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*The* **PHILIPPINE GEOGRAPHICAL SOCIETY**  
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# The PHILIPPINE GEOGRAPHICAL JOURNAL

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MANUFACTURING IN GREATER MANILA <sup>1</sup>

TELESFORO W. LUNA, JR.

THE high density of industrial concentration in the Greater Manila Area<sup>2</sup> is a distinct feature of manufacturing in the Philippines. In 1960 this area accounted for approximately 129,704 (53.18%) of the 243,933 workers employed in manufacturing (Table 1). The remaining 114,229 (46.87%) are unevenly distributed throughout the rest of the country.

Table 1 indicates, in general, the primary importance of the food and kindred industries in the Philippines. This major product group is followed by apparel and related products, textiles, lumber products, printing and publishing, fabricated metal products, tobacco products, and chemical and allied products — all with 10,000 or more employees. In the Greater Manila Area, the content of manufacturing represented by the first eight major product groups differs somewhat from the country as a whole. Textiles rank first, followed by apparel and related products, which employ almost an equal number of workers. Other groups include food and kindred products, publishing and printing, fabricated metal products, tobacco products, chemical and allied products, and electrical machinery pro-

ducts. The growing importance of fabricated metal, chemical and allied products, and electrical machinery in Manila and suburbs is noteworthy.

This paper attempts to interpret the pattern of growth, distribution and location of manufacturing in the Greater Manila Area. More specifically, this study has three aims:

1. To identify and describe the stages of development of modern manufacturing in Greater Manila;

2. To describe the present general pattern of industrial location and that of selected industries in particular, and to evaluate the major factors in operation; and

3. On the basis of the findings in the first two, to suggest broadly the lines which sound planning of industrial location in Greater Manila should follow.

Statistical data made available by the Central Bank of the Philippines constituted the principal source of information used in the field work.

The names, addresses and the major product group classification of all factories with ten or more employees were written on index cards. These were then checked and plotted on maps in the field by type of product, size and

the project by himself.

<sup>2</sup> The Greater Manila Area as delimited in this study includes the cities of Manila, Quezon, Caloocan and Pasay and the towns of Navotas, Malabon, San Juan, Mandaluyong, Makati and Parañaque.

<sup>1</sup> This paper represents the result of a research project supported by The Asia Foundation. This project was originally planned by Dr. Denis J. Dwyer, University of Hongkong, and the author. However, due to unforeseen events, Dr. Dwyer was unable to come back to the Philippines, so the author proceeded with

TABLE 1

MANUFACTURING EMPLOYMENT IN THE PHILIPPINES, 1960  
(By Type of Product)

<u>Major Product Group</u>	<u>Greater Manila</u>	<u>Provinces</u>	<u>Total</u>
Food and Kindred Products (20)	12,587	45,397	57,984
Beverages (21)	5,107	3,270	8,377
Tobacco Products (22)	9,172	1,426	10,598
Textiles (23)	15,654	15,703	31,357
Apparel and Related Products (24)	15,578	16,395	31,973
Lumber Products (25)	5,381	14,924	20,305
Furniture and Fixture (26)	2,860	1,223	4,083
Paper and Allied Products (27)	3,439	692	4,131
Printing and Publishing (28)	11,016	1,692	12,708
Leather, Leather and Fur Products (29)	309	436	745
Rubber Products (30)	5,614	600	6,214
Chemical and Allied Products (31)	8,546	2,042	10,588
Petroleum and Coal Products (32)	41	470	511
Non-Metallic Products (33)	4,779	3,491	8,270
Basic Metal Products (34)	2,199	856	3,055
Fabricated Metal Products (35)	9,657	1,431	11,088
Machinery (except electrical) (36)	3,064	234	3,298
Electrical Machinery Products (37)	6,184	281	6,465
Transport Equipment (38)	4,870	2,860	7,730
Miscellaneous (39)	3,647	806	4,453
T O T A L	129,704	114,229	243,933

Source: Compiled and modified from data furnished by the Economic Research Division, Central Bank of the Philippines.

political unit. Maps used in the field have scales of 1/10,000 and 1/20,000. Data plotted on these field maps were subsequently transferred to base maps with smaller scales. Data contained in the first two maps (Figs. 1 & 2) were originally plotted on base maps with scales of 1/40,000 and the data in the eight other maps (Figs. 3-10) on base maps with scales of 1/55,000. Although manufacturing establishments with less than ten employees were not mapped, their locations were noted as supplementary source of data during the field work.

Representative establishments of each major product group were visited during and after the field work, and managers, or executives, and other persons were interviewed, to get as much information as possible with regard to the present pattern of manufacturing development. Questionnaires were prepared and mailed to different manufacturing establishments with ten or more employees. Various sources of information on employment, production and location — in addition to data furnished by the Central Bank — like census publications, studies made by



individuals and government agencies,<sup>3</sup> were also used to facilitate the study of the pattern of manufacturing development in Greater Manila.

#### DEVELOPMENT OF MODERN MANUFACTURING<sup>4</sup>

Modern manufacturing in the Philippines started in a small way at the closing years of the Spanish regime. As of 1960 only a few of the industries established before 1900 are still in operation (Fig. 1). Among these are Cia General de Tabacos de Filipinas and its subsidiary company, La Flor de la Isabela, and the San Miguel Brewery. These companies are still located in their original sites near and along the lower course of the Pasig River in Manila. The former is in Paco, along the south bank of the river, and the latter is in San Miguel, along the north bank. Today, these companies have not only expanded their initial activities but have also extended their operations to other fields of manufacturing. Other establishments which started out before 1900 include Rufina Patis, a family-owned enterprise located along the Navotas River in Malabon, and La Perla Biscuit, Inc., in San Juan.

<sup>3</sup> The more important materials used are the *Annual Survey of Manufacturers* published by the National Economic Council (NEC) and the Bureau of the Census, *Industrial Dispersal for Economic Development* issued by the Office of National Planning, NEC, and Carlos P. Ramos: "Manila's Metropolitan Problem", *Philippine Journal of Public Administration*, Vol. 5, No. 2 (1961) pp. 89-117. The telephone directory was also used extensively.

<sup>4</sup> The following are the periods into which the growth of modern manufacturing has been broken down: Before 1900; 1900-35; 1936-41; 1942-45; 1946-60. The period before 1900 represents approximately the end of Spanish rule in the Philippines; 1900-35, the American Administration; 1936-41, the Commonwealth period interrupted by the Pacific War, 1942-45; the war interval and liberation;

For four decades, from 1900 to the outbreak of the Pacific War, manufacturing grew slowly and irregularly. From 1900-35 (during the period of American administration) its development was primarily directed to the processing of agricultural raw materials into food and kindred products (sugar, desiccated coconut, vegetable oil, margarine), the manufacture of apparel and related products, printing and publishing, the preparation of chemical and allied products, the manufacture of furniture fixture, lumber, distilled liquor and soft drinks, and ceramics.

Among the more important food and kindred manufacturing concerns established during this period, which are still in operation, are the Philippine Manufacturing Company (now Procter and Gamble Philippine Manufacturing Company), Magnolia Dairy Products, Philippine Refining Company, and the Insular Sugar Refining Company.<sup>5</sup> All of these establishments are located in Manila. Other concerns representative of the other major product groups, which were established during the same period, are La Tondeña (distilled liquor), Alhambra (tobacco), Elizalde Rope Company, Ang Tibay (footwear - in Caloo-

1946-60, Independence and the present period. It is recognized that these periods do not represent phases of purely economic significance. However, as a more suitable system is not available, the above divisions will do for the present study.

<sup>5</sup> The Procter and Gamble Philippine Manufacturing Company and the Philippine Refining Company also manufacture articles other than these classified under food and kindred products. Their classification as food manufacturing establishments has been determined by the principal product from which they receive the preponderant part of their gross revenue, or on which employment is proportionately the largest. This rule is followed throughout in the classification of other establishments by the Central Bank.

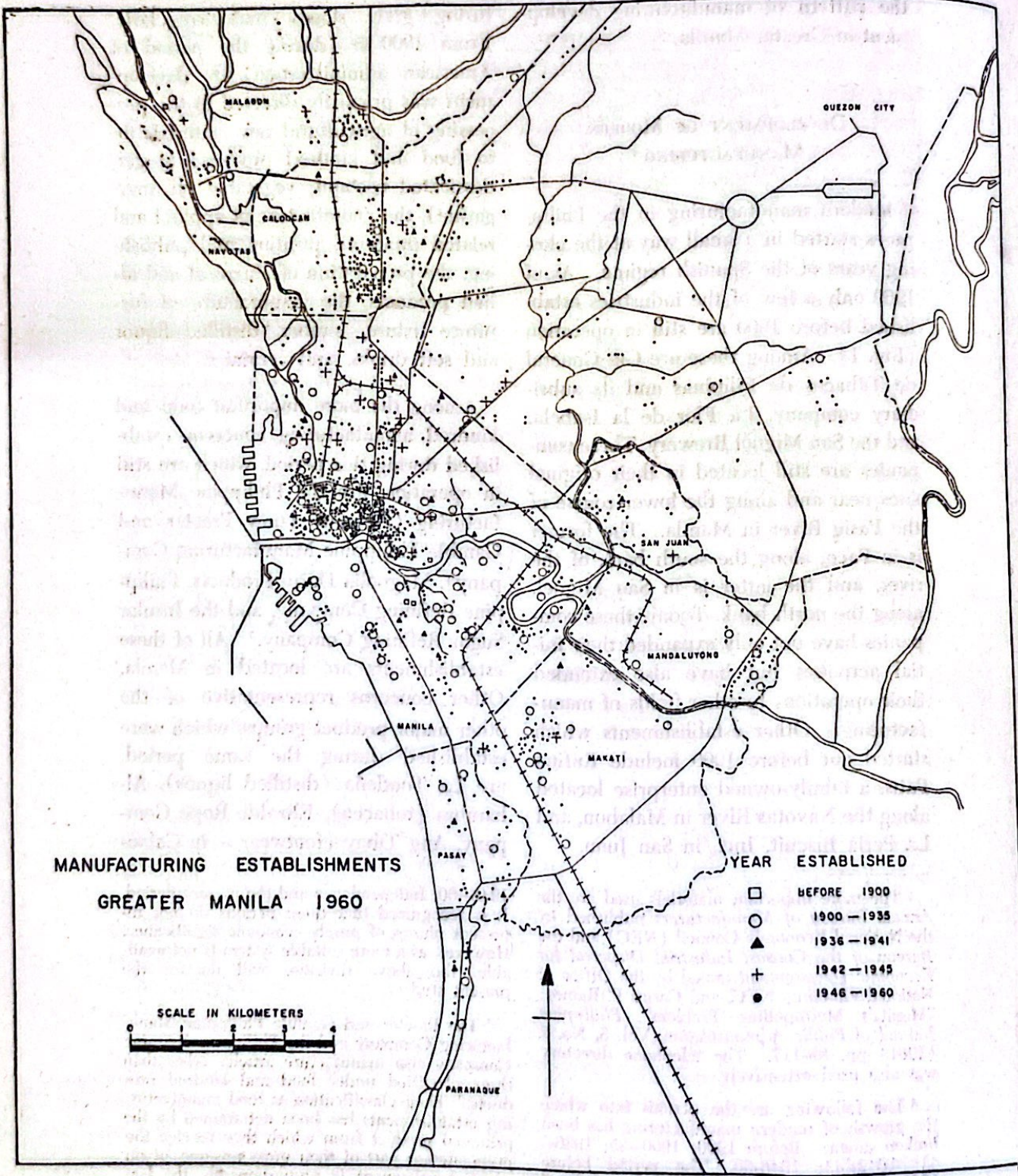


FIG. 1

can), TVT (now Manila Times — printing and publishing), Insular Lumber Company, El Porvenir (rubber products and shoes — in Caloocan), Philippine Match Company, Philippine-American Drug, Ault and Wiborg (basic chemical products — now in Makati), Machuca Tiles Company (ceramics), and the Manila Trading Company (transportation equipment).

