's activities as set-out at the beginning of the year did not get back to normal until mid-June.

The activities during the post-flood emergency period made the program's goals widely known throughout the business community. Therefore, when the activities got back to normal there was no problem getting access to the small- and medium-size entrepreneurs in the area.

The program's normal activities include four different types of functions. The first one is what we have come to call continuous technical assistance. Last year continuous technical assistance meant the selection of eight small- and medium-size industries where a complete diagnosis of the firm's operations were made, including production processes flows, analysis of accounting,

inventory, logistics and management systems, etc. It was soon realized, while the diagnosis was being developed, that all these firms had far too many problems to be adequately solved on a short-term, one-time basis. Therefore, a list of priority problems and recommendations was made, as well as the writing of case histories on each one of these firms. We estimate that it will take approximately 18 to 24 months of continuous technical assistance before technical support is no longer necessary. In addition to these eight firms, we plan to add eight to ten more this year so that we will have a total of 16 to 18 firms in the continuous technical assistance program in 1975.

In addition to the written case histories we have started an audiovisual record of all continuous technical assistance cases. We have videotaped each one of the industries, and we plan to update the audiovisual record by taping every year, recording the changes that were brought about as a result of the technical assistance provided to the firms.

The second type of activity is what we call discrete technical assistance. Thirty of these were performed in 1974. The discrete cases are simply one-time technical assistance provided to individual firms. They range from inventory control problems to the evaluation of the economic advantages of purchasing a specific piece of equipment. The problems and the recommended solutions to the problems are recorded internally, but the records are not as extensive as in the continuous technical assistance cases.

The third activity has been named investment counseling. The investment counseling services are best illustrated by situations where a person goes to FESSC and states that he is seriously considering undertaking an investment in a specific industry. On other occasions the potential investor states that he has a specific amount of funds available and asks for opinions and ideas as to what type of industry he should invest in. In 1974 twelve such cases were handled. Before answers or opinions can be given to these investors, an analysis has to be made and a sort of industrial profile has to be generated. Normally it is from these groups of potential projects that the source of topics for the preparation of manufacturing feasibility studies are selected. Four feasibility studies were prepared in 1974: brick and tile manufacturing, expansion of a candy and jelly manufacturing firm, rubber-based products (recuperation) and the manufacture and assembly of truck bodies.

The fourth function is called miscellaneous activities. They are characterized by the presentation of seminars in the three "poles" communities of the program which in 1974 were: Tubarao, Laguna and Brazo de Norte. The topics of these seminars are varied: Cost Accounting Controls, Quality Control, Inventory Management, etc. They are given for entrepreneurs who reside in these communities and particularly for the persons benefiting from the continuous and discrete technical assistance cases. Participants include the owners as well as the shop foremen and other key people of the firms. We have found that the interaction among these small- and medium-size entrepreneurs is very healthy and has often led to relationships of a technical nature among them as a result of having the opportunity of meeting other entrepreneurs with similar problems.

In December of last year a commitment was made by the federal government of Brazil to provide financial support in 1975 to the small- and medium-size industry development program. The federal funds will amount to 30% of the cost of the program for 1974. Here we have a good example of a situation where a small, non-metropolitan university that operates in what is basically a rural environment is able to attract the attention and support of the federal government. The federal government looks at FESSC's and Georgia Tech's program as a very interesting pilot experience that can be emulated in many other states in Brazil if sufficient results are realized in the next two years. In fact, discussions have already been held in connection with instituting similar programs with other non-metropolitan universities within the State of Santa Catarina.

During 1974 FESSC assigned five full-time professionals and two administrative people to the program. This year we hope that the program's output will surpass last year's. We expect the work-load to increase substantially due to the addition of other "poles" or municipalities to the program. The "mushroom" effect of the continuous technical assistance cases, with the eight cases of 1974 in addition to eight to ten more for this year, makes the need for additional personnel imperative. For an educational institution like FESSC that only has 10% of it's total budget coming from public sources, it is very difficult to expand unless student enrollment is increased. We hope to continue attracting the attention of both Brazilian and international organizations so that additional financial support can be obtained to carry out and expand this pilot project. The favorable institutional and community response to the project indicates that the project is directed in a correct course and that much is still to be accomplished. I feel that the basic elements of the project have been stated. We will be happy to answer any questions concerning the program or FESSC.

Professor Giustina is going to have to travel this afternoon and he wants to express his appreciation to Georgia Tech and AID for making it possible for them to be here this week. He is very hopeful that whatever generalizations and methodologies are realized through these discussions will be fruitful to the general development field. He hopes that the results of this conference will be spread out to other countries.

THE SMALL INDUSTRY ACTIVITIES OF THE
TECHNOLOGY CONSULTANCY CENTRE OF THE
UNIVERSITY OF SCIENCE AND TECHNOLOGY

J. W. Powell
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Ghana is a small country situated on the west coast of Africa with a population of about eight million and a land area of just under 100,000 square miles. The population density is quite low, but it's most concentrated in the south of the country. The University of Science and Technology is situated at Kumasi, which is in the central part of Ghana, 125 miles from the sea. So that, as far as the center of population is concerned, it is located very near that center. It's a small university like the other universities we've heard about this afternoon. It has 2,000 students and an academic staff of about 260. The University a few years ago became aware of the need for the University to provide service to the community in addition to its traditional roles of teaching and research. I think Kumasi has this in common with the other universities that have been represented here today.

The Technology Consultancy Centre was established in January, 1972, to extend this role of service to the community. The functions of the Centre may be conveniently classified into three headings, although there are some projects which fall under more than one category. First, we offer consultancy services of a conventional type to government departments, public corporations and large industries. In doing this, we can call upon the whole faculty of the University, so potentially we have about 260 consultants. The second role of the Centre is the stimulation of small-scale industrial development through free or low-cost consultancy services, the establishment of production units by the Centre both on and off the University campus, and the provision of manufacturing equipment, the training of personnel and other appropriate means. Third, the Centre collaborates with the faculties to encourage research and development of applied and practical nature aimed at solving problems of immediate importance to local industry. It may be noted that the faculties of the University of Science and Technology are as follows: agriculture, architecture, art (including a very strong department of industrial art), engineering, pharmacy, science and social science (which includes a department of economics and management). The Centre can call upon the services of consultants from all the faculties and collaborates with all the faculties in research, development, and production unit

operations. The Director consults with the heads of departments before a consultant is selected for a particular project. Once selected, however, the consultant deals directly with the Technology Consultancy Centre and with the client.

We publish a quarterly newsletter which is distributed to all members of the staff of the University to try to maintain their interest in the activities of the Centre. We also publish an annual review.

The Centre is financed from several quarters. The University covers the salaries of the established staff and office expenses. Consulting services bring in an increasing revenue, but this income is still small. Some projects are financed by government; however, in the first two years of its life about one-half of the Centre's income was derived from overseas sources. This income from overseas was in the form of interest-free loans or grants for what is called pump priming, to get us started. It cannot be expected to continue indefinitely and the Ghanaian government has been asked to finance the Centre with a vote which is independent of the University's educational vote. The University argues that the Centre has demonstrated that it has a useful role to play and that it deserves separate support. However, this argument is not being accepted by government at the present time, and we are still largely dependent on overseas funding for the continuation of our operations. In recent years the Centre has been spending about \$100,000 annually.

I want to talk this afternoon mostly about our operations in connection with small-scale industry. The Centre is geared to a concept that what is needed is a large number of indigenous enterprises which can progress technically and economically as rapidly as the abilities of the entrepreneurs and the available technical, managerial and financial assistance will allow. Thus the Centre sets out to help the craftsman, entrepreneur, partnership or cooperative to improve their production methods and introduce new products. The client is the pioneer, and the Centre tries to cater for his needs as he sees them. For example, the client knows that if he can produce a certain product through using locally available raw materials, there would be a ready market for it. The Centre attempts to identify suitable raw materials and to teach the production process. It will then, in cooperation with other institutions, arrange for guidance to be given in accounting and management. It may also, in certain cases, assist in raising the necessary capital for expansion.

Our experience over the last three years has shown that grass roots development involves four important stages. Firstly, there must be a man with an ambition and a will to succeed. This is the need for the entrepreneur that we have been discussing today. Secondly, the appropriate technology needs to be evolved. Thirdly, everyone concerned with the operation needs to be trained in various aspects of the enterprise. And fourthly, and it does come in fourth position, it's necessary to raise the necessary finance. Like the other speakers today, we have not found the shortage of finance to be the major constraint to energy and enterprise necessary to pursue their projects to the point at which they become viable.

I would say that the scale of the Technology Consultancy Centre is comparable to the scale of the University in that we are quite a small organization.

We have seven professional staff and about half a dozen administrative staff, and we employ between 30 and 40 people on our various projects. These are technicians, machine operators and so on. We operate under a management committee which is chaired by the vice chancellor of the University and contains all the deans and faculty and various other senior officers of the University.

The first product that the Centre was instrumental in developing was a paper glue based upon cassava starch. An entrepreneur came to the Centre and said that he manufactured cassava starch for distribution to laundries. He knew that you could make paper glue from this, but the paper glue he made was the sort of glue that we all make in school. It's very nice the day you make it, but within a day or two it starts to go hard, it grows a fungus and so on. So we put this problem to one of our chemists; and he came up with a formula which had a good shelf life, didn't grow fungus, was non-toxic so it was capable of re-wetting for use on labels and envelopes and, in fact, was a commercially acceptable product. This was introduced onto the market in August, 1972, and at that time Ghana was importing approximately \$250,000 worth of paper glue per annum. We exhibited this glue at an exhibition of made-in-Ghana goods in November of that year, and the entrepreneur was able to make contact with the State Publishing Corporation which signed a contract with him to supply glue to the value of \$20,000 per month through the State Publishing Corporation. This was practically the total supply needed by the country. His methods are labor-intensive; he employs about 25 people. He's now exporting to Senegal, he's having his glue made under license in Ivory Coast and he has sent samples of the glue to the U.K., where there seems to be some possibility of export trade. It's rather interesting that until about 1971 or 1972 Ghana was importing its paper glue from the U.K. It's just possible that we may be able to reverse that particular trend.

Another project that the Centre has is the manufacture of nuts and bolts from the locally produced Tema steel. It's called Tema steel because there is a steel mill at Tema which recycles scrap metal. It's the only engineering raw material produced in the country. When we first looked into the engineering industry back in 1971-72, we found that not even nuts and bolts were manufactured in Ghana. Many people making wooden truck bodies found that they couldn't obtain suitable steel bolts; carriage bolts. They said that when they could get imported bolts they were often in short supply and were very expensive. There were a few produced by local blacksmiths, but these were of very poor quality and they didn't particularly like using them. When we consulted with engineers in the country about the possibility of using the Tema steel for making bolts we were told it was rather too tough; that it was intended mainly as a building material for reinforcing rod. In short, it wouldn't be suitable for the manufacture of nuts and bolts. However, we went ahead and tried to make some, we found it was possible and we've been in production now for about two years. We're producing about 4,000 nuts and bolts each month and the value of the production is about \$1,500 per month at present. It employs about ten people. We have had the benefit of some British technicians visiting the unit from time to time to assist us in training the machine operators. A member of the staff of the University, a production engineer who lectures in production engineering in the Department of Mechanical Engineering, was one of the people most involved in setting up this production unit two years ago.

Another project on which we've embarked is the manufacture of bar soap. In 1972 the government encouraged the indigenous soap makers to form cooperatives for marketing and for purchasing raw materials. One of the cooperatives located near the University came to the Technology Consultancy Centre and said, "Couldn't we also manufacture cooperatively? Could you design a plant which would enable us to produce more soap than we can produce individually? Would it be possible to get the government interested in financing this operation?" So we contacted the Ministry of Industries, and the eventual outcome was the grant of about \$25,000 to enable us to establish a soap pilot plant capable of producing about one ton a day of bar soap. Within a few months of receiving the grant we were able to start pilot production at the University using a prototype plant. We invited the members of the cooperative to come along and operate this plant in order to receive training in all the manufacturing techniques. We acquired some land in a nearby village, which was given to the Centre by the chief, and we have constructed a factory to house the plant on that site. In fact, the building cost is about \$25,000, and it will be ready for occupation and production within the next two to three months. In connection with this project we have come up against the problem of the availability of caustic soda which is used in soap production. We find it is in very short supply in the country and it is, of course, an imported commodity. We found, however, that in another factory in Ghana they were producing about 30 tons a month of slaked lime which was being dumped as waste. And so we have started the small-scale manufacture of caustic soda using this slaked lime, reacting it with soda ash; sodium carbonate. We have had many inquiries from around the country for soap plants and caustic soda plants. We recently installed a small soap plant at Ho, in the Volta region, about 200 miles east of Kumasi; a quarter-ton-a-day soap plant and a caustic soda plant to provide it with its caustic soda.

