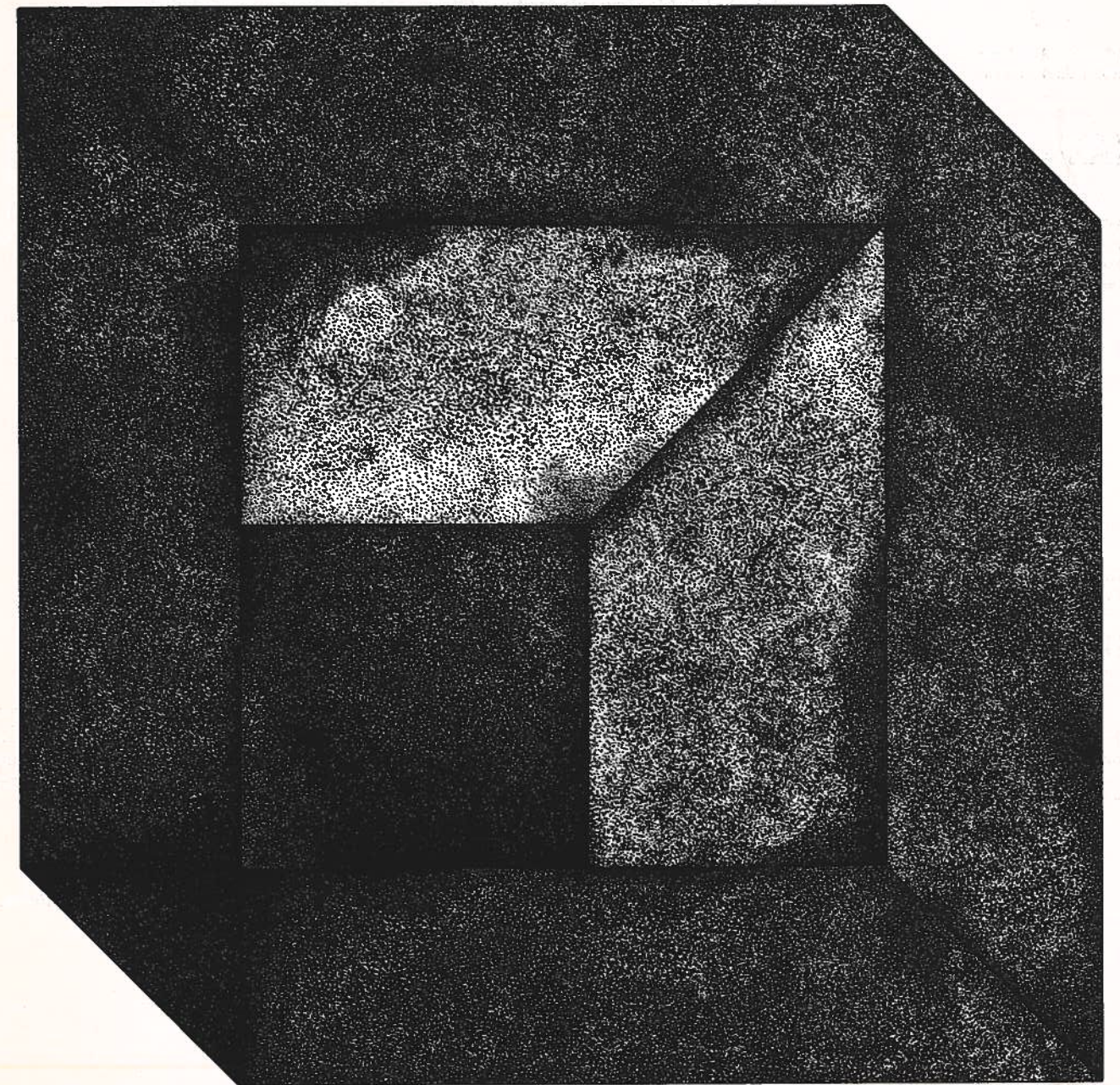


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Cover: Featured on the cover is an artist's conception of the growth potential of small industries through creativity, risk-taking, management knowhow and innovation. Designed and executed by Christopher Concepcion-Ku, the piece is called "Expanded Dimension."

Credits: Photos at K. C. Schultz Industries by Butch B. Baldoria.

DIRECTOR'S PAGE

TOWARDS CLOSING THE INFORMATION GAP IN SMALL INDUSTRIES

A dearth of information identifying viable industrial projects inhibits small industry growth in the regions.

This conclusion surfaced at the CCP-sponsored area business conferences held recently in the Visayas and Mindanao.

As early as 1971, the U.P. Institute for Small-Scale Industries conducted economic surveys of each of the country's eleven regions for this very purpose. Research teams study industrial potentials of an area in terms of indigenous natural resources, power, infrastructural and other facilities, manpower resources, etc. The result: "A List of Potential Small Industries by Region."

This brings to the fore an underemphasized but nonetheless essential component in the national small industry development campaign. Information sometimes does exist but the users often do not know it is there. This deplorable information gap may be blamed on the lack of resourcefulness on the part of the users to look for information sources on the one hand and failure of information centers to promote their information services, on the other.

While it may be true that textual and statistical information may not be accessible to the average rural entrepreneur, there are, within the region, enough sources of information to start off a new industry.

The enterprising and farsighted rural businessman may approach the following regional offices for some of his information needs:

- (1) Small Business Advisory Centers of the Department of Industry (for direct technical and management assistance)
- (2) Medium and Small Industries Coordinated Action Program (MASICAP) field teams also of the Department of Industry (for identification of viable industries through project study preparation)
- (3) Department of Trade regional offices and trade assistance centers (for information on legal aspects)
- (4) Regional offices or branches of government financing institutions like the Philippine National Bank and the Development Bank of the Philippines (for information on financing aspects)
- (5) National Manpower and Youth Council (NMYC) regional offices (for technical and skills training)

It has been scarcely realized that there exists in small businessmen themselves a rich potential source of practical information. Unless misguided by a selfish desire to discourage would-be competition, the established entrepreneur should be able to provide useful information to the enterprising upstart in the same field of enterprise. Among themselves, existing entrepreneurs will mutually benefit through information-sharing relationships.

In an effort to bridge the information gap existing in small industries, the U. P. Institute for Small-Scale Industries offers the following information dissemination and utilization services:

1. **Industrial Inquiry Services** — Entrepreneurs and industrial proponents are invited to write or call on the Industrial Information Department for technical, management and other inquiries. To enhance its industrial information capabilities, the Institute maintains tie-ups with international technology and information networks and other data banks like Technonet-Asia and the newly-established Technology Resource Center (TRC).
2. **Current Awareness Service** — The UP ISSI publishes a monthly list of technical literatures containing the latest trends and practices in techno-managerial and scientific fields.
3. **Publication of the Small Industry Journal** — Through this quarterly magazine, the Institute communicates to small entrepreneurs such various types of information as would help him improve the operation and management of his business and cope with the changing business environment.

By next year, the Institute will publish a "Directory of National Sources of Information for Small-Scale Industries" which will collate into one handy volume all existing sources of industrial information in the country.

How these programs may be operationalized nationwide, that is to say, assimilated into the current national integrated program for small industry development, is a challenge to the vision, organizational creativity and dynamism not only of the UP ISSI but also of the Commission on Small and Medium Industries of which the Institute is a member-agency.

Paterno V. Vilorio
Director

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C. What you should know about marine insurance

Any experienced exporter knows that ocean cargo insurance is an essential tool of foreign trade. Every shipment runs the risk of a long and dreary list of hazards: fire, storm, collision, theft, leakage, explosions, spoilage. Cargo insurance is the trader's shield against the losses such hazards may bring.

Many traders take the easy way out: they let their forwarder or agent handle all the details, and never bother to learn about insurance themselves. But anyone engaged in foreign trade would be wise to acquaint at least an elementary knowledge of marine insurance if he is getting the protection he needs at the best price, or if he is paying for more than he really wants.

Even though the exporter's ownership in the shipment and his obligation to insure it may end when he delivers it to the pier, in many cases he would be wise to protect himself by taking insurance on the whole voyage. For no matter when he turns over title to the shipment, his financial interest in it continues right up to the time he is paid for the goods. And if the goods are damaged in transit, the exporter may find that the buyer is unwilling — or unable — to pay him.

To avoid such risks, the exporter could make it a matter of general policy that his sales terms make him responsible for providing the marine insurance even FOB contracts. The exporter can protect himself by purchasing special contingency insurance, which makes up for any shortage in claims paid by the importer's insurance.

How to insure

The basic instrument in insurance is the policy. It is a contract, a legal document, and its principal function is to serve as evidence of the agreement between the insurer and the assured. Individual policies, written for a

Conclusion:

HOW TO AND WHY EXPORT

Corazon A. Cabungcal

single shipment, are rarely used by companies regularly engaged in foreign trade. Shippers generally insure under long-term policies. Such a policy is known as an "open cover" or "open policy." Open-cover contracts may run for a fixed period with automatic renewal, or may run indefinitely until cancelled. Under an open cover, the assured has automatic protection for all his shipments. It is a very convenient arrangement for the trader for it gives him automatic, continuous coverage.

Under an open-cover contract, it is the assured's responsibility to declare to the underwriter all shipments as soon as practicable after they go forward. If the assured delays making such a declaration, or overlooks it entirely, the shipment is still covered if the delay or oversight was apparently unintentional. The underwriter, on his part, undertakes to accept all shipments coming under the open cover without exception, subject to the specific limit for any one

In paying insurance, the object is to buy as much protection as is necessary or prudent, at as low a cost as possible. To do this one has to know what risks can be covered and to decide how much coverage is needed. An insurance policy is a contract between the insurer and the assured. It is a legal document, and its principal function is to serve as evidence of the agreement between the insurer and the assured. Individual policies, written for a single shipment, are rarely used by companies regularly engaged in foreign trade. Shippers generally insure under long-term policies. Such a policy is known as an "open cover" or "open policy." Open-cover contracts may run for a fixed period with automatic renewal, or may run indefinitely until cancelled. Under an open cover, the assured has automatic protection for all his shipments. It is a very convenient arrangement for the trader for it gives him automatic, continuous coverage.

To a great extent, the protection your marine policy gives you is defined by its "average" terms. The word "average" means partial loss. Partial loss can mean the total loss of part of the insured cargo, or simply damage to a part of it. General average is a loss that affects all cargo interests on the ship, and the ship itself. General average has been defined as "a partial and deliberate sacrifice of the ship, freight, or goods undertaken for the common safety of the adventure in time of peril and/or extraordinary expenditure with the like of a vessel."

In many cases, the assured has only to declare a shipment to his underwriter, through his agent or broker, using a brief description form. This declaration gives the basic facts about the shipment. When he wants to have evidence of insurance, the assured can get a special marine policy for the individual shipment.

A floating policy arrangement is another convenient way for the assured to get a legal document proving his insurance. It is similar to the open cover except that it is for a fixed amount of insurance.

Another coverage arrangement is the "open slip." It is the document used for placing insurance. It has no legal value in itself, but may be used as evidence of the date of conclusion of the contract.

Still another type of insurance is called the "block policy," which is used primarily for inland transit. It covers a number of small

sendings by rail, air or parcel post for a specific period, subject to a limit for any one sending or conveyance.

In buying insurance, the object is to buy as much protection as is necessary or prudent, at as low a cost as possible. To do this, one has to know what risks can be covered and to decide how much coverage is needed. An insurance policy defines its coverage in terms of the nature of the loss or damage, the extent of the loss or damage, and the conditions under which it occurred.

To a great extent, the protection your marine policy gives you is defined by its "average" terms. The word "average" means partial loss. Partial loss can mean the total loss of part of the insured cargo, or simply damage to all or part of it. General average is a loss that affects all cargo interests on the ship, and the ship itself. General average has been defined as "a partial and deliberate sacrifice of the ship, freight, or goods undertaken for the common safety of the adventure in time of peril and/or extraordinary expenditure with the like object."

Making and settling claims

Ultimately the real test of an insurance policy's value comes when the insured goods are lost or damaged and the insurer makes good the loss. This is done through the filing and "adjustment" or settling of claims.

Generally, the exporter endorses the insurance of a shipment over to the buyer at the time he endorses the bill of lading, before the ocean voyage starts. Thus the buyer becomes the assured party, and if the loss or damage takes place after this point, it is his responsibility to file the claim, and he is the one primarily interested in getting a favorable adjustment.

Special hazards to watch for

Many goods are especially prone to particular hazards. Here are examples of such hazards and

some of the goods most prone to them:

— **Breakage:** bottled goods, crockery, glassware, delicate machinery, etc.

— **Fermentation:** honey, fruit juices, malt, raisins, etc.

— **Fire:** highly inflammable goods: acetylene, gasoline, celluloid, cotton, phosphorus, etc.

— **Humidity:** hygroscopic goods; salt, sugar, nitrates, etc., cocoa beans, compressed gases.

— **Odours:** foodstuffs and other products can be affected by odorous cargo stored in some hold, such as fish meal, tobacco, hides, guano and other fertilizers, garlic, etc.

— **Sweat-goods which themselves give off moisture:** arrow root, pepper, potatoes, etc. Also any goods in metal containers or containing metal parts.

— **Taint:** foodstuffs (tea specially) paper cork, cigarettes and cigars, and many other goods are susceptible to being tainted from contact with other cargo.

— **Vermin:** flour, grain, skins, tropical woods, nuts, dates, etc.

D. Finance and credit in export trade

In every export transaction, the elements of credit and finance are inextricably interwoven, and success in the export field requires that every exporter has an understanding of these factors, of their interdependence, and of how they may be assessed and related to a particular situation.

From a banker's standpoint, in relation to export trade, these terms may be defined as follows:

Credit is the agreement of a

seller of merchandise to accept payment from the buyer after a stipulated period after shipment or actual delivery.

Financing is the provision of financial assistance either to the seller or to the buyer by an outside source, such as a bank, for the period during which the goods are in transit and any additional period that may be arranged to cover special circumstances.

Credit is inherent to some extent in every export sale, unless the seller is in the fortunate but unusual position of having received payment in advance of shipment.

The exporter should therefore be aware of the various methods of trade financing and understand the mechanics, protective features, and attendant risks of each. The method selected for dealing with any particular transaction or buyer will, in general, be that giving the exporter the degree of security that fits in with his assessment of the credit-worthiness of the buyer and that of the country to which the goods are going.

The basic instrument used in financing trade is the bill of exchange or the draft. It has been defined by statute as an unconditional order in writing addressed by one person (exporter) to another (buyer) and signed by the person giving it (exporter), requiring the person to whom it is addressed (buyer) to pay on demand, or at some fixed or determinable future time, a certain sum to, or to the order of, a specified person or to bearer.

There are five main methods of financing in use today in varying degrees:

a) **Cash payment**, either on confirmation of order or on readiness for shipment.

b) **Open account** is generally limited to cases where there is an inter-company relationship between seller and buyer or where the exporter and foreign importer have had long and favorable dealings together and there are

no exchange restrictions that might complicate settlement.

c) **Consignment** wherein the exporter retains title to the goods but agrees that payment will not be required until the goods have been sold in the country of import. Until the goods are sold, the consignee may return them at any time, without any liability and at the seller's expense.

d) **Documentary bills or documentary draft.** The essence of this is that the exporter is willing, after considering the credit risks involved, to ship the goods before payment. But he is not prepared to allow the buyer to take possession of them before payment is assured or before the buyer's obligation to pay has been established.

e) **Documentary letters of credit.** It is a more expensive means of financing than the other methods, and its popularity despite this factor is an indication of the extra security that the exporter employing it enjoys. A letter of credit is an instrument issued by a bank in favor of the exporter (known as the beneficiary), whereby the issuing bank undertakes to pay to the beneficiary a certain amount of money against delivery of specified documents within a stated period of time.

There are two main types of L/C:

1) The revokable credit can be revoked or cancelled, and this can be done at any time without the consent of the beneficiary. The latter, therefore, has no guarantee of payment.

2) The irrevokable credit cannot be revoked or modified before the expiration date without the expressed consent of all

parties to the credit. The credit consists of a legally binding agreement between the issuing bank and the exporter, no matter what calamities may befall the buyer in the interim.

E. Foreign trade barriers and the exporter

Among the many things an exporter needs to find out when he begins to explore foreign markets for his products is the rate of customs duty that will be levied on it and what other foreign trade barriers might be applicable to it in various target markets. This information will help him determine whether imports are admitted freely and whether the price of his product is competitive once customs duties and other charges have been paid.

Trade policy instruments

The trade policy instruments a country can use to protect its domestic industry by restricting imports are basically of two types:

a) those influencing the price of the imported product, i.e. customs duties, taxes and other charges levied on importation and

b) those influencing the quantity of foreign goods admitted on the domestic market, i.e. quantitative import restrictions, which usually take the form of import quotas or licensing or both combined.

Another way of regulating the flow of imports and exports is by means of foreign exchange regulations. There is also a whole series of technical regulations, e.g. sanitary regulations and regulations concerning labelling and marking as well as certain formalities, e.g. proforma invoices, consular visas, certificates of origin, etc. that the exporter must be familiar with.

Tariff barriers

Basically, customs duties are levied either for the purpose of

providing revenue to the government or to protect domestic industry or for both reasons, and sometimes also for safeguarding the balance of payments.

Tariff systems provide either a single rate of duty for each item, applicable to all countries, or two or more rates, applicable to different groups of countries.

The tariffs are usually classified as follows:

1) **Single-Column Tariff** consists of one schedule of duties in which each rate applies equally to imports from all countries;

2) **General/Conventional Tariff** shows the reduced rates agreed through tariff negotiations with other countries; and

3) **Preferential Tariff** wherein reduced tariff rates (or in many cases zero duties) are applied by a given country to imports from one or several other countries because of a special relationship between them.

Customs duties

Customs duties can be of different types depending on how their amount is determined, i.e., either as a *specific amount per unit* or as a *percentage of the value* of the goods or finally, as a combination of these two methods. These include specific duties, ad valorem duties, alternative duties, compound or mixed duties and seasonal duties.

Protection Against Unfair Competition

Unfair competition in international trade usually takes the form of dumping or the payment of direct or indirect export subsidies. The effect of both is that the price of the imported product is lower than the "normal value" for such goods. An importing country may levy an anti-dumping duty or a countervailing duty in order to neutralize the effects of such unfair competition if it is causing damage to or threatening estab-

lished domestic industry or retards the development of new domestic industries.

Non-Tariff Barriers

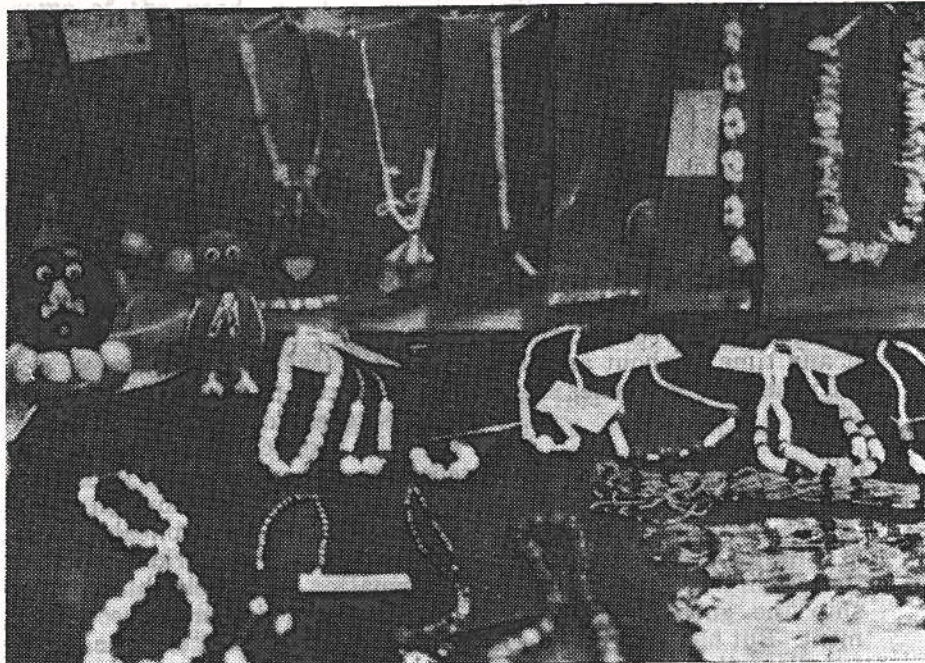
These include the following:

- 1) Quantitative restrictions. These can take a variety of forms and usually involve the establishment of quotas or the granting of licenses, or both combined.
- 2) Foreign exchange restrictions. Restrictions are not applied to the goods but to the possibility of obtaining foreign currency to pay for them.
- 3) Technical and administrative regulations. These include veterinary regulations, food and drug regulations, regulations on technical standards and administrative regulations such as marking.
- 4) Consular formalities. In a number of countries, consular documents like consular invoices, usually in the language of the importing country, must accompany shipments.
- 5) Government procurement are purchases by the public sector.
- 6) State trading involves exports to countries with a centrally planned economy where foreign trade is usually a state monopoly and their trade policy is determined within the context of their national plan.

Preferential Arrangements, Customs Unions and Free Trade Areas

Preferential arrangements — under which some countries enjoy tariff preferences.

A customs union is an agreement whereby the participating countries eliminate customs tariffs and other obstacles to trade in-



side the area and maintain a common external tariff which is applicable to all imports from third countries.

A free trade area also provides for the elimination of customs tariffs and other obstacles to trade among its members, but does not require the introduction of a common external tariff: The members can thus maintain their national customs tariffs — and an independent trade policy — vis-a-vis third countries.

International Cooperation on Tariffs and Trade

The world-wide pattern of trade barriers is in an almost constant state of change. To have an idea of what he can expect in the future, the knowing exporter will keep an eye on the activities of the two principal international organizations concerned with tariffs and other trade barriers: the General Agreement on Tariffs and Trade (GATT) and the United Nations Conference on Trade and Development (UNCTAD).

IV. FROM MANUFACTURER TO BUYER

A. Documenting Export Shipments

One of the major differences between carrying on trade in one's own country and with a foreign country is the documentation. A number of documents must accompany every export shipment.

The first thing that an exporter (or his forwarder) must find out is what documents are needed in his own country to clear a shipment for export. He may, for example, have to obtain an export license.

In addition, all countries require that the exporter fill in a document (or documents) to clear goods through Customs in his own country. This document, which is collected at the port of export, is used mainly for compiling statistics on the volume and value of a country's merchandise export.

In the importing country, the main purpose of the documents accompanying a shipment is to provide a specific and complete description of the goods so that they can be assured correctly for duty purposes. But first the importer may have to obtain an im-

port license and/or foreign exchange permit.

The documents most frequently required for an export shipment are the following, but the exporter should remember that not all of them are required by all countries nor for all goods. He must find out which ones are called for in shipments to the buyer's country.

- Commercial invoice (and custom's invoice)
- Consular invoice
- Certificate of Origin

which an exporter must be familiar with are those that govern the marking and labelling of products shipped to a foreign market and intended for sale there. The first requirement in most countries is that an imported product carry on it a mark of origin. This tells the buyer exactly where the product comes from, sometimes to help protect domestic industry, and in countries where imports are controlled, aids the authorities in maintaining that control.

The purpose of labelling is to make plain to the purchaser the quality and quantity of the pro-



Native fruit preserves command a big share of the export market.

- Certificate of Value
- Certificate of health or sanitary certificate
- Certificate of inspection, analysis or weight
- Packing List
- Ocean Bill of Lading

B. How to Mark and Label Export Shipments

Among the regulations with

ducts that he is buying and to protect him against harmful ones. Among the information that may have to be included on the label is the name and address of the manufacturer, the weight or volume of the contents, a list of the ingredients, and other relevant details.

Another type of marking with which an exporter should be familiar is shipping marks. Proper marking on the outside packing of goods being shipped are highly important if these are to reach customers abroad as quickly as possible and if they are to receive proper treatment during shipment.

V. PROCEDURAL GUIDE ON HOW TO EXPORT IN THE PHILIPPINES

A. For you to be able to undertake legal transactions, you must first (1) register with the Bureau of Domestic Trade (if you are a proprietor) or the Securities and Exchange Commission (if you are a partnership or incorporated); (2) pay the municipal tax and (3) pay the BIR privilege tax. File your exports information sheet with the Export Department of the Central Bank. If you wish to avail of appropriate incentives and tax exemptions, register with

the Board of Investments, in accordance with RA-6135.

B. If you received a purchase order from your buyers, you are then in the process of negotiations of an export sale. This purchase order must be confirmed. At this stage, you would be needing the service of a bank since all payments for goods exported are coursed through a bank.

C. Upon confirmation of the purchase order, preparations for shipments of goods must start in anticipation of the opening of letters of credit in your favor. Meanwhile, you should start readying

Small and medium entrepreneurs wishing to venture into the foreign market should find these procedural guides to exporting from the Philippines simple and easy to follow.

A. For you to be able to understand legal transactions, you must take legal advice from the Bureau of Domestic Trade. If you are a warehouse or factory, and arrange with shipping agents for cargo space. If you want your shipment to be insured, contact an insurance company. A customs broker is equipped to handle your freight from warehouse or factory to the pier area and arrange for arrastre and other services within the custom's zone. For additional fee, the customs broker maybe authorized to undertake all the paper work incidental to your exports including follow-ups with your bank, the Bureau of Customs and the Bureau of Internal Revenue.

D. Prepare to receive the letter of credit which has been opened in your favor. The letter of credit, among others, contains instructions about the shipment and the desired manner of payment.

E. With the receipt of the letter of credit, and with your goods ready for shipment, confer with your bank in: (1) preparing the report of Foreign Sales and (2) applying for an export license. The Report of Foreign Sales is forwarded by your bank to the Central Bank while the export license is forwarded to the Export Coordinating Department of the Bureau of Customs.

F. Next, you apply for a commodity clearance from the Government Offices concerned at the Bureau of Customs Building. This office verifies and issues a clearance stating that the product to be shipped conforms to export standards.

G. Obtain an Export Entry application form from the Export Coordinating Department, Bureau of Customs and fill it up.

H. You then present the commodity clearance to the Business Tax Division of the BIR of the Bureau of Customs Building, together with (1) your privilege tax

receipt, (2) the commercial invoice covering the shipment and (3) a duly accomplished Export Entry application form.

If all documents are in order, clearance by the BIR is indicated on the Export Application form. These documents are then forwarded to the Export Service Division of the Bureau of Customs for review. If complete and in order, you will be issued a copy of the Export Entry.

I. The next move consists in the payment of wharfage fees to the Customs Cashier at the Export Service Division which in turn issues an official receipt of payment and indicates clearance thereof of the Export Entry. Subsequently, you must pay arrastre charges to the operator stationed at the same place, who likewise indicates payment and clearance on the same form.

J. With your completed and authorized Export Entry form, your goods can be brought to the pier and loaded vessel. Upon loading, a customs representative on board checks and verifies cargo against documents and indicates clearance on Export Entry Application Form.

K. After loading has been completed and checked, a bill of lading is turned over by the shipping company representative to required, you can present your bill of lading to the Export Service you. If a certificate of origin is Division of the Bureau of Customs which issued such certificates. However, if you are registered with the Board of Investments under the Export Incentives Act (RA-6135), the procedure for the shipment of the registered export product is simpler.

L. Within seven days after shipment of goods, present the following documents to your bank for

negotiations:

- Letter of credit
- Bill of lading
- Demand draft
- Commercial invoice
- Any other documents required in the letter of credit

M. The bank examines the above documents, giving particular attention to whether the documents conform to the instructions in the Letter of Credit. If all documents are in order, the bank accepts the draft and documents, and pays you. The bank forwards the documents to the importer's bank or to the importer directly, depending upon the instructions of the letter of credit. This completes the cycle of exporting in the Philippines.



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WASTE AS FERTILIZER

by

Ma. Luisa V. Plana

Introduction

Haste makes waste. In this age of recycling, one must think twice before disposing of waste! Not only is there money in waste utilization; it is also wise for the ecology and the economy.

Waste recycling takes a lot of varied forms; one of the most altruistic perhaps is converting organic waste into fertilizer. There is, after all, a high demand for fertilizer products specially among developing countries heavily dependent on agriculture. In 1973, the world market reeled from an acute shortage of chemical fertilizers, triggering off drastic price increases of the commodity. This is when waste-turned-fertilizer becomes of utmost benefit.

Waste recycling in the Philippines

The Philippines is not only endowed with rich natural resources but has also an abundance of waste resources. The most abun-

dant of these waste resources are: industrial, animal, agricultural and household wastes.

Industrial waste

Numerous studies are underway on the utilization of industrial waste such as mud press, tobacco, amino, brewery, castor bean meal and lumbang meal. Initial results show that the seed waste residues (castor bean meal and lumbang meal) are as equally efficient nitrogen sources as urea and ammonium sulfate. Although mud press is not as efficient, it acts as a good soil conditioner.

Until recently, the disposal of mud press or filter press cake posed a problem to sugar millers. However, it was found that, in addition to being a soil conditioner, mud press is a promising source of commercial wax and a suitable supplement for poultry and livestock feeds. Furthermore, the ad-

"The Philippines is not only endowed with rich natural resources but has also an abundance of waste resources."

dication of mud press to bagasse, when combined with nitrogen, increases the yield of sugar and improves the hydraulic conductivity of the soil. At last count (1973), mud press from all sugar mills in the country totalled .5 million metric tons per year.

Tobacco waste, on the other hand, after extraction, can be used as lining material for acidic soils due to its high calcium concentration (15%). Amino waste, found to have a high nitrogen content, is currently being tested as fertilizer.

Animal waste

Animal manure, to be valuable to plants, must preferably be combined with chemical fertilizers. This is so because the basic nutrients that plants need (nitrogen, N; phosphorous, P; and potassium, K) are not in a readily available

form in animal excreta. Furthermore, animal waste has lower N, P, and K contents that to equal those present in chemical fertilizers, it has to be used in greater quantities.

Notwithstanding these limitations, animal manure whenever available should be applied to the soil even only to act as a conditioner. As such it helps prevent the erosion, crusting and cracking of soil. It is also a good retainer of humidity thereby promoting bacterial and animal life in the soil. Likewise, because the nutrients in organic waste are released slowly, their continuous application builds up nutrient reserves in the soil.

The best fertilizer agent among the solid wastes of farm animals is poultry manure. It can be directly applied to the soil because its nutrients are in a form readily available to plants. Swine, cattle, carabao and bat droppings may

also be tapped for their high nitrogen content. These biogenic deposits have been found by researches at the University of the Philippines College in Los Baños, Laguna, to have beneficial effects on the growth and yield of lowland rice.

On the average, the amount of hog manure produced is estimated about two kilograms per head per day. A hog farm with 5000 heads would produce about ten tons of manure daily, providing 100 kilograms of nitrogen, which is roughly equivalent to about nine bags of ammonium sulfate. The Bureau of Mines reports that there are almost .3 million metric tons of guano deposits in the country while the magnitude of phosphatized rock is around .6 million metric tons.

Agricultural waste

As early as 1914, attention has

been given to the use of organic materials as source of plant nutrients. Researches centered on the rate of decomposition of different compost materials such as rice straw combined with other organic materials like carabao and horse dung. Other possible combinations include dung and corn trash, sugarcane trash, mixed herbaceous plants, cogon grass, bamboo leaves, banana stem and leaves, sorghum trash and corn trash. Of the combinations compared, however, rice straw and bamboo leaves with carabao or horse dung decompose most rapidly.

Still, some sectors are hesitant to use compost because of the lengthy time involved in the gathering and the decomposing of raw materials. The burden of composting can be circumvented by plowing under, instead of leaving on the surface, leaves, straw or trash.

Studies from the International Rice Research Institute (IRRI) reveal that rice fields alone are a rich source of nitrogen. A hectare of rice land produces straw equivalent to 30-50 kilograms of nitrogen. There are 30 kilograms of nitrogen in every 1 1/3 bag of urea. Hence, a farmer who burns rice straw from a hectare of rice loses that much fertilizer.

Left to decompose in the field, a hectare of rice straw can return to the soil as much as 18 kilograms of phosphorus, 90 kilograms of potash and 240 kilograms of silicon, and, of course, 30 kilograms of nitrogen.

Rice straw, in whatever form it is applied, increases the phosphorus and potassium contents of the soil. Nitrogen is increased only by the addition of compost which is especially recommended during the wet season.

In an IRRI experiment with rice straw, two fields were given 100 kilograms of nitrogen. In addition to this, straw was plowed under in one field. One other field did not receive any. Grain yield in the field with straw increased by 18% or 0.93 tons per hectare over the no-straw field.

Table 1
Nutrients in Crop Residues*

CROP RESIDUES	N	P	K
	Kilograms per Hectare		
Rice Straw	30-50	4-7	150-250
Corn Stover	7-23	2-4	19-76
Sorghum Stover	3-13	2-3	12-30
Sweet Potato Vines	17-58	4-11	29-94
Mongo Hay	7-22	1-4	10-29
Bush Sitao Hay	32-56	4-8	26-50
Peanut Hay	34-108	3-10	38-94
Cowpea Hay	33-57	6-8	53-65

* Cited from the Fertilizer Industry Authority Information Release. For more data, refer to the UPLB Department of Social Science Annual Report, 1974-75.

Table 1 shows the N, P, K contents of other crop residues.

Household waste

Even kitchen and other household wastes may be converted into fertilizer. The usual practice is to pile up this garbage and compost it atmospherically. In Metro Manila alone, about 200 to 250 tons of garbage is collected in one day.

Garbage samples studied show that the Metro Manila garbage is one of the best that can be used for composting. However, two questions must be resolved: *Where is the proper place to dump the garbage?* and *What is the more sanitary way of airing it?* In Singapore and Hong Kong, it is used as a sanitary land fill while being composted.

About 65% of all plant nutrient requirements can be derived from just around one-fifth of all the garbage that is composted.

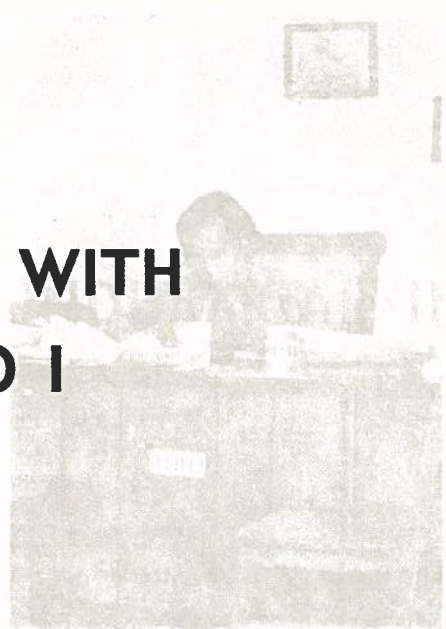
Conclusion

Side by side with the shift from an organic- to an inorganic-based farming system are the complications of pollution and the increased dependence on exhaustible energy

inputs. Concerned world organizations—the Food and Agricultural Organization and the Man and Biosphere Program—have formed consultative groups on developing research programs to utilize organic wastes. Such material recycling will make efficient use of energy which will redound to the benefit of the whole of mankind. More so, developing countries suffering from shortage of food and unable to pay for expensive chemical fertilizers, even when available, could ease both problems by making greater use of organic materials as nutrients in their agriculture.

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**A YEAR WITH
PEO I**



by **Nelia A. Embisan**

The UP ISSI Pilot Extension Office I in Tacloban City should pave the way for the setting up of similar offices in all regions of the country.

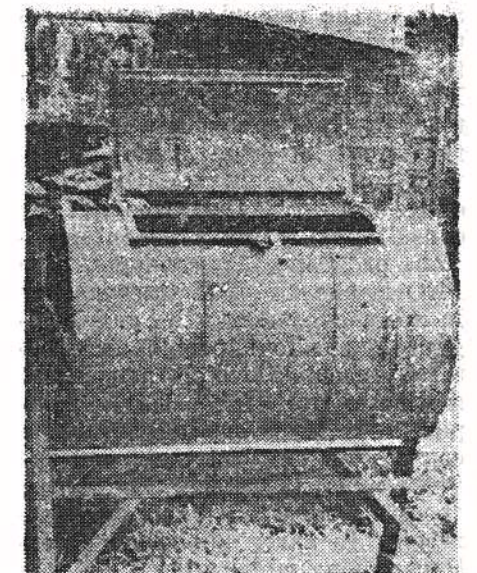


Mechanical feed mixer designed by Teodulo C. Gotico.

Since its establishment in 1966, the University of the Philippines Institute for Small-Scale Industries (UP ISSI) has always committed itself to the support of small-scale industry and entrepreneurial development. Established basically for this purpose, the UP ISSI has always been true to its commitment. Metro-Manilans, with an eye towards entrepreneurship and industry, found support from the management training, technical assistance and business consultancy offered by the Institute.

But what of the rural areas? With the recent, all-out thrust on regional dispersal, government agencies are urged to pay attention to the executive and industrial capacities that can be tapped from areas outside Metro Manila. Responding to this new challenge, the UP ISSI made plans to extend its small industry assistance projects to the countryside.