A majority of these manufacturing establishments are of foreign capitalization — American, Spanish and Chinese. Most of the American firms are subsidiaries of companies in the United States. The few concerns organized by Filipino investors started out as small family, or cottage, industries. Some of them became successful ventures and emerged as the large establishments they are today. The Ang Tibay Footwear Company is a good example of such.

The same irregular and slow trend of manufacturing activities continued during the Commonwealth period (1936-41), abruptly interrupted by the outbreak of the Pacific War. Of those established during the period, which are still in operation, the food and kindred industries (mostly bakery shops), apparel and related industries (primarily tailoring and dress shops), and printing and publishing companies are the important ones. The Rose Packing Corporation (food products — located in Pasay) and Marcelo Rubber Products, Inc. (in Northern Hills, Malabon) are among the outstanding individual establishments organized then that continue to be in operation. At present, the latter has expanded to other phases of manufacturing.

Most of the industrial activities from 1936-41 (as well as from 1900-35) were concentrated in Manila: only a few were located in surrounding towns. This sit-

uation was primarily the result of better commercial, residential and transportation facilities then existing in Manila. It was only quite recently that most of the industrial, commercial, residential and transportation developments in the suburbs, especially in Quezon City, Malabon, Mandaluyong and Makati, took place.

During the 1942-45 period, most of the manufacturing concerns were established in the later part of 1945 when Greater Manila was just liberated. Together with the new industries being set up, most of the companies which started operations before the war resumed their activities. The Greater Manila Area, especially Manila, was badly damaged during the war so that this also was the period of reconstruction and rehabilitation. A significant number of the companies established at the time most probably started out as importers of very much needed manufactured products. Later they engaged in the assembly of finished products when controls on foreign credit were imposed.

The period 1946-60 witnessed the most rapid growth of manufacturing in the Greater Manila Area. Entirely new industries were organized. The older companies that barely completed the reconstruction of their physical plants destroyed during the war almost at once began setting up subsidiary establishments. Quite a few of these older concerns also hold partial interests in new industries completely different from their original activities. Most of these industrial developments, however, are the direct results of the dollar restrictions and import controls imposed by the government. The increasing gains in other sectors of the economy of the country should not be overlooked as a

contributory factor. The recent decontrol program of the government should have a different though as far reaching effect on future industrial growth and development.

From 1946 onwards to early 1955, most of the manufacturing establishments located themselves in Manila. Then from late 1955, an increasing number of newly organized companies began to locate themselves in the suburbs, particularly in Quezon City, Mandaluyong, Makati and Malabon. Quite a few of the older companies originally located in Manila also transferred to new sites in the suburbs. Others whose physical plants could not be moved easily established branches, or else bought new land in the suburbs — part of a plan which, in the future, may find the entire plant operations in the new site. These contemplated moves may depend, however, on future circumstances and the financial capability of each individual company. Nevertheless, a number of companies, especially those found along the Pasig River in Manila, whose manufacturing activities need special sites, continue to be located where they are.

The growth and development of industry has paralleled the development of other land uses, especially residential. The present trend in industrial development in the suburbs is, therefore, nothing more than a manifestation of the continued growth of the settlement of the Greater Manila Area.

In future re-evaluation of the extent of the Greater Manila Area manufacturing zone, it may be worthwhile to include the political units of Pasig and Marikina. These two municipalities also have experienced recently rapid industrial growth and development. Several companies located in Manila

and suburbs have established branches there, in addition to a number of new factories and cottage industries. Both Pasig and Marikina have extensive undeveloped land still available for industrial sites and these communities are contiguous to the Greater Manila Area. Necessary facilities are, therefore, within reach. Polo and nearby areas in Bulacan may also merit consideration in a greatly expanded study of manufacturing.

#### INDUSTRIAL LOCATION AND DISTRIBUTION

There are several components of a manufacturing enterprise. These are the factory, the sales office, the showroom, the warehouses, the administrative office and related parts. The location of factories takes into account the location of showrooms and offices. The extent to which the physical plant is separated from the office or showroom varies from company to company and, to a lesser degree, from major product group to another. Coordination and control, however, are two important factors that greatly affect the final decision of each management.

For most manufacturing establishments of small size (those with less than 50 employees), separation of factory from showroom or offices seems unlikely. Most small establishments combine the component parts together, and the best location must be one which is suitable for the factory and the other components of the establishment. As a consequence, quite a number are located in central and outlying business centers and along major thoroughfares where pedestrian traffic is quite heavy.

In the case of larger establishments, the location of the factory may be separate from the other component

parts. This is especially so in the case of "noxious" establishments, such as those engaged in the manufacture of plywood and veneer, chemical and allied products, glass, concrete products and basic metal goods.

A number of manufacturing enterprises have also established additional factories separate from already existing ones. This development explains the lack of space requirements for expansion in the original site, or it may have been more convenient to erect a completely new factory somewhere else than to extend the existing plant and add new machinery. This is characteristic of the present expansion of the San Miguel Brewery.

Companies, however, which do not provide separate information for component parts located in different sites

are hard to plot on the map. Confronted with this problem, a certain degree of flexibility was, therefore, necessary in deciding which of the component parts of each manufacturing establishment is to be indicated. There were several instances when the location of the factory was not plotted, but the place, where apparently the greater portion of the employees or activities are found, was. As much as possible, however, the location of the factory was indicated on the maps. The presentation of the location and distribution of manufacturing concerns in the Greater Manila Area, as shown in Figures 1-10, is a simplification as well as a generalization.

#### LOCATIONAL ADVANTAGES AND PROBLEMS

As shown in Figures 1 and 2, there is a greater concentration of manufac-



The Pasig River. Like a magnet it attracts many manufacturing establishments and other firms to locate along its banks. To the left is the NDC textile plant; to the right are storage areas of Shell and Caltex.

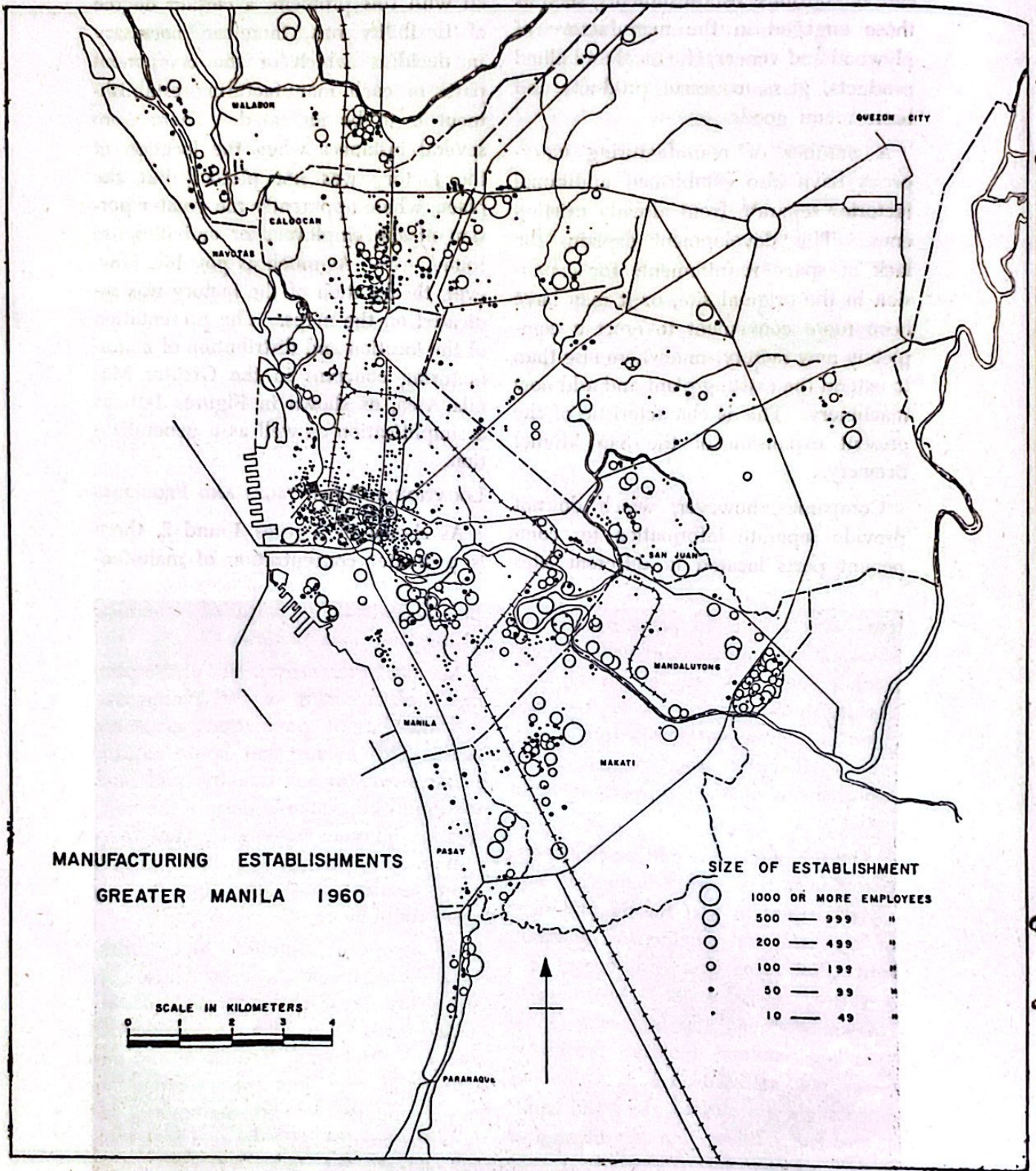


FIG. 2

turing establishments in Manila than in any of the suburbs. Although many of these establishments are of small size (Fig. 2), of the total 129,704 workers employed in manufacturing, Manila accounts for approximately one-half — 50.29 per cent; Quezon City is next with 13.08 per cent; Caloocan, 8.64; Mandaluyong, 8.15; Malabon, 5.55; Makati, 5.43; San Juan, 3.12; Parañaque, 2.55; Pasay, 2.48; and Navotas, a scant 0.71.

Taking the majority of the industries established before the Pacific War in Manila and a significant number of those recently organized, together with several older companies which shifted to new sites in the suburbs, one discerns the existence of two zones of industrial development within the Greater Manila Area. These are (1) an inner, older zone; and (2) an outer, newer zone.

*Inner Zone Locations* — It is apparent that, with regard to plant location in Manila, there are assets as well as liabilities. The major advantages of location in Manila are the use of the Pasig River as a transportation artery, proximity to the port area, adequate labor requirements and an important retail outlet.

The use of the Pasig River as a transportation artery for bringing in raw materials and in part for the shipment of manufactured products is a strong centripetal force that is important for a variety of industries. Medium-size (50-499 workers) and large-size (more than 500 workers) factories processing bulky raw materials low in value per unit weight are located along the banks of the Pasig River. Among these are: a glass factory and a carton plant at the mouth of the river, a brewery, a steel mill, a match factory, a concrete-products factory and several lumber and

plywood and veneer mills farther upstream. The use of water from the Pasig River for cooling and cleaning purposes and in the disposal of waste is one additional reason which has attracted factories to locate along its banks. These locational advantages along the river, however, hold true throughout its course, particularly where the channel is navigable.

Proximity to the port area is an important factor of location for those industries which depend largely on imported raw materials and manufactured parts. Motor vehicle assembly and repair plants are located in the South Port District, in and around United Nations Avenue (Isaac Peral) and in Canonigo Street in the Paco District. Other establishments found in these areas include a large-size tobacco factory, a food-processing plant, pharmaceutical laboratories, chemical plants, and shoe factories.

Manila, as the central city of the principal urban region of the Philippines, has the largest population concentration. This means that labor requirements of almost any quantity and quality would be available despite the competition of other activities. That there is no shortage of labor quantitatively is quite evident, although qualitatively there could be certain problems.