Mr. Lofthouse, the other day during the conference, mentioned the export of wooden shields and wooden tool handles to a company in the United Kingdom. This is, in fact, the small enterprise which is manufacturing these products. Situated in Kumasi, quite near the University, it was established by a lecturer in Physics at the University who assisted two technicians to become entrepreneurs. They left the University to set up in their own business. It began by producing scientific instruments for secondary schools. These products were designed by this physicist, who has now moved more into wooden products. He produces such things as drawing boards and T-squares, teaching aids for primary schools and wooden tool handles. We imported two very high speed, although quite simple, machines for producing tool handles. They produce 200 handles an hour. They've also been producing crates for soft drinks and beer for some of the local breweries--a wide range of products in quite large quantities, at least by local standards.

One of the products which that company has produced is a weaving loom. This is the traditional loom of the Ashanti region of Ghana and on this loom they produce the very beautiful kenti cloth which is part of the cultural tradition of those parts. However, many of the young men in the weaving villages would like to extend their capabilities and produce more modern products. The Department of Industrial Arts of the University of Science and Technology has produced some copies of the traditional English broadloom which is capable

of producing cloth up to about 42 inches in width. When the Technology Consultancy Centre started to look at this, we decided that it would be interesting to train some of these traditional weavers on the broadloom to see whether they were interested in its possibilities and to make looms available to them on a loan basis so they could take them to their villages and use them in their production. We now have this local woodworking firm manufacturing these looms, and up to the present time about 50 have been produced for use in the villages surrounding Kumasi and in some other areas of Ghana. This is a shot of the first weaver to use these looms, in a village about ten miles north of Kumasi. The old man on the right is a traditional weaver, and he weaves these brightly colored narrow strips which you see on the left. The broadloom, which is operated by his son, produces cloth of about a yard width, and obviously the two products are complementary so they've been able to extend the range of their activities. They have two of these broadlooms now, this father and son. They've trained some other members of the family to operate the broadloom. What we've done as the next stage in development of this project is to bring out from the U.K. a pedaled loom which has a flying shuttle, and we're using this for evaluation. Now this young man is working in our Department of Industrial Art, which employs about eight weavers who are under training. We hope that some of them will become entrepreneurs and will go out and establish their own enterprises. We felt it was necessary to study all aspects of the economics of operating this loom under local conditions.

Another project that we have a research fellow working on is the design and manufacture of some metal products which may have the possibility of a reasonably large market in Ghana. This young man so far has produced these domestic fittings, bathroom fittings, such as a toilet roll holder, towel rail and bathroom mirror. Now he's drawing up a feasibility study and a production plan for manufacturing these items. We hope that at some stage in the future we may be able to interest someone in taking up the project or in interesting a financial institution in providing the young man with the necessary capital to become an entrepreneur in his own right. The University is, to some extent, trying to encourage members of its own staff to become entrepreneurs.

In conclusion, I just want to say one or two things about projects that we want to become involved with in the future. In the north of Ghana the land is very dry and neglected in terms of development. In the years following independence there were many moves to try mechanized farming in these areas. The results of this can be seen from the large number of decaying carcasses of tractors that decorate the countryside. It hasn't been possible to provide, I suppose, the infrastructure necessary to maintain vehicles in these remote parts. Just within the last couple of years the use of bullocks for plowing has been introduced. There is one manufacturer of bullock plows in Ghana, situated at Accra in the south. What we're interested in doing, in collaboration with a research establishment in the north of Ghana, is introducing repair facilities, maintenance facilities for ox-drawn implements, plows and carts, and later, perhaps, to introduce the local manufacture of some of these items.

Another problem in the north is the shortage of water. There we find some villagers collecting water from holes which have been dug in the dried-up bed of a river. Within three miles of one particular location the Black Volta River is flowing. There is a considerable quantity of water flowing in this

region which isn't being utilized at all. There's no farming done, there's no irrigation done on the basis of this river. What we're interested in doing there is installing a windmill for irrigation as a pilot project to see whether this is feasible, whether we can encourage the local people to do some dry season farming using water pumped from the river.

I purposely kept my description of our work as short as I can. I've cut out quite a lot of what I wanted to say in the interest of conserving time for discussion. I shall, of course, be happy to answer any questions about our work.

DISCUSSION SESSION

Paul Lofthouse presiding

(Question from the Audience)

Rufino Ignacio:

I am sorry that my good friend from Ife was confused about the spectrum of projects that we are in. Actually, in the horizon of five years, we expect to limit our activities to the five areas mentioned: ceramics, brassware, coconut charcoaling and drying, low-cost housing technology, and the prawn industry. We may possibly go into some limited activities on simple machinery using junk vehicle parts.

I also have a comment on the low-cost housing program. This whole package of technology, from the soil cement block to the bamboo to the system of construction, is being bought from us by the mayor of Marawi City. But we thought that with his record of being an entrepreneur par excellence, he might get all the business by himself, so we thought of coming up with this self-help project at the present time. We are trying to circulate the technology and will try to teach as many people as possible how to do it because if they can supply the labor in the construction, so much more savings would be effected. The experiment is on-going; we are not stopping at soil cement. We are experimenting with other materials. In fact, we have a joint project with AID which has something to do with low-cost roofing.

Paul Lofthouse:

I think that it would be extremely useful if we could somehow, during the course of the conference, arrange that there would be close liaison so that people around the world could see what other people are doing and not have to reinvent the wheel for themselves every time. Another question that has been asked is, how does one acquire hardware? Well, again, I think the Group can help because we have this advisory service, and we are helping constantly about 250 people a year on the identification of the right sort of hardware, if it is available in the Western world. From the point of view of the items that are

developed by the group here, we would be very happy, indeed, if we could have articles on these that can be printed in the Journal of Appropriate Technology. That Journal is now having fairly wide circulation. I think this is the third issue that's come out, and the circulation is going up by leaps and bounds. This would possibly be one way of advising other people of what is going on in other parts of the world.

Joe Stepanek:

The particular question you were asking yesterday, if I recall, was not whether the university could stimulate entrepreneurs, but whether the university could become an entrepreneur and operate pilot factories. Now, I don't think the university over a long period can do either, but of course, it's much easier to stimulate entrepreneurs than to become one. But if you want to do either, you're going to have to become pretty entrepreneurial yourself. And you cannot retain the staff that you urgently require under a university atmosphere, because university professors, if they're good professors, are not entrepreneurial, and they're willing to pay an economic price for the freedom to do what they want to do rather than to get out into the commercial world. So the first problem is one of remuneration. You just can't do it in a university.

Paul Lofthouse:

John, would you like to comment on universities becoming entrepreneurs?

J. W. Powell:

I think there are a number of advantages. It's necessary to actually do the job ourselves. Maybe later, when we have more experience, we can do this sort of work and gain this sort of information from economic studies, but to a very large extent at the moment the basic statistical information isn't available. We actually have to make the product, cost it, find out if there is a market, match the quality of the product to the market needs and so on. Also, the operating production unit enables us to train staff under realistic conditions. One of the important factors is the cost of labor, and very often we don't know whether an operation is viable until we try it. We don't know whether the technology is right--we don't know whether we can get our costs right until we actually do it. The production unit enables us to take people in, train them, evaluate their performance and then reassess the situation on the basis of our experience. Another advantage is that our consultants who are managing these projects become, in a sense, entrepreneurs. They become responsible for the success or failure of those projects. They start to accept personal responsibility, and their advice to entrepreneurs is more meaningful as a result. They appreciate more the problems the entrepreneur faces and the risk element that is involved. And finally, of course, when we have these production units in operation we can demonstrate them not only to the entrepreneur himself but also to his financier. We find that this is most useful. The bank isn't being asked to finance a paper plant, but we take him

along. We say, "This is what is happening, this is the product, this is the equipment that the entrepreneur needs in order to make it, and he just needs money to buy this." Now, when people come to us and they want to make soap, we can show them a soap plant in operation, a caustic soda plant in operation. We can take them into our own operation for a few months and train them in every aspect of the operation. Then they can go to the bank, with all the costs worked out from our experience at operating this plant under commercial conditions, and present a case to the bank which is much more realistic; much more meaningful than we believe a feasibility study would be in the conventional sense.

We have a large number of production units on the campus at Kumasi. I only mention the ones that the Technology Consultancy Centre has direct responsibility for managing. There are others. We have a ceramics production unit, similar to the one I described earlier today, which is making a very good quality tableware--coffee sets and tea sets and dinner service. We have a low-cost building material production unit making landcrete blocks; soil cement blocks. They are also making cast concrete sanitary ware for low-cost housing--kitchen sinks, water closet bowls--very simple basic things like this. And it's operating profitably and has been doing so for some years. And entrepreneurs have been encouraged to take up this operation. We manufacture traffic lights for the city of Kumasi and the city of Cape Coast. We are making well pumps for installation in the villages. We are beginning to install an electroplating unit which will offer services to local industry, and we hope to eventually be able to supply component parts to the assembly plants in Ghana which make motorcycles, bicycles and motor vehicles. So all these operations, we feel, are useful in giving us the all-round experience of commercial operations in the country. We don't know how we could gain this experience and information by any other means.

Yeo Gyeong Yun:

Because KIST is a research organization, perhaps the problem we are talking about in regard to a university's activities in the commercial field may not be exactly the same as what we are facing in KIST. However, KIST was originally funded by public government funds, the same as most of the universities we've been talking about. So in that respect, maybe we have some obligation to this society. Maybe in that respect we are in the same boat. So, that's why I was thinking maybe I should mention this from our experience. First of all, I do not believe we can generalize that a university can or cannot be involved in commercial activities because it all depends on the level of the community's capability of doing for itself. The level of the economy of that society and many other social, as well as economic, factors should be considered before we decide what we should do. And in the case of KIST in Korea, we had a similar problem. First, suppose we develop a new technology and in trying to sell this idea to local entrepreneurs, they say, "If this is such a good idea, why don't you do it yourself? And if it is successful, then I will try it. Even if I will have to pay a premium for it later on, I will buy it later. I'd like to see how you do it because the idea is so new I don't want to take a chance on it." Then what? Should we wait until some other

brave man comes along to take up this project or should we do it ourselves? This kind of problem arises. This kind of problem was the reason why before World War II in Japan they organized the Physical and Chemical Research Institute. Anyway, to make my comment short, finally KIST decided to go ahead and go into the business. But, as we have pointed out here, the activities of research and development and going into commercial enterprises are two entirely different things. Also, in the management system, capital and management should be separated. So, what we did was funded by KIST by a separate organization whereby the separate entrepreneur management will run the independent, profit oriented company just like any other corporation. It will get its know-how from KIST, buying it, of course, paying for it and going into the business. And if it is successful, we are ready to sell it.

However, there are some constraints. That is because the basic principle of KIST is such that we have to improve the Korean economy in general. Also, we have to avoid competition with the local manufacturers. We have to consider these constraints very seriously. So what we have come to is a basic philosophy such that we are not going into the business of garment-making, but we may go into the making of fibers which could be a substitute. Basically, we are not going into a consumer product but are mainly concerned with industrial customers. In other words, supplying the raw material to a local industry. We will try to find some field where we can avoid the local competition as much as we can, and I am sure that you will have the same problem in the future when you start building pilot plants.

The plant will have a product and perhaps by-products. What are you going to do with those products? You have to sell them. Who is going to sell it? And what about the tax problem, since universities are normally non-profit-making and you have some privilege of tax? Who is going to pay the tax? Suppose you pay that tax; then how about the auditing problem? That kind of problem is arising, and that's why, as you pointed out, separate entities could be the solution. And that's why KIST has organized this new corporation. But we think it is going to work because we have a unique situation or peculiar condition in Korea. But that doesn't necessarily mean it will work in other areas; maybe or maybe not; it all depends.