In August of 1975, the Institute felt it was ready to open a pilot extension office in the Eastern Visayas region (Region VIII), paving the way for the setting up of similar offices in all regions of the country. A request for assistance was then made to the Engineering Experiment Station, Economic Development Laboratory of the Georgia Institute of Tech-



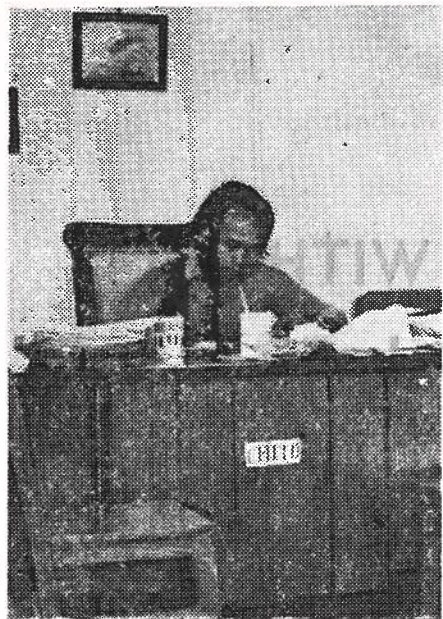
Mechanical feed mixer designed by Teodulo C. Gotico.

nology. Six months hence, on February 9, 1976, the Engineering Experiment Station approved the project and made active the Small Industry Grant. The project staff was then formed, consisting of a Project Director, a Project Coordinator, and an Officer-in-Charge. On April 23, 1976, the Small Industry Fund was granted by the Georgia Tech Research Institute under the direction of a contract from the United States Agency for Industrial Development (USAID).

On May 12, 1976, three months short of a year after the project proposal was made, the Pilot Extension Office I (PEO I) formally opened its doors to the public with a staff of seven. The staff, most of them residents of Region VIII, consists of: Ignacito U. Alvizo, officer-in-charge; Edna P. Nable, management specialist I and project coordinator; Lourdes C. Abrugar, senior research assistant; Cesar E. Lee, research assistant; Teodulo C. Gotico, research assistant; Aurora C. Canaleja, clerk-typist; and Benjamin de la Cruz, messenger-driver. Paterno V. Vitoria, director of the UP ISSI in Quezon City, acts as project director.

The Pilot Extension Office I (PEO I) is a three-year project with the aim of accelerating rural industrialization in the Eastern Visayas Region by making available to the region's entrepreneurs the assistance offered by UP ISSI to small and medium industries. It performs exactly the same functions as the Quezon City main office and has the same expertise and knowhow of the main office's staff. In terms of the consultancy, training and information programs it conducts, the PEO is the UP ISSI Quezon City in miniature, minus the gray, elegant washed-out pebble architectural ensemble which houses its mother office. The PEO I occupies a moderate-size office at the campus of the University of the Philippines in Tacloban City. Here, the staff maps out plans and operations to carry out their objectives among which are:

1. to continuously conduct con-



Ignacito U. Alvizo, officer in-charge, PEO I

sultancy in the field of medium and small-scale industries with emphasis on Philippine industries;

2. to undertake technical studies and researches on request of various government agencies concerned with industrial development;
3. to undertake the research studies for the promotion of small-scale industries; and
4. to undertake the publication of studies, monographs, research papers, articles and other written works on small- and medium-scale industry.

At a glance, the above objectives would appear to be an enormous task for a staff of seven. But the Pilot Extension Office I, through the able direction of its OIC, Ignacio U. Alvizo, has made its commitment. In its first year of operations, it has serviced 14 project cases of a technical nature and answered 15 industrial inquiries. It has also compiled data on a socio-economic base line study of Region VIII, an economic development profile of Tacloban City and conducted a survey of the training needs of entrepreneurs in Tacloban. In its first quarter report for 1977, the PEO I has visited 22 firms in Tacloban City

to assess the need for technical assistance, answered 14 inquiries and undertook seven technical assistance cases. As part of its small industry promotion campaign, the extension office has also shown audio-visual presentations of management films (work study, industrial extension work) in the five urban regions of Region VIII. In these five areas, 225 entrepreneurs/individuals attended the presentation.

One of its more valuable contributions to the feed mill operators of Tacloban City is the design and fabrication of a mechanical feed mixer. The mixing of feeds was originally done manually by the owner through the use of shovels. This mechanical device yielded a greater production output in that it replaced the purely manual process of mixing feed ingredients. The device makes use of a drum which is made to rotate manually by the operator. The mechanical feed mixer was designed by Teodulo C. Gotico, Research Assistant of the extension office and is now being utilized by an entrepreneur in Tacloban.

The Pilot Extension Office I has also initiated an organization of machine shop, automotive and agri-implementation shops in Tacloban City. This industry sector constitutes a large segment of the industrial service sector of the city, and the creation of the organization would provide integrated assistance to this area of industry. The organization, the Tacloban Ironworks & Engineering Industries Association, consists of 48 member firms and officially made the PEO I as the organization's adviser.

Realizing the need to strengthen the management capabilities of the region's entrepreneurs, and to provide a client-base in the countryside, a 32-hour entrepreneurship development seminar was held in Maasin, Southern Leyte, with 16 participants. This seminar included a one-day achievement motivation training and specific management subjects in marketing, production and finance.

The PEO I, like its mother office, maintains linkages with local

government and foreign institutions like the Commission on Small and Medium Industries (CSMI), National Economic & Development Authority (NEDA), National Cottage Industries Development Authority (NACIDA), Leyte Sababasin Development Authority (LSBDA), Provincial Government of Leyte, City Government of Tacloban, Divine Word University, Engineering Experiment Station of the Georgia Institute of Technology and the Technology and Development Institute of the East-West Center in Honolulu, Hawaii.

The Pilot Extension Office's first year of operations has been very enriching and rewarding to the business lives of entrepreneurs it has touched. As it enters its second year, the PEO I is already on the threshold of various plans and strategies geared towards small industry development. Specifically for its second year of operations, it plans to:

1. undertake industrial promotion programs through audio-visual presentations and registration of industries;
2. conduct seminars on entrepreneurship development;
3. provide technical assistance to existing and proposed industries;
4. conduct field visits to entrepreneurs and industries to answer their technical assistance needs;
5. establish more and stronger linkages with other organizations and offices; and
6. document its products.

Where for the first year the Pilot Extension Office concentrated its efforts in the Province of Leyte, it will now begin to expand its services to the Province of Samar. Samar, like Leyte, is a neglected area with promising potentials for development.

Hopefully, year 2 will prove to be a year of accelerating achievements for PEO I.

to a male form, then wedging it at the other end. This may be done in a hoppress, equipped with steam-heated jackets.

Corollary to the free bending method is the bending with a restraining strap device. While the supporting strap supports the free bending process, this process is applicable to the following types of bend:

INDUSTRIAL INQUIRY SERVICE

(Please address your inquiries to the Industrial Inquiry Service, Small Industry Journal, U.P. Institute for Small-Scale Industries, Virata Hall, E. Jacinto Street, Quezon City 3004.)

A strap made of 18 S.W.G. spring steel is suitable for bending stock up to one and a half inches thick and 14 S.W.G. for thicker stock. The strap should be wider than the bend and should be fixed at the desired shape until used.

Inquiry: I am engaged in the manufacture of furniture, and would like to seek your assistance as to how wood is bent.

F. D. Acab
Grace Furniture & Gen. Merchandise
114 Gen. Valdez Street
Caloccan City

Answer: Wood bending in the Philippines is still a novelty. Extensive research on the bending qualities of Philippine wood have not been undertaken due to lack of technical knowhow on the subject. However, the Forest Products Research and Industries Development in Los Baños, Laguna, has come up with some basic principles and methods of solid wood bending.

Principles of Wood Bending

Wood possesses elastic properties. Wood is normally bent with the use of some bending forces. However, when it reaches a certain limit, it recovers its former shape once the bending forces are released. What happens when the wood is bent beyond its elastic limits? Permanent deformation

Wood is likely to split, check and shrink if its moisture content (MC) exceeds that of the finished product. To minimize bending problems, the wood stock should be seasoned to an MC suitable for the bending method as well as to the angle of the bend.

If practical, the stock should be sawed, planed and shaped to about final form and dimension so that the operation after setting and conditioning will be limited to the operation in one plane.

Generally, timber in its natural state cannot be bent to a very short radius of curvature without breaking, but plasticizing or softening in boiling water or wet steam makes timber of many species semi-plastic. Bending the wood to a shorter radius improves the compressive properties and will have a negligible effect on the tensile properties of wood.

Not all woods can be bent. The suitability and availability of wood species govern the selection of wood to be used for bent works. If the curvature involved is severe, the bending qualities of the wood will dictate the selection of the stock. The bending properties of wood vary within the same species and more so among different species.

As much as possible, the bending stock must be free from strength-reducing defects such as decays, worm holes, shake, cross grain, pitch, surface checks, brashwood and other similar defects that will induce breakage during bending.

The Bending Stock

As much as possible, the bending stock must be free from strength-reducing defects such as decays, worm holes, shake, cross grain, pitch, surface checks, brashwood and other similar defects that will induce breakage during bending.

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Wood is likely to split, check and shrink if its moisture content (MC) exceeds that of the desired moisture of the finished product. To minimize bending problems, the wood stock should be seasoned to an MC suitable for the bending method as well as to the angle and radius of curvature involved. Satisfactory results are obtained at MCs of 20-25%.

If practical, the stock should be sawed, planed and shaped to about final form and dimensions so that the operation after setting and conditioning will be limited to sanding. Pointers in machining stock are as follows:

1. Cut stock to the minimum thickness, with due allowance for distortion and shrinkage after bending.
2. Cut stock accurately to a length that will fit tightly in the bending equipment.
3. Machine stock to uniform thickness and remove saw marks that may cause bending failures.

One of the most essential things to do to ensure absorption of bending-induced stresses is to soften the stock. Of the softening methods used, softening by steam at boiling point (211°F or 100°C) and at atmospheric pressure in a steam box or cylinder is the most commonly used.

As a general rule, steaming time of one hour per inch of thickness of stock is enough to soften or plasticize the stock. When only a section or one end of the stock is to be bent, as in tool handles, sporting goods and some furniture components submersion in boiling water is as effective as steaming.

Bending Methods

Free bending is one method of bending wood. This is done without the use of a metal supporting or restraining strap. Where the curvature is mild this process is effective. An example is the clamping of one end of the stock

to a male form, then wedging it at the other end. This may be done in a hotpress, equipped with steam-heated jackets.

Corollary to the free bending method is the bending with a restraining strap device. While the supporting strap absorbs the tensile stress, the end-pressure device provides longitudinal compression. This process is applicable to the following types of bend:

1. A simple bend in one plane
2. A re-entrant or "S"-type bend in one plane
3. A compound bend in more than one plane

A strap made of 18 S.W.G. spring steel is suitable for bending stock up to one and a half inches thick, and 14 S.W.G. for thicker stock. The strap should be wider than the wood stock and all parts of the stock to be bent must be fully supported during the bending process.

These two methods of bending are being adopted in bending machines. Current bending machines are of two distinct types: the lever arm and the revolving form.

Setting of Bends

There are two basic phases involved in the setting of bent woods: drying and fixing. During the plasticizing treatment, the stock absorbs a considerable amount of moisture. Setting can only be accomplished by removing the excess moisture in subsequent service and by cooling the bent piece.

Methods of drying bentwork depend on the intended use. For instance, some bent articles are allowed to dry at ordinary shop conditions, others like chair, radio and television cabinets are dried in a temperature-humidity controlled room or chamber. Curve components of boats and ships are dried on the frame-work of the vessels.

Fixing, the second phase, is the retention of the shape of the bent stock. A bent stock will partially straighten up if the restraining forces are released while it is still hot and moist. An incompletely set bend of sharp curvature is likely to fail in tension upon release of the restraining force. To check these faults, steam-bent stocks are set by holding them with tension straps or tie rods in a heated chamber until completely dried.

To enhance the retention of the shape of the bend, the inner or concave face should be made to dry faster than the outer. This is done by removing the form with the metal strap on or by using perforated forms to allow free air movement. As the inner face dries, the stock sets uniformly along its whole length.

Regardless of the drying method used, the bend should be kept or fixed at the desired shape until the desired MC is attained.

Bending Tests & Studies

The Bending Laboratory, Wood Processing and Utilization Service of the Forest Products Research & Industries Development (FORPRIDECOM) in Los Baños, Laguna conducted investigations on specimen of 18 Philippine woods. The studies were conducted from July 1965 to October 1973.

The studies were done to determine the limiting radii of curvature without which lumber and thin strips or laminae of Philippine woods may be bent, with the breakage limited to 5% of the total stocks. For each of the species tested an average of three trees were collected from separate regions. The results of the tests are shown on Table 1.

Should there be other matters on which you wish to be enlightened on the subject of wood technology, it would be advisable to write directly to FORPRIDECOM at Los Baños, Laguna.

Table I
THE LIMITING RADII OF CURVATURE OF SOME PHILIPPINE WOODS

Species	Density	2.5 cm. (1-in.) thick sawn lumber Average moisture content (%)	Radius at which breakage exceeded 5% of total (cm.)	FORPRIDECOM classification*	0.318 cm. (1/8 in.) thick laminae Average moisture content (%)	Radius at which breakage exceeded 5% of total (cm.)	FORPRIDECOM classification*	
Almaciga (<i>Agathis philippinensis</i> Warb)	0.440	25	47.98	Fair	12	7.89	24.81	Very good
Almon (<i>Shorea almon</i> foxw)	0.45	25	49.89	Fair	12	14.58	45.85	Good
Amugis/ <i>Koordersodendron pinnatum</i> (Blanco Merr)	0.696	25	32.59	Fair	12	19.25	60.53	Poor
Begitan (<i>Parashorea plicata</i> Brandis)	0.490	25	39.70	Fair	12	17.53	55.13	Fair
Bolong-eta (<i>Diospyros pilosanthens</i> Blanco)	0.860	25	15.67	Good	12	17.48	54.97	Fair
Guijo (<i>Shorea guiso</i> Blanco)	0.670	25	21.54	Good	12	10.69	33.62	Very good
Kalantas (<i>Toona calantas</i> Merr & Ralfe)	0.450	25	50.80	Fair	12	16.66	52.39	Fair
Malapanau (<i>Dipterocarpus Kerrii</i> King)	0.570	25	41.22	Fair	12	16.41	51.60	Fair
Malugai (<i>Pometia pinnata</i> Forot)	0.560	25	21.84	Good	12	11.02	34.65	Very good
Mayapis (<i>Shorea squamata</i> Turez)	0.450	25	47.78	Fair	12	11.96	37.61	Very good
Nato (<i>Palaquiaz luzonensis</i> F. Vill)	0.620	25	50.09	Fair	12	16.81	52.86	Fair
Pahunan (<i>Mangifera altissima</i> Blanco)	0.550	25	33.83	Fair	12	15.49	48.71	Fair
Danau (<i>Dipterocarpus gracilis</i> Blume)	0.620	25	12.70	Very good	12	12.93	40.66	Very good
Red Lanan (<i>Shorea negrosensis</i> Foxw)	0.460	25	49.50	Fair	12	20.29	63.81	Poor
Tangile (<i>Shorea polysperma</i> Blanco) Merr	0.480	25	30.58	Fair	12	15.32	48.18	Good
Tiaong (<i>Shorea polysperma</i> Blanco)	0.340	25	31.51	Fair	12	12.47	39.21	Good
White Lanan (<i>Pentacme Contorta</i> Vid)	0.440	25	49.33	Fair	12	13.03	40.97	Good
Yakal (<i>Shorea astylosa</i> Foxw)	0.860	25	21.34	Good	12	12.98	40.82	Good

* Based on radii when back strap was used.

Don't Be Silent

"At times, we have people squawking. That's not poor morale. All creative people get cross. They're frustrated because Nature, for the moment, won't tell them what they want to know."

Quotes
Management Information
November 16, 1970

Too Much Salitre Not Good for Health

National Institute of Science & Technology (NIST) scientists warn against excessive use of salitre or saltpeter. This ingredient is being used to preserve meat products called tocino and improve their color.

Salitre, chemically known as potassium nitrate, gives meat a reddish brown color, while at the same time acts as preservative. However, common practice has often resulted in improper amounts of the substance used. Sometimes housewives just mix as much as they like with the meat, because no correct amount of the substance has yet been prescribed.

Heavy curing of meat with this chemical compound could cause poisoning or even induce cancer, because the chemical produces cancer-causing nitrosamines in the body. For coloring purposes, NIST scientists advise using only minimum amounts. They suggest a rate of fifty parts per million.

Philippine Farmer's Journal
May 1976

Smoking Screens Out Noise

Smoking may be hazardous to one's health but an Australian doctor has found out that smoking is an effective screener of extraneous noise.

Dr. Russell Meares, head of the psychiatric unit of the Austin Hospital in Melbourne, Australia, conducted a research at that hospital in 1972 on why people start smoking.

Among his findings is that persons who smoke are not easily bothered by noise in their environment. The results of his study were published by *Nature*, a British Commonwealth scientific journal, in 1974.

Construction & Engineering
April 1976

PRACTICAL TIPS FOR SMALL BUSINESSMEN

Spray 110 Liquefied Grease

Applying grease can be a sticky problem, especially in those narrow spots that require lubrication. Kyodo Yushi Co. of Chuo-ku, Tokyo, has marketed a simple, labor-saving grease spray in a handy aerosol can. The new grease spray is universal type, odorless, and light yellow in color. In addition, this grease has excellent heat and water resistance and performs well under extreme pressure. A stainless steel nozzle enables the grease to penetrate into hard-to-lubricate spots. The spray immediately forms a grease film upon contact which sticks to any surface quite well. This is especially useful in such applications as vibration shaft bearings, sleeve surfaces and impact-receiving spots. Consumers will find that Spray 110 will lubricate narrow areas without having their hands stained with grease. Spray 110 can be used in office machines, construction and agricultural machinery, vehicles, chains and gears, wire ropes, machine tools and rotating or sliding parts.

Focus Japan
December 1975

Pyrolytic Conversion of Agricultural and Forestry Wastes

Pyrolysis is the thermal degradation of organic material such as agricultural wastes, producing a char, an oil, and a gas. (For example, when you burn toast, you pyrolyze it.) It provides an environmentally clean means of converting unusable ma-

terials into valuable fuels (synthetic coal and oil). Low temperature pyrolysis which emphasizes char and oil production has a special application to agricultural and forestry wastes because of the following fuel advantages:

- reduced transportation costs
- storability
- utility
- zero sulfur content

In addition, low-temperature pyrolysis:

- can be made highly labor intensive
- requires relatively low technology
- can be made self-sustaining

Thus, its potential application to LDC's is apparent. The Economic Development Laboratory, using the experience in pyrolysis gained at the Georgia Institute of Technology over the last eight years, and working with USAID support, recently completed two feasibility studies of pyrolytic conversion of agricultural and forestry wastes in Ghana and Indonesia. The results of these two studies indicate that the supply of wastes and the markets for the char and oil are excellent; in addition, the studies show that the fabrication capabilities required to build appropriate pyrolytic conversion systems do exist and that the economics of the systems are favorable.

A preliminary design was developed for a six-ton-per-day, three-shift conversion system to be located at a sawmill in Ghana. Employing 11 men per shift, the system would produce daily 1.5 tons of charcoal and about one ton of oil. Based on hardware costs of approximately US \$10,000, building costs of about \$8,500 and \$7,000 working capital, the payback period would be two years for a three-shift operation and five years for a two-shift operation; the system could not be operated economically on one shift per day.

The system could be operated in a batch mode with large pieces of wood from forestry wastes or in a semi-continuous mode with smaller materials such as sawdust, groundnut shells, or rice straw available at processing plants.

A smaller one-ton-per-day Indonesian system, using rice husks as a feed, typically has about a five-year payback.

Current plans for 1977 involve actual construction of these units in Ghana and Indonesia under AID sponsorship. The system designs for both countries incorporate many "off-the-shelf" items, and the remaining components can be readily fabricated locally.

Collaborating with Georgia Tech in the pyrolytic conversion projects are the Building and Road Research Institute and the Technology Consultancy Centre at the University of Science and Technology in Ghana, as well as the Development Technology Center of the Institute of Technology in Bandung, Indonesia.

John W. Tatom
Small Industry Development Network
Vol. 3, No. 1

New Miracle Rice Matures in 65 Days

A rice variety which matures in just 65 days has been developed at the Araneta University Foundation in Malabon, Metro Manila. The earliest maturing rice variety in the Philippines today takes 150 days. The new strain, christened "Salvador" was developed by Dean Francisco Claridad of the AUF plant breeding department by crossing two high-yielding rice varieties — the Chinese no. 2, developed in the People's Republic of China, and Baraki, a Japanese variety. "Salvador" can be planted and harvested four times a year in irrigated fields and twice a year in unirrigated ones. Aside from early maturity period, the new strain can be planted in either lowlands or uplands, is a good draught-resistant, and has high milling recovery rate. It will be soon be released to rice farmers in the country.

Times Journal
May 1, 1977

Sugar Mill/Distillery Wastes Generate Biogas

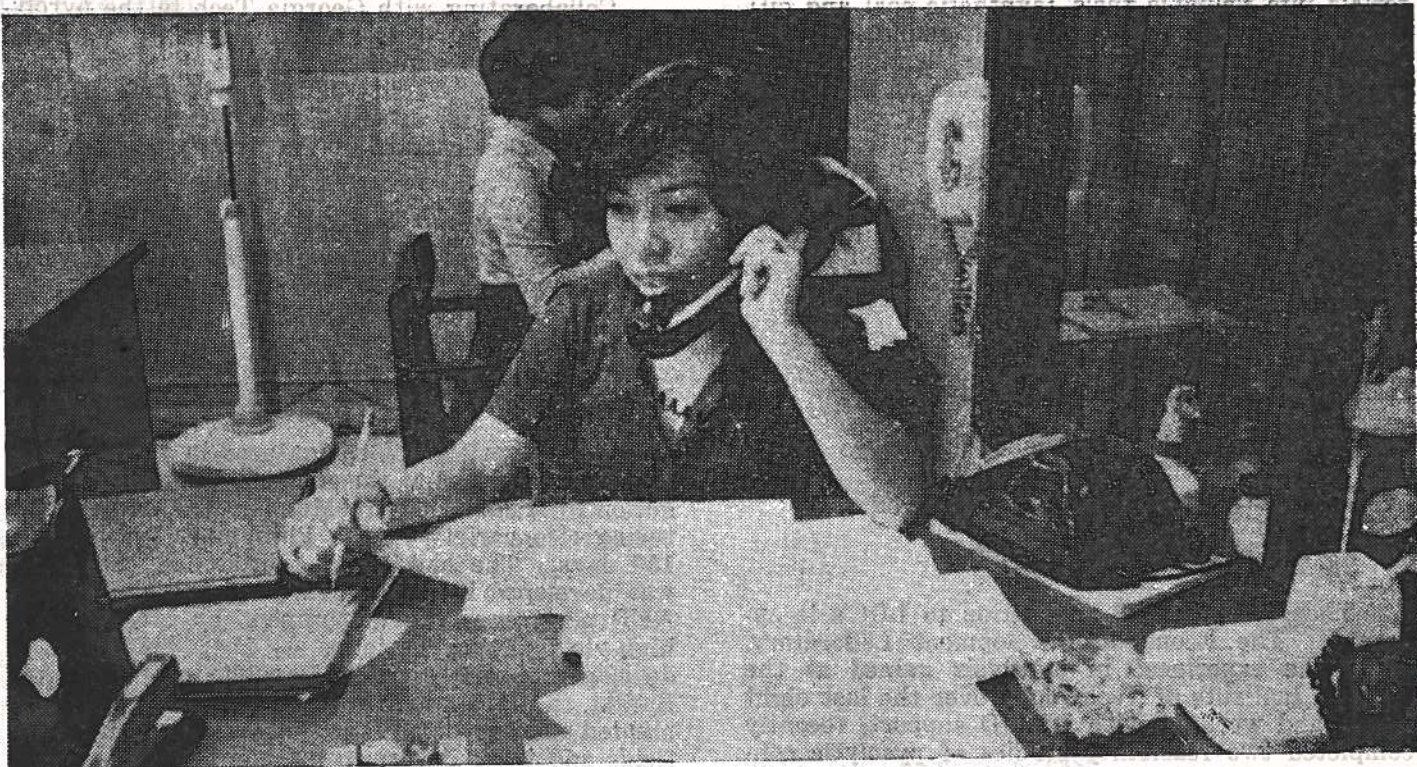
Researches have shown that waste products from sugar cane processing have valuable uses. A recent discovery was the utilization of sugar mill/distillery waste to produce fuel.

Sugar cane distillery slops or what remain after alcohol has been extracted from molasses generate biogas, which can be used as fuel for cooking and other heating kilns that currently use liquefied petroleum gas (LPG).

Slop, or distillery waste, produces methane, a colorless flammable gas which can be pressed for use as fuel in internal engines and for domestic purposes. Gas produced from slops is flammable within five days, a distinct advantage over gas produced from manure which takes 10 to 14 days before it can be used as fuel.

This discovery at the Central Azucarera de Tarlac is currently being tested.

Bulletin Today
May 30, 1977



You, too, can

WRITE BETTER LETTERS

by

Myrna R. Co

• *The first and most important rule for effective letterwriting is to be ourselves.*

Introduction

Meet Mr. Conrad Lopez, garment manufacturer, would-be exporter. Note, as he talks with a buyer, how well and confidently he speaks. He talks just a bit too much, perhaps. But no matter! He is emphatic! He is persuasive! He knows his business and makes no bones about it. The customer seems convinced and departs with a promise of a fair-sized order.

Alone in his cubicle of an office, Mr. Lopez remembers he has a letter to write. Over a month ago, he decided he was prepared to venture into exports—a move he has brooded over and dreamt about since he began to manufacture children's wear. He has written prospective principals abroad—36, to be exact—offering his small manufacturing concern as sub-contractor. No doubt, he told himself, 36 letters had to yield a reply or two. This morning, sure enough, the first response came—an inquiry from New York!

Reaching for pen and paper, Mr. Lopez is remarkably transformed. Gone is the eloquent and lively speaker. In its place is a nervous and hesitant writer, sweating over a first draft, through a second and finally a third. In the end, he is quite unsatisfied but the letter has to go.

Let us take a look at the letter he wrote.

After your communication of the first of May instant, we wish to express our heartfelt thanks for your kind inquiries showing interest in our manufacturing operations.

We have duly noted your instructions and therefore we are enclosing hereto photographic reproductions of our latest and best in children's wear.

As per your own designs which your good-selves were so kind to enclose, we feel confident that our humble capabilities will meet your high standards of excellence.

If it is to your heart's desire, we will just be too ready, willing and able to provide you with actual samples of our finished designs.

Last but not least, we thank you in advance for your esteemed favor. We hope to hear from you again in the next mail. Believe me, we are yours very sincerely.

What is wrong with this letter? The style is pompous, the sentences inconcise. Worse, it is studded with clichés and sprinkled with redundancies. The overall effect is a stilted letter.

Mr. Lopez need not "beg" as he's not asking for a dole out. A letter is a letter and not a "communication." A date is a date and not an instant.

A straightforward "thank you for your interest" is preferable to the profuse expression of gratitude with which he opened his letter. "Enclosed is" more appropriate than the longer "enclosed hereto." He has alternated between abject humility on one extreme and unwavering self-confidence, on the other. The effusive closing sentence was totally unnecessary. It is alright to call a picture a "photograph" but to say "photographic reproduction" is going overboard. Note the use of the clichés: "heart's desire," "ready, willing and able"; and "last but not least." Other phrases may be used in their stead with more effective results. And so on, for the list is long.

Mr. Lopez' letter may not be exactly typical of business letters small-scale entrepreneurs/managers write. But the thing is most of us find it hard to skillfully handle letters, memos, reports and the like. And why not? Even professional writers sometimes have difficulty putting words on paper. So it is naturally that much harder for businessmen whose talents lie in fields other than writing.

What your letters say of you

However, the small businessman must strive to improve his writing ability. When he writes a business letter, he represents himself and his company but he reflects his company's personality through his own. Indeed, a small firm's efficiency and competence may be judged by the manager's letters to a greater degree than he realizes. In many instances, the people who help decide the firm's future—customers, suppliers, importers, agents, etc.—may seldom or never meet him; their impression of him and his work must therefore depend very largely on the quality of what he writes.

Letters are doubly important to the exporter or would-be exporter. Letters can launch him into export, expand his business. Letters can make or break him. Therefore, the manager or entrepreneur owes it to himself and to his firm to make them as good as he can.

Definitely, writing good business letters is not a rare talent restricted to a handful of people with extraordinary writing ability. Almost anyone can learn to write not necessarily brilliant, elegant pieces, but to write for results.

You can improve your letters

Perhaps the first and most important rule for effective letterwriting is to be ourselves. Too many of us regard letter writing, especially business letter writing, as some kind of formula. We have a supply of stock expressions which we keep in our inventory of words from which we requisition on appropriate occasions. Why don't we let our true

selves loose and use phrases and words that come naturally, words that form part of our daily vocabulary. After all, when we write to someone, we talk to him on paper.

Plan your letters

If you want to write a good letter, you can do it, but you must plan what you want to say and determine how you want to say it before you begin.

The first step in planning is to list down the points you want to include. To illustrate, let us turn again to Mr. Lopez and his letter to a prospective foreign buyer. Let us say the buyer has shown definite interest in the firm and wants to see samples of its work. Naturally, Mr. Lopez wants to reply as soon as possible, so he sits down and lists down the points he wants to make. He wants to:

- thank him for his interest
- describe his company, its operations and products
- enclose pictures of his finished designs
- say that samples are on the way
- describe the samples
- hope that the business relationship will flourish.

The next step is to eliminate irrelevant and superfluous material and arrange the remainder in the best order. In this case, Mr. Lopez should drop the description of his company as he has already done so in his first letter. After arranging the remaining points in the best sequence, his letter would then (1) say thanks, (2) say that samples are on the way, (3) describe the samples, (4) enclose pictures, and (5) express his hopes.

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We sincerely hope this will open the door to a lasting and mutually satisfying relationship between us.

Write for your reader

It is advisable to let your reader feel important. Put him first, whenever possible. Your opening sentence must grab his attention and hold it. You must sound friendly and interested in your reader's problems.

Avoid the cold and formal:

This will acknowledge receipt of your letter dated March 18 in which you requested for a demonstration of our rice thresher Model No. 128. In reply, I should like to inform you that

Much better:

Our promotional team is due in your area next week and should be able to call on you on Wednesday, the 16th, for the demonstration you requested.

The focus of this sentence is the satisfaction of the reader's request. Other good ways to open:

- **Make a request. Please send me more information on the**
- **Say what you have done. I have asked our branch in Baguio City to get in touch with you.**
- **Dive in. The criticism you raised in your letter of last week is not merited.**
- **Ask a question. Is there a way we could better serve your needs?**
- **Show appreciation. We are very glad to do business with you.**

Throughout your letter keep your eye on the reader. Not **We are enclosing . . .** but **You will find. Not I'd like to point out . . .** but **You'll be interested to hear that . . .**

To find out more about your reader, study his or her letter. Is this customer friendly or hostile? Does the head of maintenance know that you tried his latest idea two months ago? Form an opinion and follow through.

If the first sentence motivates a person to go on reading, the last sentence of your letter makes a lasting impression — one that can affect the future. Bad form: **Thanking you in advance . . .** and **Hoping this does not inconvenience you too much.** Much better: **Thanks. We are very glad to have**

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Pay special attention to instructions. They belong in the last sentence. **Call me for an appointment.** Are the instructions complicated? Explain them fully in the body of the letter and repeat the main idea in the sentence. **Check the figures and deliver them to me tomorrow.** What, and when, simply and directly stated.

If no action is sought, end on an upbeat personal note: **If you are in town next week, drop in to say hello.** During the holiday season, don't forget to include greetings.

The final step is to double-check your letter for errors — misspellings, incorrect facts and figures, grammar, punctuation, completeness and enclosures. Know the correct business letter form, which is readily available in most textbooks.

10 Don'ts of Letter writing

Marting, Finley and Ward lists down ten don'ts of good writing in the book **Effective Communication on the Job.**

1. **Don't beg.** You are not asking for a hand-out. Nor are you a king so don't write **we** unless you are speaking for your company. **Don't state.** You are not handling down a Supreme Court decision. **Don't tell** somebody his letter is in your hands or on your desk or before you. He doesn't care where it is as long as you have read it, and he does want you to read, not duly note it.
2. **Don't tighten up.** Stiffness is alright in an upper lip or in a dress shirt, but in a letter it makes your words read like a picket fence. Be relaxed and loose when you write, and don't try to translate your thoughts into strange, unusual words that are completely foreign to the way you ordinarily say things.
3. **Don't send a crossword puzzle to your reader.** He is not interested in solving riddles or cryptograms. To organize your material, you must keep in mind that a letter has a beginning, a middle and an end, and it is up to you to put the right things in the right place.
4. **Don't be longwinded.** Keep the short story short and say what you have to say once. You are a letter writer, not a revolver, so don't be repetitious.

5. **Don't write down.** You are not teaching school and your reader is not inferior or necessarily ignorant. The condescending person is never liked and the condescending letter is hardly likely to win friends or influence people.

6. **Don't be a bully.** Never get tough in a letter. Spoken words vanish into air, but when you put down on paper, they stick around longer than a 3-year mortgage, always ready to jump out of somebody's file to refute your claim that you were misquoted.

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Market Outlook

The ice making industry plays a vital role in the country's drive for self-sufficiency in food production. An estimated 80% of ice produced is channeled to the fishing industry.¹ In coastal areas far from urban centers where fishing is the major source of food and income, ice is invaluable but often unavailable. This has resulted in a high percentage of fish spoilage.

Despite the pressing need for ice, not enough ice plants in the far-flung coastal areas have been established. There seems to be two inter-related reasons for this situation. First, investment requirements especially fixed capital for an ice plant are often too large relative to the resources of entrepreneurs in the coastal areas. Second, the bulkiness and short life of ice limit the geographical extent of the market. Thus, we find ice plants in the provinces with a high production capacity vis-a-vis a limited and localized market.

However, there is now in the market a transportable ice plant

A Viable Investment:

TRANSPORTABLE ICE PLANT

by
Tomas J. Ranada

without the disadvantages of the fixed ice plant. Its investment requirements are modest. Its capacity is just adequate to serve the needs of a fishing village or a fishing vessel. It can be transported where ice is needed, even aboard a fishing vessel saving on delivery and fixed costs.

Technical Aspects

The transportable ice plant can produce approximately one to one and a half tons of ice per day; 48 or 60 blocks of 50 lbs. each in a period of 24 hours. It is constructed, built and mounted on a structural steel base to facilitate transportation. It has attachments to produce crushed or cube ice. Its overall dimension is approximately 12' x 4' x 4'.

It has an open-type compressor, twin cylinder, single acting, complete with flywheel and drive pulley, initial oil charge, service valves and suction strainer, running at a low speed, using Freon 12. The condenser is built out of heavy duty G.I. sheets and copper tubing and cooled by a heavy duty direct driven fan blade.

The evaporator which is submerged in the brine tank is made out of six circuit coils of twelve rows each. A thermostatic expansion valve or capillary tube is used as a sensing device. It is also provided with the receiving tank, strainer-drier and moisture indicators.

The brine tank is made out of heavy-duty black iron sheets with 6" insulation on all sides and 12" insulation at the bottom.

The ice cans are made out of heavy-duty G.I. sheets, strap-welded construction and are standard sizes for 50 lbs. capacity.

The transportable ice plant can be powered by a diesel engine, electric motor or gasoline engine.

The manpower requirements would be as follows:

One	Owner/Manager
One	Operator
Three	Laborers
One	Driver
	Annual Salary/Wages
	P 7,200
	4,200
	9,000
	3,600
	<hr/>
	P 24,000

The ice plant's investment requirements are modest. Its capacity is just adequate to serve the needs of a fishing village or a fishing vessel.