A significant number of establishments, the majority of which are of small size, tend to be located in congested areas. The Divisoria commercial and industrial area, located in the San Nicolas District, but rapidly expanding into Tondo, Binondo and Santa Cruz, lies near the slums of Manila and is densely populated. In this area, numerous small-size apparel and related manufacturing establishments (mostly garment factories) are located. Concerns with

less than 50 employees, manufacturing certain food and kindred products, paper bags and boxes, cosmetics and candles, are also among those found in the area. Although the location of each establishment is entirely determined by personal considerations, proximity to slum areas, with their large potential of cheap labor supply, could be an important factor. Furthermore, Divisoria is a terminal for railroad and truck transportation systems. The area also boasts of an important retail trade: thus, it serves as an outlet for manufactured articles.

Other retail trade areas which have attracted small establishments (mostly apparel and furniture) are the central business core in and around Escolta and the commercial areas along several principal thoroughfares. Outstanding are Rizal Avenue, Quezon Boulevard and Recto Avenue (Azcarraga). The last is the major thoroughfare connecting the Divisoria area, Rizal Avenue and Quezon Boulevard. These streets are flanked on each side by an almost continuous line of retail stores and shops — the quality, size and dominance varying greatly within the areas.

Although the various suburbs have emerging and developing business centers, none so far can seriously compete with Manila in volume of retail sales. This makes Manila the dominant market for most of the manufactured goods

in the Greater Manila Area: a factor that must also be taken into account.

Among the main disadvantages of the inner zone are (1) inadequate space, (2) traffic congestion, (3) increasing land and property values and taxes, and (4) restricted operations of noxious industries.<sup>6</sup>

Limited or inadequate space is a major problem for large-scale manufacturing operations in Manila. Although there are a number of large manufacturing establishments in the city, most of them purchased their sites before the war. Their present sites can still be used efficiently and perhaps meet the space requirements up to a certain point. However, if continued expansion is expected, new sites may have to be developed somewhere.

Present production techniques have undergone radical changes. The most desirable layout for a factory is one in which all operations can be done on a single level. This would require the construction of single-storied buildings rather than multi-storied ones. In addition, the storage of materials and finished products nearby is becoming a common problem, and so is the need for parking space. The growing demand for amenable working conditions for workers would mean additional space for the construction of certain facilities such as lunch counters, washrooms and rest rooms. This can be avoided only if

<sup>6</sup> G. J. R. Linge: "The Diffusion of Manufacturing in Auckland, New Zealand", *Economic Geography*, Vol. 39, No. 1 (January 1963) pp. 23-39, listed five major disadvantages of manufacturing in the inner zone of Auckland in addition to miscellaneous ones. These are: 1. inadequate space; 2. labor shortage; 3. city congestion; 4. increased land and property values, 5. environment. Charles C. Colphy: "Centrifugal and Centripetal Forces in Urban Geography", *Annals, Association of American Geographers*, Vol. 23, No. 1 (March 1933), pp. 1-20, listed six centrifugal factors as the causes of the outward movement of factories:

1. ever increasing land and property values and high tax rates; 2. traffic congestion; 3. space inadequacies; 4. avoidance of nuisance complaints; 5. difficulty of securing special type of site; 6. irksome legal restrictions, outgrown laws, etc.

The order in which the major disadvantages of manufacturing in Manila, or the inner zone, occur is based on the tabulation of the factors of location considered as unfavorable for continued industrial growth, or expansion, by the establishments that were interviewed, and which completed and returned the questionnaires mailed to them.



the management refrain from extending some of the modern amenities to its employees.

With the increasing use of motor vehicles and the characteristic narrowness of most of the thoroughfares in Manila, traffic congestion would be another unsatisfactory feature. This condition affects efficiency in the handling of goods and materials, as more time will be spent in getting to one point from another. There are, however, areas within Manila where traffic is not so bad, but in general congestion is a problem. In addition to this is the lack of parking space and parking restrictions in certain areas. Due to the shortage of space, a number of factories also have to store materials in places located some distance from the main plant. Thus, the need of moving the materials from one place to another becomes unavoidable.

Increasing land and property values also have affected decisions of management to find sites outside of Manila. This is especially true for the larger establishments in need of additional land for expansion. As a result, although most of the older companies continue to be in Manila, parts of their operations have been moved to new sites in the suburbs because of relatively lower land and property values and larger spaces to be had. Taxes do not seem to be a very important factor of location, as tax rates do not vary much from one place to another within the Greater Manila Area, although in Manila taxes are slightly higher.

The encroachment of residential land uses into industrial areas has affected the growth and development of manufacturing in Manila. At the same time, the use of new chemicals, problems of waste disposal, the added noise, smell, smoke and dust from manu-

facturing establishments make them less and less desirable in residential areas. Thus, some establishments which have become noxious, wary of arousing complaints from residents, tend to locate in new sites far from residential areas.

Conditions of the surrounding areas near factories tend to influence location decisions. In areas where peaceful operations are no longer tenable due to the interference of "unwanted" individuals or groups, the decision to leave is hastened. Such conditions not only disrupt operations but affect employees as well, as their lives become endangered.

*Outer Zone Locations*. — Most of the disadvantages in Manila are the direct opposite of the advantages in the suburbs. The only possible exception are those of Caloocan and Pasay, where conditions more or less approach those in Manila.

Space is available not only for larger operations but also for the more efficient arrangement of facilities. Space for storage and parking is adequate. At the same time, the more progressive companies desirous of maintaining an effective labor force also have space for the construction of facilities for their employees. These facilities include washrooms, rest rooms, lunch counters and related needs. Social changes call for the more humane treatment of workers by management.

The emergence and development of planned industrial areas in Mandaluyong and Makati point out the advantages of adequate space for greater efficiency in the arrangement of plant operations. The planned development of the area in Mandaluyong bounded by E. de los Santos Avenue (Highway 54) on the west side, the Pasig River on the south, Shaw Boulevard on the north, and the town of Pasig on the east, is an out-

standing example. In addition to space availability in this area, the comparatively low cost, at the time of purchase, of the industrial lots five years ago or earlier, accessibility to Manila and proximity to major transportation routes, are also important location factors.

In Makati, the specific area with increasing industrial concentration is found along Pasong Tamo Extension, from Highway 54 northward to and slightly beyond Buendia Extension. This, however, is a combined industrial and commercial development with a linear pattern. The increased pace of high-quality residential developments, nevertheless, limits the amount of land available for industrial land use in the area.

Industrial sites along the banks of the Pasig River in Mandaluyong and Makati have been used to advantage by establishments using bulky raw materials. Among these are the Liberty Flour Mill, the Insular Sugar Refinery, the Jackbilt concrete-products factory, the Choon Huat glass factory, and the International Steel Smelting plant in Mandaluyong's side of the river. Along the south bank of the Pasig River in Makati are the Colgate-Palmolive factory, the Royal Oil Products plant and the Philippine Electric Manufacturing Company factory. Land for industries along the river is now limited.

The dispersed and fragmentary pattern of industrial land use in Quezon City is a response to the largeness of the area of the city and the lack of proper planning in the development of land for various uses. In addition to the availability of undeveloped land for industrial sites, adequate transportation facilities, excellent drainage, and comparatively low land and property values are other important factors that draw manufacturing companies to the city.

In Malabon, the presence of land for

industrial development, which could be purchased at prices comparable to those of other suburban areas previously mentioned, made possible the location of a number of medium- and large-size factories. Within this general area is found extensive undeveloped land still available for industrial sites.

The other suburban areas of Navotas, Caloocan, San Juan, Parañaque and Pasay offer less advantages for new industrial development. Although land and property values are comparatively lower than in Manila, there is less land available for industrial sites. Caloocan, San Juan and Pasay are almost entirely developed. Residential and commercial land uses take up a significant portion of the area of Pasay. In San Juan, although the land devoted to industrial use is quite moderate, there are very few undeveloped lots. The same is quite true in Caloocan.

In general, the suburbs present more advantages for large establishments than for small ones. The large establishments can have their component parts separate from one another: set up factories in the suburbs (taking advantage of adequate space) and showrooms and sales offices in the Central Business District in Manila. The better financial capability of these establishments makes this situation possible. Manila, with its higher population density and more developed retail outlets, is, however, comparatively more favorable to most small establishments which must have all their component parts intact.

#### MANUFACTURING CONTENT

Ten maps have been constructed to show the distribution and location by size and type of production. In addition, Figure 2 shows the distribution of

all establishments by size in the Greater Manila Area. A cursory study of the maps and Table 2 reveals that a majority of the establishments are of small size (10-49 employees). The area between the Pasig River to the south and Recto Avenue (Azcarraga) to the north, which embraces parts of San Nicolas, Tondo, Santa Cruz and all of Binondo, in Manila, is significant for the concentration of small-size shops. This is a sharp contrast to the industrial concentration in the Paco District south of the Pasig River and in Mandaluyong along the eastern side of E. de los Santos Avenue (Highway 54). A majority of the establishments in these areas have 100 or more employees.

Along Pasong Tamo Extension in Makati, establishments of all sizes are represented. This apparently seems to be the case with the Northern Hills region in Malabon. Both of these areas are rapidly developing into industrial sections of significant proportions and, in the case of Makati, into commercial centers as well.

In Caloocan, the section of the city between the railroad tracks on the west and Rizal Avenue on the east is also an area of intensive industrial development. Small-size establishments are slightly more in number than medium-size factories.

Aside from these areas, the other suburbs in the Greater Manila Area indicate the presence of all the different size categories.

#### TYPES OF PRODUCTS

All of the twenty major product groups of the Standard Industrial Classification adopted in the Philippines are represented in the Greater Manila Area. Textile manufacturing establishments account for 12.07 per cent of the total

manufacturing employment. It is followed by apparel and related products (12.01%), food and kindred products (9.70%), publishing and printing (8.49%), fabricated metal products (7.44%), and tobacco products (7.07%). The distribution of these major product groups, together with chemical and allied products, electrical machinery, rubber products, lumber products, and beverages, is shown in Figures 3-10.

*Textiles* — A majority of the textile manufacturing establishments employ 100 or more workers (Fig. 3). There are five factories with 1,000 or more workers: two are in Malabon, two in Quezon City and one in Mandaluyong. The two establishments found in Malabon are the Artex Development Company and the Lirag Textile, Inc. The Central Manufacturing Corporation in Quezon City, with more than 2,000 employees, is probably the largest. General Textiles, Inc., has two physical plants. The one in Libis, Murphy, has approximately 1,000 workers. The fifth (Industrial Textile Company) in Mandaluyong manufactures jute bags instead of clothing materials, as do the first four.

Included also within this major product group are two medium-size establishments which manufacture rope and cordage. These are the Elizalde Rope factory in San Nicolas and the Manila Cordage mill in Paco, which are both in Manila. In Malabon, an establishment with more than 200 workers manufactures fish nets. Its location, being close to the fishing areas of Malabon and Navotas, is noteworthy.

*Apparel and Related Products* — The largest apparel establishment is found in the northwestern section of Quezon City along E. de los Santos Avenue (Fig. 4).

The Tondo, San Nicolas, Binondo and Sta. Cruz districts in Manila north of the Pasig River show a significant con-

TABLE 2

NUMBER OF FACTORIES BY SIZE AND TYPE OF PRODUCTS  
GREATER MANILA, 1960  
(Size according to Number of Workers)

Major Product group	Large Size		Medium Size			Small Size	Total
	1,000 and over	500- 999	200- 499	100- 199	50- 99	10- 49	
Food and Kindred Products (20)	1	1	5	19	22	178	226
Beverages (21)	—	5	2	4	4	19	34
Tobacco Products (22)	1	5	6	8	7	14	41
Textiles (23)	5	2	15	10	13	22	67
Apparel and Related Products (24)	—	2	4	18	39	265	328
Lumber Products (25)	1	—	4	4	11	59	79
Furniture and Fixture (26)	—	—	2	1	7	65	75
Paper and Allied Products (27)	—	—	3	5	7	41	56
Printing and Publishing (28)	1	2	8	17	11	110	149
Leather, Leather and Fur Products (29)	—	—	—	—	2	6	8
Rubber Products (30)	1	2	4	6	7	9	29
Chemical and Allied Products (31)	—	2	10	16	13	77	118
Petroleum and Coal Products (32)	—	—	—	—	—	2	2
Non-Metallic Products (33)	—	1	7	4	9	34	55
Basic Metal Products (34)	—	—	1	4	7	28	40
Fabricated Metal Products (35)	1	2	7	18	14	73	115
Machinery (except Elec- trical) (36)	—	2	2	2	6	20	32
Electrical Machinery (37)	—	2	4	6	7	31	50
Transport Equipment (38)	—	1	4	6	12	53	76
Miscellaneous (39)	—	—	1	7	8	84	100
<b>T O T A L</b>	<b>11</b>	<b>29</b>	<b>89</b>	<b>155</b>	<b>206</b>	<b>1190</b>	<b>1680</b>

Source: Compiled and modified from data furnished by the Economic Research Division, Central Bank of the Philippines.