Joe Stepanek:

I'm worried on another aspect. I certainly reinforce what Dr. Yun has said about competing with your customers if you run factories. But there exists in Accra very public-spirited Ghanaian managers whom I met five years ago. Would it not be practical to lure them, rather than trying to reinvent management within the same country? Why not build on management skills that have already been developed at either the School of Management, the Administrative Staff College--which is doing extremely well in Accra--or the Technical Training Institute which has been feeding managers into industry? The skills exist not many hundreds of miles from you.

J. W. Powell:

I'm not quite sure what your question is.

Joe Stepanek:

Well, I worry a little about starting over when the pioneering has already been done for 20 years in Accra. My point is that you said that you had to run factories to train people to be consultants to other factories. That skill exists within Ghana already, at least enough to give you a nucleus start.

J. W. Powell:

No, what I said was related to the problem yesterday when someone asked, "How can you advise entrepreneurs without entrepreneurial experience of your own?" I'm saying that the academic consultants who work through the Technology Consultancy Centre can gain some insight into the problems of the entrepreneur through the operation of production units, and that this was one of their advantages.

Joe Stepanek:

My point is that they already exist though.

J. W. Powell:

Well, what already exists? You see, the products that you're mentioning aren't on the staff of the University of Science and Technology. Well, one of the things we do, which I think is closely related to what you're suggesting, is that we have now built up a body of entrepreneurs whom we have assisted in one way or another, and some of these people are very experienced in certain industries, in certain aspects of industries; for example, marketing and availability of raw materials. These are two areas which we often need help and advice on. Now, we work very closely with these entrepreneurs. They assist with our projects, and also they assist other entrepreneurs who are new boys to the game and come to us for advice. We often say, "Well, this is a problem that Mr. So-and-So has encountered, and he's had a lot of experience in this area. Why not go and talk to him?" We find this works very well, that we have established a network between old entrepreneurs and new entrepreneurs.

O. A. Oguntoye:

Among all of us here there is nobody that represents a department. Either you are representing a center, a unit, or so on; but all these units or centers are based in universities. You see, the problem which we will face if we are upset with our representing department is the problem which our friend from Korea presented. Universities have certain functions; they have certain ways of performance, and you cannot deviate very much from them. But, in order to be more effective, that is why we have these practical or applied-oriented units. I think we have to be very careful when we are talking of the difference between being faculty members and members of these units. As members of these units, I see all of us as consultants. We are all more or less practically oriented. There is none of us in the units doing any basic research; some

of us do go back into the department to test our teaching. But in the units or centers in which we are working we are doing a practical job, and here I think the comments of our friend from KIST are very important.

I hope that no unit or center will get itself into business. Pilot schemes are very good! Then let them take it away from you. Develop projects and get other people to manufacture them. It really is not necessary to set up all production units as a pilot scheme for others to see. But at least get it out of your hands as soon as you can. Otherwise, you are going to get into major problems, and you are going to cause your university great headaches. Should a university compete with those who are paying for that university? Immediately you get economic interest. People say, "Why should they come and take our jobs? We are supposed to be doing this. After all, we have funded the university!"

I will give you an example of what happens. Some private consultants were trying to get some job from the Ministry. Well, the Ministry gave the job to us, but the private consultants were not happy; they went up to the governor and were complaining that the university is taking the job, and they have to pay the tax. But we told them, "We compete; it's not the university competing with you. It's the unit that competed with you, and we have an advantage that we can use the resulting training. We are going to use our own people, our students; and their parents pay tax also, and we as citizens pay tax." So, this is an idea of the sort of problem we are going to face apart from the question of who is going to provide the capital. If it is provided by the government, how do you then account for the profit?

I think all those are problems that will be involved in it; problems in which I don't think we should get involved. Personally, I believe it is good to develop pilot schemes, as they are doing in Ghana. I think it is good, really. I am very much interested in Ghana's approaches because in the Department of Electronics and Electrical Engineering, as we mentioned yesterday, our people are also developing such prototypes. But we are not going the way you are going--establishing real production units--simply because of these problems which have been mentioned. I can just imagine why the government of Ghana is afraid to start giving you funds. If they give you the funds now, you go and use it in building the units; and you can't sell that unit, or it takes two or three years to get somebody to take the unit from you. Then you are going to ask the government for two or three years to keep on giving you money for something else.

You see, I think we also must be very careful about all these problems, especially when we are thinking about our university orientation. I will give you an example of another case which we have got, and that's why the case of the Philippines was very, very interesting. The World Bank people came to us in Nigeria and talked of having a National Institute for Small Industry located at our own university. Well, the governor started by saying, "Look, what would be the relationship of that Institute toward the University Council? Who is going to control that place, the Ministry or the University?" You see, they started with some problems. So, they are not going to put the National Institute in the University. And that's why I was very much interested in the

Philippine situation. But I know that there in the Philippines, maybe the University is not controlling you; it is the Ministry that is controlling you. I don't know, but I have the feeling that they will not allow you to operate as a University institution, but you have to operate under the guidance of the Ministry. I don't know, maybe you can tell us. But I know that you have that problem.

(Question from the Audience:)

Mr. Chairman, mine is a little question, directed to Dr. Powell. I was a little bit worried when he said that the government of Ghana refused to provide them with funds and that quite a substantial sum of money to run their unit comes from overseas. I wonder why this is so. The question is what relationship has your unit with the government insofar as the Ghanaian Government's overall policy for the development of small-scale industry?

J. W. Powell:

The problem in Ghana is that they have been trying to reduce the budgets of the three universities in the country. I think it's true to say, and not unfair to say, that they felt that perhaps too much was being spent in this direction and other areas, vital areas, were tending to be neglected. And I think essentially our problems stem from this. We've been trying to demonstrate to the government, and we've had some success in recent months, that our activity is rather separate from the educational function of the university. The government of Ghana is interested in developing small-scale industries. We recently had a visit from the Council of Higher Education, which is the body which advises government on university affairs. This body is now advising government that we are doing a useful job of work in the Technology Consultancy Centre, and we are quite hopeful that we will be supported in the future. We feel that our activities are very much in accord with government policy. I did mention that the soap plant is financed by the government and was a response by the university and the Soap Makers Association to a government initiative to create a cooperative of indigenous soap makers in the country.

Manuel Alba:

It's not, maybe, a question but maybe the general raising of an issue in an attempt to make my own headway in terms of the various questions and points raised here. At this point I find it difficult to generalize whether universities should operate commercial enterprises or not. The concept of a university operating business enterprises is not new. Traditionally, universities have long operated auxiliary enterprises. Food processing, hospitals, hotels and restaurants, furniture making, testing chemicals, cafeterias--these are enterprises that have the dimensions of real-world entrepreneurial or commercial enterprises, except that in the traditional concept of the university these are training institutions. And I think this is still the persuasive concept of what the university should be. On the other hand, the concept becomes fuzzy in the case of Mindanao State University. As a matter of fact, in the case of non-metropolitan state universities the concept of an academic institution traditionally bound to undertake only academic programs becomes a bit difficult

to appreciate, primarily because, in the situation of developing countries, non-metropolitan areas are devoid of any institutions that can do the work. As a matter of fact, it has been officialized in a number of cases by national planners in search of pioneering industries that some institutions have been cited to undertake the job. And necessarily, where private enterprise is afraid to come in, government agencies come in to start the work; to trailblaze in effect. And after the pioneer enterprise is considered to be an ongoing basis, the policy of turning this over to private enterprise also has been adopted. In some areas it is difficult to pinpoint a government agency, except the university, that can do this.

So, I think the fundamental question is: Yes, the universities can undertake enterprises, but up to what stage should they carry the effort? One could define here the threshold or transitional point where the effort moves away from a pioneering venture into a true commercial stage. And perhaps there is a compromise approach in the sense that what you may consider as a profit-making enterprise is really still an operation that borders on the pioneering-developmental stage that Dr. Powell mentioned. The problem really is, in the long run, that there must be other institutions that eventually will take over the commercialization of the pilot efforts started at the university. Now, this is where the real entrepreneurial talent comes in, because I think it's the entrepreneurial initiative that should take the project which the university has pioneered into the commercialization stage. And here is where I see the absence of the appropriate enterprises or institutions that can carry the ball.

Dr. Powell mentions the question of labeling; whether people who come into your institution are considered operational staff members or are they there as interns or are they as trainees? It doesn't make any difference to me. The idea is that they are in the university to learn the basics of some techno-economic operation with which, after they depart from the university, they could start off their own entrepreneurial enterprises. This is one way I think we can attempt to bridge the pioneering function of the university in some non-academic areas into what we would call the entrepreneurial initiative; to start off the takeover of a commercial enterprise. I think if institutions and policy makers recognize this, they can much more clearly identify the role of governmental agencies, such as the financing institutions, the training institutions, and the extension service institutions. It is fascinating to note, for instance, that the concept which we have been talking about is really universal; it's the same except that we are confused by the differences in labels. You call it consultancy center, we call it adaptive technology center; you call it industrial development research center, but basically they're all the same. The extent of the differences are in the matter of the unique, special environmental situations, really, and the political administrative differences in government. Even within our own RATIC network, for instance, the three universities are really different in many respects in terms of the administrative styles, but they are concerned about the same things. So, Mindanao State University appears to be a special case; the government is telling it not just to perform academic functions; it's telling Mindanao State University, "You be the developmental agency in the area." I suppose MSU is having a tough time interpreting what this mandate means; in this case here I suggest at times you have such a thing as institutional schizophrenia!

Rufino Ignacio:

Actually, what I'm trying to do is to rationalize the new mandate that is given to us. There is this presidential decree that was passed amending our charter and part of this, the principal part actually, is for us to be able to invest some of our resources to some income-producing ventures. So, we have invested a big chunk of money in this hotel. We wanted to bring in people, and there's no place to stay. So there's this private entrepreneur, a millionaire, in the University pulling the resources together to come up with the hotel right on the campus. We also have this immediate problem of selling our fry; we have this shrimp project. It is now capable of producing shrimp fry in commercial quantities, and this could net us a big amount of money. Some people are telling us to sell the technology to some private entrepreneur; but we thought, we have this mandate, and if we can do this, why not? If we can get an extra amount of money from the sale of fry, then we can use this money for some other projects in the University. There are two schools of thought.

Joe Stepanek:

You have the KIST model. When KIST wanted to be commercial, they spun-off a wholly-owned subsidiary. You should go back to Manila and insist with the government that, yes, the University will do it, but we need a spin-off development corporation, wholly-owned by the University, but run on different principles. Then you'll be off and running without all of these problems we've been hearing about that would reflect on the University.

Rufino Ignacio:

But the thing is, we are starting to like it, you know!

Joe Stepanek:

A case of the tail wagging the dog, I can see!

Ross Hammond:

I think sometimes in worrying about relationships we fail to consider that we are trying to achieve some results. If in Ghana nobody else is doing the sort of things that the University is doing, I say more power to them. Let them continue until somebody else gets into the act. We'll take and fill the vacuum.

Paul Lofthouse:

Could there not also be quite a considerable advantage to the students in the universities? In England a lot of the universities are approaching us regularly asking for student projects of a very practical nature to reinforce their academic studies. And BFC and PhD students are now taking up development projects with a practical result. Now, having a development unit within the university, although I would agree largely separately controlled

with separate management, does bring the real world to the students. I have the feeling that the students themselves probably will gain from it considerably during their academic career.

George Morelos, translating the remarks of Jose Muller:

That was quite a bit to digest in this time; it will be very difficult to do justice.