Financial Aspects

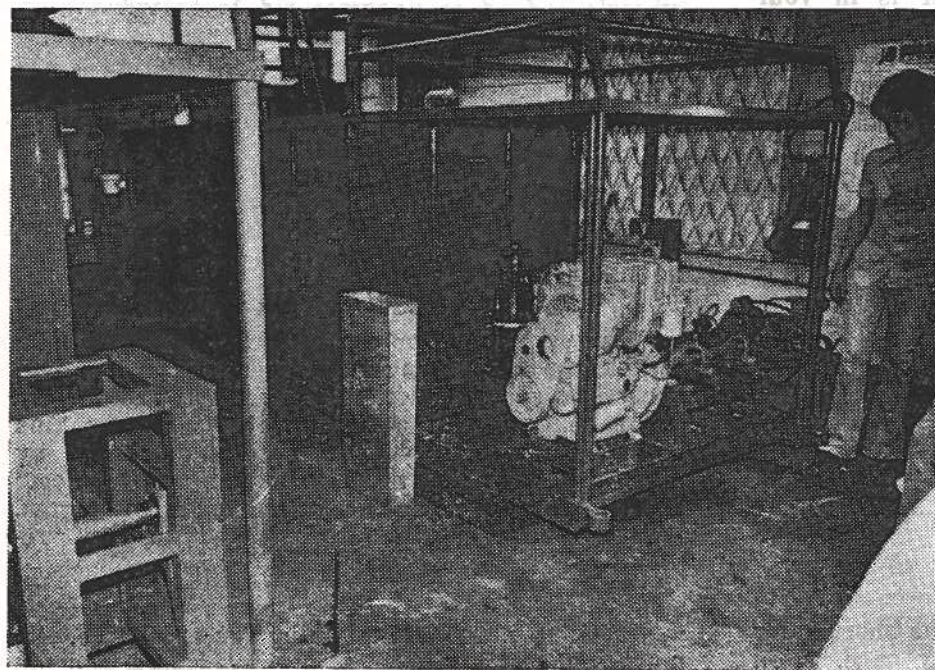
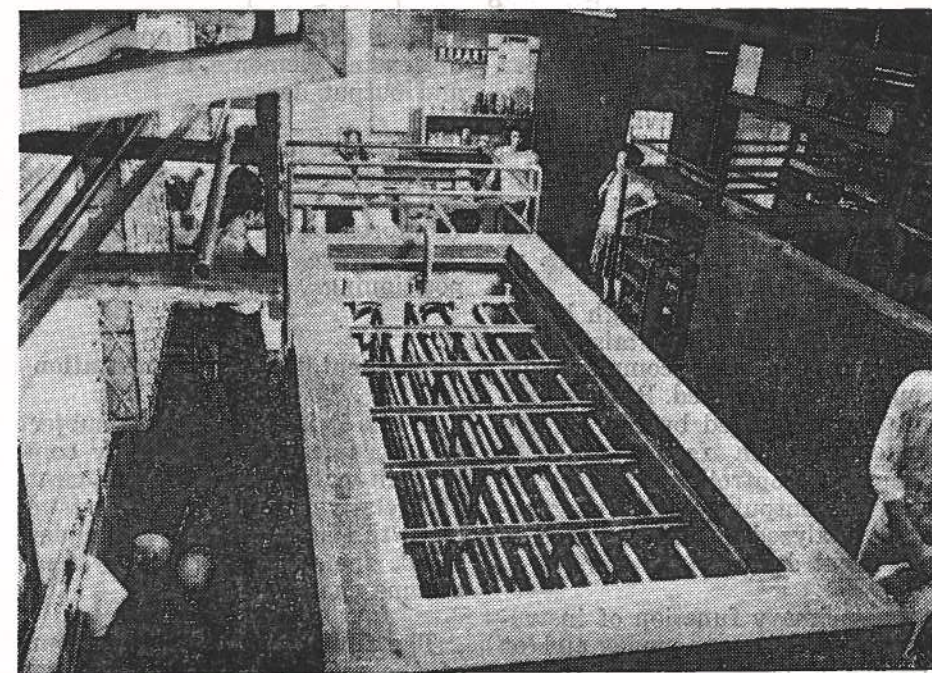
1. Fixed Capital		
Land & Building (to be leased)		
Transportable Ice Plant ¹	P90,000	
Transportation	25,000	P118,000
Furniture & Fixtures	3,000	
2. Working Capital (one month)		5,000
3. Total Project Cost		P123,000
4. Projected Annual Income Statement		
Sales Revenue ²		P135,000
Raw Materials	P15,120	
Direct Labor	13,200	
Mfg. Overhead	46,732	P 75,052
5. Net Profit Before Taxes		P 59,948
6. Return on Sales		44.4%
7. Return on Investment ³		48.7%
8. Payback Period		2 yrs. 1 mo.
9. Break-even Sales Value		P 63,285
10. Break-even Sales Volume		8,438 blocks
11. Break-even Selling Price		P 4.17

¹ Include freight and installation costs; cheaper models with second-hand engines are also available

² 18,000 blocks at P7.50 each

³ Based on total project cost

The ice plant can be transported where ice is needed, even aboard a fishing vessel saving on delivery and fixed costs.



Transportable ice plant designed and manufactured by K. C. Schultz Industries.

Introduction

Mechanization and automation of production processes is a challenge that today faces not only the major industrial concerns. Small manufacturing plants, too, find themselves compelled to institute economical and efficient method of production processes which are not based on manual efforts.

A secondary goal is increased plant safety. This is accomplished by removing the operator from toxic, noxious and hazardous areas, and by providing a more positive control on dangerous operations.

While instrumentation finds its greatest application in the food, chemical and petroleum industries, it is to varying degrees applicable to all industries. The most complex system of instrumentation is merely a grouping together of a

THE ROLE OF PNEUMATICS

in the instrumentation and control of industrial processes for small and medium industries

by

Romulo B. Rivera

Instrumentation, which plays a vital role in automation, has been considered as an art. It is now, however, slowly evolving into a science, the science of development, manufacture and application of instruments and devices for the purpose of measuring and controlling machines and process variables.

number of individual applications of sensing elements, a control unit and output device.

It is the purpose of this paper to discuss a few of the sensing and control systems by pneumatics (compressed air systems), namely temperature, pressure and level or positioning.

Fundamentals of instrumentation

While it is true that the subject of instrumentation is highly complex in nature, the fundamentals are relatively easy to understand. Once the fundamentals are understood, the more complex systems become easier to learn.

The first step is to define some of the more common terms used

in instrumentation:

1. Instrument
— a device for measuring the value of the quantity under observation.

2. Instrumentation
— the art or science of applying measuring and/or controlling de-

The brine tank is made out of heavy-duty black iron sheets with insulation on all sides and 12" thick. The ice can be made out of heavy-duty black iron sheets with insulation on all sides and 12" thick. The ice can be made out of heavy-duty black iron sheets with insulation on all sides and 12" thick.

The transportable ice plant can be powered by a diesel engine, electric motor or gasoline engine.

The manpower requirements would be as follows:

- One Owner/Manager
- One Operator
- Three Laborers

3. Control
— the method of regulating the performance of a process.

4. Automatic Controller
— a device that measures the value of a variable quantity or condition and operates to maintain it within established limits.

5. Process
— collective functions performed in and/or by the equipment in which a variable is to be controlled.

6. Process Variable
— a physical or chemical quantity or condition, such as temperature, level, etc. which varies with time.

The three basic types of instruments can be grouped according to the functions they perform (one instrument may perform only one or all functions).

- 1. Indicators
- 2. Recorders
- 3. Controllers

There are numerous process variables in plant operations to which instrumentation is applied.

- 1. Temperature
- 2. Pressure
- 3. Flow
- 4. Level
- 5. Density
- 6. Viscosity
- 7. Conductivity
- 8. Moisture
- 9. Speed
- 10. Weight

The following discussion shall be limited to the methods of applying instruments for control of temperature, level (liquids or solids), pressure and positioning. This application can be fashioned out from available components locally with standard sensors also locally available using purely pneumatics.

Temperature Control

In the textile industry, temperature control is very critical in the application of sizing liquids used in "warps" for weaving. Temperature of the sizing liquid has to

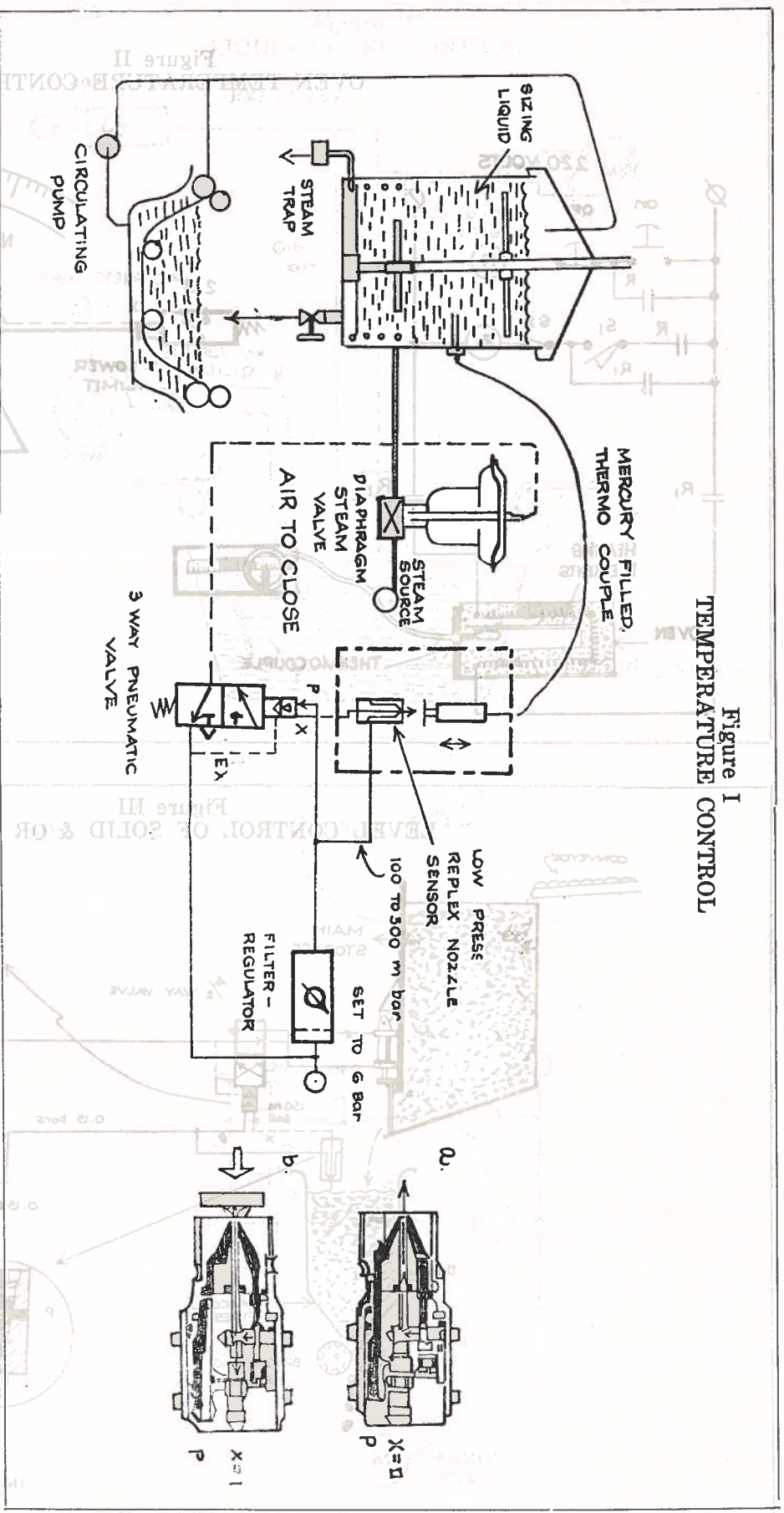


Figure I
TEMPERATURE CONTROL

Figure II
OVEN TEMPERATURE CONTROL

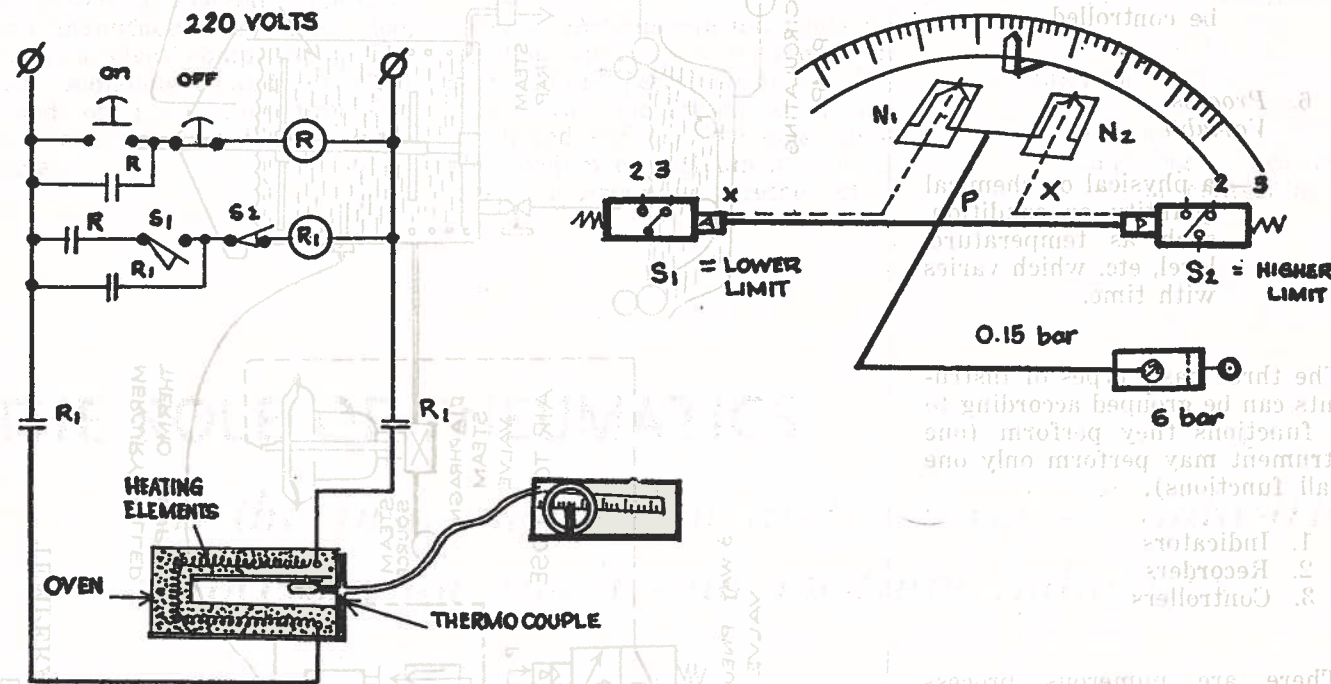
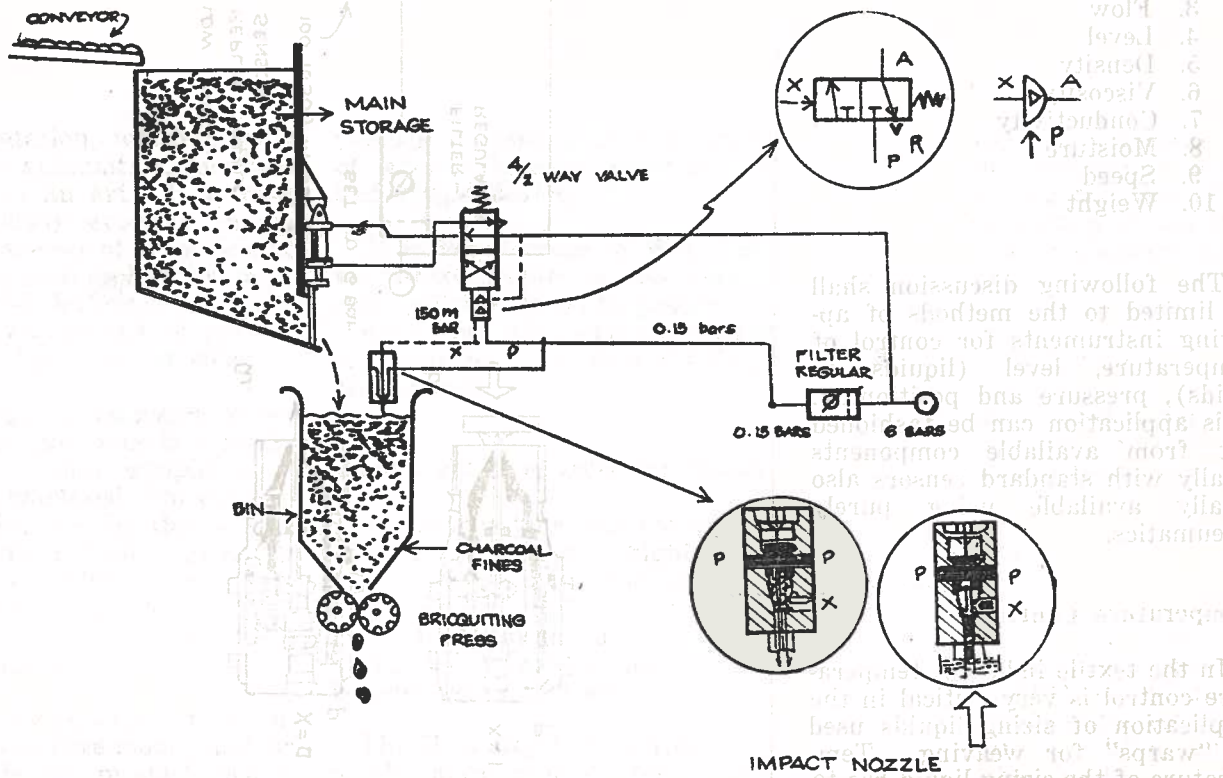


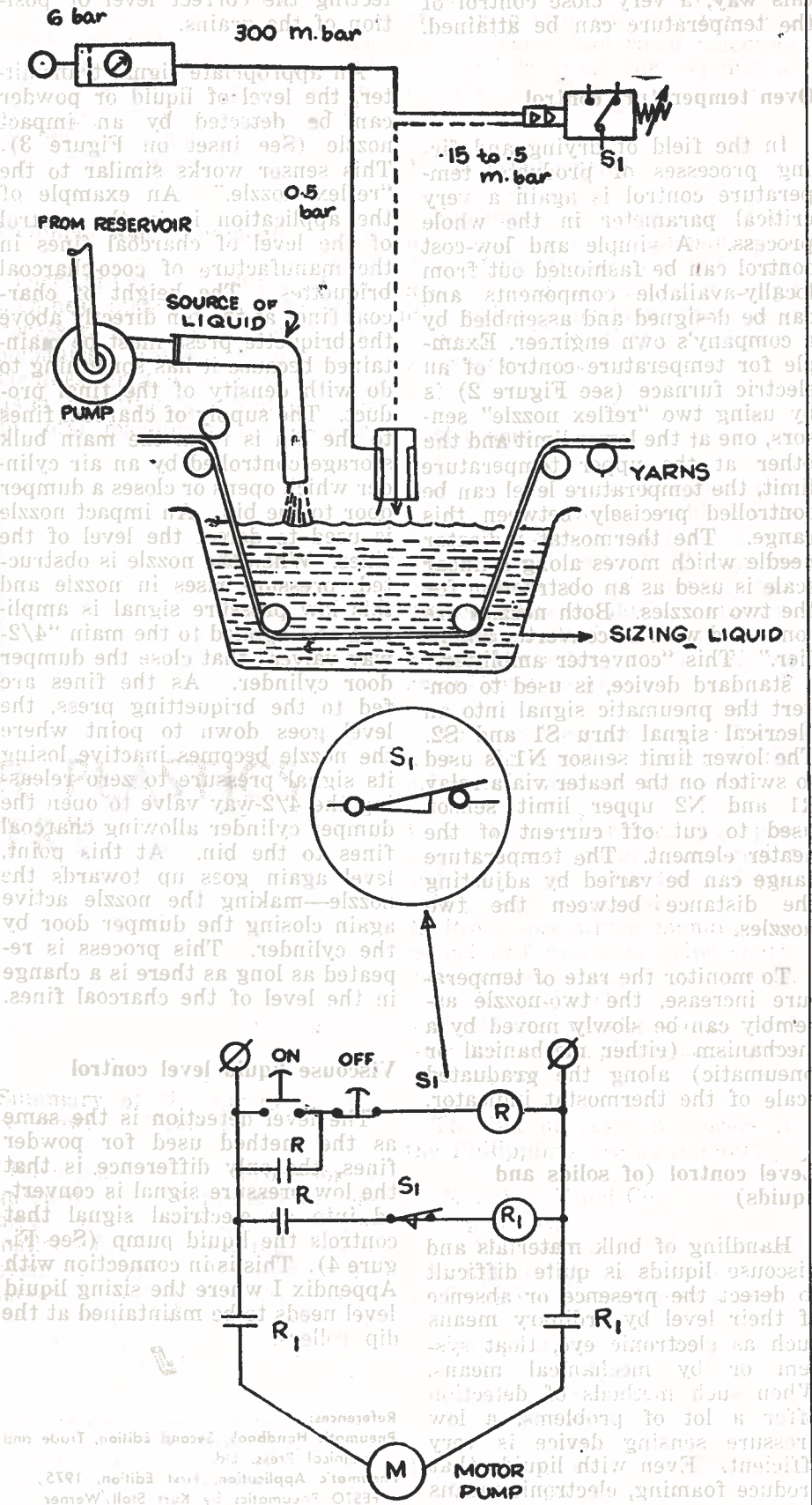
Figure III
LEVEL CONTROL OF SOLID &/OR LIQUID



be closely maintained at a certain level. The heating medium is steam which is introduced by a diaphragm steam valve (See Figure 1). Here the diaphragm valve is used to shut off the flow of steam when the required level of temperature is reached. However, it is required to open the steam valve as soon as the temperature of sizing liquid drops. This process must be automatic. Sensing this differential temperature is possible by a low pressure sensor called "reflex nozzle sensor" (see inset on Appendix I). This low pressure device basically consists of a ring-shaped slot with a hole in the center. When an air jet is released through the ring-shaped slot, it forms a circular air curtain. When an object is placed in front of the nozzle, the air jet is obstructed causing the pressure to rise inside the curtain. The pressure in the central hole rises and this can be suitably amplified and used as a signal. This type of nozzle can accurately sense objects at a distance from 0.1 mm. to 50 mm., depending on the pressure applied which ranges from 100 to 500 m bars (milli bars) and could be amplified to line pressure usually six bars. The changes of temperature is sensed by a mercury-filled thermo-couple. The movement of the thermo-couple plunger as a result of the expansion and contraction of the mercury liquid due to change of temperature is used as the obstructing element for the "reflex nozzle." The nozzle can be adjusted in direct proportion to the obstruction and the temperature could be calibrated in direct proportion to the movement of the thermocouple plunger.

To set the system to a higher temperature, the nozzle is moved away from the plunger, rendering the nozzle inactive. The nozzle controls a 3/2-way valve fitted with an amplifier. The 3/2-way valve is normally open permitting air to actuate the diaphragm steam valve and in turn allowing the steam to flow into the "size" tank. As soon as temperature increases, the plunger moves closer to the nozzle, rendering the nozzle to be active and creating pressure which is amplified to actuate the 3/2-

Figure IV
LIQUID LEVEL CONTROL



way valve to close the air inlet and shut off the steam valve. In this way, a very close control of the temperature can be attained.

Oven temperature control

In the field of drying and firing processes of products, temperature control is again a very critical parameter in the whole process. A simple and low-cost control can be fashioned out from locally-available components and can be designed and assembled by a company's own engineer. Example for temperature control of an electric furnace (see Figure 2) is by using two "reflex nozzle" sensors, one at the lower limit and the other at the upper temperature limit, the temperature level can be controlled precisely between this range. The thermostat indicator needle which moves along a linear scale is used as an obstruction for the two nozzles. Both nozzles are connected with a "converter amplifier." This "converter amplifier," a standard device, is used to convert the pneumatic signal into an electrical signal thru S1 and S2. The lower limit sensor N1 is used to switch on the heater via a relay R1 and N2 upper limit sensor used to cut off current of the heater element. The temperature range can be varied by adjusting the distance between the two nozzles.

To monitor the rate of temperature increase, the two-nozzle assembly can be slowly moved by a mechanism (either mechanical or pneumatic) along the graduated scale of the thermostat indicator.

Level control (of solids and liquids)

Handling of bulk materials and viscous liquids is quite difficult to detect the presence or absence of their level by ordinary means such as electronic eye, float system or by mechanical means. When such methods of detection offer a lot of problems, a low pressure sensing device is very efficient. Even with liquids that produce foaming, electronic means cannot be used. Powders which

produce a lot of dust during discharge offer difficulties in detecting the correct level or position of the grains.

An appropriate signal transmitter, the level of liquid or powder can be detected by an impact nozzle (See inset on Figure 3). This sensor works similar to the "reflex nozzle." An example of the application is in the control of the level of charcoal fines in the manufacture of coco-charcoal briquettes. The height of charcoal fines at the bin directly above the briquette press must be maintained because it has something to do with density of the final product. The supply of charcoal fines to the bin is from the main bulk storage controlled by an air cylinder which opens or closes a dumper door to the bin. An impact nozzle is used to detect the level of the fines. When the nozzle is obstructed, pressure rises in nozzle and this low pressure signal is amplified and applied to the main "4/2-way valves" that close the dumper door cylinder. As the fines are fed to the briquetting press, the level goes down to point where the nozzle becomes inactive losing its signal pressure to zero releasing the 4/2-way valve to open the dumper cylinder allowing charcoal fines to the bin. At this point, level again goes up towards the nozzle—making the nozzle active again closing the dumper door by the cylinder. This process is repeated as long as there is a change in the level of the charcoal fines.

Viscous liquid level control

The level detection is the same as the method used for powder fines, the only difference is that the low pressure signal is converted into an electrical signal that controls the liquid pump (See Figure 4). This is in connection with Appendix I where the sizing liquid level needs to be maintained at the dip rollers.

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Pneumatic Application, First Edition, 1975
FESTO Pneumatics by Kurt Stoll/Werner Deppert

be closely maintained at a certain level. The heating medium is steam which is introduced by a diaphragm steam valve (See Figure 1). Here the diaphragm valve is used to shut off the flow of steam when the required level of temperature is reached. However, it is required to open the steam valve as soon as the temperature of sizing liquid drops. This process must be automatic. Sensing this differential temperature is possible by a low pressure sensor called "reflex nozzle sensor" (see inset on Appendix I). This low pressure device basically consists of a ring-shaped slot with a hole in the center. When an object is placed in front of the nozzle, the air jet is obstructed causing the pressure to rise inside the nozzle. This pressure in the nozzle hole rises and this can be suitably amplified and used as a signal. This type of nozzle can accurately sense objects at a distance from 0.1 mm. to 50 mm., depending on the pressure applied which ranges from 100 to 500 m (milli bars) and could be applied to line pressure usually six bar. The changes of temperature sensed by a mercury-filled thermo-couple. The movement of the thermo-couple plunger as a result of the expansion and contraction of the mercury liquid due to change of temperature is used as the obstructing element for the "reflex nozzle." The nozzle can be adjusted in direct proportion to the obstruction and the temperature could be calibrated in direct proportion to the movement of the thermo-couple.

Started about 30 years ago, the plastics industry in the Philippines had its real take-off stage in the mid 1950's when the introduction of injection- and compression-moulded housewares in the market triggered diversification of production to other fields of plastics processing.

Today, the local plastics industry is a P500 million investment, accounting for about P350 million of our gross national product. Operating in the field of processing alone are about 400 companies employing around 30,000 workers.

Revenue from the industry is placed at P70 million.

Basic industry mechanism

In the plastics industry, production is divided into three major categories, namely:

- 1) The plastic materials manufacturer who produces the basic resin or compound;
- 2) The processor who changes the plastic resin or compound into solid shapes; and
- 3) The fabricator or finisher who further fashions and decorates the solid plastics.

thermoplastics, polyvinyl chloride (PVC), polyethylene and polystyrene fall under this group.

Although some local firms are now producing PVC resin and polystyrene for domestic use, as well as for export, the bulk of the raw materials requirements is imported from Japan.

Machinery and equipment

There are about 2000 production machines installed by the local processors. In a survey of 48 companies, injection moulding machines predominate in the industry constituting about 69% of the total machinery composition.

Of the 48 companies surveyed, 32 have tool rooms or roughly 67% of the total, with an average of four to five machines per company. These tool room machines are mainly used for repairs of moulds and dies.

Mould requirements

Producing their own mould requirements are 18 companies or 37% of the 48 surveyed. The rest are produced by the local tool and die makers, machine shops and importers from other countries as shown on Table 2.

Tool rooms

Of the 48 companies surveyed, 32 have tool rooms. Table 3 lists down the types of machines found in these tool rooms. (When the plants were visited, not all tool rooms, where moulds are made or repaired, could be seen properly. Hence, the actual number of machines may be greater.)

The products of the industry may be grouped according to the different types of producers.

1. Resin manufacturers which produce primary forms, i.e., resins and compounds in the form of granule pellets and liquid
2. Processors which manufacture secondary forms, e.g., strips, sheetings, veneer films; rigid forms, i.e., soles and heels
3. Finishers which produce finished forms, e.g., plastic bags, toys, utensils, etc.

The list of resin producers in the Philippines are as follows:

1. Mabuhay Vinyl Corp. Iligan City (PVC resin, vinyl chloride, vinyl acetate, copolymer)
2. Philippine Vinyl Consortium (PVC resin)
3. Philippine Petrochemical Products, Inc. (Polystyrene) Rosario, Cavite (Polytyrene)
4. Polystyrene Mfg. Co. Inc. Valenzuela, Bulacan (Polystyrene)

THE PHILIPPINE PLASTICS INDUSTRY *

Raw materials

The local plastics processing industry makes use of thermosetting and thermoplastics which come in the form of resins or compound. Thermosetting plastic is made up of materials which undergo an irreversible chemical change when heated and placed under pressure during the forming process. It includes phenolics, aminoplastics, silicones, polyesters and acrylics.

On the other hand, plastics materials which change only in form but do not undergo chemical change during processing are

(Summary of the survey results are shown in Table 1.)

Each local plastics processor is equipped with 11 production machines, on the average, with the smaller firms installing about seven to eight. Most of these machines are imported from Germany, Hongkong, Japan and the United States.

* This article has been adapted for the Small Industry Journal by VIRGINIA SANTOS, Senior Research Assistant, from the "State-of the Arts" Review (STAR) prepared by the UP ISSI Technology Development Department.

TABLE 1

Machinery Composition of 48 Companies¹
(Includes the Big Companies)

Types of Machines	Number	Percentage
Injection Machine	374	69
Blow Moulding	72	13
Extruders	46	8
Presses	43	8
Film Blowing	6	1
Vacuum Forming	4	1

¹ Conducted by the UP ISSI Study Team under Roland J. Rossi, Unido Expert Plastics Mould and Die Design Maker

TABLE 2

Types and Sources of Plastic Moulds

Type of Moulds	SOURCES				Total	%
	Plastic Processors	Importers	Sub-Contrac. Gen. Mach. Shop	Cus-tomers		
Injection	11	10	6	2	29	60
Blow	4	5	4	—	13	27
Compression	2	2	—	—	5	11
Rotational	1	—	—	—	1	2
Total	18	17	11	2	48	100
Percentage	37	36	23	4	100	100

TABLE 3

Types of Machines

Tool Room Machines	Number	% of Total
Lathe Machine	71	39
Milling Machine	29	16
Shaper Machine	28	15
Drilling Machine	41	23
Surface Grinder Machine	4	2
Copy Milling Machine	8	5
Total No. of Tool Room Machines	181	100%
Ave. Tool Room Machine/Co.	191/32	

The output of the local plastics processors and fabricators can be generally grouped according to the following:

1. Consumer goods
2. Industrial and electrical parts
3. Agricultural pipes and sewers
4. Other civil applications

Quality

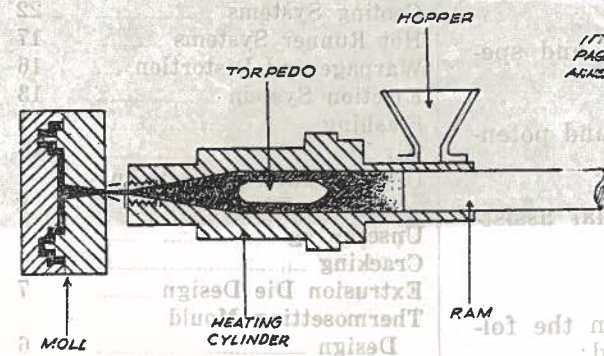
There is much to be desired in terms of the quality of products. Some common practices are resorted to by the small plastics processing establishments to cut down on production cost and beat competition. These include using more and more scrap and to copy and/or make parts thinner in components design.

Level of technology

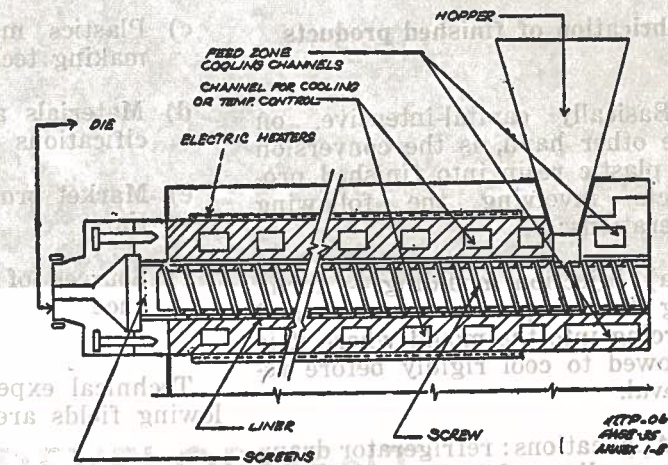
Characteristically labor-intensive, design and production of moulds consist of the following basic processes:

- a) Mould design
 - determining of specifications
 - drawing
 - determination and selection of components and parts
 - determining of mould types
 - plastic mould making
 - selection of frame
- b) Metal cutting
 - rough cutting
 - shaping
 - grinding
 - planing
- c) Machining
 - turning
 - milling
 - drilling
- d) Metal deposition*
- e) Fitting (manual operation)
- f) Heat treatment*
- g) Electroplating*

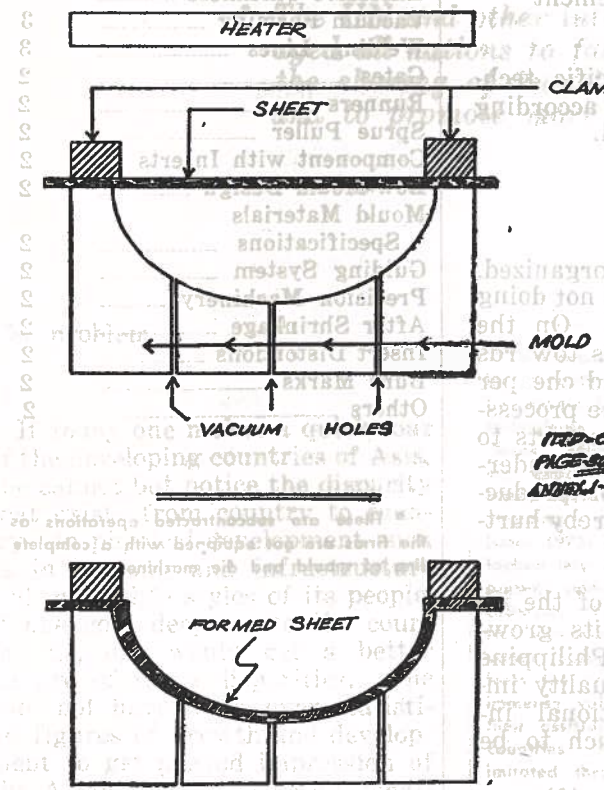
INJECTION MOULDING PROCESS



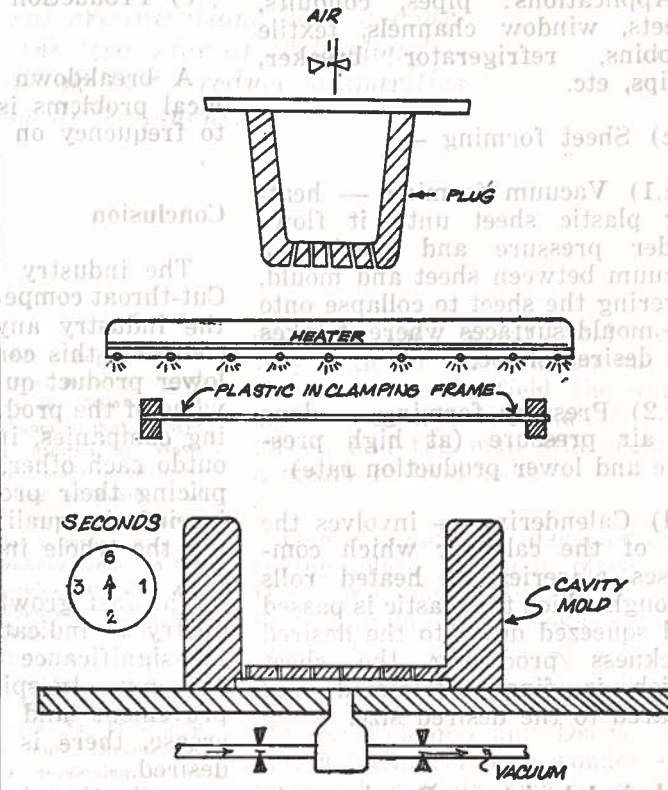
TYPICAL EXTRUDER FOR GUYA PLASTICS



FORMING



AIR-CUSHION VACUUM FORMING



- h) Fitting
 - final grinding
 - assembly
 - engraving

The industry requires the following technical information:

- i) Final assembly
- j) Testing

- a) Modern trends and developments in plastics technology
- b) Latest production techniques
- c) Plastics mould design and making techniques
- d) Materials analysis and specifications
- e) Market prospects and potentials
- f) Sources of financial assistance

Fabrication of finished products

Basically capital-intensive, on the other hand, is the conversion of plastic resin into finished products involving the following operations:

- a) Injection moulding — forming heated plastic material and forcing into the mould where it is allowed to cool rigidly before removal.

Applications: refrigerator drawers, appliance housing, radio cabinets, battery cases, wheels, gears, toys, housewares, etc.

- b) Extrusion moulding — forming thermoplastics into continuous shapes, e.g., sheets, pipes, gaskets and channels.

Applications: pipes, conduits, sheets, window channels, textile bobbins, refrigerator breaker, strips, etc.

- c) Sheet forming —

c.1) Vacuum forming — heating plastic sheet until it flows under pressure and placing a vacuum between sheet and mould, covering the sheet to collapse onto the mould surfaces where it takes the desired shape.

c.2) Pressure forming — done by air pressure (at high pressure and lower production rate)

d) Calendering — involves the use of the calender which comprises a series of heated rolls through which the plastic is passed and squeezed down to the desired thickness producing the sheet which is finally trimmed and sheared to the desired size.