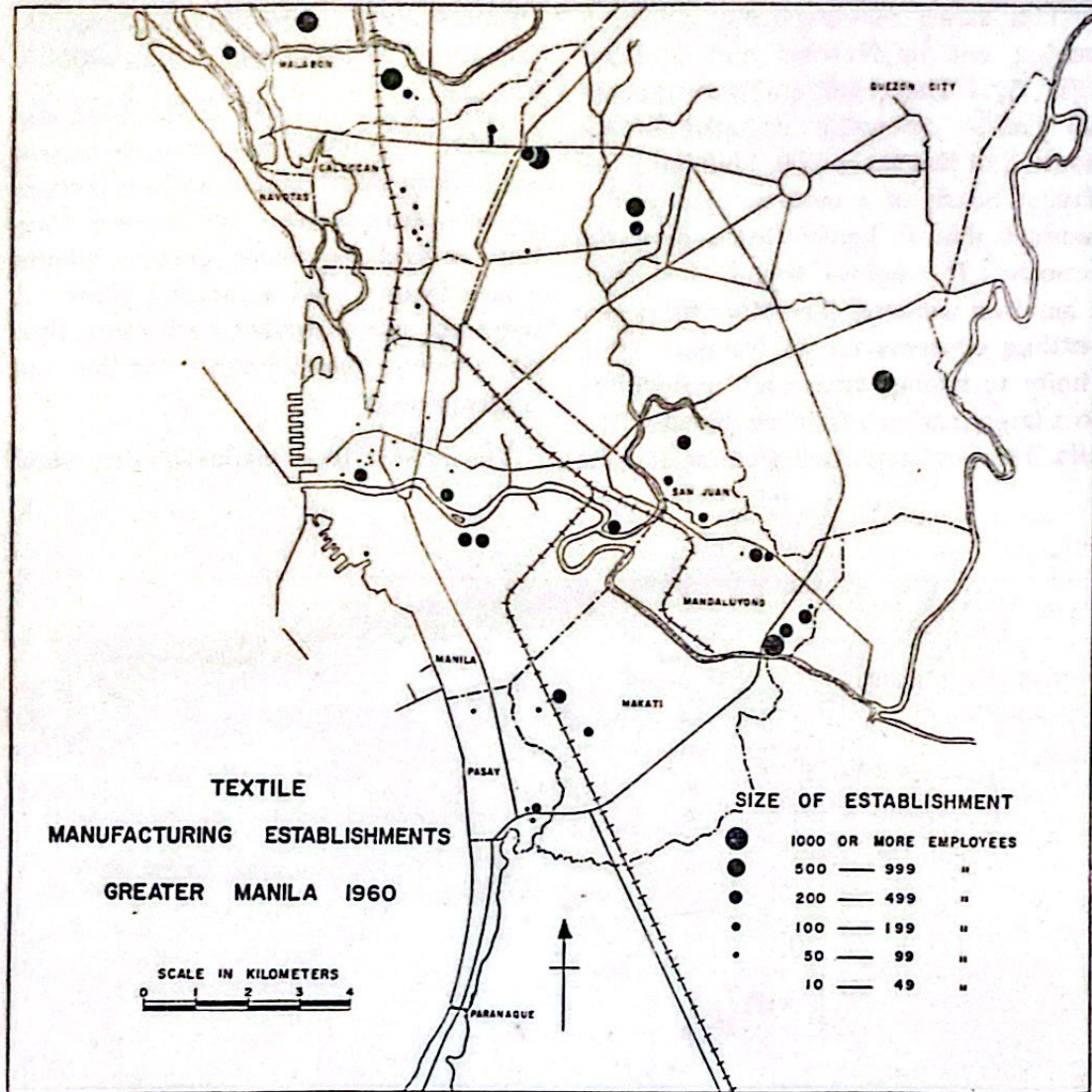


FIG. 3

centration of establishments. Although a majority of them are small, there are a few with 50 to 199 workers. Most of these establishments are shirt factories. There are also several shoe manufacturing concerns, two of which have 50 to 99 workers. Of these two, one, in addition to its plant, controls three sales offices in the central business district of Manila. The ubiquitous tailoring and dress shops are generally found near schools, colleges and universities as students form a sizeable portion of their clientele. The more exclusive dress shops are found in Ermita in

the southwestern section of Manila. Here are found a number of embassies and consulates as well as the hotel district, where tourists generally stay. This area used to be a high-quality residential neighborhood before the Pacific War.

A sprinkling of apparel and related manufacturing establishments is found in the other suburbs. Most of them are tailoring and dress shops and undergarment factories; several are shoe shops.

*Food and Kindred Products* — Perhaps one interesting feature of this particular major product group is the significance

of fish sauce manufacturing which is carried out in Navotas and Malabon (Fig. 5). The oldest and very successful family enterprise engaged in the bottling of fish sauce is in Malabon. Today, it boasts of a modern plant and a product that is known throughout the country. It employs slightly less than a hundred workers. The other fish sauce bottling concerns are in Navotas. Proximity to fishing areas and accessibility to a large market within the Greater Manila Area are important location factors.

Bakeries and confectionery factories are also found in these two communities.

In Caloocan, most of the food and kindred manufacturing establishments are bakery shops, candy and confectionery concerns, a ham and sausage factory, several soy sauce bottling plants, a lard factory, and a canning plant. A large-size establishment with more than 200 workers manufactures candies and confectioneries.