Mr. Muller feels that the minor problems of university participation are relative to the cultural and socio-economic standing of the country where the university resides. In the case of Brazil, an advanced country in many ways but with certain areas being very underdeveloped, this function is not translated in terms of the cottage industries because that's been satisfied. But, maybe the research is aimed at developing special resources of the area; an indigenous resource that needs to be exploited. And they go ahead and develop the techniques and the technology; whereas, in a lesser developed country you have to start with the cottage type of technology. He said that the problem of the role of the university in that sense, the minute aspects of it, are relative, and they can be solved. However, he felt that any university has an obligation of innovation, because it's through innovation that you get knowledge, and it's through knowledge that you get science. And if you don't get science, then you no longer perform a function as a university. So, he feels that this innovative process should be accomplished one way or another, whether participating directly or not. If you happen to be a university, he feels, there is a certain obligation to participate in this process whether it be directly or indirectly. You just have to find a formula which is adapted to your particular environment.

Seyeul Kim:

I've been quiet so far. I think in many respects the direct participation of the educational institution like a university in a practical operation of enterprises is very dangerous. Suppose you are asked by a certain enterprise to get some advice from your practical experience by learning the enterprise. Well, say, for example, that the enterprise is a paper factory; then you have to establish a paper factory. There is another enterprise. They are asking you some advice; are you going to establish another factory, I mean a modern factory? You couldn't do it! So I think, in many respects, it's very dangerous to have a practical enterprise directly run by the university. Thank you.

J. W. Powell:

I think that you may have misunderstood our aim. Where we can work with an entrepreneur, we do. If an entrepreneur already has a business or he wants to start a business, as in the case of the paper glue, we do it for him at his establishment. But if we want to generate a new industry, where there isn't this possibility of doing it off the campus, then we resort to doing it on the campus. What I'm saying is, we first explore the possibility of undertaking this operation off the campus and for the entrepreneur. And only

when this avenue presents difficulties do we actually set up the production unit on the campus itself. There is one other point I would like to mention. I think many of us in the appropriate technology or in the immediate technology field feel that in many ways the work we do is innovative. In every case the problem probably hasn't been solved within that environment with that particular set of conditions and difficulties. I think many people are prevented from coming into the area of appropriate technology because they feel that there isn't scope for invention and innovation, and this need not necessarily be so. In the case of the paper glue, for example, it was possible to have the formula patented because it turned out that this glue was a low viscosity glue and had certain unique properties that weren't generally found in glues of this type. I think there are some novel features in our small-scale soap plant. So, it is possible to have a degree of innovation in intermediate technology, and it is possible, as Mr. Lofthouse says, to have some research projects integrated into this development work.

A. O. Lewis:

I just have one or two questions for Dr. Powell. In his presentation he made mention of the fact that in Ghana finance was not the critical problem; rather, the critical problem was in the shortage of entrepreneurial talent. Now, are you saying that, in terms of the availability of investment capital in Ghana and in terms of the availability of investment opportunities, there are not enough Ghanaian indigenous businessmen coming forward to exploit these opportunities? And if this is so, what could be responsible? Could it be that the socio-economic climate or political environment makes it difficult for indigenous entrepreneurs to develop? You see, I'm raising this point because ten or twenty years ago in Nigeria the same point was also being made; that there was a shortage of indigenous entrepreneurs. Then a more detailed study did show that, in fact, what was responsible for the shortage was that the environment did make it impossible for indigenous entrepreneurs to rise up to exploit whatever opportunities there were. For instance, I will give you one example. At that time, ten years or so ago, the commercial banking in Nigeria was controlled by expatriate bankers. And studies have shown that these bankers did make it difficult for indigenous businessmen to raise enough funds to finance whatever business enterprises they wanted to finance. If one knew what could be responsible for the shortage, probably it would be easy to take measures to redress the shortage.

The second question which I want to ask you is, what exactly is the Ghanaian government doing about this shortage of indigenous entrepreneurs in Ghana?

J. W. Powell:

I'm very pleased to hear that the situation has improved in Nigeria, and I think that in many ways the experience of Ghana is following along behind Nigeria; hopefully following a similar pattern of evolution. We have not been able to identify the reasons why there is an apparent shortage of entrepreneurs. There does seem to be plenty of capital available for development. After all, the amount of capital you need is related to the number of projects which you're capable of starting. If the projects that you're capable of starting

will not absorb all the capital that's available, even though that capital may seem to be small, it's adequate. And this seems to be the situation in Ghana. For example, I came across a village in the north of Ghana which had a credit union with 200,000 cidas sitting idle at the bank. And the Catholic priest in this village said to me, "What industries could we start to utilize this money?" There is plenty of money available and people aren't generally using it. It's not true to say that the expatriate banks are preventing development, at least not in my experience. For example, it was an expatriate bank, Barclay's Bank, which financed the paper glue development. They gave the man an overdraft of seven thousand cidas in order to get the paper glue project off the ground. You might say that it was a very good risk on their part because it was paid back within 12 months, and the man has had a very substantial credit balance from that time forward. Nevertheless, the money was made available, in this particular case, by an expatriate bank. One of the things that has come to mind, and I would like to hear your comments in turn on this, is that the extended family system may be retarding individual enterprise in two ways. First, the man has less incentive to make his own way because he's supported by the family. And second, when he does manage to make progress materially, his benefits are spread very widely throughout his extended family in a sense that there's not quite so much in it for him. But that's only one factor and I think there must be many others.

A. O. Lewis:

I would like to make two points. The first one is about the role of commercial banks in the development of underdeveloped countries. You've given one example of the commercial banks in Ghana financing a particular glue project; probably this would be just one isolated example.

J. W. Powell:

It isn't, actually. I have a number of other examples.

A. O. Lewis:

In Nigeria the Nigerian Federal Government decided that about 40 percent of the shares in all the commercial banks in Nigeria should be taken over by the government. Apart from this, there is a decree to the effect that a certain percentage of all your commercial loans must be given to indigenous enterprises. This is very important, because what you find is that you can't get a loan unless you can provide adequate securities--and if you've got adequate securities, maybe you won't have to go to the banks in the first place. This is one instance we found in Nigeria; that without the government control over commercial banking in that country, it would be difficult for that country to take off because commercial banking is the oil that lubricates the machinery of the economic system. If you don't provide the oil in adequate doses, that economy cannot function properly. So this is why it is not enough to say that there is a shortage of indigenous entrepreneurs. One must try to find out what is responsible for this.

And you raised one other question regarding the role of the extended family system. Well, you know, the extended family system is not confined to family bonds. You see, the very fact that you feel that you have a responsibility to the members of your immediate family can act as an incentive for you to want to achieve more. You find in Nigeria that many of these successful businessmen, either in agriculture, or commerce or industry, have come from extended families. And apart from this, when you have this extended family system, if you want to set up a business, you can always call on these members of the extended family system to contribute. I think the tables I gave yesterday showed that many of the small-scale industries in Nigeria got their loans from their own savings and from the savings of their friends and relatives; that is, members of the extended family system; not from a bank. I don't know much about the studies that are being done in Ghana, but in Nigeria I know this; there are adequate studies to show that if you can improve the environment within which indigenous entrepreneurs can develop, there's no problem at all.

Cornelius Otiteh:

Finance, he said, is not a problem, but it could be a very important problem. I am a member of the National Advisory Committee for Small Industry Development in Nigeria. All the banks were asked to give loans. They said that they would charge 10 percent interest. The government agreed, and the government was prepared to guarantee the loans given to small industrialists. Now I should think if the banks should lose that money, the government should pay it back. Naturally, the government decided then to give the loans to the small industrialists at the subsidized rate of interest, but that has nothing to do with the banks. The banks agreed to sign an agreement with us. Then the management committee will meet, decide on giving 20 preferred loans and the bank will decide to give one. And yet, in the evolution of the loans, the bank manager was with the committee to make the decisions for 20 applicants. At the end, he is going to give one, and not because the money is not there. They have the money there, so I think you have not answered the question. What is the Ghanaian Government doing to create the environment or to develop the entrepreneurship which you said is absent?

J. W. Powell:

I would like to say that we have never taken a man to a commercial bank and had him refused the financing that he needed. That's the first point I would like to make. I would agree that the banks have much more money than they can invest. The Barclay's Bank and the Standard Bank in Ghana have a lot of money, and they're looking for suitable investments for it. There are also a number of government loan schemes--small business loan schemes--in Ghana which are intended to stimulate small-scale businesses in the country. We have, in fact, supported a number of applications on behalf of our clients to the small business loan scheme and, to my knowledge, we have never had one granted. So, there is rather a contrast between our experience with the commercial banks and with the government schemes, but I think many people go to the government loan scheme without recourse to the Technology Consultancy Centre. They are assisted by such organizations as the Ghana Business Bureau

and its subsidiary, the Management Development and Productivity Institute, which is a very useful organization in carrying out feasibility studies on behalf of entrepreneurs who want to establish new industries or extend their existing operations.

Paul Lofthouse:

I really think that subject has gone just about far enough. I believe you have a question about another subject.

Georgia Morelos translating for Jose Muller:

The question posed here relates to assisting the small industries. There is interest on the part of Brazil to learn from other experience concerning the strategic factors that affect the composition of your small industrialists. In the case of Brazil, we found that a large percentage of the small industrialists are marginal in nature. Perhaps because of the rapid economic growth of the country there is a tremendous demand for most products that are being produced. In fact, we found in our feasibility work that the market study--the market part of the feasibility study--is the least important. The market exists there; you have 105 million people and enough money in the market, and money is no problem. I mention this because this probably does not concur with Ghana or maybe a smaller country such as Ecuador. We find that a lot of the small industrialists we've assisted are marginal, and not necessarily in the short-run.

What other characteristics are there? One, there are no quality requirements for the products they are making. In other words, whatever they put out, they can sell. The demand is such that they can practically push anything on the market because of the lack of standards in the country or simply because the components they are providing are such a minor part of the whole that they are not that important. Two, we find that these small industrialists survive because they evade taxes; they do not pay taxes. They have three sets of books or no sets of books at all. Third, and perhaps most important, they abuse their employees to a very large extent. They do not pay minimum salaries, even though the country might have a minimum salary. So, all those are a matter of production costs. These firms have a definite advantage. Should these rural industries go into a major metropolitan area, they couldn't survive.

Another thing that we realize is that there are two points that seem to be in a collision course. I think we have been confusing the words "entrepreneur" and "manager" as being the same, which is not necessarily the case. In fact, it is rare when you find someone who is both. Then I think you have a higher probability for that small industrialist either to continue surviving or to grow into a larger enterprise. Another characteristic of these urban peoples is, of course, there are different types of entrepreneurs. Too, we are over-simplifying by saying that person exists. His ability to assume risk varies, and we find its crudest form is in the Horatio Alger form, who is a crude capitalist. He is very monopolistic, is very little and abuses the factors of production to a large extent.

All development institutions have short-run pressures. We've got to show results, so obviously you can show short-term results; but we know that if some of these five variables I mentioned change a little bit, that guy is not going to exist tomorrow. Now, do you find similar situations with the people you are assisting? Do you have that situation when you have a percentage of marginal, medium or small-size industrialists who, as soon as the economy or some of the things change, are not going to survive anymore? And if you do find it, what do you do about it?

Youn Bae Ouh:

It seems to me that in Korea one of the most serious problems facing small industries is access to financial sources; not only commercial banks, but also other private loan sources. As far as my own experience is concerned, I was born in a family of entrepreneurs--three generations--and I have knowledge sufficient enough to know about the situation in Korea where my elder brothers and father have been engaged in small industries and enterprises for over three decades. Most of our family members were joined in the businesses so we didn't have to worry about labor costs at all. In other words, the extended family system gets our businesses started at the outset. Later on, we just freed ourselves from the front line activities by hiring somebody else to come in and take over our roles. Look at the Chinese restaurants running in the United States. Most of them are families; the cooks are the uncles, the waiters are the cousins. They don't have to worry about labor cost problems! In other words, the extended family system would be of great help for the new businesses, as far as financial sources are concerned, because each member of the family may contribute to it with his small amount of money which he has accumulated through savings or whatever the sources may be.