Technical Assistance Requirements

Technical expertise on the following fields are needed:

- a) Latest production techniques
- b) Precision machining
- c) Component design
- d) Testing of moulds
- e) Production management

A breakdown of specific technical problems is listed according to frequency on Table 4.

Conclusion

The industry is not organized. Cut-throat competition is not doing the industry any good. On the contrary, this contributes towards lower product quality and cheaper value of the product. The processing companies, in their efforts to outdo each other, resort to underpricing their products or producing inferior qualities, thereby hurting the whole industry.

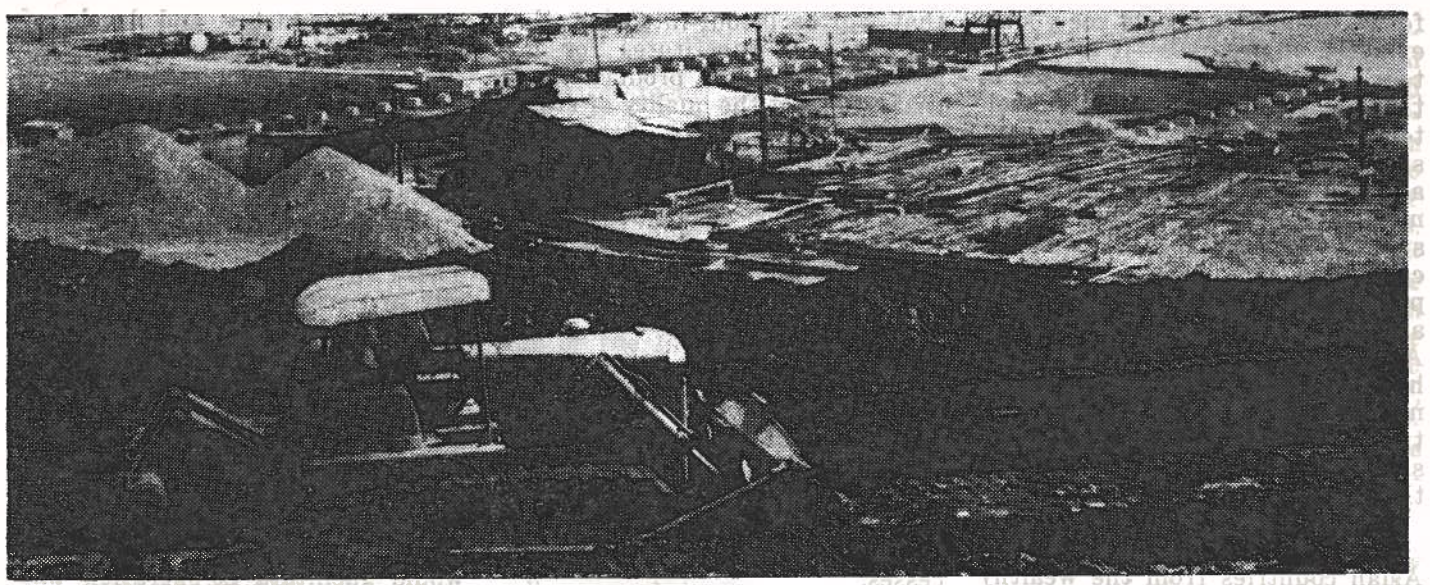
The fast growth rate of the industry is indicative of its growing significance in the Philippine economy. In spite of quality improvement and proportional increase, there is still much to be desired.

(Continued on page 40)

Table 4
BREAKDOWN OF TECHNICAL PROBLEMS ACCORDING TO FREQUENCY

Technical Problems	Frequency
Injection Mould Design	33
Cooling Systems	22
Hot Runner Systems	17
Warpage and Distortion	16
Ejection System	13
Flashing	11
Air Traps	10
Uneven Material Distribution on Blown Parts	8
Unscrewing	7
Cracking	7
Extrusion Die Design	7
Thermosetting Mould Design	6
Long Cycle Time	6
New Product Design	5
Short Shotting	5
Sink Marks	5
Pins	5
Mould Hardening	5
Component Sticking in Cavity	5
Hobbing	4
Scratches on Products	4
Excessive Thickness	3
Vacuum Forming	3
Welding Lines	3
Gates	2
Runners	2
Sprue Puller	2
Component with Inserts	2
Bow-Mould Design	2
Mould Materials Specifications	2
Guiding System	2
Precision Machinery	2
After Shrinkage	2
Insert Distortions	2
Burn Marks	2
Others	2

* These are subcontracted operations as the firms are not equipped with a complete line of mould and die machine.



SHARING IN DEVELOPMENT

by Leon V. Chico

Administrator, Technonet Asia

The UN and other international organizations have encouraged all nations to facilitate the 'transfer of technology'—the sharing of knowledge and skills to reduce disparities and to promote more uniform development.

The problem

If today one makes a quick tour of the developing countries of Asia, one cannot but notice the disparity that exists from country to country—in physical development such as in housing and infrastructure and in the life styles of its people. If one goes deeper into the countryside, one would get a better picture of these disparities. One does not have to go over statistical figures of growth and development to get a good impression of the Asian scene. After all, what-

This article summarizes a paper written by the author on the major problems faced by developing countries in "transfer" of technology. Its main theme is that present "book" solutions—often inspired by Western experiences and successes—have generally been ineffective and irrelevant. An on-going "experiment," now in progress (since 1972) in nine Asian countries, may be looked into as an alternative model to the present systems of technology transfer mechanisms. Empirical evidences that the system is workable are presented. Finally, the paper presents some of the lessons gained from the "experiment" which could be of immense value to the developed world in their assistance programmes for developing countries. The system could, likewise, be imitated throughout the developing world.

ever statistics reveal could mean very little to the common man—the farmer in the field, the worker in industry, the man in the street, and the man still seeking a means of livelihood.

One wonders at developments taking place in such places as Hongkong, Seoul, Singapore and even Manila. One gets similar impressions, perhaps to a lesser degree, in Bangkok, Jakarta and Kuala Lumpur. As one goes farther to Colombo and Dacca, one gets a feeling of both wonder and pride. For while Asia is moving

forward—and one could see visible evidence of progress—it also shelters some of the poorest people in this planet. Perhaps to say 'shelter' would be an overstatement since most of them do not have a dwelling to speak of. Far too many live in slums or even in the streets—exposed to the elements, calamities and disease. And yet, people do not despair. Talking to a Bengali or a Ceylonese or any Asian, one gets the feeling of high hopes and dreams of a better tomorrow. This is Asia today, a picture of striking affluence on one side and of shocking poverty on the other.

So much aid has poured into Asian countries from the wealthy nations of the world. These are normally in the form of: technical assistance such as experts, supplies and equipment, training fellowships and studies of all sorts; loans for development projects; and investments, mostly by multinational enterprises. There is also a persistent theme in the UN and other international organizations for action on the part of all nations to facilitate the 'transfer of technology'—the sharing of knowledge and skills to reduce disparities and to promote more uniform development.

Proposals have been made for technology data banks, new systems for the international referral of technological inquiries, reforms to the international patent system and, inevitably, new institutes where well-endowed researchers can develop theories about how it all can be made to happen. Yet, while no one denies that the industrialized countries and the international agencies could be more effective in stimulating the diffusion of technology, at the same time there is a growing realization that the greater part of man's technological know-how is already freely available—and that the biggest problem is that the developing countries are ill-equipped to find, evaluate and apply it.

Most of these developing countries in Asia are faced with problems of unemployment and of trade deficits. Many are seeking the establishment of industries

that will be labour-intensive, that will produce substitutes for imports, or that will produce goods that will meet the quality of standards of international trade and can compete in export markets. So much has been done to alleviate these problems. But much has yet to be done. These countries never seem to catch up. Innovative solutions must be sought and tested.

The reality

The situation existing in many countries in Asia does not provide "book" solutions to its problems—solutions that are often inspired by Western experiences and successes.

Present industries are often ineffective because of excessive costs (particularly through wastage of raw materials) or because their products are of poor quality. To overcome these problems and meet the objectives, industry needs technical and technological advice. Often the advice needed is at a very basic level—it is generally not a question of providing advanced technology, but of having an experienced engineer or technician take a look at a plant and make suggestions that will improve the processes or the products.

Industrial extension services in Asian countries vary according to the level of development of each country and the types of organizations set up 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. The persons charged with responsibilities for industrial extension service also recognize that the needs are greatest in the small industrial enterprises.

Because of wide difference 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 engineers or technicians, and be complementary to extension services in the fields of management, marketing and financing which are equally important. These should be organized nationally or perhaps even by provinces and cities. No service organized for the region as a whole could be expected to provide satisfactory service to the individual factories. But a regional service could provide resources on which the various national extension services could draw; the regional service could also provide a focus that would facilitate co-operation and exchanges between the national extension services and their linking into a functioning network.

There is nothing new to this concept. It has been continually discussed before. What is really new—and which can be of enormous benefit to developing regions in the world—is that it is workable. Developing countries have much to share with each other and the developed countries—through their technical assistance programmes—must appreciate this fact and consider this.

The experiment

The foregoing concept was the premise upon which a major project in Asia was conceived. In 1972, the International Development Research Centre (IDRC) of Canada agreed to support a project named TECHNINET ASIA, bringing together eight organizations in six Asian countries (later expanded to eleven organizations in nine Asian countries). The organizations involved had two common aspects:

- (a) they were all involved in assistance to small and medium industries in their respective countries; and
- (b) they were all involved in the technical and technological aspects of industrialization.

The countries and the organizations involved are the following:

Bangladesh

Bangladesh Small Industries Corporation (BSIC)

Hong Kong

The Hongkong Productivity Centre (HKPC)

Indonesia

Department of Industry (DP) through the Centre for Research and Development for Miscellaneous Industries and Handicrafts

Korea

Korea Scientific and Technological Information Center (KORSTIC)

Malaysia

Standards and Industrial Research Institute of Malaysia (SIRIM) and Council of Trust for Indigenous People (MARA)

Philippines

Institute for Small-Scale Industries, University of the Philippines (UP ISSI) and Economic Development Foundation, Inc. (EDF)

Singapore

Singapore Institute of Standards and Industrial Research (SISIR)

Sri Lanka

Industrial Development Board of Sri Lanka (IDB)

Thailand

Department of Industrial Promotion, Ministry of Industry (DIP)

Briefly, TECHNINET ASIA is a co-operative grouping of eleven participating organizations in nine Asian countries, which aims at improving the quality and efficiency of production of the small and medium industrial enterprises in these countries. It is a network for industrial technology informa-

tion and extension services. The Project has been looked upon as an "experiment in co-operation."

A Centre, located in Singapore, has been set up to act as a focal point for the network. It is headed by an Administrator selected from one of the participating organizations. The Centre is fully supported by IDRC for the duration of the Project—Phase One for 3-1/2 years (1972-1976) and Phase Two for another 3-1/2 years (1976-1980), or a total of seven years. The heads of the participating organizations, together with the Administrator, comprise a Council which meets at least annually and concerns itself with policy aspects.

Highlights of phase one

In Phase One, 1972 to 1976, the Project produced results that are attracting considerable attention. The most important results are:

- (1) That it now has a strong network of organizations which share the common goal of developing extension services for small and medium industries and that are helping each other in doing so. They make available to one another industrial technical information on products and processes in their own countries that is readily obtainable. Empirical evidence—as reported in "cases" that are being compiled—indicates that technical information obtained from countries of almost similar stages of development are by far more useful and relevant than those imported from highly-developed countries. Participating organizations also make available to each other their technical personnel for short-term assignments. Visits of industrialists from participating countries to local industries, organizations and institutions are also arranged;
- (2) That it now has the nucleus of a group—several hundred practitioners—who see indus-

trial extension as a valid professional activity. Formal training programmes and workshops have been undertaken for industrial extension and information officers to upgrade the capabilities of participating organizations. Observation, training and discussion visits—as appropriate—have been arranged within the network. In 1975, the Asian Industrial Extension Officers' Forum (ASINDEX), under the aegis of TECHNINET ASIA was born to give added impetus to this emerging profession.

- (3) That governments are now increasingly accepting the need for this type of service and allocating resources for its development. As a result, since 1972, industrial extension and information services for small and medium industries have been given a high priority in government development programmes. The developments, along this line, within each participating country and the various programmes that have been launched with satisfactory results are interesting cases in themselves.

While all the participating organizations have terms of reference that permit them to be active across the entire industrial sector, experience has shown that needs are greater in some types of industry than in others. For more effectivity, a list of industries in priority sequence has been agreed upon:

1. Metals
Food processing
2. Wood-based industries
3. Plastics
4. Packaging
Electrical appliances and products
5. Agricultural waste utilization
6. Ceramics

7. Rubber products

8. Footwear

9. Leather

10. Construction/building materials

One of the major objectives of the Project — always implicit in Phase One, and now particularly stressed in Phase Two — is the development of a self-reliant activity that will be able to continue into the future when IDRC funding is tapered off or ceases. This objective has the strong endorsement of the participating organizations.

The implications

This "experiment" is by no means completed. But this early, some lessons may be gained from the results of the Project which could be of immense value to international agencies involved in development assistance and funding:

- (1) That by effectively deploying a proportion of its own technological manpower for advisory work, a developing country can be, technologically, much more self-reliant than has hitherto been imagined;
- (2) That what is most needed is not fancy new systems, but an indigenous capacity to apply well-known and readily-available technology to overcome actual problems as they are encountered on the floors of the factories that are there today;
- (3) That developing countries have much to share with each other in terms of technological information, processes and expertise. What is needed is the stimulus to spur this co-operation and inter-change which can be effected by international agencies;
- (4) That the so-called "transfer of technology" is not a one-way affair—from developed



Technonet-Asia Administrator Leon V. Chico addressing the opening of the Industrial Extension Training Course (INDEXTRAC).

to developing country. In some cases, as supported by actual experience, developing countries can make this "transfer" a two-way affair.

Perhaps much of the experience gained from the "experiment" is not new. What is new, however, is the fact that TECHNINET ASIA is in the process of demonstrating that "self-reliance" and "co-operation" are not mere slogans. It can be made to work. The investment of IDRC in the Project is worth imitating throughout the developing world.

Sharing in development by the less developed countries of the world can achieve such great results—far more than one could think of. And it has been proven.

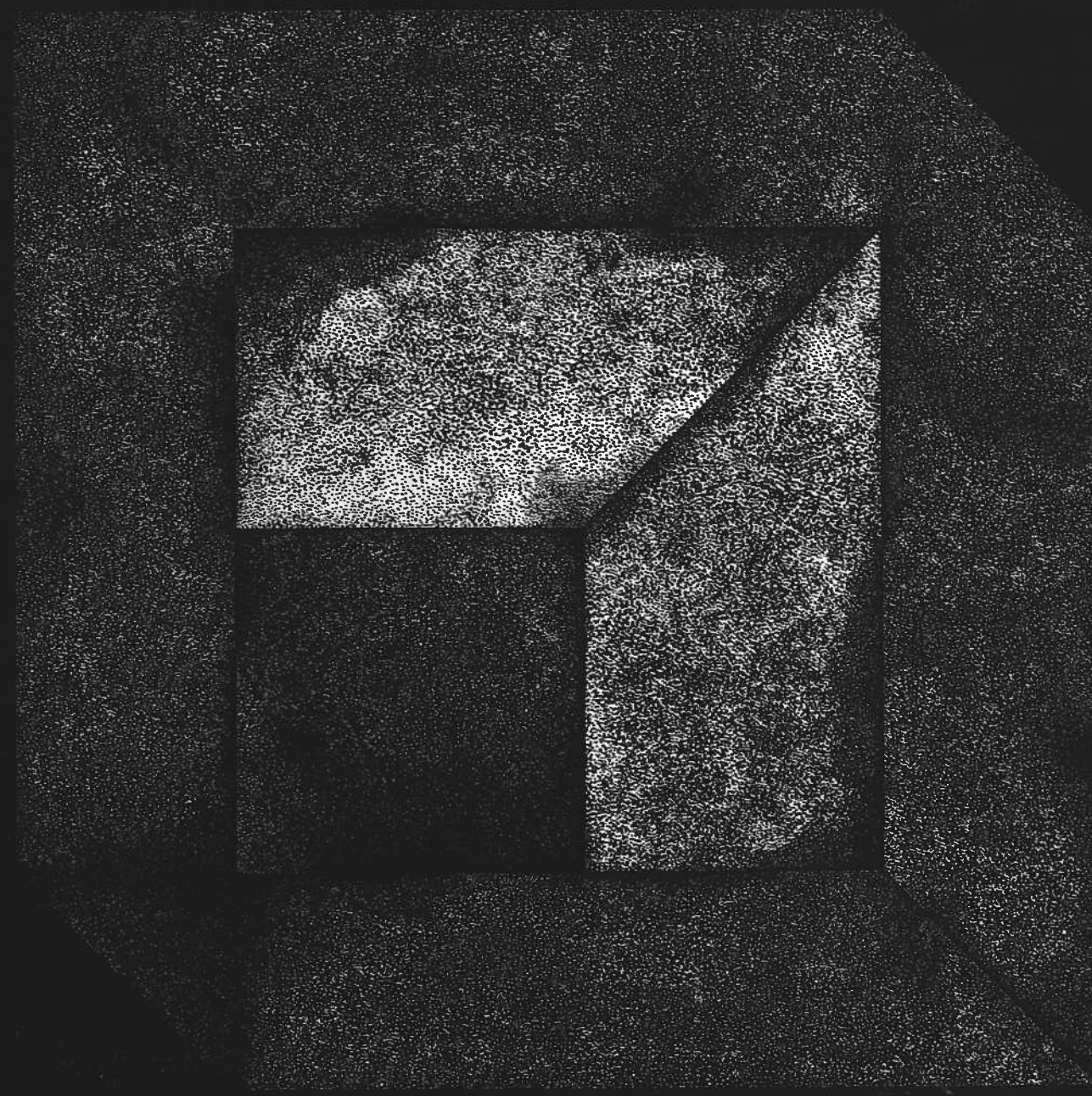
(Continued from page 36)

Research and development efforts are such that an escalation is needed along the lines of mould and die design, better processing techniques, materials analysis and effective utilization.

There is a dearth of technical information on the technological advances in the design and making of moulds and the processing of plastics.

Recommendations

1. Seminars and training programs for development of skills, as required by the industry, should be conducted. As in a previous arrangement initiated by the UP ISSI with Technonet Asia, an expert in the field of plastics technology could be detailed to assist and advise the industry.
2. The significance of current and relevant technical information on plastics technology cannot be overemphasized. Hence, an awareness program along this line is strongly recommended. The Institute has embarked on a Current Awareness Service through information dissemination in its attempt to assist entrepreneurs in upgrading production and management operations.
3. Extension engineers should be allowed to undergo advance training in plastics technology locally and abroad. Technonet Asia could sponsor such studies jointly with UP ISSI and the plastics industry.
4. The need for more research and development works is greatly felt in the fields of moulds and die design, better processing techniques, materials analysis and product design.



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1975-1976 ANNUAL REPORT

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University of the Philippines
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THE YEAR IN BRIEF

During the first ten years of its existence, the ISSI concentrated on the herculean task of generating interest and support for the development of small-scale industries. The current direction of economic reforms which placed heavy importance on the growth of the small industry sector, justifiably prompts the Institute to bask in its consciousness of a mission well accomplished.

FY 1975-1976 witnessed the translation of Institute programs into specific projects which were both innovative and timely. From the previous practice of servicing expressed needs of small industrialists, the Institute has assumed a more aggressive stance of anticipating such needs.

In consideration of the varied and numerous information needs of our developing economy, the Institute embarked on an industrial information dissemination program. This project further supported the ISSI's current involvement with adaptive technology transfer.

Research projects such as that which aims to understand the essence of Filipino entrepreneurial spirit has been initiated to guide and enable the government to be more responsive to the needs of the country's entrepreneurs.

As part of its campaign to encourage the emergence and growth of entrepreneurial talents in the country, the Institute awarded a Professional Chair on Enterprise Development to the De La Salle University.

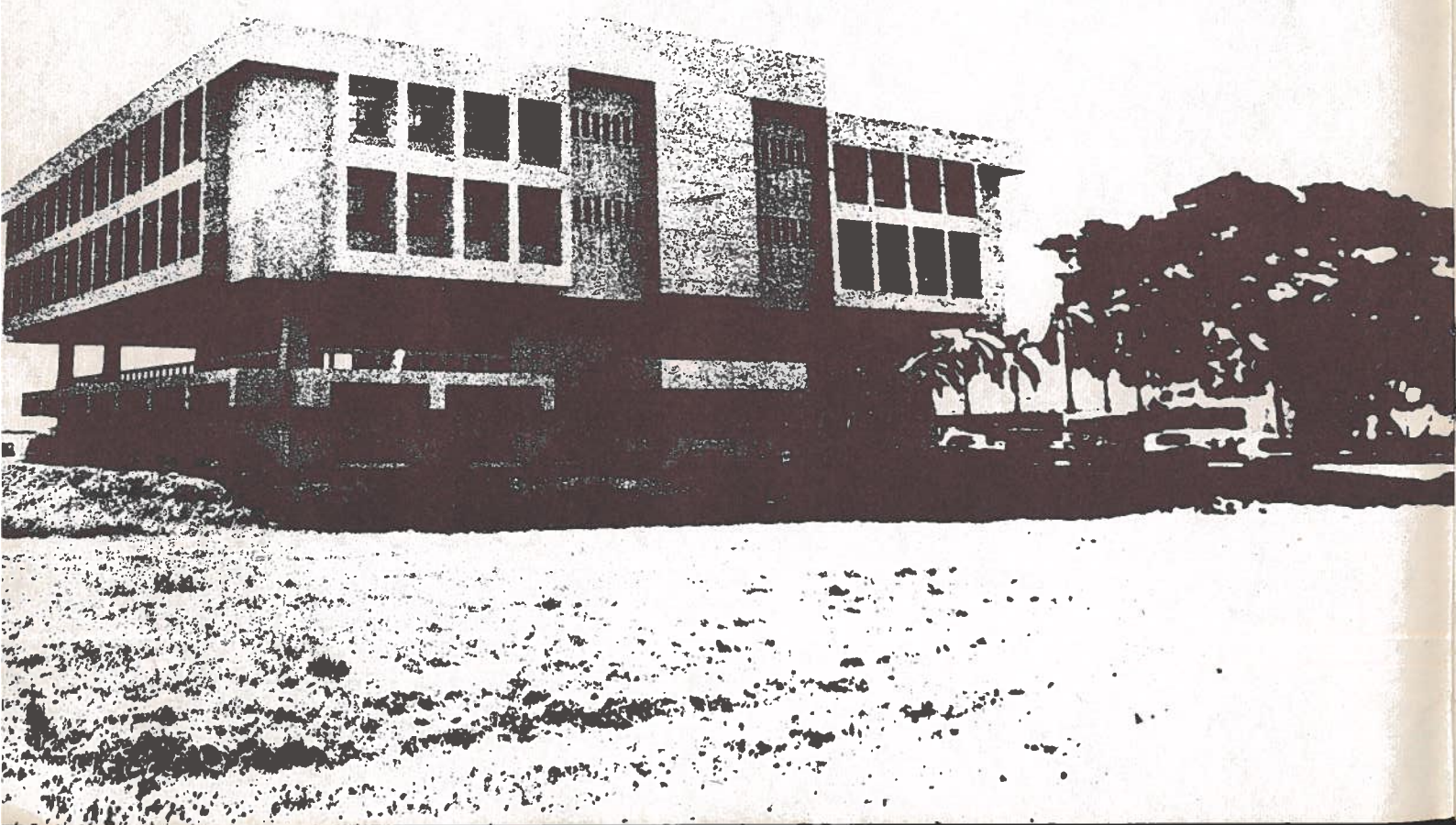
The ISSI's pilot Extension Office at UP College Tacloban in Leyte is gradually but steadily building its clientele from among the region's entrepreneurs. The response it generated and the initial success of its programs have prompted the Institute

to aim for the establishment of other extension units.

To tap the support of the private sector for SMSI development programs, the ISSI spearheaded the establishment of the Small Enterprises Research and Development Foundation (SERDEF) of the Philippines, Inc.

Networking with foreign organizations aiming towards similar objectives has enabled the institute to gain support and experience for new projects it has generated.

The Ten-Year Development Plan of the UP ISSI aims to achieve one basic goal, namely, to enhance the identity of the Institute as a center of excellence dedicated to the promotion of entrepreneurship and small enterprise development. FY 1977 ushers in the beginning of the ISSI's second decade of service to national progress.



THE YEAR'S OPERATION

MANPOWER DEVELOPMENT PROGRAMS

The Institute has conducted or is conducting the following programs as part of its commitment to develop the country's human resources.

Management Consultancy Course (MCC):

This seven-month course was designed to reorient the approaches used by management consultants, industrial extension officers and technical officers in initiating improvement and giving guidance in the operation and/or establishment of small and medium industries. The course includes an integration of the entire management mix, problem identification, analysis and decision-making. Twenty-five (25) participants graduated from the MCC in 1975, of which seven (7) were foreigners from Papua, New Guinea, India, Indonesia, Korea, Sri Lanka and Pakistan. A total of 246 participants have attended the course since 1966.

Regional Industrial Development (RIDE) Course:

This six-month course is conducted for local and foreign administrators engaged in regional operations. The program covers the fields of introductory economic analysis, regional development, statistics, project development, and project management. The methodology includes lecturers and fieldwork assignments. In 1975, the RIDE graduated twelve (12) participants, four of which were from Indonesia, Sri Lanka and Korea. A total of

124 participants have attended the course since 1970.

Low-Cost Automation and Production Management (LCA-PM):

This course is geared towards promoting the application of the concept of adaptive technology appropriate for developing countries, by providing technical training to managers and engineers in the Institute's low-cost factory automation laboratory and conducting demonstration projects. Two local programs held this fiscal year trained 58 participants, bringing the total number of LCA graduates to 297 since 1970. Foreign participants represented Malaysia, Thailand, Afghanistan, Bangladesh, India, Pakistan, Indonesia and Nepal.

Managers' Course (MC):

This three-month course aims to provide participants with the basic knowledge in running an enterprise. The course incorporates lecture-discussions, group dynamics, business games, case studies, plant visits and integrated plant surveys. To-date, 403 managers and potential managers have participated in the MC, 102 of which graduated this fiscal year with two foreigners from Chile and Swaziland.

Special Programs (SP):

Various seminars are conducted on a short-term basis covering a thirty-hour spread as a supplement to the training needs and requirements of small and medium industries. The Institute conducted 22 such seminars this fiscal year on the following areas: Supervisory Effectiveness Program, Marketing for General Manage-

ment, Production Management, Accounting and Financial Management, Project Preparation and Development. A total of 572 participants attended these courses which brings the cumulative figures to 10,125 since 1967.

TOTAL NUMBER OF GRADUATES of UP ISSI Training Programs By Course

Course	NUMBER OF PARTICIPANTS			TOTAL
	1966-70	1971-74	1975-76	
Management Consultancy Course	89	128	25	242
Regional Industrial Development Course	34	78	12	124
Low-Cost Automation Course	34	205	58	297
Entrepreneurship Development Program	-	265	14	279
Managers' Course for Small and Medium Industries	-	301	102	403
Special Programs	2,790	6,763	572	10,125
TOTAL	2,947	7,740	738	11,470

Other special packaged seminars/workshops were conducted in cooperation with other agencies:

Project Assistance and Supervision Program

This course was specially designed for DBP personnel who would be assisting and supervising small industry projects in various regions of the country. The objective was to enable these DBP-assisted firms to maximize their contributions to the economy and pay back their obligations to DBP. The course program incorporated knowledge and practice in small industry policies, management and consultancy tools, and problem diagnosis. Thirty-one (31) DBP personnel participated in the program.

Industrial Guarantee and Loan Fund (IGLF) Seminar-Workshops for Bank Evaluators

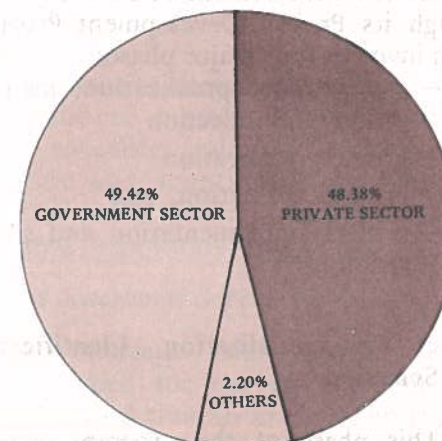
Two seminar-workshops held in Davao City and Zamboanga City familiarized the regional and rural bankers and evaluators with the objectives, uses, application and advantages of IGLF financing in order that they could participate actively in the IGLF financing program. A total of 86 bankers and evaluators attended the two seminars.

Other agencies which cooperated in the seminar were the Central Bank, the Department of Industry's MASICAP, Media Communicators Company, NEDA Region IX, and the Jaycees.

Project Preparation and Development for ACA Personnel

This seminar was conducted for the project directors, supervisors and technicians of the Agricultural Credit Administration (ACA) with the aim of providing them the required tools in project preparation, development and evaluation.

Attended by a total of 31 participants, the seminar also became an avenue for interaction among the regional directors and technicians.



PROFILE OF PARTICIPANTS AS TO SECTORAL REPRESENTATION

Small Enterprises for Economic Development (SEED)

The SEED program was conceived by the Central Bank's Department of Rural Bank to assist countryside rural banks in the promotion and implementation of the Industrial Guarantee and Loan Fund (IGLF). Specifically, the ISSI handled the technical portion of the Initial Orientation Development Program (IODP) phase of the course. This included lectures, discussions on the status, practices, problems and prospects of small-scale industries in the Philippines, plant visits of garment, handicrafts, food processing, furniture and woodcraft industries, a 10-day on-the-job development activity, a one-day Bankers and Supervisors' Conference, workshops on project study analysis, and a session on action planning.

PROJECT DEVELOPMENT

The generation of new industrial ventures is a primary requisite of continued economic growth. These new projects, moreover, should be assisted in order to minimize the inherent risks involved in the process of growth. The Institute works towards the achievement of such objective through its Project Development Program which involves four major phases:

- project conceptualization, identification and selection
- project preparation
- project evaluation, and
- project implementation and supervision

Project Conceptualization, Identification and Selection

This phase of the program involves servicing project inquiries and providing

guidance to the small industry proponents. Specifically, the inquiries dealt with project identification, sources of financing, sources/types of available assistance, and sources of information.

During the fiscal year under review, the Institute's Industrial Consultancy Department (ICD) serviced a total of 208 inquiries covering the following sectors: trading/services, metal products, chemical products, agriculture/agri-based industries, wood products, handicraft, garments and leather products.

In terms of geographic dispersion of inquiries and guidance service, Metro Manila continued to be the major source of proponents and/or clients, accounting for 58.7%.

Project Study Preparation

This includes the preparation of the following studies:

1. Project/investment profile
2. Pre-feasibility study
3. Project information
4. Project feasibility study
5. Project study review/revision

During the year, the ICD undertook the preparation of nine project feasibility studies on the following industries: feed-mill, garments, foundry, and poultry/livestock breeding.

Project Evaluation/Review

The ICD evaluated and reviewed 18 project studies. These studies had the following distribution: five in Metro Manila, four in Luzon, six in the Visayas, and three in Mindanao.

Project Supervision Management

Project development functions also involve follow-up actions and visits and preparation of progress reports on projects initiated and/or supervised by ISSI. The three projects currently under Institute supervision are: the MATI Industrial Cooperative, Inc. in Munoz, Nueva Ecija, the BIPA Farm Workers' Welfare Foundation projects in Binalbagan, Negros Occidental, and the proponents under the Supervised Credit Program.

MANAGEMENT AND INDUSTRIAL EXTENSION SERVICES

The Institute seeks to develop existing small industries by improving their operational efficiency and productivity through technical and managerial improvements. The extension services are categorized into:

- a) Management Audit Service, which includes total management/systems audit, activity audit and systems and procedures audit; and
- b) Management/Technological Assistance, which includes marketing assistance, design of machinery, transfer of technology and work method/improvement.

Specific projects include the following:

- evolving systems and procedures for setting up the Marikina Data Bank, an information system on the footwear industry and other related industries, jointly undertaken by the ISSI and the Marikina Shoe Trade Commission;
- establishment of a quality control system for Weinstein Pianos and Philippine Stationaries;
- technical assistance service provided for the Manila Brickworks, Inc., Bu-

lacan; Brickmen, Inc.; Rattan Filipiniana, Inc., Davao City; Michaelangelo Rattan Furniture, Cebu; Matuguina Industries Development Inc., Cebu; MSTC Water Hyacinth Project, Marikina; and Achiever's Construction and Development Corporation.

INDUSTRIAL INFORMATION DISSEMINATION

The information needs of a developing economy are varied and numerous. Specifically among the lines of promotion and development of small and medium industries, there is dire need for the following information:

1. market information
2. information on industrial equipment
3. information on raw materials
4. infrastructure information
5. information on new technology, processes and industrial management tools
6. information on industrial environment; and
7. information needed for decision-making by industrialists and by government agencies for policy formulation.

To cater to these information requirements and to substantiate the Institute's efforts to collect industrial, technological, economic and scientific information, the Industrial Information Department (IID) instituted these various programs:

Current Awareness Service (CAS)

The Current Awareness Service has been designed for the entrepreneur who could not find time to brush up on current trends and developments in the field of

business and industry operations. The latest information from books, journals, periodicals and other publications are scanned, analyzed and stored for dissemination. A monthly list of technical literatures are issued containing the latest trends and practices in techno-managerial and scientific fields. The program works on a subscription basis wherein interested individuals are taken as a regular subscribers for a very nominal fee. Since the start of the CAS project in August 1975, a total of eleven (11) Current Awareness Lists containing 1000 scanned and analyzed articles have been disseminated.

Selective Information Service

This service works on a system whereby entrepreneurs may request for articles or any technical subjects of interest not included in the Current Awareness List. The IID staff undertakes the search for such articles and sends them to the interested party. Some 468 articles have been sent upon request.

Technical Inquiry Service (TIS)

The IID technical staff undertakes a thorough research or study on special inquiries on technical matters for which no ready materials or references are available.

For the past fiscal year, a total of 122 such inquiries on technical matters had been serviced, such as:

- commercial production of vinegar from coconut water
- bio-gas technology
- balut-and salted-eggs production
- manufacturing process for bricks

- shoe design
- substitution of cotton to rags in the manufacture of mop heads and many others.

Adaptive Technology

A specific approach in the propagation of the concept of adaptive technology is through the application of low-cost factory automation as a tool for upgrading production techniques. In this regard, the Institute's laboratory facilities are considered as the most modern in Asia or in any developing country. Advice and demonstrations are given on how automation could help factories; how automation could be adopted without computerizing or utilizing "high-charge" electronic devices and regardless of its personnel and financial capabilities and how to design and install low-cost automation equipment.

RESEARCH

Research is in the forefront of ISSI activities and is conducted in direct support to national programs on small-scale industries. Moreover, research undertakings are applicable to academic pursuits and extension services of the Institute. Such projects are generally categorized into three basic concerns:

1. Researches requested by outside entities

Certain activities are undertaken to answer research needs of outside individuals and organizations. These projects may take the form of socio-economic surveys and/or industrial potential surveys of a region,

province, city or town. Other surveys may have something to do with opportunities for specific groups as in industry studies.

On request of the Minalin Development Foundation (MDF), the Institute conducted a socio-economic and industrial survey of Minalin, Pampanga. The comprehensive economic study sought to identify two town projects for immediate implementation and the mechanics of action which will utilize the manpower resources of the MDF.

A census of Marikina shoe manufacturers was carried out as instigated by the Marikina Shoe Trade Commission (MSTC). The objective was to determine the present status of shoe manufacturers in Marikina and identify their problems and prospects.

As part of its assistance to the Binan Footwear Producers Association (BFPA), the research staff started a study on the viability and mechanics of setting up a trading company to be organized by the BFPA. The enterprise aims initially to provide and ensure the supply of cheaper raw materials to the member-producers and eventually to expand its services to include the marketing of their finished products.

The Research Department also undertook an industry study of sporting goods upon request of the Association of Sporting Goods Manufacturers, Inc. The study sought to determine the present status of the sporting goods industry with the view to identifying its problems and prospects. Measures for the stimulation of growth of the local industry were also recommended.

A nationwide survey on subcontracting opportunities for small business members of the Chamber of Commerce of the Philippines was conducted for the CCP. With the objective of determining the nature and extent of subcontracting possibilities

for the CCP member-firms, the project studied existing subcontracting arrangements in the Philippines and identified possible points of entry/expansion for the enterprises.

2. Initiated Research Projects

This involves activities undertaken as part of the plans and programs of the Institute to support the needs of small and medium scale industry development in the country. The projects are usually designed to guide national policies on SMSI. Such would include economic studies of industry categories where small industry predominates as in garments, furniture, footwear, etc., industry studies and model schemes.

The Research Department has completed a nationwide survey on the "Presence or Absence of Role Strain among Filipino Entrepreneurs." The study had a three-fold objective: (a) to contribute to an understanding of planned organizational change as it affects the Filipino small business opportunity; (b) to further contribute to an understanding of values, attitudes and beliefs held by Filipinos towards business and (c) to understand the factors affecting the decision-making of a businessman. The results of the study are intended to guide and enable the government to be more responsive to the needs of the country's entrepreneurs.