The largest food manufacturing plant

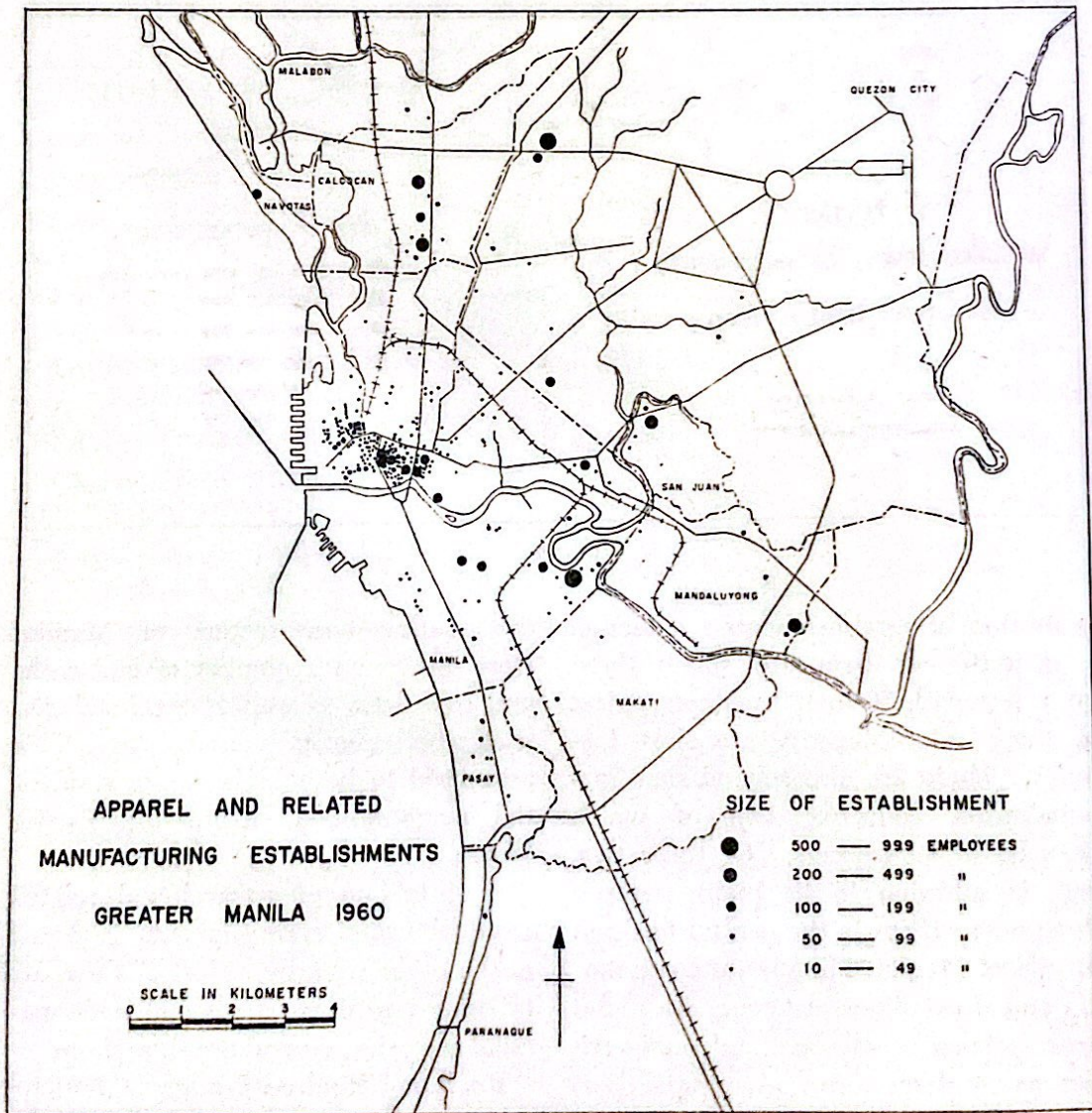


FIG. 4

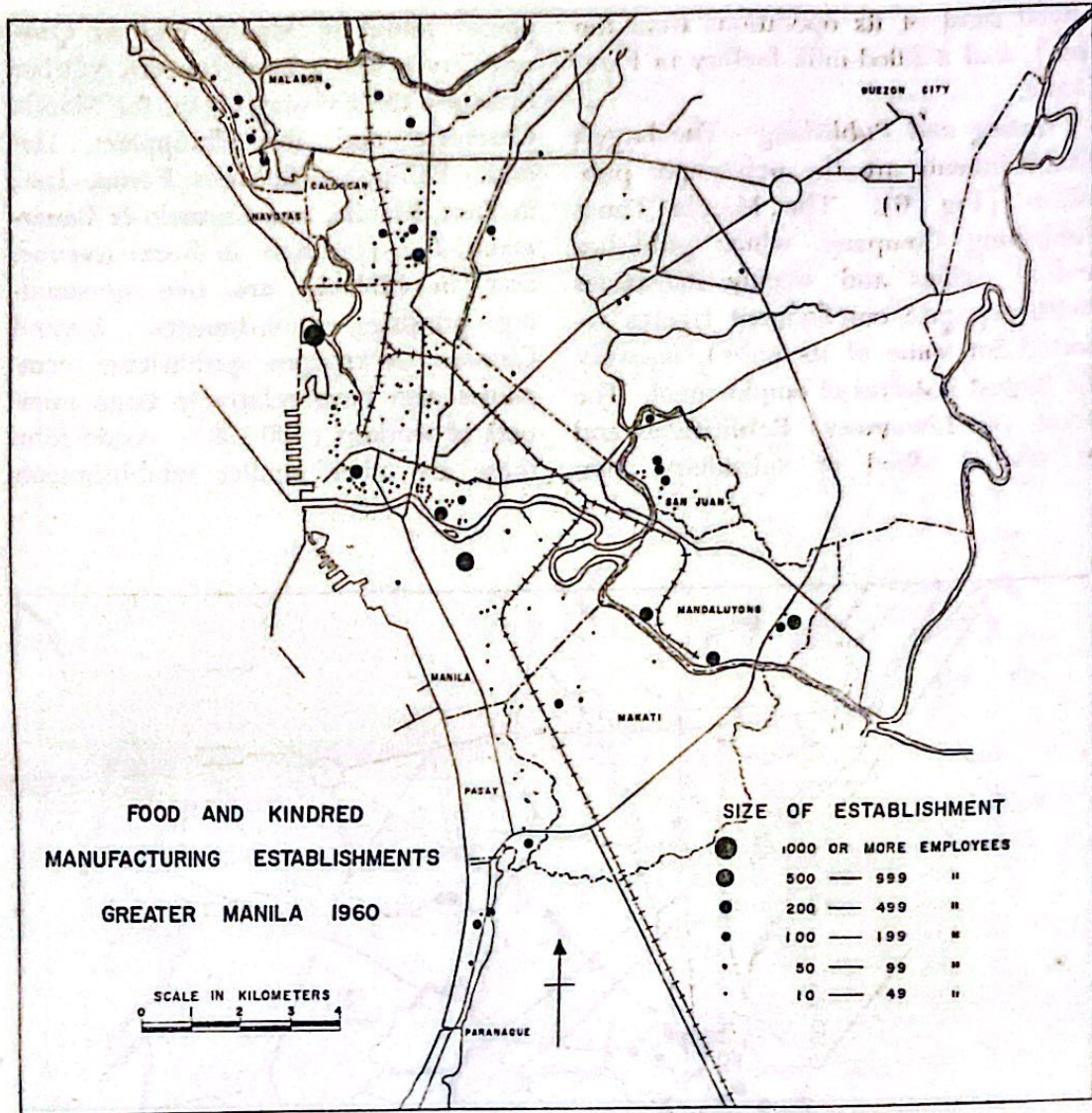


FIG. 5

is located in Tondo, Manila. It manufactures soap, detergents and related items, in addition to such food products as cooking oil, salad oil and margarine. Another factory, though slightly smaller in number of employees, is likewise engaged in producing similar products. An ice cream plant with more than 300 workers is also found in Manila. Most of the other establishments are bakeries, small ice cream plants, candy and confectionery concerns, noodle factories, and vegetable oil pro-

cessing concerns.

In Mandaluyong, there are three establishments with 200–499 workers: one is a sugar refining plant, another a flour mill and the third a filled-milk factory. Others are coffee and cocoa processing factories.

The rest of the establishments scattered in the other suburbs includes several poultry feed mills in Quezon City, three large bakeries in San Juan engaged in the manufacture of biscuits, a canning factory in Pasay (which has since

moved most of its operations from the area), and a filled-milk factory in Paranaque.

*Printing and Publishing* — The largest establishments are the newspaper publishers (Fig. 6). The Manila Times Publishing Company, which publishes several dailies and weekly magazines (with separate employment figures reported for some of its units), is easily the largest in terms of employment. The Roces (or Liwayway) Publications and its several allied or subsidiary com-

panies found in Manila and in Quezon City is also a large concern. Other firms are the Evening News, the Manila Chronicle and the Philippines Herald. Philippine Business Forms, Inc., in Paco, Manila, and Carmelo & Bauermann, Inc. (formerly in Recto Avenue, now in Makati) are two outstanding printing establishments. Several Chinese newspaper publishing companies also have relatively large numbers of workers (100-199). Aside from these are other smaller establishments

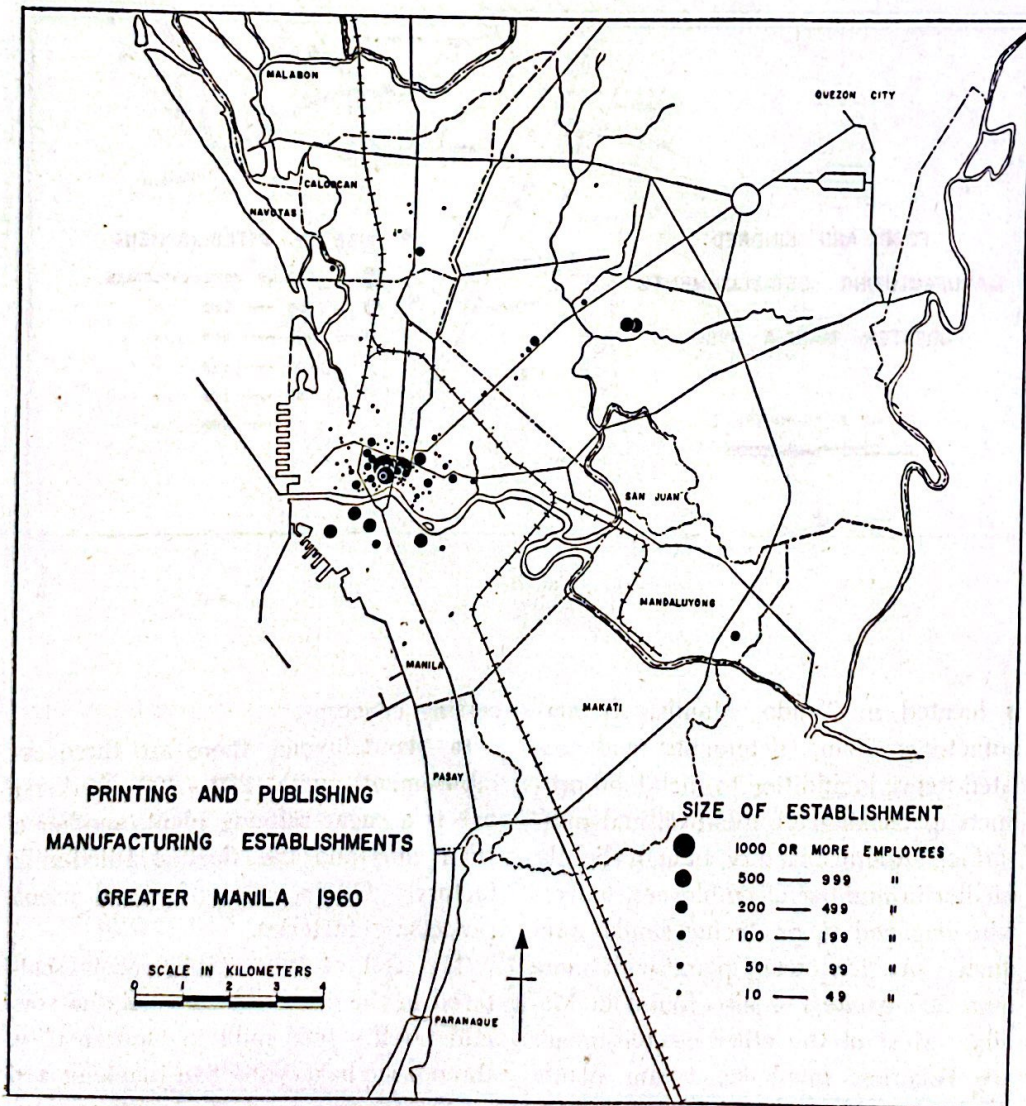


FIG. 6



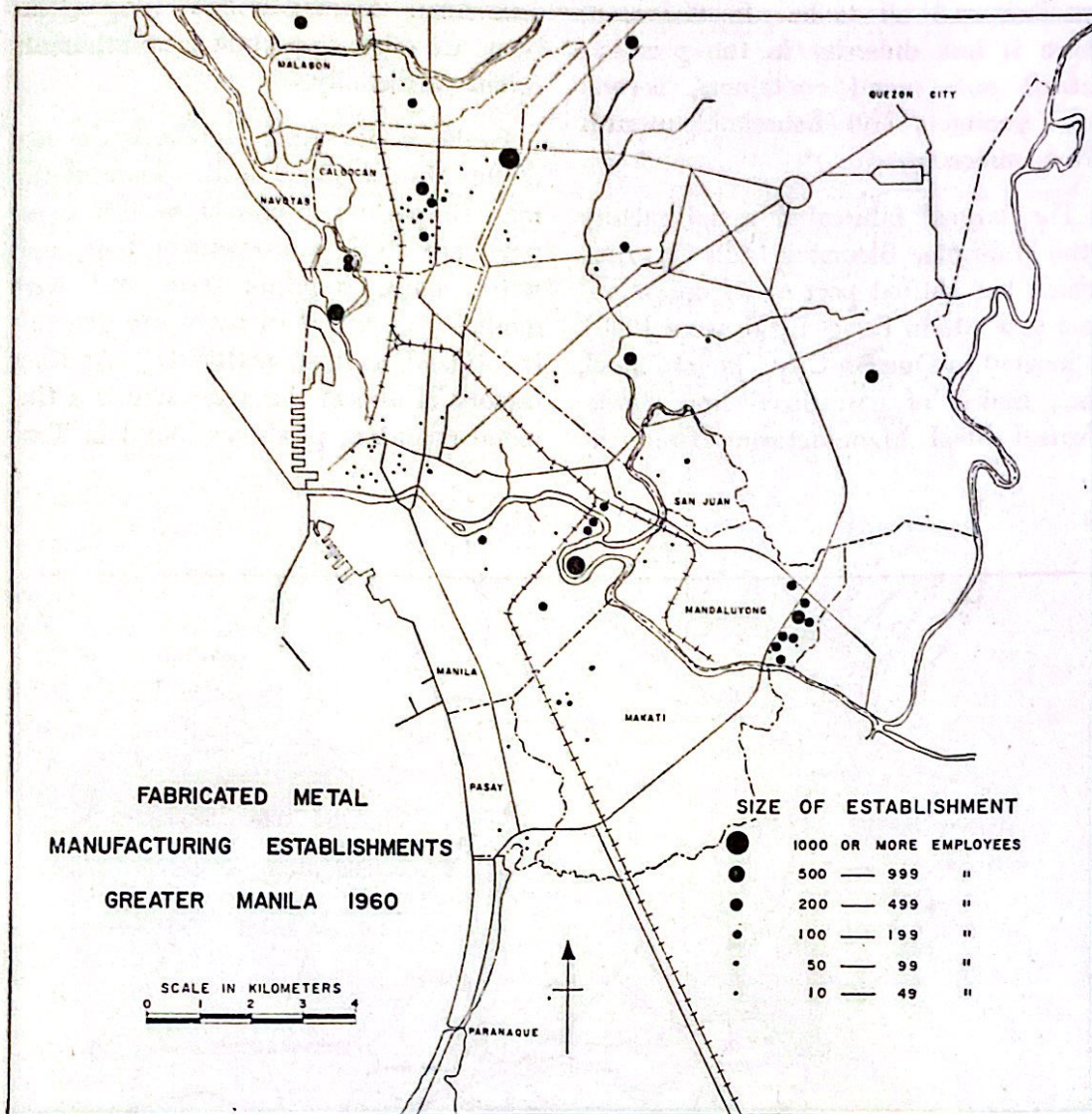


FIG. 7

engaged in the printing and the publishing of books, magazines, stationeries, calendars and related items. The major area of concentration is in Manila, especially in the Sta. Cruz district.

*Fabricated Metal Products* — Mandaluyong and Caloocan show a preponderance of firms belonging to this major product group (Fig. 7). Although there are not as many establishments found in Mandaluyong as in Caloocan, there are more medium-size factories in the former than in the latter. The factories in

Mandaluyong are laid out in an exclusive industrial area while those in Caloocan are in densely built-up areas, where industrial, commercial and residential land uses encroach upon each other.

The establishments found in Mandaluyong produce a variety of fabricated metal products. A concern manufacturing aluminum sheets, foils and extrusions is quite prominent. Other companies produce metal containers, roofing materials, steel building frames, and

gasoline and oil tanks. In Caloocan, there is less diversity in the products turned out: metal containers, certain steel products and household utensils are common.