Now, back to the university role and attempts to set up commercial enterprises. I would say that as far as we are concerned in Soong Jun University, we have never dared to think of that kind of enterprise so far. But, many of the Korean universities are running hospitals as an integral part of the total education system. They are now running into serious financial difficulties simply because they have large-scale organizations. To maintain that large-scale organization, they have got to have a certain number of patients regularly. In other words, they have to reduce the cost of medical care lower than the private doctors, who in turn are also running into serious problems because of the university businesses. Well, Dr. Yun pointed out that KIST has now decided to run the business simply because nobody liked to come in to take over these various ideas. Why? I thought people liked to take this chance and were all for running their own business! In the time of economic depression, as you might say, the chance of success is drastically reduced. If the nation's business increases rapidly, the chance of success is increased accordingly; then private banks or anybody else who has the money like to join in as entrepreneurs. This all depends on the general circumstances of the nation's economy.

A. O. Oguntoye:

I would just like to make some comment on the speaker before the last. Rarely, except in India, do I find an experience of a small industrialist running three or four books. In Nigeria, I can tell you that the most successful businessman, including his factories, pays the least tax. So, it's not only a question of small industrialists who try to evade tax. All those who are rich in Nigeria try as much as possible not to pay tax. The people who pay tax are like ourselves, who are not in business. So, that is not a characteristic of small industrialists alone. It is a fact that small industry is a fragile industry, simply because of the level on which the man is operating. And that's why we are all trying to help him. I don't believe, for one thing, that in small industry you can have a small industrialist who is an entrepreneur and is not a good manager--he is going to fail. This combines the two together. He may not have any formal training, but once he goes into the business he's already a manager; he is a salesman; he is doing everything to make a success. One man whom I have talked with about 20 miles from Ile Ife said, "Look, I started with only 50¢, equivalent, and 35 out of that 50 was borrowed." And today he is one of the richest men in the city. You see, not only is he taking a risk, but he has to work 24 hours. He worked hard and built up a business, and you say he is not a manager? I don't know a manager who cannot organize himself and try to get something. Therefore, I believe that in small industry the small industrialist is not only an entrepreneur; he is a manager! Unless he can manage he will never get on.

Then, secondly, as far as what we have just said; that small industry uses a lot of unpaid labor. His own labor is not paid for; he works overtime; he does not pay himself. He does not pay his wife. He tries to pay the minimum wage, but this is characteristic of small industry. In industrial development how do you accumulate capital? You must exploit somebody else. Somebody must work for you. Look, I think we must not be sentimental about this thing. They pay small wages, but in the future they will be able to pay better as they grow.

J. W. Powell:

The first point is about the fact that any quality will do in the market of the developing countries. We felt this at first, but our experience has been quite reverse. The market is very conservative. They say in Ghana that you can't sell any motorcar except a Mercedes, and this really describes the situation. For example, when we manufacture soap we are competing with the Lever Brothers' product, the Key Soap. Some small soap-makers actually put a key on the bar of soap that they sell, and although the quality of that soap is very inferior to the soap that we are making, it will always sell on the market before our soap. We can't put a key on our soap. We have to use another symbol, but the small entrepreneur can do this, you see, and get away with it for a time.

But the other factors you mentioned I would agree with. They generally don't keep any books of accounts. They do exploit their employees, and so on. To some extent they are vulnerable to changes in the market situation. For

example, if the established manufacturer increases his production so that he can flood the market, then the indigenous manufacturers are in a very difficult situation because of this conservative market situation. Just to answer one of the other points raised by a contributor about the difficulty in managing very large commercial enterprises, I would agree. The University of Science and Technology certainly doesn't have any plans at the moment to operate large-scale production units, and we rather hope that before our projects grow large, they will be transferred to the private sector--taken over by entrepreneurs, groups of entrepreneurs, partnerships, maybe by cooperatives in some cases. The university has no plans to be a manufacturer on the large-scale in the long term.

George Morelos:

Just two points that, perhaps, are sort of a case of exception. In the case of this country, according to the Small Business Administration, something like 90 percent, a very high rate, is the mortality rate among new business in this country. And the major cause is the lack of managerial talent. I would think that the type of person you're talking about is whom we call a Horatio Alger type. If you take that man out of Nigeria and put him in the United States, he would also become a millionaire. He is just one of the very talented individuals. From my personal experience I find that as long as the business is very small he can manage efficiently. But the moment he starts growing the man is not able to handle the business anymore. He goes into dept, he doesn't depreciate his equipment, he never considers his personal labor as being a cost, and so on. In fact, you find in many cases he'd be much better going off to a big city and working to make more money rather than having the trouble of supporting the 50 or 60 families he is providing employment for. Perhaps in terms of development I think the motivational causes in generations to create an entrepreneurial class are pretty much of a black box. Still, the one thing we can definitely do is help improve the managerial talents of these persons, both technically and in an administrative way. And again, in the case of Brazil, we find that the strong aspects of the small business entrepreneur in Brazil is that he is a good technical man, but he lacks managerial talent, so we are heavy on that part.

Seyeul Kim:

I would like to ask a small question to Dr. Powell from Ghana. I understand you mentioned about a pilot plant on a cooperative basis. Isn't that right? What kind of cooperative of small-scale industry do they run there? Would you please explain in more detail--production and marketing; anything else?

J. W. Powell:

The original government concept was to encourage small-scale soap manufacturing, the cottage industry people--the people who make soap in the 50-gallon oil drums in their back yard--to form cooperatives for marketing and also for bulk purchase of their raw materials--notably palm oil, caustic soda, and a few other things.

The group that approached the University is also intending to manufacture cooperatively. Now in Ghana the government has established what is known as the Department of Co-ops, and any group of people with common interests can form themselves into a cooperative. They have to obey the rules layed down by the Department of Co-ops. They have to become registered. They have to keep books in accordance with the procedures which are laid down by the Department of Cooperatives. And I don't know these rules and regulations in detail, but I know that the government has established these because in the past there were a number of cases of cooperatives that were not well-run, and the secretary or the treasurer ran off with the funds and so on. Now they are properly constituted and can be controlled.

Seyeul Kim:

The reason I am asking this specific question is, don't they have any difficulty in the division of profits or the shares or something like that?

J. W. Powell:

Well, there again, you see, they formally plan for the distribution of profits. As I say, I don't know the exact details of how the profits are distributed, but I do know that a certain amount of the profit has to be reinvested in the industry; the partners can't take everything out and allow the business to collapse. Of course, there are rules and regulations which apply to winding up the cooperative if all the members decide they want to finish, and there are rules which govern individual members leaving the cooperative and new members joining the cooperative.

Seyeul Kim:

When you set up a small production unit, such as on a campus, and you have shown it to have potential, now at what price are you going to sell this plant to the indigenous entrepreneur who wants to buy your production unit?

J. W. Powell:

So far what we have done is sold new plants to entrepreneurs, and we just say the cost is this much. If you want it that's what it will cost to build it. If you want us to train your people we normally provide that free of charge. But if you want us to loan you technicians to operate the plant during the commission period and so on, then we make a charge for this. If someone wants to take over an entire project as it exists--the hardware, employees, everything--then the University negotiates with them individually, as we are negotiating with one person over the possible purchase of this soap plant. I don't think it will be sold by the University, incidentally, but someone has applied to purchase it from the University and has opened negotiations.

Seyeul Kim:

It is purely an assumption, but in certain cases the University itself may be running in the red. On the other hand, the industries you are running on the campus are making a profit. Then certainly are you not willing to sell these plants to indigenous managers? What about that situation?

J. W. Powell:

I must say that there are some problems that must be resolved, but there is a lot of interest among those who want to stop the University from retaining some interest in these programs. But this wouldn't be 100 percent interest; maybe 50 percent. Some formula will have to be devised in each specific case. Clearly, the University will want to enhance its income so that it can spend more money on research and development. In the case of the glue manufacturer, he is able to supply the critical match we need. We made one plant that we transferred to him, and we finished.

Paul Lofthouse:

Yes, I was thinking of the soap one.

J. W. Powell:

In the case of soap, the idea was that small plants were to be situated in the various regions of Ghana to supply the local needs. And until a sufficient number of these plants are established, we feel we can still go on with our own plant, training operators and developing the product and the process. But certainly when we feel that the national need is being met the University wouldn't continue operating its own prototype. The need in Ghana is 70,000 tons per annum, of which Lever Brothers produce 38,000 tons per annum, so about half the national need could be met by other manufacturers. And so we have to build a lot of these small plants producing 300 tons per year, which is the scale of our own operation, before the national need is met. Now we must continue, I think, to provide training facilities and also the possibility of further development within our own organization for the time being.

John Kaatz:

One question. I heard a proposal to stimulate small-scale industries in rural areas. Given the business conglomerate economies and limited development funds, I would like to hear the case for that rather than using a world pole strategy.

Paul Lofthouse:

I don't know whether we have time to present a case for anything; we have time to answer a question. I'm sorry. Well, gentlemen, we are within a minute. I think perhaps that is good enough time. Thank you very much indeed.

SEMINAR
FRIDAY A.M.

Manuel Alba presiding

THE SMALL INDUSTRY ACTIVITIES OF THE REGIONAL
ADAPTIVE TECHNOLOGY CENTER INSTITUTIONS

Manuel Alba
Director
Technology and Development Institute
The East-West Center
Honolulu, Hawaii, U.S.A.

Good morning. This morning I have a kind of a dual role; being chairman and, at the same time, presenting the cases of the Regional Adaptive Technology Center Institutions.

However, I want to stay with my second role by describing what a Regional Adaptive Technology Center is. I think a good background has been presented during the conference and Vice President Ignacio has further amplified the concept. But there is one point which I might bring out, in response to questions from several of our colleagues during this workshop, and it has to do with what our set of criteria was for choosing the cooperative institutions in this Adaptive Technology Center. I should start off by saying that the concept was worked out by the Institute and by the cooperating institutions long before I came to the Center. In fact, one of the original participants in the conceptual evolution was Mr. Ignacio himself; and I think one of the IDD staff members, Mr. Gaston Parets, was there at the time this thing was being worked out. Another IDD staff member, Bill Ward, sat in on the conceptual workshop that evolved the operational idea of the Adaptive Technology Center. One of the fundamental, and in fact sensitive, issues that was considered was which institutions should be chosen for this initial experimental effort.

Well, there were a number of criteria considered, among which (and I should mention, perhaps Rufino Ignacio and Bill Ward can amplify on this) was

the question of the readiness of each institution to perform the role that we had conceived for the Adaptive Technology Center. That is, readiness in terms of the fact that the institution must have a minimum number of disciplines in terms of emphasis, because the emphasis of the Adaptive Technology Center was not just on the technological context, but also on the understanding of the basic social-political-economic process. Second was the willingness and the readiness of the university administration, which was a critical thing. As a matter of fact, initially there were four or five institutions considered, but they were ultimately narrowed down to three on the basis that two institutions were not administratively prepared to make a commitment, to provide a statement of such a commitment from the head of the university. Third, was the question of the resources that the university could put to bear with respect to the operation of the idea. By resources here we mean not only staff, but also the possibility of getting some financial resources from elsewhere; the national government or other interested funding agencies. The fourth was the question of the relevance of the idea to the various national plans themselves. I think, in fact, this was a fundamental issue that was considered in the light of the choice, for instance, of Mindanao State University. Mindanao State University has been identified by the National Educational Plan as well as by national policy to be the regional university for Mindanao. The choice in the case of the Philippines was not difficult. But the choice in the case of Korea was a little bit more difficult because there are a number of qualified candidate institutions in Korea. As a matter of fact, after we had decided on taking in Yeungnam, we got correspondence from a number of other Korean universities inquiring as to why they were not chosen.

But the effort should start, minimally, with only that number of institutions which can be manageably coordinated. In a sense, this was really a pilot demonstration or experimental attempt on the part of a number of cooperating institutions. The case of Hasanuddin University, much like Mindanao, was the identification of the role of Hasanuddin University as a developmental institution in South Sulawesi--in fact, in the entire island of Sulawesi itself--being the only really viable educational institution that can perform the role in that part of Indonesia. And then, of course, as I mentioned, there is the critical factor of the expectation of national support for the effort, in this case to be reflected either in terms of recognition in the regional or national plan; and second, in terms of the fact that ultimately the government will recognize the existence of the institution in terms of a budgetary recognition, which is I think what each of our ATC Institutions is presently hoping for. Presently, there is going on at the Center a training workshop, to which each of the Adaptive Technology Center Institutions has sent a team of four members each. An additional two members will be sent there for the purpose of learning about the concept of documentation, information acquisition and dissemination. That is, in fact, one of the underlying features of the Technology Center itself.