3. Special Research Projects/Assignments

Other activities are undertaken to supplement the Institute's training and consultancy projects. In this regard, the project team approach is adopted to allow flexibility and efficient utilization of the Institute's resources.

An example under this category is the project on the State-of-the-Arts (STAR) Review. The STAR is a series of studies conducted by the Institute in collaboration with the International Development Research Center (IDRC) of Canada to determine and evaluate the existing technology at different levels of sophistication in a particular sector of the industry. Five (5) STAR projects were accomplished during the year on the following industries:

- electroplating
- sheetmetal
- ceramics production
- coco-coir processing; and
- plastics

The baseline information contained in the STAR are intended to serve as basis in the formulation of an effective technological assistance program for the industry.

Publications

For the year 1975-1976, the Institute published four issues of Volume VIII of the SMALL INDUSTRY JOURNAL with special focus on industrial extension, adaptive technology, entrepreneurship, and small industries for social development.

In collaboration with other organizations, the Institute also published/disseminated the following: "Proceedings of the Conference on Adaptive Technology and Small Industry Development" May 1976; and the "Proceedings of the Second National Footwear Industry Workshop/Convention" April 1976.

The ISSI regularly collaborates with other organizations in the publication of their newsletters: Technonet Asia Newsletter, EOQC (European Organization for Quality Control) Newsletter, and Small

Industry Development Network of the Georgia Institute of Technology.

The Library

The Institute maintains a well-stocked specialized library offered to service the needs of those who do research in small business and industry. As of June 30, 1975, the library had a collection of 1,713 volumes, 396 periodicals, 1,350 monographs and pamphlets, 1,910 reports, 500 pieces of ephemeral materials and 6,549 pieces of microfiches.

ENTREPRENEURSHIP DEVELOPMENT

One of the most essential elements of economic development is the entrepreneur. The Institute's adherence to this assertion brought about the evolution of the Entrepreneurship Development Program (EDP), an integrated campaign designed to provide training on motivation, management and enterprise development to individuals possessing entrepreneurial talents.

In cooperation with the National Manpower & Youth Council (NMYC), the Institute launched the program in August 1973 with sixteen (16) aspiring entrepreneurs. In 1974, the EDP took off on a national scale assisted by the NMYC, the Development Bank of the Philippines (DBP), the Industrial Guarantee and Loan Fund (IGLF), and the Commission on Small and Medium Industries (CSMI). To-date, 15 courses have been conducted in eleven regions of the country with a total of 279 graduates.

Venue	No. of Graduates
Metro Manila I	16
Butuan	18
Metro Manila II	15
Tacloban	24
Legaspi	14
Cebu	19
La Union	15
Iloilo	27
Cabanatuan	25
Davao	10
Tuguegarao	18
Lucena	17
Zamboanga	20
Trainor's Course (GMA)	22
Metro Manila III	19
TOTAL	279

Cognizant of the needs of would-be entrepreneurs, the EDP has been designed so that the responsibility of the program administrators does not cease after the training phase. Per arrangement among the program's sponsoring and supporting agencies, the graduates of the training program could avail themselves of financial assistance from government financing institutions, notably the DBP and IGLF. Marketing, technical and managerial assistance are correspondingly provided by each member-agency of the CSMI, the integrating body for all agencies involved in promoting the development of small and medium industries.

After three years of involvement and spearheading the national campaign to promote entrepreneurship development, the Institute's growing expertise has come to be recognized by a number of local and foreign organizations. This is evidenced by several projects undertaken by the Institute aside from the two regular EDP courses conducted during FY 1975-1976. A seminar on "Small Business Management" was

conducted in Iloilo City in coordination with UP College Iloilo, Central Philippine University and West Visayas State College. Participated in by fifty (50) entrepreneurs, the seminar sought to upgrade the entrepreneurial skills of small industry owners in Iloilo.

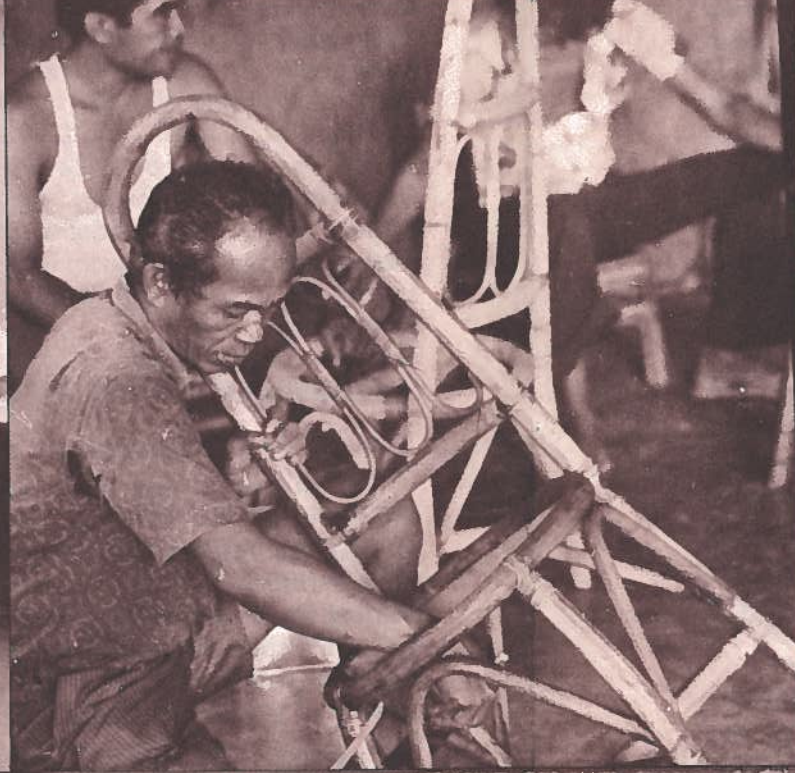
A three-day appreciation seminar on entrepreneurship development was conducted in Calapan, Oriental Mindoro upon request from the Provincial Government. Attended by 49 municipal development coordinators and businessmen, the seminar was aimed at promoting entrepreneurial activities in the province.

The Institute has also awarded a Professorial Chair on Enterprise Development to the De La Salle University. The Institute has developed a course patterned after the Entrepreneurship Development Program which has been included in the curriculum of senior Business Administration students at DLSU. The ISSI makes available all lecturers, resource persons and materials for the three-unit course which was first offered in June 1976.

In order to ensure the applicability and relevancy of the programs on entrepreneurship development, the Institute embarked on a two-month study of the impact of the EDP thrust. About 80% of the graduates of four EDB courses were personally interviewed to gauge the strengths and weaknesses of the program. The results were used to reinforce existing assumptions and/or restructure inept areas.

REGIONAL EXTENSION

The recent successes of the Institute programs on the development of small and medium industries, heretofore limited to urban areas by virtue of certain constraints and limitations particularly with respect to lack of manpower and fiscal resources,



have prompted the ISSI to aim for the establishment of UP ISSI Extension Offices in regions outside the Metro Manila area.

As a pilot venture, the Institute set up the ISSI Extension Office at the University of the Philippines, College of Tacloban in Leyte province. The regional office was intended to accelerate rural industrialization in the Eastern Visayas (Region VIII) covering the provinces of Northern Samar, Eastern Samar, Western Samar, Leyte, Southern Leyte, and the sub-province of Biliran. By narrowing the distance barrier, the region's entrepreneurs would be able to avail of the assistance offered by the Institute to small and medium industries.

In the implementation of the project, the Institute is being assisted by the Economic Development Laboratory of the Georgia Institute of Technology (GIT), which provides technical support and funding under the Small Industry Grant Contract. In turn, the funds have been made available to GIT by the US Agency for International Development (USAID) under the 211d-program.

The ISSI Extension Office at UP Tacloban became formally operational on May 1, 1976. The center started to lay the foundations for the performance of the functions and services generally offered by the Institute. Manned by five full-time staff, the functions and services generally offered by the Institute. As a preliminary step, baseline studies on the area were conducted. Linkages and interactions were fostered with several local institutions: the Sab-A Basin Development Authority, Provincial Development Staff, Regional Commission for Small and Medium Industries, and the regional offices of the NEDA, NACIDA and DAP. The extension office staff also underwent training, with the pro-

ject officer-in-charge sent to the Georgia Institute of Technology in Atlanta, Georgia for a five-week training exercise.

From May to June, the extension staff were able to extend technical assistance to eight (8) proponents on the following fields of activity: soy sauce manufacture, swine-raising, poultry/livestock, charcoal-making, brick and tile production, and manufacture of roman shades and venetian blinds. Assistance is also being provided for the Nula-Tula Resettlement project in Tacloban City in the identification of economic activities for the rehabilitation of settlers.

In addition, several inquiries have been served ranging from technical matters to sources of financing.

The extension unit is currently undertaking the preparation of project feasibility studies of identified industries. Promotional efforts are also being directed to the other principal cities of the region.

In addition, several technical personnel of the Institute regularly visit the extension office in order to hold consultation sessions with local clients.

SPECIAL PROJECTS AND COOPERATIVE ACTIVITIES/LINKAGES

A majority of special projects undertaken by the Institute during the year were an offshoot of its heavy commitment to support and be part of cooperative activities generated to promote the development of small-scale industries.

Specific projects undertaken in close coordination with other entities, public and private, local and foreign, include:

First Asian Industrial Extension Officers Conference (FAIEOC)

The ISSI collaborated with TECHNOnet ASIA in holding a conference for Asian industrial extension officers. Held from November 5-10, 1975, the meeting was attended by 40 delegates and observers from member-countries of TECHNOnet Asia. The conference resulted in the formation of an association which would serve to professionalize extension services and agents as catalysts of change necessary in the development of small-scale industries in Asia; continuously adapt the extension agents to the developments in industrial practices; and serve as a forum for interaction between different specialist groups. A regional cooperative approach of mutual concern was the main idea behind the entire conference.

Management Techniques Course 868

The Institute cooperated with the Westinghouse Learning Corporation in the conduct of a five-day course on management techniques from November 10-14, 1975. The course was a management orientation program for supervisors and managers with the objective of performance improvement and continued professional growth. A total of 52 foreign and local delegates participated in the program.

Workshop on Power and Energy Conservation

The Institute co-hosted this two-day workshop/seminar on power and energy conservation held on January 15-17, 1976. Organized by the Association of Government Mechanical and Electrical Engineers of the Philippines (AGMEEP), the program

was co-sponsored by the NEDA Energy Task Force, the Philippine National Oil Commission (PNOC) and the UP ISSI. Some 236 participants from both government and private agencies attended the workshop.

Third Industrial Extension Officers' Training Course (INDEXTRAC)

The ISSI co-sponsored with TECHNOnet Asia the conduct of the 1976 course for industrial extension officers from January 28 to March 19. The course, in general, was similar to that held at the Small Industry Training (SIET) Institute in Hyderabad, India. However, this time the course placed heavy emphasis in in-plant industrial extension training under the guidance of experienced extension officers. Sixteen (16) participants attended the course from various Asian countries.

Inter-Country Project Committee (ICPC) Meeting

The ISSI, together with the Development Academy of the Philippines (DAP) and the International Rice Research Institute (IRRI) hosted the ICPC meeting from February 2-6, 1976. The meeting was a continuation of the Research Planning Workshop on "Ways of Developing Entrepreneurial Initiatives in Rural Centers and Low Income and Urban Communities" held at the East-West Technology and Development Institute in May 1975. With the involvement of some 20 operating agencies and research centers in Asia, the Pacific and the United States, the workshop aimed to assist low-income regions and communities by identifying lines of research in entrepreneurial development.

Second UNIDO Industrial Quality Control Training Program

An international training program on industrial quality control was sponsored by the ISSI in cooperation with the UNIDO and the Swedish International Development Authority (SIDA). With 27 foreign and local participants, the course was conducted from February 16–28, 1976. The course aimed to enable quality control managers to upgrade their knowledge and expertise in effective quality control procedures — a vital aspect of a country's industrialization program. It highlighted the different quality management techniques as well as some specific tools on quality engineering.

Second National Footwear Industry Workshop/Convention

The second national convention for footwear industry producers was co-sponsored by the Institute and held from April 27–30, 1976 in Marikina, Rizal. The theme of the meeting was "Targeting the Export Market through the Use of Indigenous Raw Materials." The other cooperating agencies were the Bureau of Foreign Trade of the Department of Trade, Marikina Shoe Trade Commission (MSTC), Chamber of Commerce of the Philippines (CCP) and the Tanners' Association of the Philippines.

Conference on Adaptive Technology and Small Industry Development

The ISSI hosted the conference on "Adaptive Technology and Small Industry Development" on May 26–29, 1976. The conference was a project of the Economic Development Laboratory, Georgia Institute of Technology, under the USAID 211d grant. Some 40 delegates and representa-

tives of GIT counterpart institutions and various international organizations dealing with small industry development attended the conference. The countries represented included: Ghana, Nigeria, Ecuador, Brazil, Korea, Kenya, Austria, the United States and the Philippines.

Master of Management in Small Industry (MMSI)

The Institute initially conceived of the Master of Management in Small Industry (MMSI) in 1970. Groundwork activities evolved into a proposal which underwent a series of refinements until its approval in 1975. The graduate program was initially offered at the UP College Tacloban during the first semester of school year 1976–1977. The ISSI directly supervises and assists the College in the conduct and mechanics of the course, by providing all lecturers and course materials. The two-year degree program is open to local and foreign students.

Casebook on Management of Small Business

The ISSI and the Development Academy of the Philippines jointly prepared a casebook on the management of small business. The project was funded by the Commission on Small and Medium Industries (CSMI). The project generated twenty (20) cases divided into four areas of management, namely: marketing, production and technology, management and organization, and finance and accounting. Case subjects covered the following industry/business: furniture, garment, handicraft, woodcraft, shellcraft, metalcraft, machine shop and food products.

Other Involvements

The Institute is also represented in the following national and local committees: Presidential Task Force for the Development of Lubang Island, the National Industrial Estate Program, and the Regional Development Councils of Regions III and IV.

The ISSI is also heavily involved in the projects of the Commission on Small and Medium Industries (CSMI), providing technical and manpower support to Commission programs.

Having gained recognition and asserted its importance as a dynamic institution for small industry development, the ISSI has received a number of foreign visitors who observed/studied Institute programs for adaptation and/or conferred with its technical staff on various related issues. As its contribution to the development of small enterprises in Swaziland, South Africa, the Institute played host to two ILO Fellows on an observation/study tour of the SMSI development process in the Philippines. They were: Mr. Gilbert Dhlamini, Managing Director of the Small Enterprises Development Company, Swaziland; and Mr. Siphon Nkambule, Promotions Officer of the Small Enterprises Promotion Office, Ministry of Industry, Swaziland.

THE SERDEF

While the government has indeed buckled down to create an economic climate in which small and medium enterprises may flourish and grow, the main thrust for industrial development is still largely left on private initiative. To be sure, the realization of our economic objective still rests on the creativity, innovativeness, and risk-taking of private enterprise.

Thinking along these lines, the Institute found it fitting to call upon the private sector to support the national program for small and medium enterprise promotion and development.

Towards this end, the ISSI spearheaded the establishment of the *Small Enterprises Research and Development Foundation of the Philippines, Inc.* (SERDEF), composed of a group of private citizens bound together by a common concern for small and medium industry growth. It was registered with the Securities and Exchange Commission on May 13, 1976.

Objective

The SERDEF envisions the private component in the partnership for growth between the government and private sectors through the provision of financial and developmental support to organizations directly involved with the promotion of small and medium industries. The Foundation will basically initiate, promote, support, and complement the efforts of different entities in the sphere of small and medium industry development. Its activities will cover the areas of research, education and training, entrepreneurship development and regional development.

Board of Trustees

The founding members, who also comprise the Board of Trustees, represent a broad spectrum of Filipino leadership in education, industry, finance, law, government, and civic affairs.

They are:

Dr. Manuel S. Alba
Deputy Director-General

National Economic and Development
Authority

Dean Benjamin M. Catane
U.P. College Tacloban

Dr. Leon V. Chico
Administrator
TECHNONET Asia

Mr. Rony V. Diaz
Director-General
National Manpower & Youth Council

Mr. Honesto O. Francisco
Director

Department of Rural Banks
Central Bank of the Philippines

Dr. Pablo P. Gabriel
President
Manila Metal Container Corporation

Prof. Thelmo T. Garrucho
Assistant Vice-President
United Laboratories, Inc.

Mr. Victor G. Guevara
Executive Vice-President
Mabuhay Vinyl Corporation

Mr. Vicente R. Jayme
President
Private Corporation of the Philippines

Dr. Mercedes M. Leuterio
Dean, College of Commerce
San Sebastian College

Mrs. Alicia Llamado-Reyes
Executive Officer for Industrial
Projects, and Manager, Industrial
Projects Department I
Development Bank of the Philippines

Dr. Sixto K. Roxas
President
Bancom Development Corporation

Dr. Lourdes L. Sanvictorias
First Vice-President
Chamber of Commerce of the
Philippines

Prof. Paterno V. Vilorio
Acting Director
UP Institute for Small-Scale
Industries

The officers of the Foundation are as
follows:

Mr. Vicente R. Jayme
Chairman

Mr. Victor G. Guevara
Vice-Chairman

Dr. Lourdes L. Sanvictories
President

Dean Benjamin M. Catane
Treasurer

Prof. Paterno V. Vilorio
Corporate Secretary and Executive
Director

The Foundation has its headquarters
at the ISSI building in Diliman, Quezon
City.

STAFF DEVELOPMENT

The new programs and expansion plans
of the Institute underscored the importance
of developing the capabilities of its person-
nel, both technical and non-academic.

As of June 30, 1976, the ISSI staff
totalled 136 members, broken down as fol-
lows: 69 academic personnel (24 technical
staff, 45 researchers) and 67 employees in
the administrative level.

The Institute administration fully sup-
ported staff development programs and en-
couraged the participation of its personnel
in various local and foreign seminars, work-
shops and conferences. In addition, it sought
the involvement of ISSI technical person-
nel in consultancy activities for local and
national government projects.

Scholarship/Fellowship Grants

The following staff members were sent
on special fellowship grants:

1. Myrna Rodriguez-Co
Smaller Enterprise Development
(Colombo Plan)
Nagoya, Japan
2. Sonia Tiong-Aquino
National Research Center/Technical
Information Selection Training
Course (IDRC)
Ottawa, Canada
3. Ignacito U. Alvizo
8th Advanced Training for
Industrial Managers
Research Institute for Management
Science (RVB)
Delft, The Netherlands
4. Herminia Rosales-Fajardo
Study/Observation Trip covering
the Countries of Canada, Mexico,
Venezuela, and Georgia, U.S.A.
5. Rudolfo O. Sumicad
Special Program on Advanced
Industrial Maintenance Management,
Stockholm, Sweden
Industrial Information System
National Research Center/Technical
Information Training Course (IDRC)
Ottawa, Canada

International Conferences

The Institute was represented in sev-
eral international conferences:

- Second Asian Conference on Training
and Development
- Fourth International Training and
Development Conference

Held simultaneously in Vigyan Bhavan,
New Delhi, India

November 1975

represented by Mr. Paterno V. Vilorio
International Symposium on Small
Business

Held in Tokyo, Japan, November 1975
represented by Dr. Leon V. Chico

First Asian Industrial Extension
Officers Conference

Held In Manila, November 1975
represented by Victor C. Luna

Conference on Adaptive Technology
& Small Industry Development

Held in Manila, May 1976
represented by Mr. Paterno V. Vilorio
and Mrs. Herminia R. Fajardo

Socio-Economic Technical Mission to
the People's Republic of China
PROC, April-May 1976

represented by Mr. Paterno V. Vilorio
Maria Adela A. Santiano

Workshop on Entrepreneurial
Expansion of Small Firms

East-West Center, Hawaii, May 1976

UP ISSI Employees' Association

The Employees' Association of the
Institute has been organized in January
1976 with the following objectives:

1. to work for the general welfare of
UP ISSI employees;
2. to promote mutual understanding
& cooperation with UP ISSI;
3. to undertake economic activities
which will redound to the benefit
of its members; and
4. to develop social relationship and
camaraderie among its members.

PROGRAMS FOR FY 1977

ISSI EXTENSION OFFICES

In support of the regional dispersal program of the government, the Institute will undertake the expansion of extension offices with the objective of setting up one in each region of the country for the next ten years.

Now that the ISSI Extension Office at the UP College Tacloban, Leyte servicing Region VIII is fully operational, plans are underway to establish the Institute's second extension unit. For this purpose, a proposal has been submitted by the ISSI to the Georgia Institute of Technology for funding the establishment of ISSI extension offices in Puerto Princesa, Cagayan de Oro and Davao to bring direct assistance to Regions IV, X and XI, respectively. The time framework for the three-year project has been set from 1977 to 1980.

QUALITY CONTROL CENTER

A proposal evolved by the ISSI for the establishment of a Quality Control Center within the Institute has been accepted for funding under the UNIDO Country Programme. The aim is to promote and develop quality control technology for small and medium industries in the Philippines through a well-organized system of assistance geared towards improvement of quality, increase of productivity, and cost reduction. The project is expected to be operational starting 1977 covering a three-year period.

TECHNICAL INFORMATION SERVICE

The Institute seeks to formulate a more effective transfer of technological resource information for small industry development programs. This project concept is based on the establishment of a link between the information generators (research and development institutions, scientific communities, etc.) and the information

users or clients (small industrialists, industrial extension officers, policy makers, etc.)

Several projects have been scheduled in line with the ISSI's industrial information transfer program. These include:

- Publication of a Directory of National Sources of Information in Small Industry Development in the Philippines;
- Installation of a UNITERM Information Indexing System - a more effective information retrieval system; and
- Publication of a small Industry Development Thesaurus - a mechanism which will match the language used by the information users in expressing their needs and the language used by the information indexers.

These projects will go hand-in-hand with the intensification of the promotion of existing services of the Institute, the assessment of consumer needs and training programs on information utilization.

INSTITUTIONAL INDUSTRIAL EXTENSION ASSISTANCE

The Institute has felt the need for industrial extension assistance to industrial intermediary organizations such as trade associations, specific industry groups, chambers of commerce, among others.

This form of client-oriented service differs in a way from the traditional orientation of "one to one correspondent" approach between the small industrialist and the extension officer.

Beginning FY 1977, the ISSI plans to build-up its capabilities on Institutional Industrial Extension. This approach will require the development of new skills for the extension officers, that is, institution-building capability, problem-solving skills on the industry level, and other related concepts.

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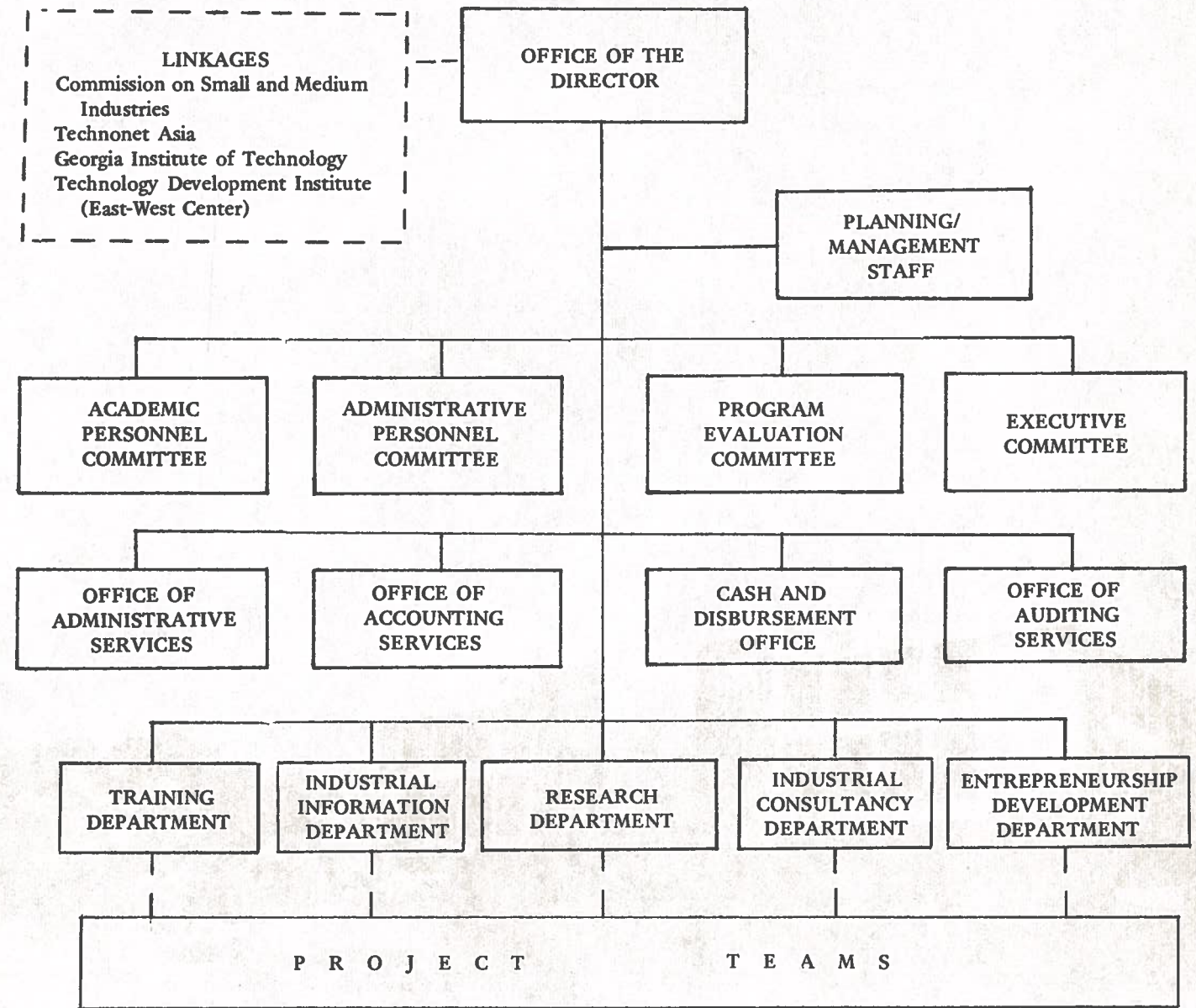
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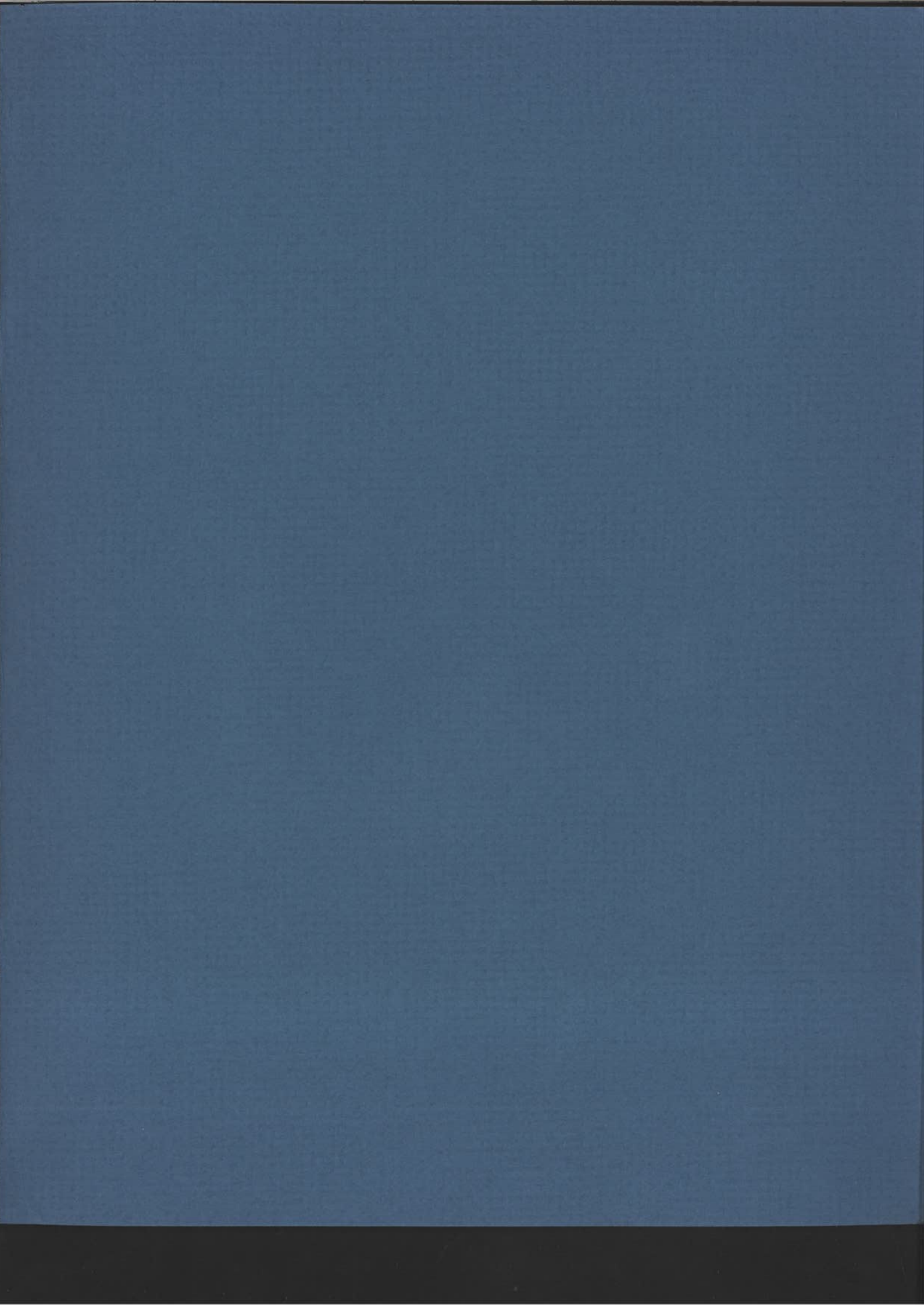
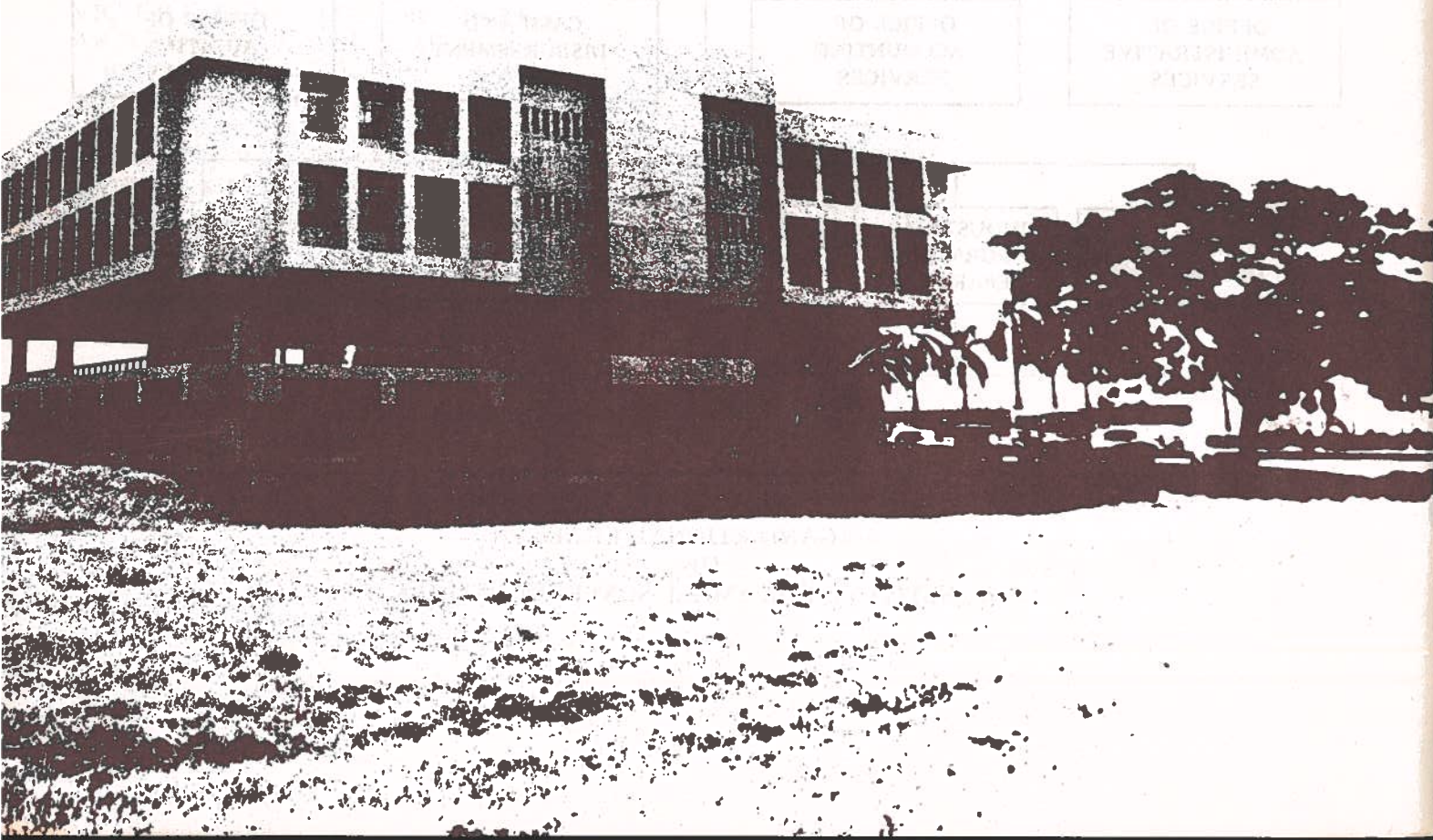
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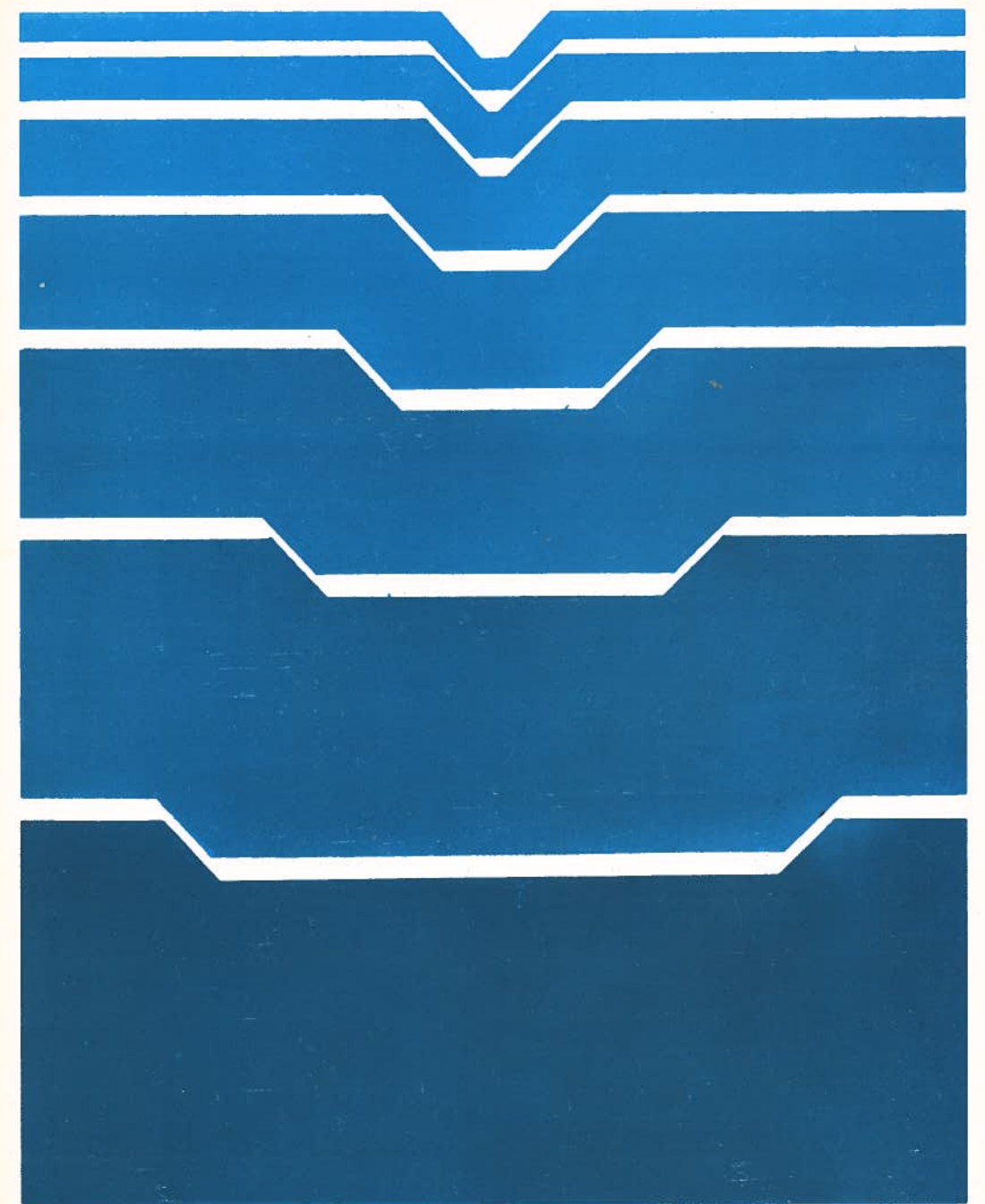
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 Journalism, Administrative Officer
 FILOTEO L. LUNA, MS, BSC, MSMin.E.
 Auditor
 PRIMO M. RECINTO, BBA
 Chief, Accounting and Finance Services



**ORGANIZATIONAL CHART
 OF
 UP-INSTITUTE FOR SMALL-SCALE INDUSTRIES**





U.P. and the FUTURE

A PERSPECTIVE DEVELOPMENT PLAN

OFFICE OF THE PRESIDENT
UNIVERSITY OF THE PHILIPPINES
MARCH 1977

UNIVERSITY OF THE PHILIPPINES

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President of the Philippines

Board of Regents

The Honorable Juan L. Manuel, *Chairman*
Secretary of Education and Culture

The Honorable Onofre D. Corpuz, *Vice-Chairman*
President, University of the Philippines

The Honorable Abelardo G. Samonte
Chancellor, University of the Philippines at Los Baños

The Honorable Ruben Santos Cuyugan
Chancellor, Philippine Center for Advanced Studies

The Honorable Abraham F. Sarmiento
President, U.P. Alumni Association

The Honorable Tomas S. Fonacier

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The Honorable Gerardo P. Sicat

The Honorable Ambrosio F. Tangco

The Honorable Ronaldo B. Zamora

Dr. Gémino H. Abad, *Secretary*

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Dr. Emanuel V. Soriano, *Executive Vice-President*

Dr. Oscar M. Alfonso, *Vice-President for Academic Affairs*

Dr. Ramon C. Portugal, *Vice-President for Administration*

Dr. Gémino H. Abad, *Secretary of the University*

Prof. Manuel P. Bendaña, *University Registrar*

FOREWORD

THE U.P. AND THE FUTURE

A PERSPECTIVE DEVELOPMENT PLAN

When President D. Pardo took office as the second President of the University of the Philippines on January 23, 1975, the President of the U.P. Board of Regents, Dr. Onofre D. Corpuz, gave him a copy of the University's plan for the "development" of the University. The plan was approved and adopted by the Board of Regents of the University on the day that the President was elected and installed.