The largest fabricated metal factory (the Philippine Blooming Mills Co., Inc., which has shifted part of its operations to a new site in Pasig, Rizal, since 1960) is located in Quezon City. Jacinto Steel, Inc., maker of galvanized iron sheets, Ysmael Steel Manufacturing Company

and Acme Steel Manufacturing Company are other important establishments found in the city.

Punta, in Sta. Ana, Manila, is the site of the Marcelo Steel Mill. Some of the more important products of this company are steel reinforcement bars, nail wires, nails, interlink wire and wire mesh. Iron and steel scrap are generally utilized as raw materials. Another factory of almost the same size is a tin-metal container producer found in Ton-

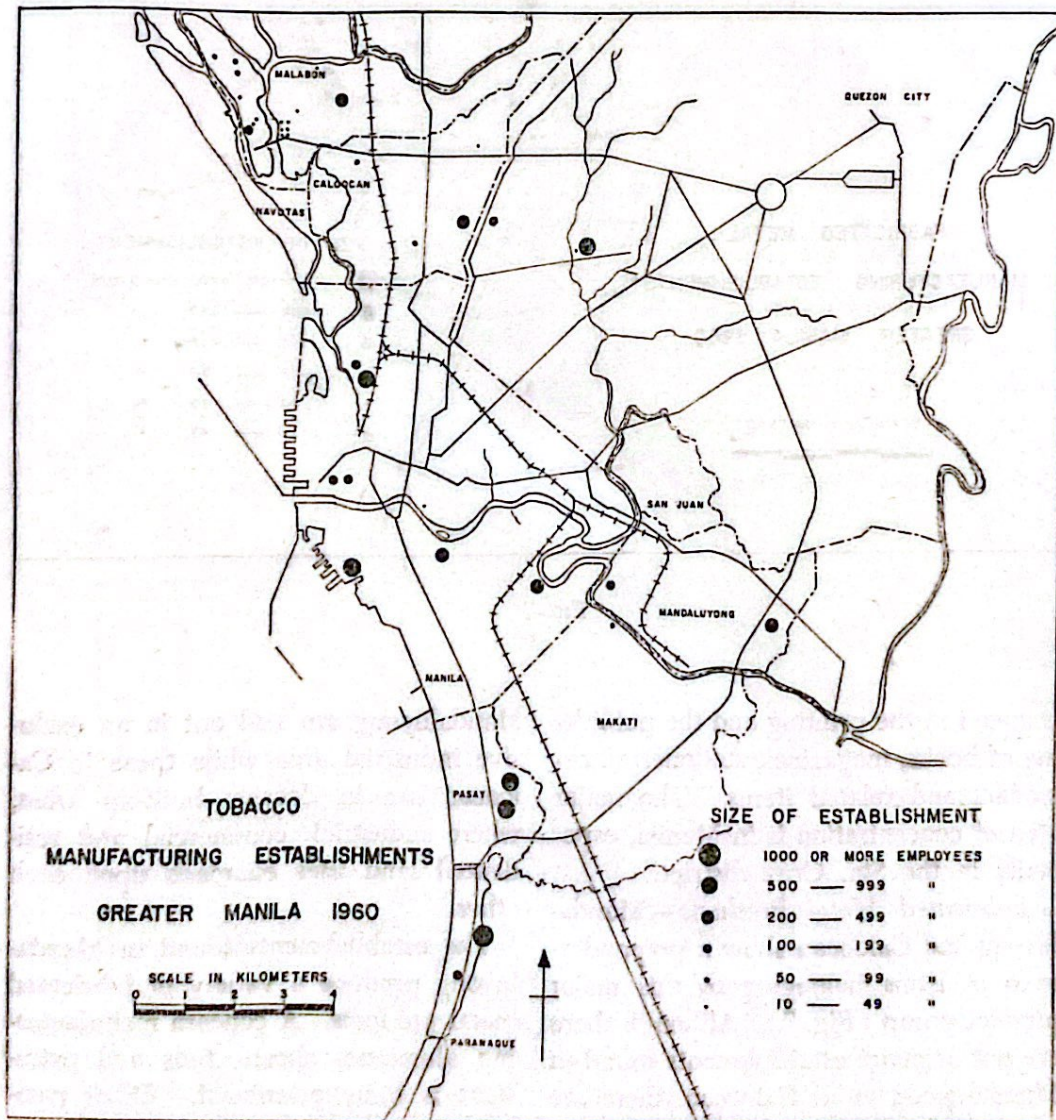


FIG. 8

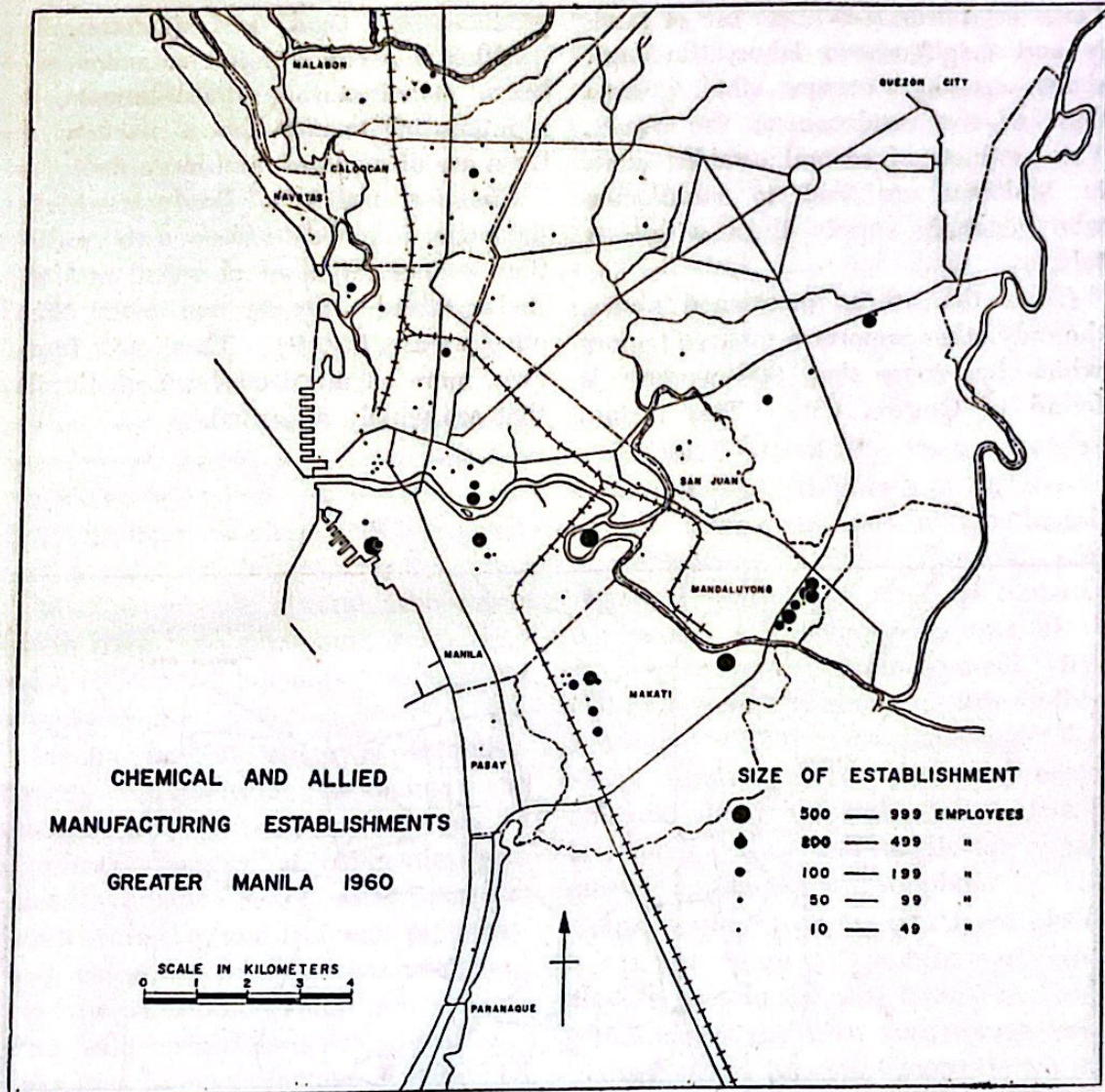


FIG. 9

do. The rest are smaller. In San Nicolas are found a number of foundry shops turning out wrought iron products.

The Pacific Manufacturing Engineering Company, found in the northern part of Malabon, is also a good-size factory with more than 200 workers. Others are considerably smaller. Except for Paranaque, the other suburban towns have several fabricated metal manufacturing establishments.

*Tobacco Products*—The largest tobacco factory is found in Paranaque,

which accounts for a large portion of the total employment (Fig. 8). Two establishments with 500-999 workers are found in Pasay.

Among the better known tobacco manufacturing companies are Alhambra and Tabacalera (Cia General de Tabacos de Filipinas) found in Tondo and Paco, both in Manila, respectively. A factory with almost 700 workers, in the South Harbor district, is relatively new.

Quite unique in development are the cigar tobacco shop houses in Malabon.

These establishments make use of family and neighborhood labor; the work shops usually occupy the ground floor of the residence of the owner. The products of several establishments in Malabon are sold to middlemen who generally supply them with raw tobacco.

Other than those mentioned above, the only other important tobacco factory which has more than 900 workers is found in Quezon City. This factory

produces both cigars and cigarettes.

Although there are not so many tobacco manufacturing establishments, it is interesting to note that a majority of them are of medium- and large-size.

*Chemical and Allied Products* – Mandaluyong and Makati show a more distinct concentration of chemical and allied establishments in one place than other areas (Fig. 9). There are, however, more chemical concerns in Manila that are widely dispersed.