This has been a three-year effort. In first thinking about what the Adaptive Technology Center is, at the time we were starting, we really had no operational grasp as to what the Adaptive Technology Center should be. And this is where experiences like those of the ISSI and IDD came very much to mind in providing some operational insights. The second year was devoted to getting

the kind of national institutional commitments from the universities themselves, as well as to explore the industrial, economic and social possibilities within the respective communities. And eight months were devoted to undertaking feasibility studies on a number of potential projects with which the Adaptive Technology Center will play a role. I don't want to take much of the time in this respect. I would rather that you get the details of Yeungnam University and Hasanuddin University from the horse's mouth. Mindanao State University was explained very well yesterday; and we have two videotapes, one on Yeungnam University and the other on Hasanuddin University. I'm very cognizant that you have been exposed to a number of videotapes during the last three days, and I'm not so sure you could stand two more. This isn't anything close to "Hawaii Five-0", but I suppose this is the only medium in which I could do justice to what these two universities are doing.

There are no sophistication implements that are being used, no quality standards observed at all. So in a sense, Hasanuddin University has a tremendous selling job to do in respect to the acceptance of any manner of technology at all to introduce some improvement in the process of making boats. This is where the Social Science team of the RATC becomes very important, primarily because of the cultural and educational qualifications of the population. The selling part becomes essential in this case. There is still a certain amount of resistance to the introduction of something that is alien in terms of the culture. But with the cooperation of the local institutions, the University teams are starting to lower the resistance of the shipyards. But Hasanuddin has a challenge in terms of more than just the technical problems of the industry in the area. There are also a lot of administrative and financing problems, as well as the problem of communicating with the central government. So, Hasanuddin fits our own concept of what a university can do in respect to assisting a whole region.

What is so wonderful about this boat building thing is that when you ask them to build you something, all you have to do is tell them the volume and the speed that you would want this boat to go. And without any drawing or anything, they could produce the boat just like that. What is interesting is that the boats are durable; they last for some time. And the anthropologists often raise the question, "Do we need to change the system here and completely alter this stuff?" So we have been cognizant about this problem, but the demand of the market, as well as the need to raise the level of income of the population, seems to present an alternative in terms of really helping out the industry in this respect. I think there has been some favorable response to the idea.

So, I would like to end the presentation here.

ISSUES AND PROBLEMS

Joseph E. Stepanek presiding
Consulting Engineer
Boulder, Colorado, U.S.A.

Joe Stepanek:

We are now going to recapitulate what we have been discussing at the conference and at this seminar by identifying the major issues and problem areas. I have shared with you, in a very drafty piece of paper, some of the things I have been hearing.

MAJOR ISSUES AND PROBLEM AREAS

1. Industrial Policy
 - establishing national objectives
 - inducements to large industry
 - equalization of opportunity for small industry
 - policy modifications required to accelerate small industry growth
2. Industrial Interactions
 - small with large
 - small with agriculture and artisan industry
 - small with foreign markets
3. Institution Building
 - autonomy and the commercial/entrepreneurial atmosphere
 - maintaining long-term vitality
 - multiplication of a variety of "institutions"
4. Entrepreneurship Development
 - identifying potential entrepreneurs
 - enhancing entrepreneurial skills
5. Providing Managerial and Technical Services
 - staff selection and training
 - retaining staff quality

- designing service techniques
- encouraging private consultants (including part-time faculty and large-industry staff)

6. Acquiring Technological Hardware

- national sources
- import of machinery and equipment
- international information services

7. Finance and Other Physical Inputs

- fixed and operating capital
- industrial estates
- transport and communications
- raw materials, components and spare parts

In this list I have attempted to include everything I heard you say, and to be honest, I have included a couple of things I didn't hear you say but which I think you would have said, had we had time. We have only 29 minutes to examine the issues and problems. First, I invite discussion only on the major headings so that there will be, hopefully, a consensus as to what the major issues and problems are. And I suggest further that we keep in mind that this might be a suggestion to IDD as a way of organizing the proceedings of the seminar. I assume that is what Ross had in mind; how do we bring together the various things we have discussed in an orderly manner? I suggest that we initiate discussion on that basis. Have we missed major issues in this list?

Bill Littlewood:

I notice that you have not mentioned anywhere in this list a particular attention to the rural areas. This is of particular interest to AID, as everyone realizes from the initial keynote address. And perhaps it could be put into the fourth item in number one, Industrial Policy. You could add a clause, "particularly in rural areas" to the fourth item; perhaps it might fit in elsewhere. Also under category two--Industrial Interactions--as a layman in the area, I am puzzled why you speak of "small" with foreign markets, but do not have "small" with local markets. Is that somewhere else in the list here; am I just overlooking it? I would think that small industry would interact primarily with the local markets and that once it gets into the foreign markets you have a new level of quality control and a new level of size. Maybe it's then no longer small industry, although it might be a component of the larger industry which interacts with the foreign market? Thank you.

A. O. Lewis:

While I agree with the major heading and the suggestions already made by Mr. Littlewood, I am not very happy with the separation of four and five; so I am suggesting putting the fourth point under five, the development of the managerial skill of the owner/manager. I think that we have to deal with the manager himself, so you ought to develop his skill as well.

J. W. Powell:

The title of this week's activities, both the conference and the seminar, was "Techniques and Methodologies for Stimulating Small-Scale Labor-Intensive Industry in Developing Countries." I am a little troubled by the absence of any reference to labor-intensive in this list of issues. We seemed to have broadened the scope considerably in the discussion of labor in terms of small-scale industries to the very general field of industrial development. And I am wondering whether we shouldn't return to this more narrow and specialized area and include some factors relating to the choice of industries: what factors effect the choice of labor in terms of industry as opposed to capital intensive industry and what social and economic factors are involved? I know this isn't a very specific suggestion, but it is something that is troubling me.

Ross Hammond:

I guess I am particularly concerned with institution-building; not only the organizations around here, but our own as well. And I would particularly like to refer to one aspect of this type of activity. As we listen to the organizations, it is obvious that, in a way, they are filling a vacuum, or have filled a vacuum in that particular country, by starting some activities which have not been evidenced before. It seems to me that one real challenge confronting all of the organizations in this room is to expand your worthwhile programs and see that they are meaningful in your own environment. But our experience has been that, as we start programs that are worthwhile, sooner or later other organizations in Georgia pick them up and we find ourselves having to look for new areas. Other people pick up programs that we have initiated, and this is allright; its fine! But that leads to the big challenge that all of our organizations really have, and that is to continue to develop innovative new approaches that can be useful in the economic development field. And I think, looking at us all in the organizational sense, this is the major challenge which we all face. A lot of the things we do become routine after a while, and are not very challenging--at least in the university atmosphere--and we just have to keep looking for new ways to do things better. I think it is really organizations like those around the table that are responsible in their own environments for producing this innovative type of program.

A. O. Lewis:

In a conference of this nature where we have participants from many institutions, one of the advantages of attending would be to hear from the various organizations represented as to what the problems are and what is being done in those problem areas. We could identify the problems and discuss what each organization is doing in the case of each problem. Maybe one could get one or two new ideas from such a discussion. So, what I am trying to suggest is that we would identify the problem areas, and that in publishing the proceedings, maybe we could include solutions or suggested solutions for the problem areas.

Now on the list, for me, one area that I find interesting is number two, "Industry? Interactions", especially "small with foreign markets". Now, we have been discussing the marketing problems of small-scale industries. When

we were looking at the video-tape this morning, someone did ask whether there was a difference between selling to local buyers and selling to foreign markets. I think that there is an important difference here, since if a local producer wants to sell abroad there are various stages that he has to go through; for example, knowing about the foreign documentation, foreign currency and the rate of exchange, how to contact the various organizations in these foreign countries that can help him, etc. So that in many developing countries local producers do not know these procedures. One of the things being done to encourage local producers to sell abroad is to organize periodic training courses in export promotion. So, that is a good idea if you want to expand small-scale industries; to try to encourage local producers to sell some of their production abroad. But, to do this, apart from insuring that they produce a good quality product, you must also train them about foreign documentation and so on and so forth. So I think this is an important aspect.

Joe Stepanek:

Your first suggestion on sharing problems is pertinent. I call your attention to the Small Industry Development Network, published by Georgia Tech; it performs that type of function. Your recommendation, I'm sure, has been listened to by Ross as a way to make the newsletter even more valuable by including more problems and sharing the solutions with you.

A. O. Lewis:

Thank you very much, Mr. Chairman. If one has to comment; rather than repeat the whole seminar, I personally think the paper before me really covers all the discussions for the last two days. Maybe we can just underline some areas where we think emphasis should be laid.

Now I will really talk about industrial policy. I think that IDD, whose staff will be doing the editing and reporting of the proceedings of the seminar, should really put more emphasis on this. And I will also underline the suggestion of Mr. Littlewood that this modification of policy with regards to industrialization or small industrial growth, particularly in the rural areas, really should be emphasized. That is the theme of the seminar and conference, as I understand it; and it is better that we say that we are doing justice to that more than anything else. I think we discussed the growth of small industry relatively little. We didn't really go in depth into the question, as we did with rural areas.

Then there is the question about Industrial Interaction. I have already modified the third subheading under number two so that it reads, "small with both local and foreign". There are problems with foreign markets that are not identical with those encountered when you are producing for local markets. And I think export promotion is a different area. As a matter of fact, we have another division that wants to look at export promotion, but I think that small industry should provide for local markets. Well, I have already stressed that we should develop the managerial skills of the owner/manager.

I would only like to underline once more that there is a need for more than just this newsletter as a means for the exchange of information among all organizations dealing with small industry. Because, you see, it is very, very good, and I think that IDD should be congratulated for calling this sort of seminar. The first thing that I gained out of it is hearing of the work that is being done by others. So that I don't have to duplicate; if I think that there is something being done somewhere I can just write, "Please, let me have more information." So I think we should still--apart from getting in touch with Georgia Tech with items for the newsletter--continue exchanging ideas among ourselves. I think it should be stressed that organizations interested in development of small industries should continue to work together.

Then on item seven, I have two or three comments to make. I will talk on seven-two, "industrial estates". I say that we should include industrial areas. We didn't discuss industrial estates, but if we did, we would find that, in most cases, industrial areas are cheaper for governments to keep than industrial estates which are more costly. The governments are not going to establish so many industrial estates all over the place. Then on seven-three, "transport and communications", I will suggest that you add "other infrastructure facilities". And then item seven-four, "raw materials, components and spare parts", I think not only the identification of the raw materials but their development should also be stressed. Thank you.

Yoon Bae Ouh:

As we are concerned with methodologies and techniques for stimulating small-scale industries in developing countries, I have two questions in mind. The first, who is going to stimulate small industries in developing countries? On our part we are talking about a lot of methodologies and techniques involved in this respect. On the other hand, I urge that the developed countries should also set up policies to stimulate the small-scale industries in developing countries. This two-way interaction must be viewed in one context in which developing countries should exert their own efforts to stimulate small industry. No matter what kind of policies we adopt on the part of developing countries, the international environment which constrains national policies makes things different. This one thing I would like to point out.

Second, I'd like to adopt the Georgia Tech concept of development. The system here at Georgia Tech has a reservoir of technical information, and at the other end of it are the end users or recipients of services. In between these two posts is IDD as the delivering mechanism. Now, the day before yesterday we talked about some problems involved in bringing certain delivery mechanisms to the other big organizations or institutes; in our case, say Soong Jun University to KIST. These sorts of organization linkages must be promoted as a means of stimulating small-scale industry. Now, as a private educational institution, and we have, of course, a college of engineering with sophisticated equipment and testing tools, yet we can't solve all of the problems in the course of providing services to small industry. What we can do is to transmit these problems which we can't solve to other institutions, like KIST or some other places elsewhere through the organization channels.

Then this might help a great deal on our part. This I ask you to add somewhere in this list.