If the University is truly to reflect the spirit of the times, where will the critical thought that is transforming the face of society—come from? There has to be a critical, unflinching, unadorned thought, and that the University can be seen at a distance and hopefully provide an approach to the problems of the times or putting them at the service of the people. Thus the University is ideally suited to do.

It is essential to the President's plan for the U.P. to be a vision that can be translated into a concrete reality. The members of the University have been gathered together into the second edition of the U.P. Development Plan. A perspective plan for the U.P. is the duty of the President of the University in order to provide a framework for the strategy by which the University as a Filipino institution may contribute to the discharge of its mission, which is to the University's contribution to the development of the building of the New Society.

Office of the President
University of the Philippines
March, 1977

THE U.P. AND THE FUTURE

The Honorable Juan L. Manuel, Chairman
Senate of the University of the Philippines

The Honorable Onofre D. Corpuz, President
University of the Philippines

The Honorable Abelardo G. ...
Chancellor, University of the Philippines

The Honorable Ruben Santos ...
Chancellor, Philippine State University

The Honorable Abraham ...
Chancellor, U.P. Diliman

The Honorable ...
Chancellor, U.P. Los Baños

The Honorable ...
Chancellor, U.P. Baguio

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The Honorable ...
Chancellor, U.P. Marikina

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The Honorable ...
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Chancellor, U.P. San Carlos

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Chancellor, U.P. Tuguegarao

The Honorable ...
Chancellor, U.P. Visayas

The Honorable ...
Chancellor, U.P. Zamboanga

The Honorable ...
Chancellor, U.P. Cebu

Office of the President
University of the Philippines
March 1977

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When Dr. Onofre D. Corpuz took his oath as the eleventh President of the University of the Philippines on January 23, 1975, the President of our Republic, Ferdinand E. Marcos, observed that the essence of the University is "the love for the life of the mind." In no uncertain terms, he defined the role of the University in the New Society which he has envisioned and created:

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Annex B. If the University is only going to reflect current realities, where will the critical thought—the transforming criticism of society—come from? There has to be a zone of sanity, of clear, uncluttered thought, so that the turmoils can be seen at a distance and hopefully provide an approach to accommodating them or putting them at the service of the society. This the University is ideally suited to do.	30
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In response, then, to the President's call for commitment to clear vision and purposive action, ideas from the various constituencies of the University have been gathered together into this second edition of "The U.P. and the Future: A Perspective Development Plan" by the Office of the President of the University in order to provide a framework for the strategy by which the University as a Filipino institution may continually be strengthened in the discharge of its mission, whilst all in the University community contribute meaningfully to the building of our New Society.

FORWORD

When Dr. Gino D. Cojuangco took the oath as the eleventh President of the University of the Philippines on January 22, 1975, the President of our Republic, Ferdinand E. Marcos, observed that the essence of the University is "the love for the life of the mind." In the uncertain future, he defined the role of the University in the New Society which he has envisioned and created:

If the University is only going to reflect outward realities, where will the critical thought—the transforming criticism of society—come from? There has to be a zone of clarity, of clear, uncluttered thought, so that the tumults can be seen at a distance and hopefully provide an approach to accommodating them or putting them at the service of the society. This the University is ideally suited to do.

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60	Annex J The Present Services, Resources and Capabilities of the University

THE U.P. AND THE FUTURE

Introduction

The purpose of this paper is to describe the projected path of the University in the years ahead. It outlines the general thrusts and directions of the University and its strategy for coping with a dynamic environment. This strategy aims not only for survival on a *status quo* basis but also for growth and development.

The University strategy outlined in this paper is intended to:

- * Serve as a frame of reference for the more detailed development plans of the various schools, colleges and units of the University
- * Provide information to the University's important publics (e.g., the national government, faculty and staff, students, alumni, other governments, world organizations and foundations) on the directions of the University so that these various publics can increase their involvement in University activities

This paper is based on various inputs that are available as of this time such as:

- * Concept papers submitted by various associates of the Program Development Staff, Office of the President

- * Workshops among various constituencies on the above concept papers
- * Development plans of various units which have already formulated such plans
- * Documents from national government agencies
- * Views of thought leaders within and outside the University

In brief, this paper describes the general orientation of the U.P. in the coming years as well as the more specific directions of growth which will entail the commitment of more resources.

The Concept of U.P.'s Contribution

Periodically, usually with the coming of a new University President, we look back to the past, reflect on contemporary conditions and develop a vision of the future in order to define the contribution we would like to make to promote the well-being of our people. Once again, we are being asked to define the concept of U.P.'s contribution to Philippine society.

The concept discussed in the following paragraphs is not anything dramatically new. The ideas presented have been articulated repeatedly over the years. Perhaps what is new is the manner in which these ideas are translated into practical terms.

In brief, U.P.'s contribution to the nation will be to continue developing itself into an outstanding academic institution which, through responsible academic leadership, can help strengthen the capabilities of our society to realize our aspirations as a whole and as individual members of society. Thus, U.P.'s aspirations are identical with those of the nation.

But how will U.P. "help strengthen the capabilities of our society to realize our aspirations?" It is envisioned that U.P.'s contribution will be embodied in programs/projects that will:

- * transmit and disseminate knowledge that is relevant to nation building as identified by the U.P. units which have the expertise themselves
- * discover new knowledge, particularly in areas pertinent to the needs of a developing society and those in which the University enjoys some comparative advantage
- * enhance, preserve and disseminate the national cultural heritage
- * bring knowledge to bear on the solution of national problems
- * provide the poor, minority groups and other disadvantaged members of Philippine society with increasing opportunities for advancement, either as beneficiaries or members of the U.P. community.

Moreover, the University's programs and projects will be undertaken in such a manner as to reflect the University's aspirations to be:

- * a *creative center* for Philippine Society
- * an *effective development-oriented institution*
- * a leading center of *quality higher education*
- * a *worthy member of the world community of institutions of higher learning*

The foregoing, in brief, is the concept of U.P.'s contribution to the nation.

The University's "Market Share" in the Work of Higher Education

1. The University will gradually develop the capability to admit yearly an increasing freshman population from about 4,000 now up to a maximum of about 8,000 25 years from now.

For a period of more than 10 years now, the U.P. has been admitting a relatively fixed number of about 4,000 freshmen: 2,000 in the College of Arts and Sciences and approximately 2,000 in the other units of the U.P. (i.e., U.P. Colleges Manila, Baguio, Cebu, Clark, Iloilo and Tacloban). Thus, U.P.'s share of the market has been a decreasing percentage of the national population. This policy seems to have been a good one for the last 10 years but is no longer tenable as a policy in the years ahead. Philippine population is expected to double within the next 25 years from about 42.5 million in 1975 to about 83.4 million (medium assumption) in the year 2000. In order to maintain its share of the burden, U.P., therefore, should gradually develop the capability to admit up to about 8,000 freshman students by the year 2000. This is not to say that U.P.'s capacity should increase in direct proportion to population. It simply means that U.P. will have to increase its capacity and 8,000 is probably a conservative estimate. What U.P.'s "fair share of the market" should be will have to be the subject of continuing studies.

Over the next 10 years, the total U.P. student population (undergraduate and graduate) will be allowed to increase up to approximately 31,300 as shown in Table 1. This assumes a rate of increase at about the same rate as the population increase on the undergraduate level and slightly higher on the graduate level in order to increase the proportion of graduate students.

2. The composition of the U.P. students will be modified in order to make the opportunities of a U.P. education more accessible to the various socio-economic groups in the Philippines.

Studies have shown that the composition of students admitted into the University in the last two decades may be described as follows:

- * Workshops among various constituencies on the above concept papers
- * Development plans of various units which have already formulated such plans
- * Documents from national government agencies
- * Views of thought leaders within and outside the University

In brief, this paper describes the general orientation of the U.P. in the coming years as well as the more specific directions of growth which will entail the commitment of more resources.

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2. The composition of the U.P. students will be modified in order to make the opportunities of a U.P. education more accessible to the various socio-economic groups in the Philippines.

Studies have shown that the composition of students admitted into the University in the last two decades may be described as follows:

Table 1
Student Population

	1967/1968	1975/1976	1987/1988
Undergraduate enrollment¹ (Philippines)			
Public		109,200	
Private		621,830	
		<u>563,000</u>	<u>731,120</u>
Graduate enrollment¹ (Philippines)			
Public		9,160	
Private		24,445	
		<u>33,605</u>	
U.P. enrollment²			
Undergraduate	15,100	19,400 ³	25,000
% of total		2.65%	
Graduate	1,900	4,700 ⁴	6,300
% of total		14.0%	

¹Department of Education.

²U.P. Registrar's Office and UPLB.

³The UPLB component is 3,400.

⁴The UPLB component is 1,100.

- * Children from high-income families
- * Mainly from urban areas
- * Mainly from the best high schools

Therefore, it may be said that U.P. has neglected to serve the lower-income and non-urban groups who actually compose the vast majority of our people. Inasmuch as intelligence among our people is not confined to high-income or urban families, the University will undertake a major effort to change the composition of students admitted into the University in order to approximate the distribution of Filipino families among the various socio-economic groups.

This effort to change the composition of U.P. students will include modifications or provisions in the following areas:

- * the admissions system
- * a learning assistance program
- * teaching philosophy
- * psycho-social assistance program
- * the scholarship program
- * tuition fee subsidy structure
- * grants-in-aid program

Work in this area has now reached the pilot stage. An experimental group of 100 will be admitted in June, 1977.

3. New and expanded graduate programs will increasingly receive emphasis relative to undergraduate programs.

The 10-Year Horizon

Over the next few years, the main emphasis of U.P.'s efforts will consist of programs and projects that will:

- * enhance the University's capabilities as a *creative center* for Philippine society
- * be supportive of articulated *national priorities formulated through direct or indirect U.P. participation*
- * initiate bold and innovative internal institutional improvements

As a creative center for Philippine society, the University will strive to be an effective *agent of reform* and a constructive *social critic*. Relative to this, two major programs will receive substantial support:

- * a strong Arts and Sciences Program
- * a broad-ranging Research Program

The Arts and Sciences Program which will highlight a new general education concept, divisional majors (natural sciences, social sciences and

humanities), self-paced programs, graduate programs and work-oriented programs is discussed in Annex A. The approach to research is discussed in Annex B.

The national development plan formulated by the government has been regularly updated and modified in order to reflect environmental changes. The basic approach to Philippine development is shown in Figure 1. Its emphasis is on *agricultural development* and *industrial development*. In *agricultural development* the government expects to promote

- * improvement of rural income
- * food self-sufficiency

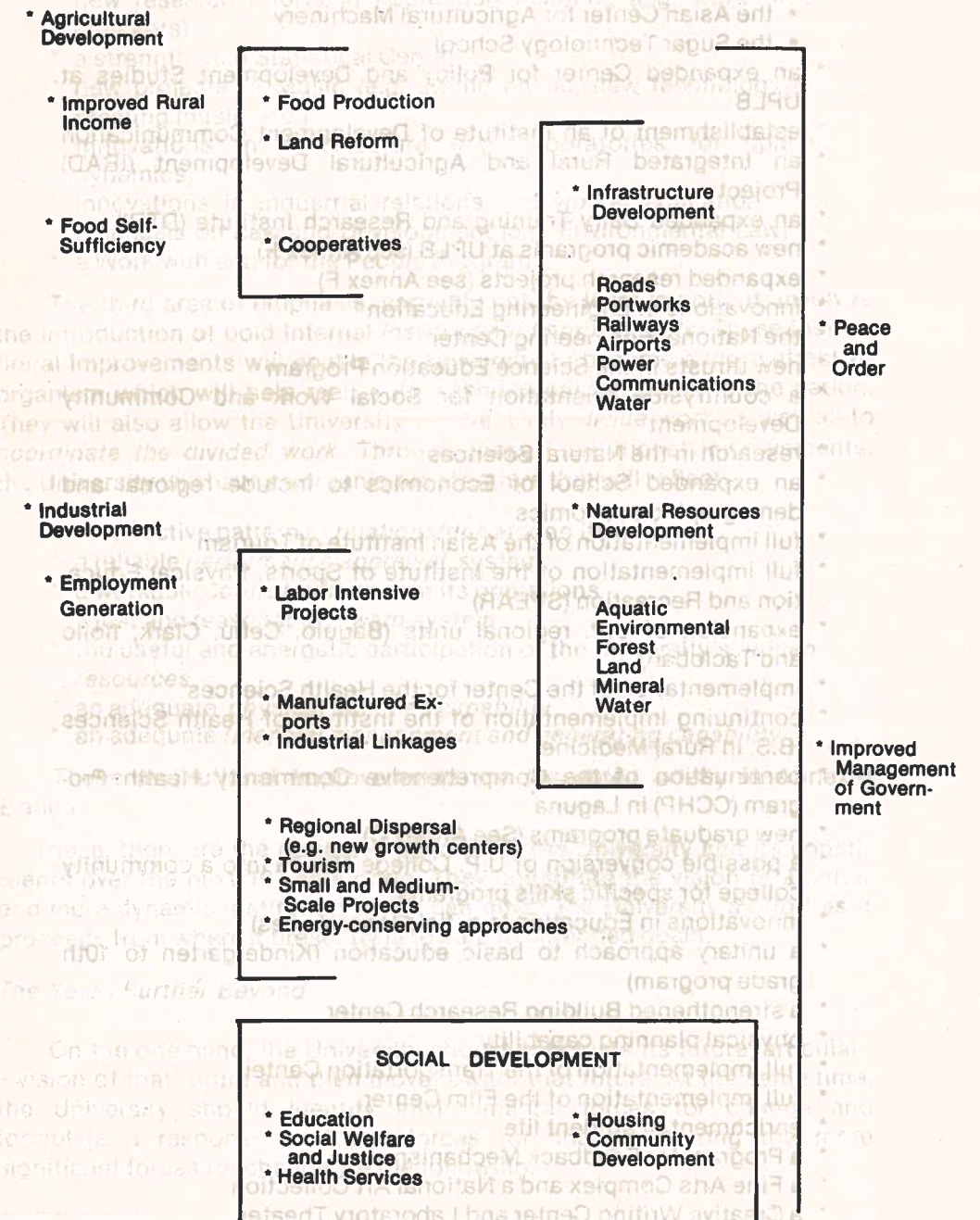
This will be accomplished through expanded food production, natural resources development, land reform and cooperatives. Industrial development will generate new and more employment. This will be accomplished through labor intensive projects, manufactured exports, industrial linkages, regional dispersal, tourism, and small and medium-scale projects. In accomplishing all these, private sector participation will be encouraged. For its part, the government has promised to forge ahead with social development (education, social welfare and justice, health services, housing and community development) and infrastructure programs. Moreover, the government has also committed to ensure peace and order as well as to bring about better management of government.

Within the framework of these national priorities, as well as other considerations important to the U.P., the University will continue to formulate its own participation in development efforts through specific programs/projects. Some of these new programs/projects, which have been identified as of this time as well as those already on-going, are discussed briefly in Annex C and Annex F and include:

- * U.P. in the Visayas (fisheries, etc.)
- * an expanded College of Veterinary Sciences
- * fisheries research
- * an expanded Marine Sciences Center
- * an expanded College of Agriculture with the institutionalization of the following:
 - Institute of Plant Breeding
 - Crop Protection Center
 - Animal Science Center
- * a new College of Development Economics and Administration to include:
 - an expanded Institute of Agricultural Development Administration (IADA)
 - an expanded Agricultural Credit and Cooperative Institute (ACCI)
 - an expanded Agrarian Reform Institute (ARI)

Figure 1

BASIC APPROACH TO DEVELOPMENT



- * a growing urgency for more development by the less developed countries
- * the changing values of affluent nations and of developing nations which see the possibility of affluence for themselves
- * the continuing pressure of population growth
- * a growing urgency to reduce unemployment and the rich-poor gap
- * the rising tide for more and better education
- * the growing sophistication and complexity of technological requirements with the developed nations rapidly forging ahead while the rest of the world is still bound to primitive modes of doing things
- * the growing sophistication of communications capability
- * the growing concern for resource and environmental management for growth and ecological balance objectives
- * the increasing phenomenon of a corporate social conscience
- * the irreversible trend toward socio-economic and political interdependence within a country and among the nations of the world.

In order not only to survive but also to be useful in the long-term future, the University should innovate and conceptualize academic and non-academic programs which will directly address these forces for change.

U.P. AND EDUCATION

The University will not seek to be the apex of Philippine education. However, it will strive to be at the center of Philippine education, radiating, as it were, its beneficial influence to the other parts of the educational system while learning from the system either informally or formally through various consortia. The University's position in the educational system will not be determined by law but in large measure by U.P.'s own distinctive competence as well as by the recognition accorded by the other members or components of the educational system. One thing is certain: the University will do its utmost to be a truly outstanding educational institution.

In the years ahead, the U.P. will gradually introduce a "work with and for the people" approach as a component of a U.P. education. In operational terms, this means that in the future, no one will receive a degree from the University unless he has worked with the people some time during his stay in the University. In this way, every U.P. graduate will be encouraged to understand how the common *tao* thinks and feels.

It will probably not mean very much anyhow for the U.P. to aspire to be the outstanding educational institution in Southeast Asia. As a matter of fact, this may be an impossible dream. But certainly the University ought to strive to be the outstanding educational institution in the Southeast Asian region in a number of areas. In this way, the University can make a

contribution to the region. At the present time, the University is ahead in such areas as management, economics, agriculture, medicine, animal sciences, human settlements, communications, population studies and Asian Studies.

With respect to the rest of the world, the University will always keep abreast of developments in the progressive institutions of higher learning in various parts of the world. Thus, a network of linkages with such institutions will be developed in order to foster exchanges and joint projects of varying types. The concerns of the Third World will also be emphasized.

THE U.P. ANNEXES

The U.P. in the 21st century will be a system of universities with four main components:

- * U.P. Diliman
- * U.P. at Los Baños¹
- * U.P. in the Visayas (to include Iloilo)
- * U.P. in the Sulu Archipelago or Davao (possibly other growth centers of the nation)

The University will also maintain the flexibility to respond to regional requirements. Thus, regional units such as U.P. College Baguio, U.P. College Cebu and U.P. College Tacloban will develop specific areas of strength. If and when Clark Air Base becomes the Philippine International Airport, U.P. Extension Division Clark Air Base may also evolve into a regional unit of the U.P. Depending on the magnitude of funding support which may become available, each of the regional units can evolve into an autonomous university within the U.P. provided that it meets the minimum requirements for autonomous universities recently articulated by the Board of Regents.

This then is the vision of U.P.'s future.

¹ Please see Annex F.

The Arts and Sciences Program

The Arts and Sciences Program (ASP) will be a distinctive area of strength in every campus of the University (i.e., U.P. in Diliman, Los Baños, Visayas and the Regional Units).

An important component of the ASP will be the General Education Program (GEP). In essence the content of the GEP will focus on:

- Man and Society
- Philippine Society
- Man and Art
- Philippine Art
- Man and Science

ANNEXES

Annex A The Arts and Sciences Program

Annex B The Approach to the Research Program

Annex C The Thrust in Support of National Priorities

Annex D The Extension Function of the University

Annex E Institutional Improvements

Annex F A Note on UP at Los Baños

Annex G A Note on Affiliated Foundations

Annex H A Note on Budgetary Projections

Annex I A Review of the Planning and Budget Process

Annex J The Present Services, Resources and Capabilities of the University

- Expansion of the newly-established extramural program
- Third World workshops, studies and publications
- Expansion of the recently established evening division
- Operationalization of the newly-established Office of Student Affairs

Other new projects may include an expanded museum of Anthropology, a glass plant house, an Ecology-Physiology-Genetics

¹Subject to periodic review by the various units concerned.

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U.P. in the Visayas (to include Iloilo)

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ANNEX A
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An important component of the ASP will be the General Education Program (GEP).¹ In essence the content of the GEP will focus on:

- * Man and Society
- * Philippine Society
- * Man and Art
- * Philippine Art
- * Man and Science
- * Philippine Science and Technology

The ASP will be enriched through *divisional programs* in the natural sciences, social sciences and the humanities. Some innovations will include:

- * *Self-paced* programs
- * *Work-oriented* programs
- * *A liberalized system of prerequisites* both at the graduate and undergraduate levels

There will be continuing efforts to encourage:

- * Faculty and staff development (especially in departments with a high turnover)
- * Teaching effectiveness
- * Research and publications
- * The writing and production of textbooks and laboratory manuals

In Diliman, new projects in the proximate future may include the following:

- Expansion of the newly-established extramural program
- Third World workshops, studies and publications
- Expansion of the recently established evening division
- Operationalization of the newly-established Office of Student Affairs

Other new projects may include an expanded museum of Anthropology, a glass plant house, an Ecology-Physiology-Genetics

¹ Subject to periodic review by the various units concerned.

Laboratory, a Microbiology-Mycology-Phycology Laboratory, an herbarium, a Ph.D. program in Chemistry, a translation project for Philippine history, new capability in Mineral Economics, an Ethnic Arts documentation project, Applied Mathematics, a "bootstrap" Physics Laboratory, a new major's program in Drama and Speech Pathology, packaged courses in speech and the theater and the development of a regular theater season.

New classrooms, laboratory space and offices will be available to the CAS in Diliman upon the completion of the Zoology Building which is now under construction in 1977. Upon the completion of the College of Business Administration Building, which is now also on-going near Vinzons Hall, the CAS will take over the present building of the College of Business Administration in early 1978.

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Subject to periodic review by the various units concerned.

The Approach to the Research Program

The research program will be part of the University's effort to be an *agent of reform* as well as a *constructive critic*. It will stress research activities which contribute to:

- * preserving and transmitting the cultural heritage
- * discovering new knowledge, particularly in areas critical to a developing society
- * bringing new or existing knowledge to bear on the solution of national problems (e.g., problem-oriented research programs relating to poverty)

The initiative for undertaking research and for generating the necessary funding support for such research projects will continue to come mainly from the individual units. Similarly, the approach and methodology to be used in conducting the research and research evaluation will be left to the units themselves since it is they who have the professional expertise to do so.

To provide more direction to the research program and thereby carry out the University's objectives, the central administration will seek to administer research activities with a University-wide perspective. This will require the adoption of a mechanism for monitoring all research projects being undertaken, regardless of the source of funding, and the human and other resources involved in these research projects.

The adoption of this mechanism can facilitate the identification of research capabilities and on-going research activities as a basis for a more equitable allocation of available research funds. It will also allow the University to standardize compensation for research and possibly, to include this in the reward system. At the same time, it will enable the University to identify the broad research disciplines in which research work should be actively promoted and for which research funds will be made available.

In this regard, the New U.P.-N.S.D.B. agreement which involves a substantial amount of support, gives the University more flexibility in the allocation and implementation of research grants and also reduces the usual red tape considerably. The University will respond to this welcome manifestation of confidence from the National Science Development Board (N.S.D.B.) by seeing to it that the allocation process for research funds optimizes the expected benefits.

The central administration's role will therefore be purely *facilitative* and *monitoring*. Its facilitative role will be to assist units interested in

undertaking research projects in negotiations with external funding agencies and with other Universities for possible collaborative research efforts. Its monitoring role will be to keep better track, through the mechanism earlier described, of all research work in the University and the output generated.

The central administration will deliberately encourage the application of these research findings by improving linkages among researchers and making these findings regularly available in practical and understandable form to potential users.

With regard to the research program of the U.P. at Los Baños, the following are the specific features:

1. The thrust of the University Research Program shall be in pursuance of the University mission and goal of agricultural and rural development.
2. The University Research Program should give increasing emphasis to problems affecting small farmers.
3. The UPLB should play an active and leading role in the National Research System in the field of humid tropical agriculture and related sciences. It should likewise assume a similar active and leading role in the Southeast Asian region and internationally.
4. UPLB should pursue two types of applied research:
 - a) *Discipline-oriented research:*
In-depth research in the various disciplines of Philippine and humid tropical agriculture, forestry and rural development to solve problems;
 - b) *Client-oriented research:*
The UPLB should increasingly share responsibility for applied research trials in the farmers' fields with regional agricultural colleges/universities and research agencies/stations.
5. To exercise its leadership role in the national research system, the UPLB should follow an active strategy for research program development and fund/resource generation (e.g. IPB, NCPC).
6. Relationship with PCARR:
In the implementation of the NEDA Regionalization Plan (even in research as research is supportive of respective Regional Development Plans), the build-up of research resources in the regional research centers/stations/colleges/universities should only be commensurate with the location-specific and adaptive type research role of such stations/centers. The UPLB should be the National Agricultural Research Center.

7. The UPLB should seek to establish and maintain a regular budgetary appropriation for research from the Philippine Government for the sole purpose of advancing science and Philippine culture over and above the immediate utilitarian values of the research project/study. This University Research Fund should be used for certain University research projects which are desirable but are not included in the national development priority list.

8. The University Research Program will include:

- a) Unit-initiated/generated programs
- b) University-wide programs—e.g. environment, energy conservation, unconventional food sources, educational and institutional research, teaching innovations, research management, etc.

9. Following its active strategy, the UPLB should be a primary signatory to research collaborative agreements with parties, government or private; international research centers/agencies and others involving a substantial role and participation of UPLB staff and resources. Deviations from this will be allowed only in exceptional circumstances, provided that the interests of the University and the country are not adversely affected.

10. The UPLB should have a mechanism (e.g. Foundation) to accept and administer non-governmental research grants. This Foundation, however, should be a facility only for the programs which are in pursuance of the University's interests and goals.

11. Royalties, patents, and copyrights should be credited to the institution; they should generate income for the University as additional sources of rewards/incentives for researchers and other employees.

12. The UPLB should jointly agree on an evaluation scheme and procedure with funding agencies (e.g. PCARR).

13. More prerogatives and authorities should be delegated to deans/directors, department chairmen—e.g. appointments, business matters.

14. A university mechanism for generating project ideas among the faculty/staff should be established.

ANNEX C

*The Thrust in Support of National Priorities*¹

The University and its various constituencies have identified, in addition to on-going programs, new program/project ideas consistent with the basic approach to Philippine socio-economic development adopted by the national government. The process of program/project identification is a continuing process and results in incremental improvements to the University's concept of making a contribution to public welfare. The various program/project ideas which have been identified as of now are described in summary form in this annex. These brief descriptions are based on various concept papers prepared by associates of the Program Development Staff, Office of the President, and on updated development plans of some colleges and units of the University.

The U.P. in the Visayas (UPV)

The UPV is a projected autonomous university in Panay which will have capabilities in fisheries science and related fields. The UPV is envisioned to have the components of a modern university similar to the UP at Los Baños and will integrate the present U.P. College Iloilo and the College of Fisheries which will be transferred from Diliman. The project is to be implemented over a five-year period and is estimated to require an investment of about ₱250 million which will be funded through a World Bank and/or U.S.A.I.D. loan as well as by the Philippine government. Project proposals have been submitted to and discussed with the World Bank. These proposals are now being revised in collaboration with EDPITAF, the Department of Education, the Department of Natural Resources and other agencies in preparation for another series of discussions with the World Bank. In anticipation of this major project, the U.P. College Iloilo and the College of Fisheries will initiate a faculty recruitment and development effort.

An Expanded College of Veterinary Sciences

This will be another World Bank-funded project.

The concept is to expand the present College into a College of Veterinary Sciences which will emphasize animal production, animal health and public health. This is a major departure from the present concept which is concerned mainly with the treatment of animal diseases.

In this connection, the academic programs of the College will be transferred to the UP at Los Baños. In Diliman, the capability of the College will be strengthened through a Research Institute, a Continuing Education Center and additional facilities for microbiology and parasitology and the veterinary hospital (e.g., surgery).

¹Excludes U.P. at Los Baños which is discussed in Annex F.

Fisheries Research

Fisheries research will be made increasingly production-oriented in line with the government's programs for self-sufficiency in food. Research will include sustenance fishing and inland fishery. Studies will focus on the production potentials of traditional and non-traditional fishing grounds, with emphasis on biology, oceanography, and problems of fishing methods and operations as well as on the development of fishpond or aquaculture technology for fish and invertebrates for increased fish production.

An Expanded Marine Sciences Center (MSC)

The MSC addresses itself to the need for: (1) proper management and conservation of our nation's marine resources; (2) rational utilization of marine resources for the benefit of our people; (3) science and technology for the enhancement of economically important marine resources; and (4) exploration of marine elements and resources as tools in advancing the frontiers of knowledge. In this connection, the activities of the MSC will consist of more staff recruitment, infrastructure development and acquisition of equipment needed to undertake projects (e.g., inventory of marine resources, multidisciplinary research on the products of marine plants and animals).

Innovations in Engineering Education

Academic programs will be reviewed and changes will be introduced to keep up with the changes in society. This effort will be directed toward (1) making instruction at all levels responsive to individual and social needs and (2) making engineers contribute to the solution of social problems. Interdisciplinary programs which will bring engineering students together with those from other fields (architecture, law, biology, geology, sociology, political science, etc.) will be evolved to devise solutions to real life problems.

A National Engineering Center

This project may be funded by the Asian Development Bank (ADB) and/or the UNDP. It seeks to link the teaching, research and extension service capability which will pioneer in the technology development efforts of the Philippines and Asia. The main component of this project is staff development which is now in an advanced stage.

New Thrusts in the Science Education Program

The Science Education Center has made many pioneering and significant contributions in the development of teaching materials in collaboration with the Department of Education. New directions to be

stressed include a development center for science and mathematics, emphasis on teacher education in science and mathematics, more cross-cultural studies, and curriculum development. Localized curricula for areas outside the urban areas will be given more attention.

An Increasing Countryside Orientation for Social Work and Community Development

While maintaining its present areas of strength, the Institute of Social Work and Community Development (ISWCD) will work toward (1) indigenous training for social development workers as well as rural workers, (2) the use of a rural social work laboratory, (3) extension services through continuing education programs, (4) community organizations and development models. New areas such as industrial social work and social work with the family and child will also be explored.

Research in the Natural Sciences

The work to be undertaken will be problem-oriented and directly related to the technical needs of industry. This effort will be supplemented by extension services as well as in-service training programs.

An Expanded School of Economics

This unit expects to develop additional capability in regional economics and demographic economics. The program in development economics will be strengthened and the Institute of Economic Development and Research (IEDR) will establish a programming pool to provide computer programming and documentation services. The School of Economics' transfer to its new building is expected to provide the necessary space and facilities for its expanded programs.

The Asian Institute of Tourism

This Institute was established by the University in 1976 and the construction of the building is now underway. The objective is to contribute toward the professionalization of the industry and help develop a foreign exchange earning industry without its negative aspects through a rational scheme. The Philippine Tourism Authority and the Department of Tourism will continue to assist in the implementation of this project.

SPEAR

The Institute of Sports, Physical Education and Recreation (SPEAR) was also established by the University in 1976. To fill the great need for physical education instructors in the country, the Department of Physical Education was elevated into a degree-granting institute. In relation to the

national fitness program, SPEAR will provide trained professionals in sports and the management of sports activities. In connection with the University's desire to provide for wholesome community recreation, SPEAR will also train personnel for the recreational needs of our various communities. Further project development work involving the faculty and the Program Development Staff is going on.

Expansion of Regional Units

In support of the regional dispersal efforts of the government, the University will continue its efforts to strengthen the regional units through better facilities (equipment and buildings) and a stronger faculty.

The unit development plans reflect an orientation toward national as well as regional needs as follows:

- U.P. College Baguio—arts and sciences, fine arts, tourism, mining and geology, Northern Luzon Research Center, high school
- U.P. College Cebu—arts and sciences, fine arts, management education, the maritime industry (e.g., naval architecture, marine engineering), the marine sciences and health sciences, high school
- U.P. Extension Division Clark Air Base—arts and sciences, business administration, etc.
- U.P. College Iloilo—arts and sciences, development management, Visayan studies, continuing education, science education, rural institutions, public health, high school
- U.P. College Tacloban—arts and sciences, animal science, health sciences, community development, management education, small and medium-scale industry
- U.P. College Davao —arts and sciences and other appropriate programs

The Committee on Regional Matters (CRM) will continue to assist in facilitating the work of regional units.

The Center for the Health Sciences

The University will move toward the implementation of the concept of the Center for the Health Sciences. The Center is envisioned to be an autonomous university which will integrate the programs and services of the following units:

- * School of Allied Medical Professions (SAMP)
- * College of Dentistry
- * Philippine Eye and Research Institute (PERI)
- * College of Medicine
- * College of Nursing

- * College of Pharmacy
- * Philippine General Hospital
- * Institute of Public Health
- * The National Teacher Training Center for the Health Professions (NTTCHP)
- * Other related units (e.g., the U.P. Health Service)

It will be located on a 30-hectare area in Diliman.

Project development work on the *Philippine Medical Center*, a P500 million project with capabilities in tertiary health care, will continue.

The *SAMP* will introduce a new general masteral program for the allied health sciences and undertake the preparation of teaching materials.

The *College of Dentistry* will pursue its plan to become an integrated institution in all disciplines related to oral health. The undergraduate program will introduce new disciplines. The postgraduate program will cover all clinical disciplines. Clinical research and community service will be given more attention. Finally, a cleft-lip and palate program will be started.

PERI envisions its transformation into an Institute of Ophthalmology and will have, among others, a glaucoma program.

The *College of Medicine* will implement the transfer of its library to a newly-renovated library building, continue its innovative and pioneering work in the Institute of Health Sciences, and strengthen linkages with the Philippine General Hospital and, eventually, the Philippine Medical Center.

The *College of Nursing* envisions curricular innovations (e.g. a 2-year nursing program, clinical nursing, and a Doctor of Nursing degree). It intends to initiate a continuing health education program for the rural areas. The College also aspires to become a training center for S.E. Asian nursing fellows.

The *College of Pharmacy* which, in recent years, has had problems of recruiting qualified students is now in the process of formulating an appropriate mix of services. The expectation is that this may include an Improved Industrial and Community pharmacy program, a new hospital and clinical pharmacy program, research on Philippine medicinal plants, and an expanded extension (e.g. consultancy) program to generate income for the College.

The *Philippine General Hospital* will pursue its institutional improvement programs as well as strengthen its linkages with other health science units.

The *Institute of Public Health* will move toward an improved Department of Community Health, a new M.S.P.H. (medical microbiology,

epidemiology and biostatistics), a doctoral program (nutrition, parasitology) and public health administration.

The *NTTCHP*, established in late 1975, will pursue the improvement of teaching projects as well as curriculum development in the health professions.

The Institute of Health Sciences (IHS)

The IHS was established in Tacloban by the University in June, 1976 and now has 96 students. As the only one of its kind in the world, it has the potential of bringing about a major breakthrough in medical education in the Philippines. The IHS is a collaborative project of the College of Medicine, the U.P. College Tacloban, the Institute of Social Work and Community Development and the Department of Health. It has a step-ladder academic program which produces barangay health workers (after 6 months), midwives (after 18 months), and nurses (after 30 months). Students of the Institute earn a Bachelor of Science in Rural Medicine (B.S.R.M.) degree (36 months after high school). The BSRM graduate will be a general practitioner qualified to handle about 70% of the ailments of Filipinos, especially in the rural areas.

The Comprehensive Community Health Program (CCHP)

The CCHP expects to continue its efforts toward developing a community which will be self-reliant in health. Training outposts will also be initiated.