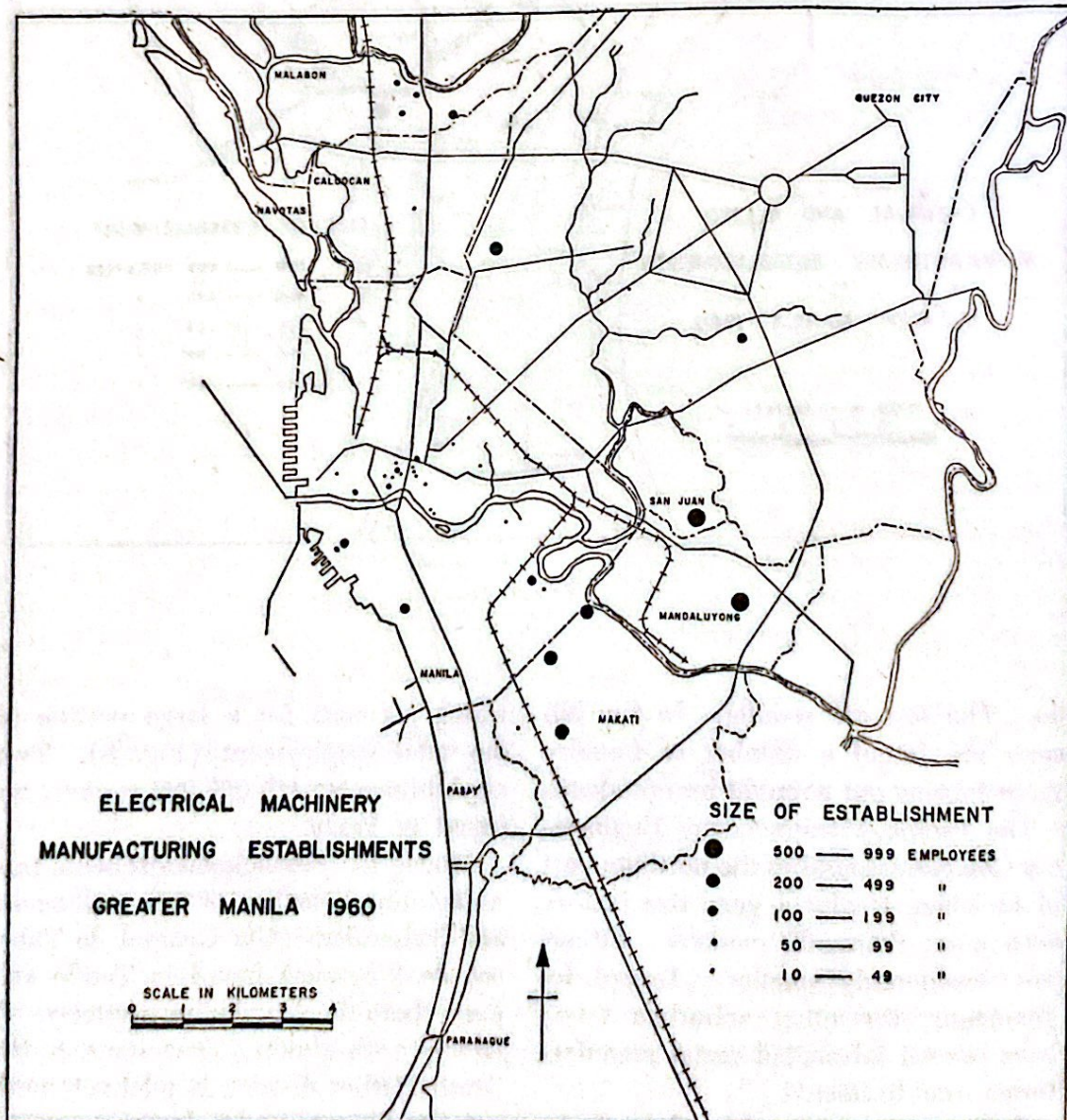


FIG. 10

In Mandaluyong, most of the establishments manufacture medicinal and pharmaceutical preparations. A concern which manufactures a variety of chemical products, such as calcium carbide, carbon and synthetic organic chemicals, and another which produces synthetic resins and related products are found in Mandaluyong's industrial area. They stand out among the common run of drug laboratories.

Factories which turn out pigments, dyes, colors, toners, paints and varnishes are found in Makati. A plant near the Pasig River, with close to 600 workers, makes toilet articles. Other important companies include several laboratories which have been producing drugs bearing prominent trademarks, known the country over.

Manila has its share of establishments manufacturing medicinal and pharmaceutical items. However, a significant number of companies produce synthetic resins and plastics, paints, varnishes and lacquers, pigments, dyes, colors, toners, soap, cosmetics and toilet preparations. There are two medium-scale establishments which specialize in the manufacture of liquefied gases as chlorine, oxygen and helium. One of them, however, has recently moved its place of operations to a new site in the suburbs. The Philippine Match factory in Santa Ana, which turns out safety matches popular throughout the country, is a company of note. It accounts for approximately two-thirds of all the workers engaged in the manufacture of matches throughout the country.

The chemical fertilizer factory in Malabon, located along the Polo River, is the most important within the Greater Manila Area. The noxious fumes coming from the plant, however, have been the cause of several complaints from re-

sidents in the town as well as in nearby Polo, Bulacan. The furor that has been raised recently brings to mind the significance of location-decision involving noxious factories, with special reference to residential sections.

Other suburban communities have for the most part the more common types belonging to this major product group. These are the drug laboratories, and the paint, varnish and lacquer factories.

*Electrical Machinery Products*—Manufacturing establishments of this major product group turn out an assortment of products (Fig. 10). These include electrical transmission and distribution equipment, motors and generators, electrical communications equipment, dry cell and storage batteries, electric bulbs, tubes and related items, radio and television receiving sets, tubes and components, and an assembly of electrical household, office and medicinal apparatuses, appliances and supplies.

Among the more important establishments, in terms of number of employees, are: in Manila—Ram Car, Inc., which makes dry cells and storage batteries; General Electric Company, which assembles electrical appliances, apparatus and supplies; Avegon, Inc., and Elizalde Trading Corporation, which produce radio and television receiving sets; in Quezon City—Carlson Electronics, whose major products are radios, electronic tubes and related items; and Refrigeration Industries, Inc., whose assembled electrical appliances and apparatus are becoming more and more important in the market; in Makati—Aircon, Inc., manufacturing air conditioning equipment; and the Philippine Electric Company (PEMCO), making electric bulbs, tubes and allied items known all over the Philippines; in Mandaluyong—Radiowealth, Inc., which is one of the

largest manufacturers of radio and television receiving sets and electronic tubes as well as related products; in San Juan — Radio Electric Headquarters (REHCO), also a large —concern, likewise making radio and television sets, tubes and other component parts; and in Malabon—Pacific Welding Company, which produces electric communications equipment.

Electrical machinery manufacturing establishments are scattered widely throughout the Greater Manila Area without any discernible concentration or special location requirements. Most of the companies are medium-size, with 50 to 999 employees.

*Rubber Products* — Establishments which manufacture rubber tires, inner tubes and related items, and those engaged in recapping, retreading and vulcanizing operations are classified under this major product group. In Malabon, the Marcelo Rubber Factory is outstanding. Products include tires and inner tubes, rubber footwear and rubber foam. In nearby Caloocan are the El Porvenir plant and the Jacinto Rubber factory. These two concerns, with more than 300 workers, each turn out similar rubber products such as shoes and boots. Other firms in Caloocan are smaller in size.

The Firestone, Goodrich and Good-year rubber manufacturing companies are located on the map in Makati, although not all of their operations are found there. The difficulty of separating available employment data made it necessary to adopt a certain degree of flexibility in plotting their locations as such on the map. These firms are branch companies of the three most important rubber producing establishments bearing the same names in the United States.

*Lumber* — Of the several firms classi-

fied under this group, the largest is the Insular Veneer mill in Santa Ana, Manila. It is credited with almost 1,400 workers. Several plywood and veneer plants with 50 to 500 employees are also found nearby. All of these establishments have used the Pasig River to advantage — i.e., as a cheap means of transporting bulky raw materials.

A number of establishments classified under this group are also found in the suburbs but the largest number is located in Manila. In addition to plywood and veneer products, other establishments in this group manufacture window and door sashes, frames, louvres and jalousies, wooden boxes, barrels, drums, buckets and crates. A few are plain sawmills while several are creosoting and wolmanizing plants. Establishments making cork products from imported raw materials, though not so many, provide variety in the kinds of articles produced.

*Beverages* — This group is the eleventh of the major products ones with a total employment of more than 5,000 for the Greater Manila Area as a whole. Classified under this group are establishments which produce distilled liquor, wine, malt liquor, soft drinks and carbonated beverages. Bottling, not involving the processing or manufacture of beverages, is classified under wholesale trade.

The San Miguel Brewery in San Miguel, Manila, is easily the most outstanding. Nearby is the Coca-Cola plant, which bottles not only "coke" but also a number of other types of soft drinks. It is a subsidiary company of the San Miguel Brewery. La Tondeña and Tanduay, manufacturers of distilled liquor, are within the general area where the San Miguel Brewery is located. Several medium-size distillery plants are also found in Binondo and San Nicolas, Manila.

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In Quezon City, the Pepsi-Cola plant along Aurora Boulevard is a keen competitor of Coca-Cola. Within the same compound is the Pepsi-Cola Far East Company, which is apparently organized for a different function. The Coca-Cola Export Corporation is also found in Quezon City, along E. de los Santos Avenue (Highway 54).

Other important soft drinks producers are the Canada Dry Bottling plant and the Bireley's California Orange factory in Parañaque. Both are medium-scale establishments.

The other product groups at present are less important than those discussed above. Several, however, are developing rapidly; perhaps, in subsequent studies, they may replace some of those which have been previously considered. These groups exhibit more or less similar locational characteristics as the other product groups.

#### MANUFACTURING BY POLITICAL UNITS

The order of importance of the product groups in the Greater Manila Area as a whole differs from each of the several political units (Table 3). None of the suburbs and Manila show the same emphasis in their manufacturing activities. Such differences are partly due to industrial location requirements and degree of development.

*Manila*—The focus of manufacturing in Manila is on apparel and related products, publishing and printing, food and kindred products, and lumber products. These industries employ 18.03, 14.42, 9.39 and 6.91 percent, respectively, of the 65,223 workers in manufacturing. Other manufacturing industries which have significant employment figures include textiles, 6.70 per cent; chemical and allied products, 5.86; electrical machinery products, 5.80; and

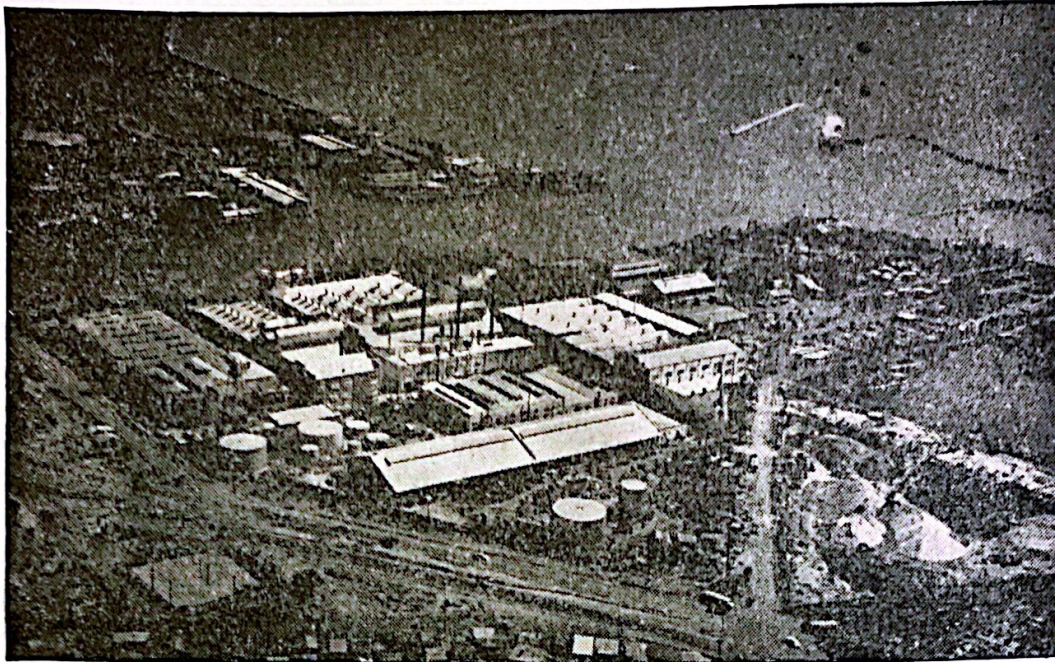
fabricated metal products, 5.78. All other categories of production are represented with smaller percentages, petroleum and coal having the least.

Manufacturing establishments are widely scattered throughout Manila. A fair concentration of industries is, however, found in Divisoria, including parts of the districts of Tondo, Binondo and Sta. Cruz, along the banks of the Pasig River in the districts of San Miguel, Paco and Sta. Ana, and in the South Port District.

As a whole, a significant portion of manufacturing in Manila is done in small-scale establishments which are largely concentrated in the congested districts of San Nicolas, Binondo, Tondo and Sta. Cruz, north of the Pasig River. Medium- and large-size establishments are more numerous along the banks of the Pasig River and in the districts south of the river.

*Quezon City*—The manufacture of textiles is the most important industry in Quezon City. This accounts for 26.08 per cent of the total manufacturing employment in the city. In actual number of workers, textile manufacturing in Quezon City employs more than does the same activity in Manila or in the other suburbs. The manufacture of fabricated metal products employs 12.34 per cent; apparel and related products, 8.40; beverages, 8.01; paper and paper products, 7.72; printing and publishing, 6.44; tobacco products, 6.18; and chemical and allied products, 5.67. Except for the manufacture of petroleum and coal products, all other categories of industrial production are represented by smaller percentages.