Bill Littlewood:

As I mentioned earlier, I am a layman in the methodologies of stimulating small industry. I can see clearly, I think, however, what some of our goals or objectives ought to be. And that is to find alternatives; that is, alternative employment opportunities for the rural areas. Not everybody is a successful subsistence farmer, even. And we know that in most rural areas in developing countries, the population is extremely poor. They are subsistence farmers; they make just enough for themselves and their families to survive. We would like them to produce more, so that it can come onto the world food market. But, in addition to those who cannot make it for some reason or other in farming, they have at the moment only the alternative of moving to the big city, whether it be Manila or Seoul; and you create new problems there with unskilled people coming in great masses into these big cities. We are all familiar with the slum problems and the urbanization problems. So if we can find some way to establish alternative employment opportunities in the rural areas, that would certainly be a goal that is very dear to the heart of AID these days, and, I think, also to the developing countries themselves.

Now just to expand on that slightly, such employment in the rural areas ought to serve the needs of the people in the rural community, so that they have better access to the material things that you can get in the big cities; that they have better access to education, to better health and better nutrition. In addition, it should also help their economic development. These things overlap, I think of the concept of cooperatives--bringing them into the monetized economy. These people are in a trading economy, their actual income is perhaps \$100 a year or something. They cannot buy very many manufactured goods with that.

And then the third point I have already mentioned, or implied at least, is the reversing of this trend toward urbanization. It's a hard one to do, and we haven't really done it in the United States; although I understand now there is more of a movement back to the farming community in the U. S., but I think for many other reasons. I don't think it is quite the same.

My last point in discussing small industry; I know that much of it was improvement of existing small industry, making the rice miller more effective or something like that, but I hope there is also equal attention to establishing new, innovative small industry that might open up, using indigenous raw materials that do not have a market at the moment. There is a lot of room for technology there.

But it must be tied together with everything else that we have been talking about--the economic and general policies, the social acceptabilities, etc. So I hope that we focus both on improvement on any existing small industry, troubleshooting as in many of the cases we have discussed, and also focusing on the innovative. I won't say new, because sometimes it isn't always new. Ferrocement technology is a very old, labor-intensive technology, but it may have a role in the storage of small amounts of grain or food, and it may have a role in small boats. So put in innovative, in any case. It fits the local situation. Thank you.

Cornelius Otiteh:

Thank you. Mr. Chairman, I only want to make a few comments on number one, Industrial Policy. In my view, I think whenever we talk about institutional organizations to stimulate or establish small industries, it is very, very important that government policy should be clearly defined. I don't think that any university or institution trying to carry out the work of assisting the small entrepreneur can go very far without the government being clearly aware of the objectives. So, I think the question of government policy towards the stimulation and development of small industries should be greatly emphasized. I think this is the pivot. Have them set clear objectives. Then marry the institutions that the universities are operating, which have other assignments, and whatever other agencies the government wants to establish. In other words, they should have a coordinating body so that they can achieve better results. The message I want to give is that we should try to bring, in some way, to the notice of the government what the problem is and how to tackle the problem. Otherwise, I think our efforts will be very, very much limited.

Leon Chico:

Well, I was about to say almost the same thing that Mr. Otiteh said. A question was asked yesterday by the gentlemen from Nigeria which I thought was not answered. He said, "Who controls the programs of the institutions? Is it the minister of industry or the university?" So I thought, as he said, the program of the university should be relevant to the national development plan; in fact, he thought it should be a part of the plan. If possible, as we try to do in our case, it should influence that national development plan. So, I think that would be an addition to either item one or three, the relevance of the institution and its influence on the development of the national plan.

Herminia Fajardo:

I don't think I have anything to add to what Leon said.

Rufino Ignacio:

I am worried about Georgia Tech and IDD. Are we holding them rigidly to this outline here?

Anyway, I think everything has been said. I would possibly want to emphasize the role of the universities in actually evolving methodologies for the

stimulation of small-scale industries. Actually, universities always say this, you know, but they actually pay lip service to this. But the mechanism is not really there. They have pockets of activities here and there--different colleges doing this type of research--but there is really no tie-up with the national government for coming up with policy instruments, coming up with the original industrial plans or being in the mainstream of decision making. This would be original industrial development. So I would emphasize the role of the universities here, and the concrete things that some of these institutions are really doing now. Because I am sure this would be a very good reference for some other universities to emulate.

J. W. Powell:

I would like to echo some of the things that Bill Littlewood was saying. While he was speaking, I had the impression that he and I were standing at the other end of the telescope. I feel that what we should begin with is the need of a man for a job; for employment. And I would have liked to have given more emphasis to a heading, "Employment Generation", under which we might discuss such matters as the cost of labor (low wages aren't the same as low labor costs); factors determining labor/capital mix; social and political influences on the choice of labor-intensive industries; the relative effect of sole proprietorships, partnerships and cooperatives; the role of village development committees in rural development; agricultural-based industries; and craft industries.

Bart Duff:

One disadvantage of being at the end of the chain is the chance of being redundant, and I suspect that I may be a little redundant at this point. I have just two footnotes to some things that have been said. First of all, in the area of industrial policy I missed yesterday's session so I may have missed something important. But at the conference and seminar both, I have heard only one what I would call innovative idea regarding incentive packages to small-scale industries. This was the progressive taxation or rebate idea that the ISSI people have regarding the degree of labor intensity; Decree 92. And it seems to me that we need to do a little more thinking about these kinds of packages, how do you give the incentives to small-scale industry? I know in the Philippines that many of the incentive packages that are available have been tried as incentives to small-scale industries, and they have been almost entirely inappropriate or unattractive. And yet they have no viable alternatives. It seems to me that this is an area that really does need some attention; whether they are financial packages or combinations of financial/technological/management packages or just what they are. But we are not really reaching these smaller firms effectively, I think, with existing policies.

The second is an issue that relates very much to our own program. I am sort of re-emphasizing what I said on Monday, that our biggest bottleneck right now is in the development of effective mechanisms for transferring or extending technologies. We have felt for some time that the development of technology should be complementary with other agricultural development goals. In fact, the generation of income in the rural areas is a stimulus to rural-based industries. And the kinds of industries you try to induce into these areas should be the types of industries that have a positive interaction with the farm

sector. This kind of complementarity should be given a good deal of attention in the planning process.

Manuel Alba:

Talk about your problem of being last, what about Paul and myself? The best I can say is that I agree with what everyone just said, because the listing here is quite comprehensive in terms of what has been addressed by the conference and seminar. There is just one thing I would like to emphasize here. So that the next conference and seminar doesn't lapse into just another conference and seminar, consider the fact that out of this conference and seminar might emerge a set of recommendations; a basis for a little bit more of an operationalization, rather than just drawing up an agenda for the next conference in 1976. I'm particularly concerned, therefore, that out of this list we select those issues which are clearly a subject for national policy but which, in terms of the reports presented during this last week, have not been emphasized by any national policy statements. Of course I include in this the question of planning.

Second, which of these issues would decidedly necessitate further research; particularly in the area of some innovative ways, techniques and methodologies of stimulating small-scale industries? And which of these issues and areas would deserve some particular attention as regards the role and strategy of technical assistance? This is, in fact, one item I would like to add to the list because I think it is particularly important in terms of AID's own role, as well as in terms of the role of technical assistance agencies such as IDD.

So I'd like to develop a framework in terms of which items we should look at from the standpoint of new national policies, which should we look because we know little about them (and, therefore, require research toward which the institutions concerned here might direct their attention a little more intensively) and which would be particularly interesting in terms of technical assistance agencies and institutions directly involved in this activity.

Then maybe some additional concentration--this is really a comprehensive listing--since the question of marketing is not emphasized here. Yet, when we speak about stimulation to industries, the stimulus of the market is possibly one of the most potent. I feel that the institutional capabilities that have been revealed here are not very adequate in this respect.

And then, emphasis should be directed to the social-cultural factors involved as developing countries go through the process of deciding between alternative industrialization strategies.

There is a cross pressure here of economic and cultural factors. We certainly know very well about some of the instances where these factors have come to a head in the matter of technology transfer or the adoption of certain types of intermediate technology. Outside of the context of labor-intensive versus capital-intensive is the question of whether, in the long-run, the national cultural value system would be compatible with these recommendations.

Paul Lofthouse:

And that leaves me with virtually nothing to say apart from, I would like to emphasize under six, "Acquiring Technological Hardware"; it's not only a question of acquiring technological hardware, but it's also the identification of those techniques that can be best adapted to the countries. And the other point I would like to underline, that has already been mentioned once, is the necessity for the interchange of information between organizations concerned in these activities, so that we do not--each of us--separately invent the wheel. Thank you.

Seyeul Kim:

Well, all I have to say is, "Me, too," and nothing else. But since this will be my last opportunity to say something, instead of making any more comments I would like to leave a future challenge to you, which I believe will be very vital for the success of your venture because this problem has risen in our organization where the economy itself is growing in such a dynamic way I'm sure you have already faced it or will be facing it in the very near future. Basically, small-scale industry is very, very competitive. On the other hand, the extension service organizations such as we belong to are not, I repeat, are not the experts on every field. We are, perhaps, the experts in basic principles or in training. But this can create some serious problems. I will give you one example. Suppose Ross is helping this fishing pole industry. I don't believe IDD has an expert on the making of fishing poles. They do have an expert in industrial engineering or production management, and they also have managerial expertise. But they did not know, I believe, how to make a fishing pole. So while IDD was helping that company, they acquired some know-how which might be limited to aiding a particular type of entrepreneur. And as a consequence of IDD's assistance, now that fishing pole company is very prosperous. Then, the question that you have to face is, what happens if another person comes to you and asks you to establish a fishing pole plant? You gained some experience out of company A, and there is a person B who is coming and asking you to help him build a plant. Would you utilize the knowledge you gained by helping this existing fishing pole industry and then help another company to become established, thereby putting the two in competition, or would you refuse the second request? If you refuse, then you are more or less refusing to increase employment opportunities. So that there is a moral obligation which comes from rendering technical service, because while you are in the process of doing this you are gaining knowledge which could be very vital to that business. Would you give this idea to another firm, thereby creating competition? If you start doing this, then there will be a lack of confidence, and there won't be any more cooperation. They will not come to you for advice. So there is a very thin line. How you are going to handle this? I'm afraid I do not have an answer for this. But we are facing it, case by case every day. And I'm sure you will have the same problem very soon. So I think it's better for you to start worrying about it. And I don't think the purpose of this seminar is only to come up with answers, but maybe to give you a chance to think. Thank you.

Joe Stepanek:

Since we have gone so far over time, we are going to go over two more minutes as I try to make a few more general remarks. I think a very interesting thing has happened during the past three days. Most of us are concerned with institutions, so the focus of our attention primarily, up until now, has been on institution building and the problems involved. Today as we reflect a little, we realize that a good institution has to live under a proper umbrella. And I've noticed almost without exception our attention now is turned to the policy umbrella under which we have to work. And I think this is a very important conclusion of this meeting.

On some specifics, Bill, wouldn't you agree with the TDI formulation of calling it non-metropolitan rather than rural? I call your attention to the situation in Brazil, which I think is ideal: a new industrial growth center in a city of 60,000 people, which is large enough to have a potential for growth and to provide the nucleus for work in rural areas outside of that city. I think that's really what we have been talking about.

Bill Littlewood:

There's no problem. When we use rural we include villages or market towns.

Joe Stepanek:

Well then, let's don't use rural, because a lot of people less sophisticated would think of rural as village, which has no potential, if you take it in isolation, for the kind of industry we have been talking about.

I missed the point of local markets--but I think it's a very good addition--because I was looking at some of the real problem areas, and, of course, export markets are more of a problem. I like the idea of restructuring points four and five, and linking entrepreneurship and managerial development because, while they are different, they are closely related; and let five be the provision of other technological services. I like very much the replacement of industrial estates, which is a very narrow and capital-intensive concept, with industrial areas. Mr. Powell, in his second intervention, made some very important points: that the whole thing that we are concerned with is employment generation; this is one of the major benefits of small industry. But what does cause me to run up the red flag is this repeated use of labor-intensive. I think it's a false issue and a trap. If you're living in England and, as an engineer, you're asked by the owner of a factory to design a factory, you are never told to make it capital-intensive. You are told to save labor and if you have to use a little more capital, then do it. But very often you design to save labor and capital at the same time. I can give you dozens of examples. If you are living in Nigeria with labor surpluses, you are told to save capital, not to employ labor, if you are given the proper instructions. And as a result, you may or may not employ labor, but in any event the capital you save can be used to employ more labor. And nobody in his right mind would have two

small industry programs, one capital-intensive and one labor-intensive, because you're going to live under one umbrella and you are going to try to design to be appropriate to that umbrella. Now some countries design an umbrella to encourage labor-saving industry rather than capital-saving, and that's why we have expressed such a concern over policy issues.