New Graduate Programs

Various units are planning on implementing new graduate programs as follows:

- * Masteral—family life and child development, urban and regional planning, MBA honors program, public enterprises management, epidemiology, biostatistics, medical microbiology, housing, man-environment studies, landscape architecture, physical therapy
- * Doctoral—nutrition, home economics, nursing, chemistry, parasitology, architecture.

U.P. College Manila

The faculty is still in the process of reviewing the concept of U.P. College Manila. The guideline articulated as of the present is that U.P. should not have two colleges of arts and sciences in the Metro Manila area.

Innovations in Education

The College of Education seeks to be a leading center of development-oriented teacher education, educational administration and management and educational research. The college will be involved in continuing education for all types of educational personnel, the development of instructional materials and teaching aids, the development of educational field laboratories, the improvement of college teaching, and the development of a unitary approach to basic education (K-10th grade program).

The Kindergarten to 10th Grade Program (K-10)

The K-10 program was formally established by the University in 1975. ₱4.0 million was allocated for a building which is now under construction.

This is an innovation in the area of pre-collegiate training. The major defect in the present approach is the fact that most schooling assumes training preparatory to college. This gives rise to the "drop out" phenomenon. What is needed is a K-10 program which will provide skills to the young so that they can define their social roles early in life. In this way, a young Filipino can stop schooling before grade 10 and still be useful to society. The "drop out" phenomenon will then disappear. The University will pioneer in this effort and study how it can be adopted on a nationwide basis.

Additional funding is needed to complete the transfer of the K-6 levels from the present site to a new site across Katipunan, hopefully, within a two-year period.

A Strengthened Building Research Services Center

The purpose of this effort is to provide support to the nation's infrastructure program both in the public and private sectors. This has a wide spectrum of usefulness: low-cost housing, design of buildings suitable to the Philippine setting, study of indigenous materials, etc. Linkages with the National Housing Authority (NHA), the Department of Public Works, Transportation and Communication and the Human Settlements Commission will be established.

Physical Planning Capability

In connection with the physical planning capability, the Institute of Environmental Planning (IEP) has identified priority activities which include a 10-month full-time urban and regional planning masteral program, an estate management program, a resettlement planning and management program and an urban transportation management program. In research,

basic studies on Philippine and Asian planning practice and experience will be undertaken for reference and teaching purposes.

The Transportation Center

The Transport Training Center was established in the U.P. in accordance with LOI No. 428. A joint project of the U.P., the Department of Public Works, Transportation and Communication, and the Department of Public Highways, the TTC will initially offer post-graduate training courses in traffic planning, traffic engineering and traffic management starting in 1978. The program will be supported by the Japanese government (JICA) which will detail a number of transport experts to the University to handle the training courses and provide training equipment.

Staff development for the project has been started and the construction of the TTC Building in the College of Engineering block is scheduled to start early in 1978.

The Film Center

There is no Philippine school of film even though the movies have grown into a multi-million industry. The cinema is art and the civilized world has produced the cinematic arts as its contribution to the classic arts of painting, film, music, sculpture, dance and architecture. The Film Center is intended to be the powerhouse of the cinematic arts which will develop the imaginative talents of apprentice writers for Filipino films, and train potential directors, camera artists, film editors, film critics, film researchers, film educators, and film lovers.

P.D. 1050 has allocated ₱6.0 million for the building of the Film Center which was established in late 1975. A substantial inventory of equipment was transferred to the U.P. from Pamantasan ng Maynila. Staff have been recruited and some of them are now undergoing advanced training.

Ethnic Documentation Center

The Philippines has a wealth of indigenous ethnic visual arts and music which are rapidly being eradicated by modern life and technology. The Ethnic Documentation Center will undertake the identification, description and preservation of these arts and make possible their further study.

Enriching Student Life

In order to enrich the University life of students, there is a need to cope with a number of extra-curricular problems and needs. In this connection, the University will undertake a program that will address itself to the following:

- * Socio-cultural needs
 - adjustment to a university setting
 - exposure to a rich cultural experience
 - opportunities for the development of social skills
- * Academic/financial needs
 - early awareness of sources of help
 - resolution of financial problems
 - encouragement of scholarship
- * Career/emotional guidance and speedy resolution of disciplinary cases.

In general, there will be a determined effort to monitor the progress of students from entry to exit from the University. The capability to do this will be developed.

A Program for Feedback Mechanisms (PFM)

One of the most important ingredients of a developing society is a feedback network that provides reliable information relative to the thinking of various segments of the population, especially the masses of our people, on national issues and developments. The PFM, a project of the Institute of Mass Communication, has been started and the initial output is expected.

The Fine Arts Complex and the National Art Collection

Work to relocate the College of Fine Arts from Gonzales Hall to its new site has been started and funding for the building is expected in 1978.

There are many art treasures in the Philippines which need to be kept in a safe place at the same time that they are shared with the public. Owners of these art pieces have signified their willingness to deposit their collections with the University if given assurance that these will be properly cared for. This project of the College of Fine Arts will receive support and will be undertaken as soon as possible.

The College will also establish a Design Research and Training Institute.

Laboratory Theater

As part of the University's efforts to encourage creative writing and the dramatic arts, a laboratory theater will be constructed in the campus.

Production of Textbooks and Teaching Materials

The following academic units will undertake the production of textbooks: College of Home Economics, College of Public Administration,

College of Nursing, the Institute of Mass Comunication, the School of Allied Medical Professions, the College of Business Administration, the College of Education, the College of Arts and Sciences, and the Statistical Center.

New Thrusts in Management Education

The new College of Business Administration building is now under construction and this will be the location for present as well as future programs to include a B.S. in Fisheries Management, an MBA honors program and a masteral program in public enterprises management in collaboration with the College of Public Administration, the School of Economics and the College of Engineering. A Center for Management Studies will be established. Extension services will allot more time for public-service oriented agencies.

The *Philippine Executive Academy (PEA)* will continue its Senior Executive Development Program. In addition, the following programs will be introduced: foreign trade, public enterprise management, and the management of agricultural and rural development programs.

The *U.P.-ISSI* will intensify its entrepreneurship development program with emphasis on management skills acquisition and project development assistance to cover a large number of provinces, towns and cities. It will also direct its training, research and consultancy activities towards regional industrial dispersal through an integrated countryside development package.

The *U.P.-ISSI* will also undertake projects aimed at infusing, testing and incorporating entrepreneurial development projects in the grade school, high school, college and vocational school curricula towards inculcating self-employment rather than employment.

The *College of Public Administration* will strengthen its MPA and DPA programs, as well as continue assisting the regional units. Research efforts will be focused on basic issues on Philippine politics and government. Extension services will be geared to assist in enhancing the administrative capabilities of national agencies and local government through a strengthened Administrative Development Center (ADC) of the College. The ADC was recently established by the Board of Regents.

New Programs in Library Science

In addition to the present academic programs, the Institute of Library Science seeks to implement a Special Training Course for Information Specialists. This training course will service the S.E. Asian region. The training course will include nine new courses designed to provide intensive

training in information handling to employees of information centers, documentation centers, libraries, resource centers and data banks.

Population Planning

The masteral program will be expanded. The scope of research work will include fertility and mortality analysis, migration, and work-force concepts.

A Strengthened Statistical Center

Faculty development and recruitment is a priority project of the Center.

Projects in Music

An annex to Abelardo Hall will be constructed in 1977 to ease the congestion. Other projects include a record of Philippine ethnic music, community service for music teachers and the strengthening of the Philippine Youth Orchestra. The College seeks to maintain its leadership and strengthen ties with Asian through a cohesive program of artistic development. It also plans to adopt the latest technology in creating and re-creating music, continue collecting and preserving the rich Philippine musical heritage and provide ample opportunities for the performance of traditional and contemporary works of Filipino composers.

Innovations in Architecture

New academic programs will include a B.S. in Industrial Design, a B.S. in Building Technology, an M.A. in Housing and an M.S. in Man-Environment Studies, a master of Landscape Architecture and a Ph.D. Program. Linkages with Engineering, Tourism, Business Administration, Psychology, Geology and Geography, Sociology, Anthropology, Community Development, the IEP and the SAMP will be established. Three laboratories will be established: architectural science, space dynamics and building systems.

The Asian Labor Education Center

The newly established masteral program in Industrial Relations will be expanded. A new specialization in labor administration will be offered. In addition, a more advanced worker education program will be introduced.

Emphasis on Law and Development

Following tradition, the programs in the field of law undertaken by the U.P. Law Center have been concerned mainly with the development or elaboration of legal doctrines. A new dimension and direction will be given

to these programs so that the Center may become a still more potent and vital institution of law and justice in the country. To this end, law and its role in development will be a new program area to be more fully explored. Some projects contemplated include the Education Code, Environmental Law, and the Labor Code.

The College of Law will evolve into a law complex composed of the Law Center, the Law School, the Law Library and a Law Alumni Hostel. A one-year, full-time LLM program will be introduced.

Work with and for the People Program

There will be an intensive effort to encourage students and faculty to serve in the rural areas through modified programs which provide opportunities for field work, internships in towns, barrios and provinces, participation in community activities, and other forms of extension work. These programs will be integrated in a University-wide program and coordinated with other national government agencies in the locality. Student teachers and faculty members will also be encouraged to teach in the regional units and in other rural areas for a period of time.

- Greater involvement of the Board of Regents and the University Council in the discussion of major issues
- Greater faculty and staff participation in the governance of a unit in line with the action of the Board of Regents relative to the College of Arts and Sciences in Diliman in 1976
- Project Development and Management Seminars for all units of the University
- Review of existing linkages with various universities and agencies (public and private) and exploration of new linkages with local and international agencies and organizations
- Improved linkages with the alumni and establishment of a mechanism for alumni participation in University activities

The Extension Function of the University

The University's extension services are in line with its goal of becoming an outstanding academic institution which can help strengthen the Filipino society's capability to realize national aspirations.

In response to the increasing number of opportunities for the University to contribute to the upliftment of national well-being through these services, the central administration will adopt a more comprehensive strategy for undertaking university extension services. This strategy will be implemented by an Office of Extension Services to be created in the Office of the President.

The Office of Extension Services will be primarily a monitoring and coordinating unit. Its main concerns will be to identify and develop the market services of the various units, particularly those with limited opportunities for extension work, to package extension projects with a multi-disciplinary approach, and to formulate the guidelines and policies which can encourage extension work at the same time that it upgrades these services and the competencies of the faculty.

Through the proposed Office of Extension Services, the University will be able to render not only the usual extension services such as organizing training programs and seminars, extramural studies, management audits, and consultations which are presently being undertaken by individual units but also extension services which can avail of inter-disciplinary expertise. It will also make these services more readily accessible to government agencies, business associations, professional and other public groups in need of assistance.

The Administration Center

The newly established central program in industrial relations will be expanded in new directions in order to provide more services to the community.

Following tradition, the programs in the field of law undertaken by the U.P. have been concerned mainly with the development of professional legal doctrines. A new direction and direction will be given

Institutional Improvements

In order to undertake its work, the University as an organism must be able to divide the work and then coordinate the divided work within an appropriate structural framework which includes:

- * a pattern of relationships (more commonly although inadequately called the organization structure)
- * a performance appraisal system (to measure planned versus actual results)
- * a control system (to monitor or keep track of what is going on)
- * processes/procedures
- * the reward system
- * the human component that energizes the different projects of the University

Improvements and/or Modifications Relative to the Patterns of Relationships

Within the University, the change will be toward more participation among constituencies in the various processes (e.g., planning, key decisions, etc.), more delegation to decision centers nearer the rank-and-file, and new roles for key bodies (e.g., the Board of Regents, the University Council, the faculty of colleges, etc.).

In this connection, the following will be undertaken:

- * Improvement and active encouragement of the use of the U.P. Planning Manual which was introduced in 1976
- * Further delegations of authority to the Chancellor of UPLB, various Deans and Directors as well as the Deans of Regional units
- * Greater involvement of the Board of Regents and the University Council in the discussion of major issues
- * Greater faculty and staff participation in the governance of a unit in line with the action of the Board of Regents relative to the College of Arts and Sciences in Diliman in 1976
- * Project Development and Management Seminars for all units of the University
- * Review of existing linkages with various universities and agencies (public and private) and exploration of new linkages with local and international agencies and organizations
- * Improved linkages with the alumni and establishment of a mechanism for alumni participation in University activities

To enable the University to assess its performance as objectively as possible, the following will be done:

- * Institutionalization of a participative planning process (Note: the establishment of the Program Development Staff and its work are intended to enhance this process.)
- * Institutionalization of program/project budgeting (Note: New budgetary forms and added personnel have been arranged by the Budget Office.)
- * Comparative assessments with other institutions of higher learning here and abroad
- * Adoption of a mechanism for a periodic review of academic programs

These features are expected to enable the University to have a means of comparing planned versus actual results.

During the last year, work was started in this direction. This work will be continued toward the full implementation of the Management by Objectives (MBO) approach in the U.P. The U.P. Planning Manual uses the MBO approach (i.e., units and sub-units, superiors and subordinates agree on what is to be done, how it is to be done, and go through a periodic joint review of results.)

On the Control System

A computer-based Management Information System (MIS) is now in the process of development. Once installed, the initial capability will enable the University to monitor:

- * human resource capability
- * the equipment situation
- * accounting and budgetary systems
- * space requirements and use
- * student data
- * the location of documents

Performance appraisal as well as decision-making will be enhanced with the availability of an MIS capability. However, this also indicates the need for the expansion of the U.P. Computer Center.

The above components are in various stages of conceptualization. Some are already operational (e.g., equipment and document tracking). Work in this area will be continued.

The following work will be continued:

- * Studies on systems and procedures to reduce delays in transactions
- * The eventual publication of a loose-leaf U.P. Manual (now being pilot-tested in certain offices) which can be conveniently updated on a monthly basis
- * The maintenance program which will explore more participation at the unit level (e.g. College of Arts and Sciences)
- * Review and use of the output of studies and workshop on records management
- * Development of the Equipment Procurement Program (E.P.P.) to standardize University acquisitions (e.g., microscopes) and to present a rationalized request for funding in accordance with categories such as requests arising as a consequence of:
 - A deficiency situation
 - A need to replace obsolete equipment
 - The expansion of an existing program
 - The institution of a new program

On the Reward System

The components of the reward system which will be developed are as follows:

- * a rational promotions system—this will be a mathematical formula-based system which will include appropriate variables (e.g., teaching effectiveness etc.) whose values will be the result of peer ratings and/or student ratings as well as of superior officers. The approach is expected to be more objective and influenced less by arbitrary and subjective decisions of superior officers. This is not to say, however, that judgment by superior officers will be eliminated entirely.
- * a regularly updated salary plan—inflation has repeatedly rendered the University's salary plan obsolete. This will be updated by means of periodic studies which will take into account not only the effects of inflation but also the University's location relative to other public as well as private educational institutions and some selected companies in the private sector. The University will exert efforts to be an "industry leader" in this area as well as to be competitive with the companies in the private sector. A job evaluation study will be undertaken as a basis for future changes in the U.P. salary plan. In this connection, the U.P. will request the National Government to restore the authority of self-governing boards, like the Board of Regents, to determine the number of employees and their salary level. This authority ceased to be effective January 1, 1977.

* A University housing approach—the idea of housing for everybody inside the U.P. campus is not only impossible but unwise. At present, there are about 602 units, fully occupied, and about 1,500 applicants in the waiting list. A review of the present allocations of available land indicates that not very much space is left. Moreover, the present system lulls the staff who have housing into a false sense of security because when they retire, they are once again faced with the same problem of looking for housing. Thus, an alternative approach which may briefly be described as follows will be pursued:

- hold the present number of units plus those already under construction (about 252 more)
- generate a turnover among campus residents by providing a workable loan program to encourage faculty and staff to locate outside by constructing a house on a lot of their choice or on a new area to be acquired
- construct the houses the *bayanihan* way (or Cuban style) with the U.P. providing the labor and construction management
- approximate market rental rates for housing within the campus for those who can afford and are qualified to avail of the housing loan but adopt a rationalized rental scheme for those who will be temporarily residing in the campus
- * an improved *University Health Service* and a supplementary *health insurance* program with the U.P. mainly as a facilitator in behalf of voluntary participants among the faculty and staff
- * expansion of the newly implemented *Voluntary Assistance Program In Case of Death*
- * a supplemental Retirement Program based on the earnings of the accumulated retirement fund
- * more opportunities to attend local/international conferences
- * a liberalized policy on consulting opportunities for faculty and staff within the framework of reasonable constraints
- * a more liberal and extensive faculty development program
- * a more liberal credit load and/or honoraria for research
- * sabbatical leaves
- * others (honorific rewards, educational benefits, professorial chairs, artists/writers in residence appointments, etc.)

On Better Management Capability

A perennial U.P. problem is providing management expertise for its administrators who are usually appointed to office without such expertise. A management orientation program will be undertaken to fill this need.

Heads of units who need managerial training will be given opportunities to acquire managerial skills. The Project Development and

Management Training Program which was recently started will be continued and improved.

On the Improvement of Key Resource Inputs

The University will also vigorously pursue the following key programs/projects:

- * the *U.P. Infrastructure Development Program (U.P.I.D.P.)* which is expected to cost about P200 million during the next five years over and above the projected cost of U.P. in the Visayas and the Philippine Medical Center (Note: the U.P.I.D.P. is now in the process of project development work with various units that have pending infrastructure projects—e.g., the transfer of Rizal Hall units from Padre Faura to Diliman.)
- * the library system which will gradually evolve into a system of library clusters, part of which will be computer-assisted
- * an *equipment standardization* program
- * a U.P. Press with an expanded capability
- * a faculty/staff recruitment and development program which will improve the faculty mix as follows:

	1966-1967	1976-1977	1986-1987
Ph.D.	10.3%	16.2%	28.0%
MA/MS	27.0	37.4	47.0
AB/BS	43.6	31.6	15.0
Others	19.1	14.8	10.0
	100.0%	100.0%	100.0%

Note: The most recent infusion of resources is in the form of a World Bank loan making available about 300 man-years of fellowships (doctoral and masteral for UPLB and the College of Veterinary Medicine). There are on-going negotiations to provide fellowships for the College of Arts and Sciences and the College of Fisheries.

- * an alumni relations program
- * activation of the Property Division toward improvement of procurement, the information system, inventory control and standardization
- * expansion of the Student Disciplinary Tribunal into a University Disciplinary Tribunal
- * study and improvement of the U.P. Food Service

- * a strengthened capability of the Registrar's Office through the establishment of a new registration center, development of improved test questions, a shift of problems relative to admissions to regional units and computer-generated transcripts of records
- * a strengthened Office of Academic Services through information and extension services, a computerized personnel information system and effective liaison with outside agencies
- * continuing efforts to transform the campus into a huge botanical garden
- * a strengthened Office of Academic Affairs through the development of (1) capability to store, retrieve and analyze academic information, (2) a mechanism for the evaluation of the University's academic policies, procedures and rules, (3) capability for academic personnel studies and (4) faculty and academic staff development plans.
- * a strengthened Office of General Services with better capability in records management, document tracking and expanded telephone services (2000-unit system).

On the Financial Inputs

The principal source of support will continue to be subsidy from the national government. However, within the framework of P.D. 711 (which makes all U.P. income part of the income of the national government), the University will continue to generate additional income through:

- * a new tuition fee approach based on ability to pay under a democratized admission policy
- * self-generated income from more business enterprises from an integrated business district in the Diliman campus, the land grants, etc.
- * loans
- * donations

Self-generated income will receive emphasis in order not to make the University unduly inflexible with respect to urgent projects which cannot be funded by an increased national government subsidy. In the allocation of funds, units which have good projects but cannot easily obtain funding support will be given extra consideration.

Studies regarding a new corporate entity for generating funding for the U.P. will be continued.

A Note on U.P. at Los Baños

The UPLB—An Institutional Scenario

During the next 25 years, the country is expected to experience increasing industrialization and urbanization. At the turn of the century, Los Baños will find itself an urbanized section of Metropolitan Manila. These have several implications for UPLB's thrusts among which are the following:

- * Agriculture and Forestry will continue to be a distinctive competence of UPLB. However, several agriculture-related areas will be developed. These include natural resources development, processing of agriculture, forestry and fishery products, agricultural and rural development, and agribusiness and development management. These will be institutionalized into programs, centers or institutes.
- * UPLB will increasingly become a center for graduate studies and advanced research in agriculture, forestry and related sciences in the Philippines and in Southeast Asia.
- * The studentry will increasingly be international as UPLB seeks to accommodate the high level manpower training needs of agricultural and rural development in Southeast Asia.
- * The manpower and technology demands of agricultural and regional development as well as the urbanizing environment of UPLB will mean more short-term and problem-oriented training programs at UPLB.
- * The UPLB will continue to be a multi-polar center of excellence. These poles may change in nature and composition as new areas of concern become apparent.
- * The UPLB will attempt to consolidate units along program lines for more efficient administration and for greater breadth and depth of program activities. Thus, for example, units concerned with the development of social technology such as IADA, ACCI, and ARI should be placed under one umbrella such as a College of Development Economics and Administration.
- * In the foreseeable future, the UPLB will continue to focus on agricultural and rural development in a more comprehensive and integrated manner. The areas of expansion will involve the following:
 - Institute of Human Ecology
 - Institute of Agricultural Development and Administration
 - College of Forestry

— College of Agriculture with expansion in academic, research and extension programs, some of which will be institutionalized as follows:

- Institute of Plant Breeding
- Crop Protection Center
- Animal Science Center

— Expansion of the Department of Agricultural Engineering into an Institute/College of Agricultural Engineering and Technology to include the:

- Asian Center for Agricultural Machinery
- Sugar Technology School (or Institute)

— College of Sciences and Humanities with programs and centers which include the:

- Environmental Sciences
- Limnological Station
- Center for Creative and Performing Arts
- Natural Science Museum

— Center for Policy and Development Studies

— Dairy Training and Research Institute

— Agricultural Credit and Cooperative Institute

— Expansion of the Department of Development Communication into an Institute

* Accelerated research activities, especially those areas concerning rural and agricultural development, will occupy at least 50 percent of the staff's time.

* A more extensive outreach and public service program will be undertaken through:

— action programs such as the Integrated Rural and Agricultural Development (IRAD) Project and

— institutional consultation to the government and the private sectors (e.g., UPLB-Technical Assistance to the Bicol River Basin Development Project).

Major Programs

1. Instruction

The College of Agriculture will produce generally two types of B.S. graduates: (1) agriculturists with an appreciation of land use ecology, environment, etc.; and (2) specialists, many of whom will go on to graduate and research work. The college will continue to maintain and support the UP Rural High School with thrusts in science and rural development to serve primarily as a feeder to the UPLB programs in agriculture and other sciences.

The B.S. Forestry course offered by the College of Forestry will offer more fields of specialization like silviculture, timber management, forest range management, timber harvesting and forest economics. New courses will be offered (see Attachment 1).

The programs of the College of Arts and Sciences (currently the College of Sciences and Humanities), will be interdisciplinary, inter-unit or inter-campus. The college will have to institute strong undergraduate programs to complement and reinforce other units. At the undergraduate level, the teaching option will be introduced in most of the curricula as early as 1977. On the graduate level, the Master of Science in Education (MSE) and Master of Arts in Teaching (MAT) degree programs will be instituted for specific clientele. The new areas of emphasis are shown in Attachment 1).

The Institute of Human Ecology will use a new approach in its instructional programs, e.g., team teaching in order to further emphasize the interrelatedness of the various disciplines as they apply to the various aspects of life. The institute will try to forge stronger links between formal and non-formal education systems. Only one undergraduate degree program, the B.S. Human Ecology, is planned, although areas of concentration may be increased. Graduate programs will be highly professionalized.

The A.B. Economics program will be added to the list of degree programs offered by the Institute of Agricultural Development and Administration. Three new programs are envisioned in answer to the increasing needs for manpower in the fields of development and resource economics, agricultural development administration, nutrition planning and cooperatives management (See Attachment 1).

The quality of engineering education will become a focus of the instructional program starting in the late 1970's. The College of Engineering, which will develop from the now existing Institute of Engineering and Technology, will lead in agricultural engineering education in all of Southeast Asia.

The team-teaching approach to contract engineering development with provinces/municipalities and private industries will be used to utilize faculty expertise in the total systems development of provinces, municipalities and private industrial projects with concentration on agricultural and rural development. This will be done through joint projects with the IADA, CA, CF. (The list of anticipated new curricula to be offered is found in Attachment 1).

The present IADA will evolve into an economics and management complex. The Agrarian Reform Institute will become part of IADA. While it will still be useful for students to have an overview of agrarian reform in the

Philippines and other countries, the ARI will primarily be to help them acquire a historical perspective of the movement. It goes without saying that we expect the agrarian reform process or at least the land transfer part of it to have been consummated by the year 2000 A.D. The course requirements for the MA degree must be revised to include courses in economics, cooperatives and agribusiness.

To be integrated further with IADA is the present ACCI which will be the primary institution for advanced study, research and extension in cooperatives development and management.

As a center of advanced knowledge in the field of dairying, DTRI will offer degree programs at the B.S., M.S., and Ph.D. levels. There will be a greater degree of specialization within the dairy sciences. Areas like dairy microbiology, dairy chemistry and the like will be the specialized programs/projects.

The CPDS shall evolve into a major program center for utilizing overall UPLB expert manpower and scientific and technological outputs in addressing directly and/or indirectly policy and developmental problems of the various sectors of the nation. It is not envisioned for the CPDS to develop along the stereotype functional level of instruction, research and extension of other academic units.

2. Research

By the year 2000, the research thrust of the UPLB will shift from an individual farmer-oriented type of research to one with a wider concern and perspective to include the other elements in the rural economy. The research agenda will also move away from a commodity-by-commodity approach to a more integrated one. Research projects will mostly be problem-and field-oriented. Relevance, applicability and demonstrability of research results will be the main considerations in research undertakings.

Well before 2000 A.D., the following research areas are envisioned to be either intensified or started:

Agriculture and Food Production

1. Small-farming technology
2. Various scales of farming systems, e.g., multi-cropping, crop-livestock, fish farming, lowland and upland
3. Unconventional and non-traditional sources of food, medicine and drugs
4. Utilization of farm and industrial by-products, conversion of animal and other wastes into resources
5. Production of low-cost, longer-lasting, and easy-to-handle food products

Forestry

1. Forest biology and resource management.
2. Forest utilization to include low-cost housing, food from wood and other forest products, utilization of solar energy for wood processing, production of pulp and paper and textile materials, adhesives, and preservatives.

Social and Cultural Studies

1. Initiation and management of social change.
2. Filipino and Asian values and attitudes, governments, art, folklore, theater and drama
3. Constraints in the various cooperative programs and projects
This will also provide feedback for the policy formulation, development and implementation of programs

Economics

1. Design and validation of a national model for monitoring food supply-demand conditions, as well as the analysis of policy options for containing food emergencies or crisis situations.
2. Development of guidelines for agribusiness entrepreneurship and resource materials in agribusiness and development management.

Environmental Engineering

1. Basin approach to water resources engineering and management; flood hydrology and groundwater development; flood control and irrigation.
2. Development and management of swamps, grasslands, uplands and mangroves.
3. Environmental management including conservation and pollution control.
4. Agrometeorological forecasting and advising in cooperation with PAGASA.

3. Extension

Through the UPLB's extension activities, novel research results and output as well as UPLB's treasury of knowledge in the fields of agriculture, forestry, the arts and sciences and the broad spectrum of agricultural and rural development are shared with the private sector and the government.

The major program innovations in extension will be the following:

1. Training courses in:

- a) science education

- b) conservation education
 - c) farm planning and budgeting, development project analysis, marketing farm products, cooperatives and credit
 - d) agricultural machinery industries, operation and maintenance of farm machinery, agricultural crop processing industry
2. Information services which will make available in appropriate and presentable form information, particularly those related to agriculture, forestry and other related fields for the use of policy makers, farmers, government employees, and others.
 3. Institutionalized consultative and staff support services for government agencies and farmers groups.
 4. Others
 - a) establishment of a Center for the Performing and Creative Arts (CPCA), a mobile theater that will bring plays, dance and music to the barrios.
 - b) establishment of a Learning Resource Center that will provide learning assistance to students who lag behind in their class because of inadequate secondary school preparation.
 - c) establishment of a regional network for agricultural machinery, a precursor of the Agricultural Mechanization Foundation which will provide the technical manpower and information in the development of the agricultural machinery industry.
 - d) a university production farm where various farming systems and models can be studied and tested by students and farmers.
 - e) pilot human settlements.

Similarly, the academic non-teaching and other support personnel whose salaries are drawn from regular university funds will need to be increased as follows:

YEAR	1976	1981	2000
NUMBER	226	570	1165

Those under externally-granted funds number about 600 in 1976. This will increase to 1000 in 1981 and about 2500 in the year 2000.

The non-teaching academic staff will staff the research and extension programs of the UPLB.

Infrastructure and Facilities

Classrooms, laboratories, offices, equipment and other facilities will have to increase three times to meet the anticipated three-fold increase in

Staffing Profile

Based on the major program innovations envisioned for the period, the quality and size of the faculty is expected to increase as shown below.

BY RANK	YEAR							
	1952		1976		1981		2000	
	No.	%	No.	%	No.	%	No.	%
Professor	8	(9.8)	33	(5.5)	105	(13.6)	338	(23.5)
Assoc. Professor	9	(10.9)	84	(24.2)	166	(21.4)	359	(24.8)
Asst. Professor	7	(8.6)	144	(42.2)	253	(32.6)	462	(32.1)
Instructor	58	(70.7)	344	(56.1)	252	(32.4)	283	(19.6)
TOTAL	82		595		776		1442	
INCREMENT		513		181		666		

BY DEGREE

	YEAR							
	1952		1976		1981		2000	
	No.	%	No.	%	No.	%	No.	%
Ph.D.	17	(20.8)	177	(29.8)	302	(38.9)	926	(64.2)
Master's	15	(18.3)	205	(34.5)	344	(44.3)	411	(28.5)
B.S.	50	(60.9)	213	(35.7)	130	(16.7)	105	(7.3)
TOTAL	82		595		776		1442	

student enrollment, doubled staff and the greater magnitude and intensity of research and extension activities.

The buildings to be constructed in the next five years are as follows:

Agricultural and Rural Development

- Institute of Plant Breeding Complex
- National Crop Protection Center Complex
- National/Regional Training Centers for Rural Development
- Animal Science Center Complex
- College of Veterinary Medicine
- Sugar Technology School
- Food Research Institute
- Communication Technology for Development
- Basic Research Laboratory
- Soil Research Center
- Administration and Auditorium-Lecture Hall
- Renovations/Annexes for Development Communication, High School
- Agricultural Education and Agronomy

Arts and Sciences

- Social Sciences Building
- Humanities Building
- CAS Administration-Auditorium

Forestry

- Forest Biological Science Building
- Fiber Science Building
- Natural Resource Conservation Education Center
- Forestry Technician School Building
- Dormitories
- Staff Houses and Apartments
- Forest Ranger Stations (Makiling Forest)
- Annexes for the Forest Science, Wood Technology and Administration Buildings

IADA, ACCI, ARI AND CPDS

- Socio-Economic Development Complex

DTRI

- Administration Building
- Conference Center

- Training Complex
- Central Dairy Herd Station
- Regional Dairy Station
- Dairy Processing Plant
- Central Experiment Station

ENGINEERING

- Agricultural Machinery Testing and Evaluation Center
- Regional Network for Agricultural Machinery
- Energy Research Center
- Water Resources Center
- Post Production Technology
- Agrometeorology
- Agricultural Mechanization Foundation
- Engineering Science Laboratory
- Mechanical/Civil/Industrial Engineering

Studentry and External Clientele

	Students			
	1952	1976	1981	2000
Undergraduate	821	3441	5620	10100
Graduate				
Master's	8	944	1560	3900
Ph.D.		162	320	1000
TOTAL	829	4547	7500	15000
High School	211	360	500	640
	Outputs			
	1952	1976	1981	2000
Undergraduate	71	325	850	2250
Graduate				
Master's		120	400	1170
Ph.D.		26	65	300
TOTAL	71	471	1315	3720

As a tax-supported institution, the UP at Los Baños is expected to accommodate an increasingly greater percentage of the student population

than the private colleges and universities which shall have reached their optimum in enrollment and growth. Hence, by the year 2000, the UPLB will accommodate at least 15,000 students.

About 8000 new freshmen will be admitted by the UP System and it is expected that the UPLB will have a bigger share of the new freshmen than the other units because of its curricular offerings in agriculture, forestry, engineering, arts, sciences, etc. which are clearly supportive of articulated national priorities in education.

The Graduate School will have an enrollment equivalent to one-third of the UPLB's total student population. About 25% will be doctoral students and the rest, masteral. The foreign enrollment will be kept at the 1976 level of about 20%. This policy will enable the UPLB to accommodate more Filipino students, mostly graduates and staff of the regional colleges and universities, as well as the personnel of government institutions.

By the year 2000, the democratized admissions policies will have opened the doors of the University to more students from different socio-economic groups and from various parts of the country. As long as standards are maintained, all possible means will be harnessed for instruction to accommodate the influx. Among the feasible options are the following:

1. establishment of a 2-year General Studies Program for students interested in a broad general education
2. opening up of an extension or community college, i.e., correspondence school, night school, school-on-the-air, etc. to accommodate working students
3. following a quarterly or trimester scheduling system
4. innovations in teaching and communication technology to reach a larger number of students through the use of such devices as instructional TV and other electronic equipment, programmed instruction and a computer-based instructional system
5. accelerated instruction programs similar to the INTAPS program.

A "work with and for the people" approach will be a built-in component of every curriculum. It may be incorporated in programs of apprenticeship/practicum and research. The honors and the extramural studies programs will be for both undergraduate and graduate students.

Other Clientele:

- a) Government extension specialists and technicians, development planners and program management staff of national programs
- b) international/regional extension activities for ASEAN, Asian, and other humid tropical countries

- c) Conferences/seminars/workshops for scientists/researchers on specialized problems of the Philippines and humid tropical agriculture, forestry, sciences, ecology, arts, etc.
- d) Government agencies/corporations and private firms requiring staff consultancies
- e) Teachers and students from private and public schools as well as out-of-school youths
- f) Farmers and other lay people interested in the short courses offered by the UPLB

<p>Graduate</p> <p>A. Post Management</p> <p>Food Engineering</p> <p>Development Communication</p> <p>Rural Sociology</p>	<p>B. Arts and Sciences</p> <p>Chemistry</p> <p>Physical Chemistry</p> <p>Environmental Chemistry</p> <p>Human Toxicology</p> <p>Mathematics, Statistics & Physics</p> <p>Information Science</p> <p>Operational Research</p>	<p>C. Life Sciences</p> <p>Botany</p> <p>Ethnobotany</p> <p>Plant Ecology</p> <p>Mycology</p> <p>Phycology</p>	<p>D. Forestry</p> <p>Forest Biology</p> <p>Forest Wildlife Management</p> <p>Natural Resources Management</p>
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NEW FIELDS OF SPECIALIZATION

I. Undergraduate

A. Arts and Sciences

Chemistry

Applied Chemistry (industrial, environmental, agricultural)

Mathematics, Statistics, and Physics

Physics

Applied Physics (electronics, meteorology)

Computer Science

Botany

Economic Botany

Floristic Studies

Life Sciences

Applied Microbiology

Cell Biology

Molecular Biology

Radiation Biology

Zoology

Aquatic (freshwater and marine resources management)

Wildlife

Radiation Biology

Social Sciences

Local Government and Administration

Psychology

Anthropology

Humanities

Art History

Pilipino (and other languages)

B. Forestry

Forest Biology

Forest Wildlife Management

Natural Resources Management

C. IADA-ACCI

Economics

Cooperatives (B.S. and Diploma Course)

D. Engineering

Agrometeorology

Mechanical Engineering

Civil Engineering

Industrial Engineering

E. DTRI

Dairy Science (B.S. and Diploma Course)

II. Graduate

A. Post Management

Food Engineering

M.S.

Development Communication

Ph.D.

Rural Sociology

Ph.D.

B. Arts and Sciences

Chemistry

Physical, Inorganic

M.S.

Analytical and Environmental Chemistry

M.S., Ph.D.

Human Toxicology

M.S.

Mathematics, Statistics, & Physics

Information Science

M.S.

Operations Research

M.S.

Botany

Ethnobotany

M.S.

Plant Ecology

M.S., Ph.D.

Mycology

M.S., Ph.D.

Phycology

M.S., Ph.D.

Life Sciences

Industrial Microbiology

M.S., Ph.D.

Ecology

M.S.

Biosystematics

M.S.

Molecular Biology

M.S.

Immunobiology

M.S.

Zoology	
Parasitology and Medical Zoology	Ph.D.
Wildlife	M.S.
Social Sciences	
Philippine Studies	M.A.
Sociology	M.A.
Science Education	
Botany, Chemistry, Life Science,	M.S.
Zoology	M.S., M.A.T.
C. Forestry	
Forest Parks and Recreation Management	M.S.
Multiple Use Forest Management	M.S.
Forestry Business Management	M.S.
Wood and Polymer Chemistry	M.S.
Natural Resources Extension	M.S.
D. IADA-ACCI	
Agribusiness Management	Masteral
Agricultural Development Administration	Masteral
Resource Economics	M.S.
Cooperative Management	Masteral
E. IHE	
Resource Management	M.S.
Environmental Analysis & Planning	M.S.
Development Education	M.S.
Population Studies	Masteral
Food Policy & Nutrition Planning	M.S.
F. Engineering	
Land and Water Resources Engineering	Ph.D.
Agricultural Crop Processing	Ph.D.
Agricultural Power and Machinery	Ph.D.
Agrometeorology	Ph.D.
Mechanical Engineering	Ph.D.
Civil Engineering	Ph.D.
Industrial Engineering	Ph.D.
G. DTRI-Animal Science	
Dairy Production	M.S., Ph.D.
Animal Nutrition Dairy	M.S.
Dairy Technology	M.S.