A whole area of work which Paul has emphasized, and which I wish we could devote another day to, is the problem of the transfer of technology. All of us have come here with knowledge of new hardware and software, and there has been, I feel, a tremendous exchange of information between us on that subject. But we haven't considered the institutionalizing of the exchange of information on the available hardware. There is a lot of very interesting work going on in the world; there have been a lot of false starts in this area, and I think that this should be put on the back burner for inclusion in the newsletter and any new conferences that we have.

So, I would like to sum up. I think that the modifications are excellent. I think that the two areas which should be given attention and more detail in the future are: this whole question of industrial policy strategies, national objectives for one; and the second, how we can tie the world together better with respect to information on what is available with regard to technological hardware and, I would add, Bill's software.

R-E-V-I-S-E-D D-R-A-F-T
EMPLOYMENT GENERATION
MAJOR ISSUES AND PROBLEM AREAS

1. Industrial Policy
 - influence development plan
 - establish national objectives
 - inducements to large industry
 - equalization of opportunity for small industry
 - policy modification required to accelerate small industry growth
 - selection of policy implementation agencies
 - non-metropolitan areas
2. Industrial Interactions
 - small with large
 - small with agriculture and artisan industry
 - small with foreign markets
 - small with local markets
3. Institution Building
 - delivery systems
 - autonomy and the commercial/entrepreneurial atmosphere
 - maintaining long-term vitality; innovation
 - multiplication of a variety of "institutions"; role of universities
 - promotion of organization linkages

4. Entrepreneurship/Managerial Development
 - identification of potential entrepreneurs
 - enhancing entrepreneurial skills
 - owner/managers
5. Providing Other Technical Services
 - staff selection and training
 - retaining staff quality
 - designing service techniques
 - encouraging private consultants (including part-time faculty and large-industry staff)
6. Acquiring Technological Hardware; and Software Transfer of Tecnology
 - national sources
 - importation of machinery and equipment
 - international services
7. Finance and Other Physical Inputs
 - fixed and operating capital
 - industrial areas and estates
 - transport, communications, and other infrastructure
 - raw materials, components and spare parts
8. Employment Generation
9. Role and Strategy of Technical Assistance

APPENDIX



INSTITUTE FOR SMALL-SCALE INDUSTRIES
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Cable Address:
"INSMASCIND"

6 June 1975

Mr. Donald Lodge
Engineering Experiment Station
Georgia Institute of Technology
Atlanta, Georgia 30332
U. S. A.

Dear Don:

Enclosed is a copy of an excerpt of Presidential Decree No. 92, as requested. The whole decree consists of some fifty pages which includes a consolidation of previous laws. (Republic Acts 5186, 6135, & 5455). The portions excluded refer to the organization of the Board of Investments, procedural matters, and other incentives which were already previously granted. This excerpt includes new incentives which particularly affect labor-intensive small enterprises.

Let me comment on these incentives:

e) Tax Credit on Domestic Capital Equipment

This provision encourages the local manufacture of machinery, equipment and spare parts which otherwise would have been imported. It grants a tax credit equivalent to 100% of the value of the compensating tax and customs duties had these items been imported plus another 50% equivalent tax credit to the manufacturer of the machinery, equipment or spare part.

k) Deduction for Labor Training Expenses

This provision encourages manufacturers to train unskilled workers by allowing an additional deduction from taxable income. Please note that these expenses would have normally been already deducted from profits as part of a company's costs. This provision

Mr. Donald Lodge
Page 2

allows a second deduction from taxable income within the prescribed limits.

We feel that this incentive promotes employment of untrained workers. Otherwise, manufacturers would rather employ workers already skilled who generally do not have problems of seeking employment.

Section 9.

a) Special Tax Credit

This provision allows a tax credit equivalent to the sales, compensating and specific taxes and duties on raw materials and semi-manufactured products used for export products. In effect, this encourages the export of labor or international sub-contracting.

b) Reduced Income Tax

This provision promotes labor intensity and the use of local raw materials in the manufacture of export products by allowing again a second deduction from taxable income the cost of direct labor and local raw materials to the extent of 25% of its export revenue.

Section 7.

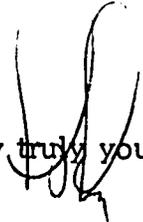
b) Reduced Income Tax

This is the same as the incentive above except that it applies to those registered under another law. Please note that this decree is a consolidation and amendment of three laws.

I hope the above comments will help in clarifying these provisions of Presidential Decree No. 92 pertinent to labor-intensive small-scale industries.

Thank you and warm regards.

Very truly yours,


LEON V. CHICO

cc: Dr. Ross Hammond

MALACANANG

Manila

PRESIDENTIAL DECREE NO. 92

BUSINESS INCENTIVES AND REFORMS

AN ACT INTENDED TO IMPROVE BUSINESS CLIMATE BY AMENDING REPUBLIC ACTS NUMBERED FIFTY-ONE HUNDRED EIGHTY-SIX, SIXTY-ONE HUNDRED THIRTY-FIVE, FIFTY-FOUR HUNDRED FIFTY-FIVE AND FOR OTHER PURPOSES.

WHEREAS, There is a need to improve the overall climate for business and industry in the Philippines in order to accelerate economic growth and promote the well being especially of the masses of our people.

WHEREAS, Although the various incentives already provided in existing laws to encourage investment, both local and foreign, in desirable industries and projects have actually induced their establishment in preferred areas, there is still a need to re-examine their precise impact and relevance not only to increased productivity but to the improvement of the living standards of the people;

WHEREAS, In order to achieve the foregoing objectives, it is necessary to update and rationalize existing incentives and provide new ones that can help optimize the rate of economic development by giving priority to export-oriented industries especially those utilizing indigenous raw materials and which can generate more employment and income opportunities in keeping with the escalating demands of our people for the basic essentials that make for decent existence.

NOW, THEREFORE, I, FERDINAND E. MARCOS, President of the Philippines, by virtue of the powers in me vested by the Constitution as Commander-in-Chief of the Armed Forces of the Philippines and pursuant to Proclamation No. 1081, dated September 21, 1972, and General Order No. 1, dated September 22, 1972, as amended and in order to effect the desired changes and reforms in the social, economic and political structure of our society, do hereby order and decree amendments to Republic Act Numbered Fifty-one hundred eighty-six, otherwise known as the Investment Incentives Act, and complementary laws such as Republic Act Numbered Sixty-one hundred thirty-five, otherwise known as the Export Incentives Act and Republic Act Numbered Fifty-Four hundred fifty-five, as follows:

XXXXXXXXXX

"(e) Tax Credit on Domestic Capital Equipment. A tax credit equivalent to one hundred per cent (100%) of the value of the compensating tax and customs duties that would have been paid on the machinery, equipment and spare parts had these items been imported shall be given to the registered enterprise who purchases machinery, equipment and spare parts from a domestic manufacturer, and another tax credit equivalent to fifty per cent (50%) thereof shall be given to the said manufacturer: Provided, (1) That the said machinery, equipment and spare parts are directly and actually needed and will be used exclusively by the registered enterprise in the manufacture of its products, unless prior approval of the Board is secured for the part-time utilization of said equipment in non-registered operations to maximize usage thereof; (2) that the prior approval of the Board was obtained by the local manufacturer concerned; and (3) that the sale is made within seven years from the date of registration of the registered enterprise. If the registered enterprise sells, transfers or disposes of these machinery, equipment and spare parts without the prior approval of the Board within five (5) years from the date of acquisition, then it shall pay twice the amount of the tax credit given it. However, the Board shall allow and approve the sale, transfer, or disposition of the said items within the said period of five (5) years if made (1) to another registered enterprise; (2) for reasons of proven technical obsolescence; or (3) for purposes of replacement to improve and/or expand the operations of the enterprise.

XXXXXXXX

"(k) Deduction for Labor Training Expenses. An additional deduction from taxable income of one half of the value of labor training expenses incurred for upgrading the productivity and efficiency of unskilled labor shall be granted to a registered enterprise: Provided, That such training program is duly approved by the appropriate government agency or in the absence thereof by the Board: and Provided further, That such deduction shall not exceed ten percent (10%) of direct labor wage."

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"SEC. 9. Special Export Incentives for Registered Enterprises. - Registered enterprises may be entitled to the following special incentives for exports of their registered products and commodities:

"(a) Special Tax Credit. - A tax credit equivalent to the sales, compensating and specific taxes and duties on the supplies, raw materials and semi-manufactured products used in the manufacture, processing or production of its export products and forming part thereof, whether exported directly by the registered enterprise or sold to another export producer which uses such sold product as a direct input in export products manufactured or processed by it and subsequently exported, or to an export trader: Provided, That the tax credit shall accrue to the registered enterprise only after the other export producer or export trader has in fact exported the products of the export producer or those in the manufacture or processing of which such inputs were used.

"(b) Reduced Income Tax. Registered enterprises shall be entitled for the first five years from its registration, to deduct from its taxable income an amount equivalent to the sum of the direct labor cost and local raw materials utilized in the manufacture of its export products: Provided, however, That such deduction shall in no case exceed twenty-five per centum (25%) of its total export revenue.

Before registered enterprises may avail themselves of the foregoing export incentives benefits, they shall apply first with the Board, which shall approve the application upon proof: (1) that the enterprise proposes to engage in good faith in creating a market for its products abroad; (2) that the product to be exported is one included in the government priorities plan as suitable for export, or if not so included, that its export will not adversely affect the needs of the domestic market for the finished product to be exported or for the domestic raw materials used in its manufacture; (3) that the enterprise has or will set up an adequate accounting system to segregate revenues, purchases and expenses of its export market operations from those of its domestic market operations; and (4) that the exported products and commodities meet the standards of quality established by the Bureau of Standards or, in default thereof, by the Board.

The Board may suspend or cancel wholly or partially the above deduction under this section whenever any action is threatened or taken by an international association or foreign nation which would nullify the purposes of said incentive and would impair or threaten to impair the export trade of the Philippines or its relations with other nations."

SEC. 15. Section Seven, excluding paragraphs (c) and (d), Republic Act Numbered Sixty-One Hundred Thirty-Five is hereby amended to read as follows:

"SEC. 7. Incentives to Registered Export Producers. - Registered export producers, unless they already enjoy the same privileges under other laws, shall be entitled to the incentives set forth in paragraphs (g), (h), (i), (j) and (k) of Section seven of Republic Act Numbered Fifty-one hundred eighty-six, known as the Investment Incentives Act, and registered export producers that are pioneer enterprises shall be entitled also to the incentives set forth in paragraphs (a), (b), and (c) of Section eight of the said Act. In addition to the said incentives, and in lieu of other incentives provided in Sections seven and nine of that Act, registered export producers shall be entitled to benefits and incentives as enumerated hereunder:

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(b) Reduced income tax. - Every registered export producer, except those registered under Section six, paragraph (b), subsection (iii) of this Act, shall be entitled for the first five (5)

years from the registration, to deduct from its taxable income an amount equivalent to the sum of the direct labor cost and local raw materials utilized in the manufacture of its export products, Provided, however, That such deduction shall in no case exceed twenty five percentum (25%) of its total export revenue.

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(e) Exemption from Export Tax. - The provisions of law to the contrary notwithstanding, exports by a registered export producer of its registered export product shall be exempted from the export tax, impost or fee, including the stabilization tax under Republic Act Numbered Sixty-one hundred twenty-five.

SEC. 19. Effectivity. - This Decree shall take effect from its approval.

Approved.

Done in the City of Manila, this 6th day of January, in the year of our Lord, nineteen hundred and seventy-three.

(SGD.) FERDINAND E. MARCOS
President
Fepublic of the Philippines

By the President:

(SGD.) ALEJANDRO MELCHOR
Executive Secretary