A Note on Affiliated Foundations

Subsidy from the national government will always be less than the requirements of the University in its efforts to strive for excellence and continued growth as well as to undertake innovations. Thus, income generated from non-governmental sources must be given more emphasis.

Several U.P. units have been the beneficiaries of affiliated foundations. These benefits include:

- * income supplements through professorial chairs, honoraria for research, etc.
- * donations of equipment
- * travel grants
- * infrastructure (e.g., buildings)

U.P. units will therefore be encouraged to organize affiliated foundations which will help make additional resources available to them. The approaches used by the College of Engineering, the College of Business Administration and the Institute of Environmental Planning exemplify this idea.

In this connection, efforts to establish a U.P. Foundation which will facilitate the coordination of existing foundations, assist in the establishment of unit affiliated foundations as well as undertake income-generating projects for the benefit of the University, are now underway.

1987	1,282.0 million
10-year total	8,448.8 million
Yearly average	845 million

* Assumes a 10% growth rate annually in real terms and a 10% inflation rate.

* Excludes the funding for the Asian Institute of Technology.

A NOTE ON BUDGETARY PROJECTIONS

A tight budgetary projection for the next 10 years is not feasible at this time. Much less is it feasible for the 25-year perspective. It is possible, however, to indicate "ball park" figures if only to provide some idea of the magnitudes involved. Thus, on the basis of some assumptions relative to inflation and a desired growth rate in real terms over the next 10 years, the U.P. is expected to need fund support with ranges approximately indicated as follows:

Pessimistic Growth Assumptions^a

	Current Operating expenditures	Capital Expenditure
FY 1976 (actual)	P 163.8 million	P 2.45 million
FY 1977 (available)	207.0 million	48.3 million*
FY 1978	248.4 million	About P1.0 to P1.2 billion within the first 5 years from 1978.
FY 1987	1,282.0 million	
10-year total	6,448 million	
Yearly average	645 million	

^aAssumes a 10% growth rate annually in real terms and a 10% inflation rate.

*Excludes the funding for the Asian Institute of Tourism.

	Current Operating expenditures	Capital Expenditures
FY 1976 (actual)	P 163.8 million	P 2.45 million
FY 1977 (available)	207.0 million	48.3 million
FY 1978	258.8 million	About P1.0 to P1.2 billion within the first 5 years from 1978.
FY 1987	1,928.0 million	
10-year total	8,604 million	
Yearly average	860 million	

^bAssumes a 15% growth rate annually in real terms and an inflation rate of about 10%.

*Excludes the Asian Institute of Tourism.

A Review of the Planning and Budget Process (PBP)¹

1. The basic features of the PBP

The PBP of the U.P. may be briefly described as follows:

- * It is participative.
- * It is a continuing process.
- * It has a recurring 12-month cycle.
- * It is resource-seeking.
- * It is goal-setting.

The *participative* feature of the PBP means that the unit (e.g. using the workshop approach among its faculty and staff) has the basic initiative for planning its own future and for assisting the University's central administration in establishing to the various funding groups (including the national government) that its programs deserve to be supported. Thus, in a very real sense, the Program Development Staff (PDS) of the Office of the U.P. President is mainly a facilitator of the PBP. It does not plan for the various units of the U.P.; its task relates to the *University as a whole*.

The *continuing* feature of PBP means that the plan of the U.P. must be updated at least once a year. Appropriate changes must be reflected as soon as possible.

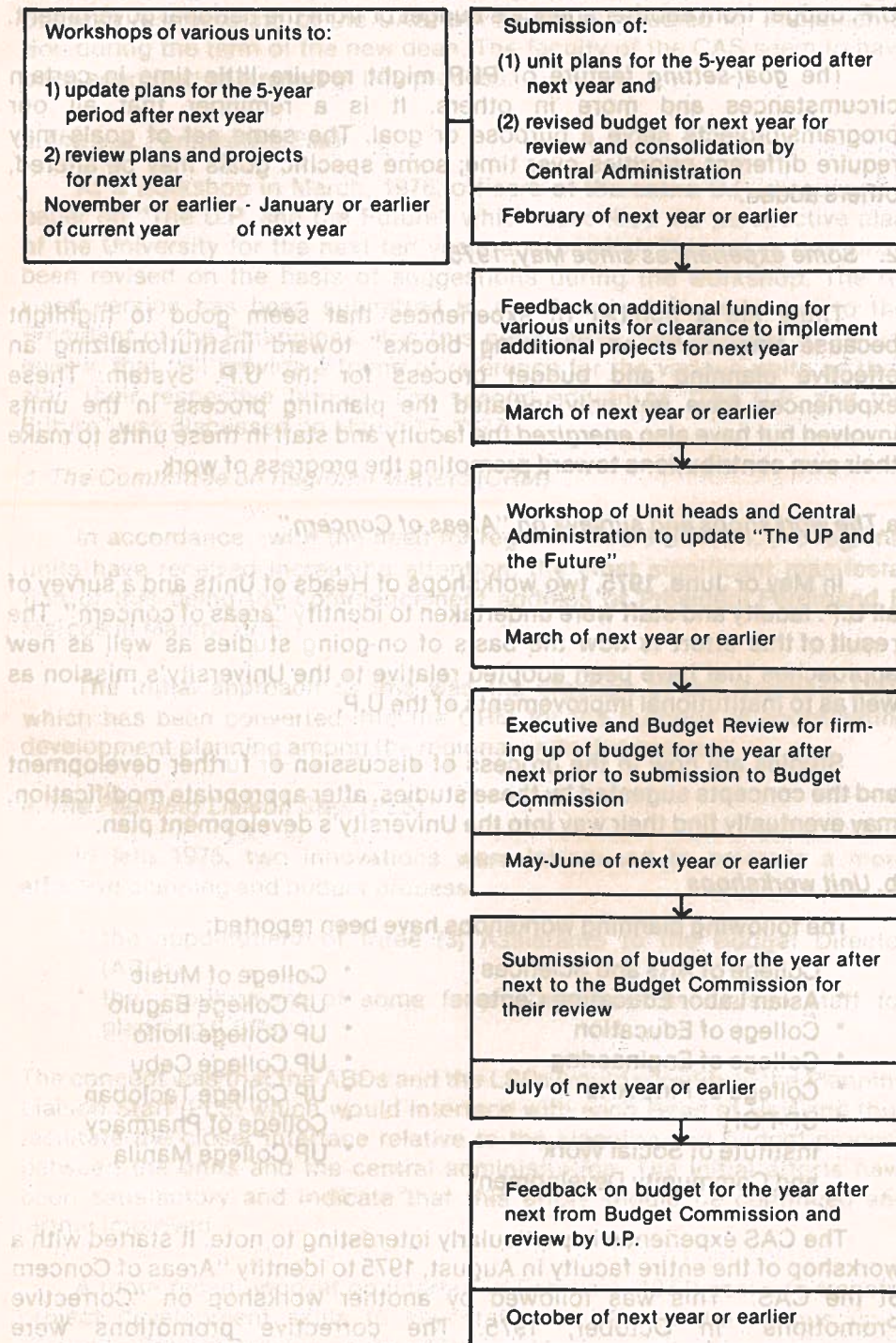
The *recurring* cycle is briefly described in Chart 1.

Thus, it is expected that over time, the U.P. Perspective Plan and the plans of each unit will be incrementally improved and we will not have to start from scratch every time there is a new set of U.P. administrators.

The *resource-seeking* feature of the PBP means that although not all program/project ideas can be included for funding in a particular budget cycle, the PBP will develop an inventory of these ideas which central administration can promote for support by various funding agencies or which can be funded whenever the national government is able to provide a substantial increase in the University's budget. Example of this are the *Asian Institute of Tourism* and the *Fine Arts-Film Center Complex*. Some U.P. Deans Directors and students are under the mistaken impression that the University has diverted scarce U.P. resources to these projects to the detriment of other "higher priority" projects. What has actually happened in these cases is that some funding agencies (e.g. Philippine Tourism Authority) had financial resources which could be made available

¹See EVP Memorandum No. 42, the U.P. Planning Manual, dated November 8, 1976 for a more detailed discussion of this subject.

Chart 1
During the Current year Next Year



to the U.P. because these projects were also in their area of interest. The money did not come from the U.P. budget but was in effect added on to the U.P. budget from another agency's budget or from the national government.

The *goal-setting* feature of PBP might require little time in certain circumstances and more in others. It is a reminder that all our programs/projects serve a purpose or goal. The same set of goals may require different priorities over time; some specific goals may be altered, others added.

2. Some experiences since May, 1975

There are a number of experiences that seem good to highlight because they serve as "building blocks" toward institutionalizing an effective planning and budget process for the U.P. System. These experiences have not only initiated the planning process in the units involved but have also *energized* the faculty and staff in these units to make their own contributions toward promoting the progress of work.

a. The workshops and surveys on "Areas of Concern"

In May or June, 1975, two workshops of Heads of Units and a survey of all U.P. faculty and staff were undertaken to identify "areas of concern". The result of this effort is now the basis of on-going studies as well as new approaches that have been adopted relative to the University's mission as well as to institutional improvements of the U.P.

Studies are now in the process of discussion or further development and the concepts suggested by these studies, after appropriate modification, may eventually find their way into the University's development plan.

b. Unit workshops

The following planning workshops have been reported:

- | | |
|---|-----------------------|
| * College of Arts and Sciences | * College of Music |
| * Asian Labor Education Center | * UP College Baguio |
| * College of Education | * UP College Iloilo |
| * College of Engineering | * UP College Cebu |
| * College of Fine Arts | * UP College Tacloban |
| * UP-PGH | * College of Pharmacy |
| * Institute of Social Work
and Community Development | * UP College Manila |

The CAS experience is particularly interesting to note. It started with a workshop of the entire faculty in August, 1975 to identify "Areas of Concern of the CAS." This was followed by another workshop on "Corrective Promotions" in October, 1975. The corrective promotions were implemented by the Board of Regents in October, 1975. The August

workshop was followed by a workshop on the proposed approaches to the "Areas of Concern" in March, 1976. Many of these proposals (including a possible restructuring of the CAS) will be further studied for implementation during the term of the new dean. The faculty of the CAS seem to have been energized as a result of this process.

c. The U.P. Perspective Plan

At a workshop in March, 1976, officers of the entire U.P. discussed a paper on "The U.P. and the Future" which describes the perspective plan of the University for the next ten years and beyond. This paper has since been revised on the basis of suggestions during the workshop. The revised version has been submitted to the Board of Regents and to the President of the Philippines. It is this perspective plan, subject to annual review, that will provide a frame of reference for the various units as they plan their respective futures. The second edition of "The U.P. and the Future" was discussed on March 17, 1977.

d. The Committee on Regional Matters (CRM)

In accordance with the need for regional diversification, the regional units have received increasing attention, the most significant manifestation of this being the commencement address of President Ferdinand E. Marcos in March, 1976.

The initial approach to this was the creation of the Regional Desk which has been converted into the CRM for the purpose of coordinating development planning among the regional units themselves.

e. The Planning Liaison Staff (PLS)

In late 1975, two innovations were introduced to promote a more effective planning and budget process:

- * the appointment of three (3) Assistants to the Budget Director (ABDs)
- * the appointment of some faculty members as Liaison staff for planning (LSPs)

The concept was that the ABDs and the LSPs would constitute the Planning Liaison Staff (PLS) which would interface with each Head of Unit and thus facilitate the closer interface relative to the planning and budget process between the units and the central administration. The initial efforts have been satisfactory and indicate that this effort should be continued and further improved.

A more recent innovation (started in February, 1977) seeks to transfer project development skills to key staff members in the various units through a Project Development and Project Management training program.

f. **The Executive Review (ER)**

* **The Purpose**

The Executive Review (ER) is intended to serve as a useful dialogue between the heads of various units and the officers of central administration on the plans of the University in general and of specific units in particular. The ER is undertaken every year in the months of May or June or earlier and is the final phase in the University's annual planning and budget cycle prior to the presentation of the University budget to the Budget Commission, Office of the President of the Philippines.

* **The Participants**

- The President (The Chancellor and his staff in the case of UPLB)
- The Executive Vice-President
- The Vice-President for Academic Affairs
- The Vice-President for Administration
- The Budget Director
- The University Registrar
- Deans, Directors and Office Heads in the group of units scheduled for a Particular Session and their Respective Assistants
- The Planning Liaison Staff for specific units concerned

* **The ER Agenda**

The ER session is held from 10:00 A.M. to 3:00 P.M. The agenda is as follows:

- Preliminary comments by the President
- Fifteen-minute presentation by each Head of Units of the unit's updated plan for the following year and plans for the next three years as well as significant developments during the past years.
- Lunch and open discussion of unit plans
- Discussion of unit budgets

* **Suggested Content of Presentation by Heads of Units**

- a. Present programs/projects (instruction, research, public service or extension and special problems).
- b. Relevant statistical data
 - Budget (current and last two years)
 - Faculty staff profile (e.g. number, degrees, areas of expertise, faculty undertaking further studies)
 - Students (current and last two years by program)
 - Research projects
 - Extension projects
 - Other significant information

3. **Some difficulties**

In the initial efforts of the University to improve its use of its limited resources through planning as well as to acquire new resources, the following difficulties have been noted:

- a. The PBP is still being taken as a one-person show by some units.
- b. Some Heads of Units still *do not consider the PBP as the most important aspect of their responsibility* and rely on very low-level staff members to undertake the PBP for their units.
- c. Some units which need information and additional planning expertise *do not seek assistance* and, as a result, submit rather unsatisfactory working papers which make further analysis a difficult and time-wasting process.

PRESENT SERVICES, RESOURCES AND CAPABILITIES

There are continued efforts to increase and enhance the University's resources, capabilities and services which are required to effectively perform its various tasks.

The University is still the center of highly trained "brainpower" in the country in the fields of natural and physical sciences, social sciences and humanities, medical and health sciences, agricultural sciences, engineering and technology. As of December, 1976, the regular teaching force in the entire University including Diliman and Manila, U.P. at Los Baños and regional units consists of 2,539 faculty members. Of this, 411 have doctoral degrees, 916 have a Master's degree or its equivalent, 819 have bachelor's degrees and 393 have other professional degrees. The figures indicate that the faculty is now composed predominantly of masteral degree holders, with an increasing number working toward the doctorate degree. Many of these faculty members are leading experts in their specific fields of study and a number of them have attained international recognition as scholars, scientists, public administrators, researchers and artists.

As of February, 1977, the University has 44 colleges, schools and institutes which include newly-established units like the Asian Institute of Tourism and the Institute of Sports, Physical Education and Recreation in Diliman, the Institute of Agricultural Engineering and Technology in UPLB and the Institute of Health Sciences in Tacloban. It offers academic programs in 156 fields of concentration leading to bachelor's degrees, 295 areas leading to master's degrees, and 83 major fields leading to doctoral degrees. The doctoral programs include agricultural sciences, environmental sciences, anthropology, botany, geology, pharmacy, food science, English literature, linguistics, Philippine studies, political science, psychology, business administration, economics, statistics, education and public administration. (See attached listing of colleges, schools and institutes and academic degrees offered).

Research in the University is being more actively promoted through the research centers among which are the Natural Science Research Center, the Science Education Center, the Marine Sciences Center, the Engineering Industrial Research Center, the Philippine Eye Research Institute, the Law Center, and the Dairy Training and Research Institute. The University is also in the process of evolving a mechanism to monitor and coordinate the allocation of research funds (initially, those available under the U.P.-NSDB Research Program), research activities and the products of research.

The consolidated library collections of the University are the most extensive in the country. As of the last academic year, the library holdings found in 33 branch libraries, 2 departmental libraries and 2 non-collegiate libraries consist of 783,116 volumes, 18,510 serial titles, and 12,195 reels of microfilm. The Main Library in Diliman houses most of these collections. The College of Law, School of Economics, Medical and Agricultural Libraries are also noted for their excellent resources.

The University has a computer center in Diliman which is equipped with an IBM 360/40 computer. The center provides high-speed computer and programming services to the administration, faculty and students and to several government agencies and private users. The U.P. at Los Baños also has computer facilities which include an IBM 1620 Data Processing system and auxiliary machines.

Aside from its 493-hectare campus in Diliman, the University also has campuses in Los Baños and Manila and in various regions of the country, namely, Baguio, Clark Air Base, Iloilo, Tacloban and Cebu. These regional units are receiving priority attention to enable them to strengthen their arts and sciences programs and to develop a distinctive expertise in an area responsive to regional needs.

Eventually, each of these regional units may evolve into an autonomous University which will be the University's regional center for diffusing high quality education and other related services to a greater segment of the rural population of the country.

Table listing various academic programs and degrees offered, including fields like Applied Mathematics, Biology, Botany, Chemistry, Geology, and Public Administration.

**UNIVERSITY OF THE PHILIPPINES SYSTEM
COLLEGES, SCHOOLS AND INSTITUTES AND ACADEMIC
DEGREES OFFERED**

COLLEGES

Architecture, College of

Undergraduate

Bachelor of Landscape Architecture
Bachelor of Science in Architecture

Graduate

Master of Architecture
Architectural Design
Architectural Science
Community Architecture
Housing

Arts and Sciences, College of

Undergraduate

Bachelor of Arts
Anthropology
Comparative Literature
English
European Languages
History
Humanities
Linguistics
Philippine Literature
Philippine Studies
Philosophy
Pilipino
Political Science
Psychology
Sociology
Spanish
Speech and Drama

Bachelor of Science
Chemistry
Foreign Service
Geology
Biology
Botany
Geography
Marine Science

Mathematics
Physics
Psychology
Zoology

Graduate

Master of Arts

Anthropology
Art-History
Comparative Literature
English
History
Linguistics
Philippine Literature
Philippine Studies
Philosophy

Pilipino
Political Science
Psychology
Sociology
Spanish
Speech and Drama

Master of Science

Biology
Botany
Chemistry
Geography
Geology
Marine Biology
Marine Geology
Mathematics
Meteorology
Oceanography
Physics
Zoology

Doctor of Philosophy

Anthropology
Botany
English
Environmental Science
Geology
Linguistics

Mathematical Sciences
Philippine Studies
Political Science
Psychology
Sociology
Zoology

Asian Labor Education Center

Graduate

Diploma in Industrial Relations
Master of Arts (Industrial Relations)
Master of Industrial Relations

Asian Institute of Tourism

Undergraduate

Bachelor of Science in Tourism

U.P. College Baguio

Undergraduate

Bachelor of Arts
Humanities
Social Sciences

Bachelor of Science

Applied Mathematics
Biology
Mathematics
Physics-Mathematics
Pre-Medicine

Graduate

Master of Management
Business Management
Educational Management
Public Management

Business Administration, College of

Undergraduate

Bachelor of Science in Business
Administration
Financial Management
Marketing Management

Bachelor of Science in Business
Administration and Accountancy

Graduate

Master of Business Administration
Master of Agricultural Business
Management
Doctor of Business Administration

U.P. College Cebu

Undergraduate

Certificate of Fine Arts (Painting)
Bachelor of Arts in Communication
Broadcast Communication
Journalism

Bachelor of Arts (Social Sciences)

Anthropology
Political Science
Psychology
Sociology

Bachelor of Science

Biological Sciences
Botany
Marine Biology
Zoology
Mathematics
Psychology

Bachelor of Science in Business
Management

Bachelor of Science in Hotel and
Restaurant Management

Graduate

Certificate in Governmental
Management

Master of Education
Guidance

Master of Management
Business Management
Educational Management
Public Management

Master of Nursing

Maternal & Child Health Nursing
Medical-Surgical Nursing
Psychiatric-Mental Health Nursing
Public Health Nursing

Master of Arts in Teaching

Biology
General Science

Master of Arts
 Nursing-Maternal & Child Health
 Nursing
 Medical-Surgical Nursing
 Psychiatric-Mental Health Nursing
 Public Health Nursing

**U.P. Extension Division Clark
 Air Base**
Undergraduate

Associate in Liberal Arts
 Bachelor of Arts
 Economics
 Psychology
 Sociology
 Social Sciences
 Bachelor of Science in Business
 Management
 Bachelor of Science in Education
 Social Studies

Graduate

Master of Arts in Asian Studies
 East Asia
 Southeast Asia
 Master of Education
 General Educational Administration
 Master of Management
 Business Management
 Educational Management
 Public Management

Dentistry, College of

Undergraduate

Doctor of Dental Medicine

Economics, School of

Undergraduate

Bachelor of Arts
 Economics
 Bachelor of Science in Business
 Economics

Graduate

Certificate in Development
 Economics

Master of Arts (Economics)
 Doctor of Philosophy (Economics)
Education, College of
Undergraduate

Bachelor of Industrial Education
 Bachelor of Science in Education
 Biology
 Chemistry
 Communication Arts-English
 Communication Arts-Filipino
 General Science
 Health Education
 Home Economics
 Library Science
 Mathematics
 Music Education
 Physical Education
 Physics
 Social Studies
 Special Education

Bachelor of Science in Elementary
 Education

Arts
 Communication Arts-English
 Communication Arts-Filipino
 Health Education
 Home Economics
 Library Science
 Music Education
 Physical Education
 Science
 Social Studies
 Special Education

Graduate

Certificate in Educational Administration
 Certificate in Social Studies
 Certificate in Teaching
 Health Education
 Mathematics/Science Teaching
 Reading
 Second Language Teaching
 Special Education

Master of Arts in Teaching

Home Economics
 Physical Education
 Reading

School Health Education
 Science Education
 Biology
 Chemistry
 Elementary Mathematics
 Elementary Science
 General Science
 Mathematics
 Physics
 Second Language Teaching
 Social Studies
 Special Education

Master of Education

Biology
 Chemistry
 Curriculum and Instruction
 Educational Administration
 Educational Technology
 Elementary Education
 Elementary Science
 Elementary Mathematics
 General Education
 General Science
 Guidance
 High School Mathematics
 Language Teaching
 Physical Education
 Physics
 Reading
 School Health Education
 Secondary Education
 Special Education
 Teacher Education

Master of Population Studies

Population Education

Master of Arts

Education
 Educational Psychology
 Foundations of Education
 Professional Diploma
 Educational Administration

Doctor of Education

Counselor Education
 Educational Administration
 Social Studies

Doctor of Philosophy

Educational Foundations
 Language Teaching

Engineering, College of

Undergraduate

B.S. in Chemical Engineering
 B.S. in Civil Engineering
 B.S. in Electrical Engineering
 B.S. in Geodetic Engineering
 B.S. in Industrial Engineering
 B.S. in Mechanical Engineering
 B.S. in Metallurgical Engineering
 B.S. in Mining Engineering

Graduate

Diploma in Engineering (Water
 Resources)

Master of Engineering

Chemical Engineering
 Civil Engineering
 Computer Science
 Electrical Engineering
 Engineering Sciences
 Environmental Engineering
 Industrial Engineering
 Mechanical Engineering
 Metallurgical Engineering

Master of Science

Chemical Engineering
 Civil Engineering
 Computer Science
 Electrical Engineering
 Engineering Sciences
 Environmental Engineering
 Industrial Engineering
 Mechanical Engineering
 Metallurgical Engineering
 Nuclear Engineering

Environmental Planning, Institute of

Graduate

Master of Urban and Regional Planning

Housing
 Industrial Location Planning
 Planning Utilities and Services
 Transportation Planning

Fine Arts, College of

Undergraduate

Certificate of Fine Arts

Painting
 Sculpture
 Visual Communication

Bachelor of Fine Arts
Art Education
Art History
Painting
Sculpture
Visual Communication

Fisheries, College of
Undergraduate

Diploma in Fisheries
Fish Capture
Fish Culture
Fish Preservation
B.S. in Fisheries
Fisheries Business Management
Fisheries Technology
Inland Fisheries
Marine Fisheries

Graduate
Master of Science in Fisheries
Aquaculture

Health Sciences, Institute of
Undergraduate

Certificate in Midwifery

College of Home Economics
Undergraduate

Bachelor of Interior Design
Bachelor of Science
Clothing Technology
Food Technology
Community Nutrition
Family Life & Child Development
Home Economics (Home Arts)
Hotel and Restaurant Administration

Graduate
Master of Home Economics
Master of Arts in Home Economics
Clothing
Textiles and Related Arts

Family Life and Child Development
Master of Science in Food Science
Master of Science in Foods and Nutrition
Community Nutrition
Food Service Administration
General Hospital Dietetics

Doctor of Philosophy
Food Science
Food Chemistry
Food Microbiology
Food Processing

U.P. College Iloilo
Undergraduate

Diploma in Fisheries
Fish Culture
Bachelor of Arts
English
History
Humanities
Political Science
Social Sciences

Bachelor of Science
Business Administration
Accounting
Education
Communication Arts-English
History
Physical Sciences

Fisheries
Inland Fisheries
Biological Sciences
Management
Natural Sciences

Graduate

Certificate in Teaching
Science Teaching
Second Language Teaching
Master of Arts in Teaching
Biology
Chemistry
Language Teaching
Master of Management
Business Management
Educational Management
Public Management

Law, College of
Undergraduate

Bachelor of Laws
Graduate

Master of Laws
Library Science, Institute of
Undergraduate

Bachelor of Library Science
Graduate

Master of Library Science

U.P. College Manila
Undergraduate

Bachelor of Arts
Economics
History
Political Science
Social Sciences
Bachelor of Science
Biological Sciences

Mass Communication, Institute of
Undergraduate

Bachelor of Arts
Broadcast Communication
Journalism
Bachelor of Arts in Communication
Communication Research

Graduate
Diploma in Population Communication
Master of Arts
Broadcast Communication
Communication
Journalism

Medicine, College of
Undergraduate

Doctor of Medicine
Diploma in Anesthesiology
Graduate

Master of Science
Biochemistry
Pharmacology
Physiology

Allied Medical Professions, School of
Undergraduate

B.S. in Occupational Therapy
B.S. in Physical Therapy

Music, College of
Undergraduate

Artist's Diploma in Music
Keyboard
Strings
Winds or Percussion
Voice

Certificate of Proficiency in Music
Strings
Winds or Percussion

Teacher's Diploma in Music
Composition
Keyboard
Strings
Winds or Percussion
Voice

Bachelor of Music
Band Conducting
Choral Conducting
Composition
Keyboard
Strings
Winds or Percussion
Music Education
Music Literature
Theory
Voice

Graduate
Master of Music
Composition
Instrument
Music Education
Musicology
Theory
Voice

Nursing, College of
Undergraduate

Bachelor of Science in Nursing
Graduate

Master of Nursing
Maternal & Child Health Nursing
Medical-Surgical Nursing
Psychiatric-Mental Health Nursing
Public Health Nursing

Master of Arts
Nursing
Maternal & Child Health Nursing
Medical-Surgical Nursing
Psychiatric-Mental Health Nursing
Public Health Nursing

Pharmacy, College of
Undergraduate

Bachelor of Science
Industrial Pharmacy
Pharmacy

Graduate

Master of Science
Industrial Pharmacy
Pharmaceutical Chemistry
Pharmacy
Doctor of Philosophy
Pharmaceutical Chemistry
Pharmacy

Population, Institute of
Graduate

Master of Arts
Demography

Public Administration, College of
Graduate

Certificate in Governmental Management

Master of Public Administration
Fiscal Administration
Local Government
Organization Management
Personnel Administration
Program Development and Administration
Doctor of Public Administration

Public Health, Institute of
Undergraduate

Bachelor of Science in Public Health
Graduate

Certificate in Dental Public Health
Certificate in Hospital Administration
Diploma in Medical Microbiology
Master of Hospital Administration
Master of Occupational Health
Master of Public Health (Veterinary)
Master of Public Health Engineering
Master of Science in Public Health
Biometry
Medical Microbiology
Medical Parasitology
Public Health Nutrition

Social Work and Community Development, Institute of
Undergraduate

B.S. in Community Development
B.S. in Social Work

Graduate
Diploma in Community Development
Diploma in Social Work
Master of Community Development
Master of Social Work

Sports, Physical Education and Recreation, Institute of
Undergraduate

Diploma in Sports Coaching
Bachelor of Physical Education
Certificate in Physical Education

Graduate
Master of Physical Education
Master of Science (Physical Education)

Statistical Center
Undergraduate

Bachelor of Science (Statistics)
Graduate

Diploma in Statistics
Master of Statistics
Master of Science (Statistics)
Doctor of Philosophy (Statistics)

U.P. College Tacloban
Undergraduate

Bachelor of Arts
Humanities/Social Sciences
Social Sciences

Bachelor of Science
Applied Natural Science/Management
Biological Sciences

Bachelor of Science in Community Development
Graduate

Master of Management
Business Management
Educational Management
Public Administration

Master of Management in Small Industry
Master of Arts in Teaching
Elementary Mathematics
Elementary Science

General Science
Mathematics
Social Studies

Veterinary Medicine, College of
Undergraduate

Doctor of Veterinary Medicine
Graduate

Master of Science
Veterinary Parasitology
Veterinary Pathology

U.P. AT LOS BAÑOS

Agrarian Reform Institute
Graduate

Master of Agrarian Studies
Master of Arts (Agrarian Studies)

Institute of Agricultural Development and Administration
Undergraduate

Bachelor of Science in Agricultural Business
Bachelor of Science in Agricultural Economics

Graduate

Master of Agriculture (Agricultural Economics—Farm Management and Production Economics Marketing)

Master of Science (Agricultural Economics—Credit and Cooperatives, Farm Management and Production Economics, Marketing, Policy and Development)

Doctor of Philosophy (Agricultural Economics—Farm Management and Production Economics, Marketing)

Institute of Agricultural Engineering and Technology

Undergraduate

Bachelor of Science in Agricultural Engineering

Graduate

Master of Science (Agricultural Engineering Crop Processing, Farm Power and Machinery, Soil and Water Engineering (Irrigation and Drainage))

Master of Science in Agronomy

College of Agriculture

Undergraduate

Bachelor of Science in Agriculture (Agronomy, Animal Science, Entomology, Horticulture, Plant Pathology, Soil Science)

Bachelor of Science in: Agricultural Chemistry; Agricultural Education; Agricultural Extension; Development Communication (Development Journalism, Community Broadcasting, Audio-Visual Communication); Food Technology; Sugar Technology

Graduate

Master of Agriculture (Agricultural Education; Agronomy—Crop Production and Management; Animal Science—Animal Production, Meats; Horticulture—Crop Production and Management; Soil Science—Soil Fertility, Soil Conservation and Management)

Master of Science (Agricultural Education; Agricultural Extension; Agricultural School Administration; Agronomy—Crop Breeding and Genetics, Crop Physiology, Crop Production and Management, Seed Technology, Weed Science; Animal Science—Animal Breeding, Animal

Nutrition, Animal Physiology, Animal Production, Meats, Community Development, Development Communication—Audio-Visual Communication, Community Broadcasting, Development Journalism, General Development Communication; Entomology—Acarology, Economic Entomology, Insect Ecology, Insect Pathology, Insect Physiology, Insect Resistance in Plants, Insect Toxicology, Insect Transmission of Plant Diseases, Livestock Entomology, Systematic Entomology (Insect Taxonomy and Morphology); (Food Science and Technology—Food Chemistry, Food Microbiology, Food Processing, Foods and Nutrition; Horticulture—Crop Breeding and Genetics, Crop Physiology, Crop Processing and Handling, Crop Production and Management, Embryology and Tissue Culture, Ornamental Horticulture, Plant Propagation and Nursery Management, Postharvest Physiology, Seed Technology; Plant Pathology—Crop Diseases and Control, Fungus Physiology, Host-Parasite Relations (Pathogenesis), Mycology, Phyto-bacteriology, Plant Parasitic Nematology, Plant Virology; Rural Sociology; Soil Science—Soil Fertility, Soil Conservation and Management, Soil Chemistry, Soil Microbiology; Soil Morphology, Genesis, and Classification, Soil Physics);

Doctor of Philosophy (Agricultural Education; Agricultural Extension; Agronomy—Crop Breeding and Genetics, Crop Physiology, Crop Production and Management, Weed Science; Animal Science—Animal Breeding, Animal Nutrition, Animal Physiology, Animal Production; Community Development; Development Communication; Entomology—Acarology, Economic Entomology, Insect Ecology, Insect Pathology, Insect Physiology, Insect Resistance in Plants, Insect Toxicology, Insect Transmission of Plant

Diseases. Livestock Entomology, Systematic Entomology (Insect Taxonomy and Morphology); (Food Science and Technology—Food Chemistry; Horticulture—Crop Breeding and Genetics, Crop Physiology, Crop Production and Management, Embryology and Tissue Culture, Postharvest Physiology; Plant Pathology—Crop Diseases and Control, Fungus Physiology; Host-parasite Relations (Pathogenesis), Mycology, Phytobacteriology, Plant Parasitic Nematology, Plant Virology; Rural Sociology; Social Science—Soil Chemistry, Soil Fertility, Soil Conservation and Management, Soil Microbiology, Soil Morphology, Genesis, and Classification)

College of Forestry

Undergraduate

Ranger Certificate

Bachelor of Science in Forest Products Engineering; Bachelor of Science in Forestry

Graduate

Master of Forestry (Forest Biological Sciences—Forest Botany, Forest Ecology, Forest Entomology, Forest Pathology; Forest Physiology, Forest Resources Management—Forest Biometry, Forest Economics and Policy, Forest Photogrammetry, Logging Engineering, Range Management, Silviculture, Timber Management; Watershed Management, Wood Science and Technology—Gluing of Wood Products, Industrial Management, Mechanical Processing of Wood, Preservative Treatment, Timber Mechanics, Wood Anatomy, Wood Physics, Wood Seasoning);

Master of Science in Forestry (Forest Biological Sciences—Forest Botany, Forest Ecology, Forest Ento-

mology, Forest Pathology, Forest Physiology, Forest Resources Management—Forest Biometry, Forest Economics and Policy, Forest Photogrammetry, Logging Engineering, Range Management, Silviculture, Timber Management, Watershed Management; Wood Science and Technology—Gluing of Wood Products, Industrial Management, Mechanical Processing of Wood, Preservative Treatment, Timber Mechanics, Wood Adhesive, Wood Anatomy, Wood Physics, Wood Seasoning);

Doctor of Philosophy (Forest Biological Sciences—Forest Botany, Forest Entomology, Forest Pathology; Forest Resources Management—Silviculture; Wood Science and Technology—Gluing of Wood Products, Preservative Treatment, Timber Mechanics, Wood Adhesive, Wood Anatomy, Wood Physics, Wood Seasoning)

Institute of Human Ecology

Undergraduate

Bachelor of Science in Home Technology (Food Nutrition, Family Development, Home Management); Bachelor of Science in Human Ecology (Community Nutrition, Social Technology, Human Settlements)

Graduate

Master of Science (Applied Nutrition, Family Resource Management)

College of Sciences and Humanities

Undergraduate

Bachelor of Arts in Communication Arts (Speech Communication, Theater Arts, Writing); Bachelor of Arts (Sociology)

Bachelor of Science in Chemistry; Ba-

chelor of Science in Biology (Acad-
 Technology
 Institute of Agriculture
 Technology
 Bachelor of Science (Applied Ma-
 Mathematics, Botany, Mathematics,
 Statistics, Zoology)

Graduate

Master of Science (Biology—Cytology,
 Genetics, Microbiology; Botany—
 Phycology, Plant Anatomy and Mor-
 phology, Plant Ecology, Plant Phy-
 siology (Plant Growth Regulator,
 Photoperiodism, Plant Nutrition,
 Salt Tolerance, Water Relations),

Systematics, Chemistry—Analyti-
 cal Chemistry, Biochemistry, Chem-
 istry of Agricultural Products, Pro-
 teins and Enzymes; Statistics—Bio-
 metry; Zoology—Phytonematology,
 Vertebrate Biology (Rodents), Verte-
 brate Embryology and Developmen-
 tal Physiology);

Doctor of Philosophy (Biology—Cytol-
 ogy, Genetics, Botany—Phycolo-
 gy, Plant Physiology (Plant Growth
 Regulator, Plant Nutrition); Chemis-
 try—Bio-Chemistry, Chemistry of
 Agricultural Products, Proteins and
 Enzymes)

PHILIPPINE CENTER FOR ADVANCED STUDIES

Institute of Asian Studies

Institute of Philippine Studies

Graduate

Graduate

Master of Arts (Asian Studies)

Master of Philippine Studies

Master of Arts (Philippine Studies)

Doctor of Philosophy (Philippine Studies)

Institute of Islamic Studies

Undergraduate

Bachelor of Arts in Islamic Studies

OTHER UNITS

- Brackish Water Research Center
- Building Research Service
- Computer Center
- Film Center
- Institute for Small-Scale Industries
- Law Center
- Local Government Center
- Marine Sciences Center
- Natural Science Research Center
- Philippine Executive Academy
- Philippine Eye Research Institute
- Philippine General Hospital
- Science Education Center
- Training Center for Applied Geodesy and Photogrammetry