Medium- and large-size factories are located in the northwestern section of the city, in and around E. de los Santos Avenue and northward along A. Bonifacio Avenue. Establishments manu-



Portion of Port Area settled in by manufacturing establishments utilizing bulky raw materials. The San Miguel Brewery Glass Factory and a number of automobile assembly plants are located in the area.

facturing paper, paints and varnishes, concrete products, apparel, basic and fabricated metals are represented.

Other manufacturing establishments are extensively dispersed over other parts of the city. Several plants producing diversified items are found in Santa Mesa Heights. A large tobacco factory, a paper plant and a textile mill are located in San Francisco del Monte; a large bottling plant (Pepsi-Cola) in Aurora Boulevard, and a chemical plant in Santolan Road in Cubao; a large fabricated metal manufacturing establishment (Ysmael Steel) in España Extension in New Manila; another textile mill in Libis, Murphy; and several printing establishments along Quezon Boulevard Extension and A. Roces Avenue. Inadequate planning in the development and subdivision of land for different purposes in the city accounts for the dispersal of industries.

*Caloocan City*—The area of significant industrial concentration is located

in the central section through which the principal thoroughfare roughly divides the city into two. The northwestern and southwestern sectors of the city also exhibit a fair density of manufacturing concerns. Manufacturing is, however, more evenly distributed throughout the city compared with Manila or Quezon City.

Industrial firms which produce rubber products engage 13.70 percent of the total manufacturing employment in the city; food and kindred products, 13.20; fabricated metal products, 12.08; basic metal products, 10.36; and apparel and related products, 5.50. All other industrial activities are represented by smaller percentages, except the manufacture of petroleum and coal products. It is interesting to note that the first three industrial activities are almost of the same strength.

Many of the firms in Caloocan employ less than 100 workers. Establishments engaged in the manufacture of

TABLE 3  
MANUFACTURING EMPLOYMENT IN GREATER MANILA, 1960  
(By Type of Product and Political Unit)

Major Product Group	Manila	Quezon City	Caloocan	Mandaluyong	Makati	San Juan	Parañaque	Pasay	Navotas	Total Employment	
Food and Kindred Products (20)	6,125	878	1,478	932	1,159	451	575	487	250	252	12,587
Beverages (21)	2,685	1,359	233	—	286	—	12	476	56	—	5,107
Tobacco Products (22)	2,790	1,048	484	566	1,098	94	—	1,643	1,449	—	9,172
Textiles (23)	4,370	4,423	884	2,632	1,741	674	—	—	312	—	15,654
Apparel and Related Products (24)	11,759	1,425	617	644	210	178	371	53	214	107	15,578
Lumber Products (25)	4,508	381	216	81	26	3	43	—	34	89	5,381
Furniture and Fixture (26)	2,018	248	106	115	4	218	75	—	76	—	2,860
Paper and Allied Products (27)	1,019	1,309	182	274	232	63	273	—	87	—	3,439
Printing and Publishing (28)	9,409	1,092	299	100	8	—	8	—	19	81	11,016
Leather, Leather and Fur Products (29)	98	50	18	—	63	—	—	—	—	80	309
Rubber Products (30)	878	171	1,536	28	695	2,256	—	—	50	—	5,614
Chemical and Allied Products (31)	3,822	962	458	1,776	330	967	189	18	24	—	8,546
Petroleum and Coal Products (32)	14	—	—	—	27	—	—	—	—	—	41
Non-Metallic Products (33)	1,666	221	525	1,101	329	242	650	10	4	31	4,779
Basic Metal Products (34)	397	137	1,161	225	—	88	8	—	183	—	2,199
Fabricated Metal Products (35)	3,773	2,093	1,354	1,360	437	183	90	117	88	162	9,657
Machinery (except electrical) (36)	1,460	20	404	297	—	883	—	—	—	—	3,064
Electrical Machinery Products (37)	3,782	388	187	30	149	648	1,000	—	—	—	6,184
Transport Equipment (38)	3,532	310	377	356	—	110	63	3	16	103	4,870
Miscellaneous (39)	1,118	444	687	56	412	45	10	502	360	13	3,647
<b>T O T A L</b>	<b>65,223</b>	<b>16,959</b>	<b>11,206</b>	<b>10,573</b>	<b>7,206</b>	<b>7,047</b>	<b>4,041</b>	<b>3,309</b>	<b>3,222</b>	<b>918</b>	<b>129,704</b>

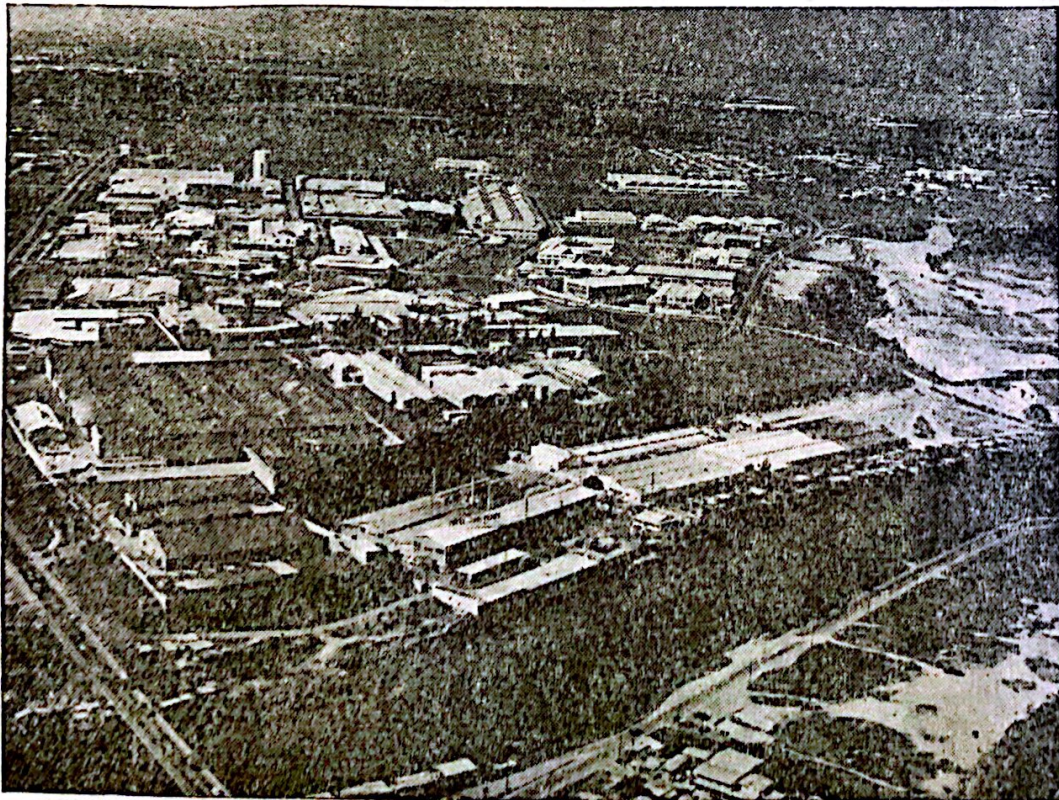
Source: Compiled from data furnished by the Economic Research Division, Central Bank of the Philippines.

fabricated metal products and basic metal products are nothing more than oversized blacksmith shops or small foundries.

*Mandaluyong*—The manufacture of textiles and related products is easily the outstanding industrial activity in Mandaluyong. This major product group accounts for 24.89 per cent of the 10,299 workers employed in manufacturing. The production of chemicals and allied products employs 16.79 per cent; fabricated metal products, 12.86; non-metallic products, 10.41; food and kindred products, 8.81; and apparel and related products, 6.09. Except for the manufacture of leather products, beverages, petroleum and coal products, all other types of industrial activities are represented.

Along the eastern side of E. de los Santos Avenue, close to the Pasig River, lies the major industrial center in Mandaluyong. This area is exclusively developed for industrial use although the term "industrial park" cannot be used to describe it. Other manufacturing establishments are far in between. A number of large firms processing bulky raw materials are located along the Pasig River and those employing less than 50 workers are generally located in residential neighborhoods.

*Malabon*—The textile industry leads all other major product groups, with 24.16 per cent of the total manufacturing employment in Malabon. Food and kindred industries rank next with 16.08 percent; tobacco, 15.24; rubber products, 9.64; fabricated metals, 6.06; che-



The manufacturing area in Mandaluyong. It is new and within good transportation routes like the Pasig River (foreground) and the Epifanio de los Santos Avenue (left). Manufacturing is diversified.

mical and allied products, 4.60; and non-metallic products, also 4.60. Aside from the production of basic metal, machinery, and electrical supplies and appliances, other types of industries are represented but not well developed.

Industrial development is fairly concentrated in the Northern Hills region in the north central section of the town. Factories found within this area turn out an assortment of products such as different rubber products, chemical and allied products, electrical machinery and related items, carbonated beverages, textiles and non-metallic products. Factories vary in size from small to large.

Small factories and shop houses are generally found in the western sections of the town. The manufacture of tobacco products is carried out mostly in small shop houses, utilizing local labor. Most of the food and kindred industrial establishments are likewise small.

Rizal Avenue Extension, the major route in Malabon, is also the location of a number of factories. Most of them are small. The few medium-scale factories have plans to relocate themselves in Baesa, in the northern section of Quezon City, where land is still available for industrial development.

*Makati* — The fabrication in part and distribution of rubber products, with 32.01 per cent of the manufacturing employment in Makati, overshadow other categories of industrial activity. Establishments manufacturing chemical and allied products employ 13.72 per cent; machinery (except electrical), 12.53; electrical machinery, supplies and appliances, 9.20; textiles and related products, 8.77; and food and kindred products, 6.40. In 1960, the beverage (a firm which manufactures distilled liquor is located in the area since 1962), printing and publishing, leather, petroleum

and coal industries were not represented.

Although factories are characteristically scattered throughout the area, increasing industrial concentration is evident along the principal thoroughfares. This is particularly so along Pasong Tamo Extension and Buendia Avenue. The development of high-quality residential subdivisions nearby (actually the homes of many of the executives of the firms in this area) may, however, limit the type and expansion of industrial land use in the future.

*Other Areas* — In Parañaque, only nine of the twenty major product groups are represented. The manufacture of tobacco, which employs about one-half of the total manufacturing employment, is practically concentrated in one establishment which has more than 1,500 workers. Only one other firm with 120 workers is engaged in the production of tobacco products. The preparation of food and kindred products and the bottling of soft drinks are also well established. All of the factories are located along Quirino Avenue, the major thoroughfare.

The manufacture of tobacco is the leading activity in Pasay. In 1960, two large industrial firms accounted for all the 1,450 workers employed in tobacco production. Other types of industries which are fairly developed include textile, food and apparel. Factories are widely dispersed; some are located near business sections while others are found in residential neighborhoods.

In San Juan, the focus of manufacturing is on the assembly of electrical supplies and appliances, textiles, non-metallic products, and food and kindred products. These four manufacturing groups have more than 70 per cent of the total manufacturing employment. The entire employment in the assembly of electrical supplies and appliances is in one large establishment. Of the 44 other indus-

trial concerns with 10 or more workers, only 12 employ 100 workers or more. Location along the town's principal thoroughfares and residential neighborhoods is common.

Navotas has the least number of workers in manufacturing. The preparation of fish sauce, the repair of fishing and small inter-island boats, and the manufacture of tin cans, and lithography are the more important industries. Small boat repair yards are located along the Navotas River, a stream of moderate depth which empties into the Manila Bay. Factories which process fish for the preparation of fish sauce are, likewise, located close to the river or the bay.

#### INDUSTRIAL LAND USE PLANNING

The development of planned industrial areas or districts is becoming the accepted method of opening up land for industrial use, as facilities can be better provided for such than in cases of dispersed, non-contiguous locations. Just as entire residential communities are planned and built as integrated development, so must land for projected industrial use be carefully laid out.

The most important locational requirement for industrial areas, as gathered from the present study, invariably is accessibility to transportation facilities. Such may include all or just one of the following: roads, railroad and deep water channels. Nearness to the port area is also important and direct access to the airport may likewise prove to be of value to certain types of industries. Although not so many of the establishments interviewed, or those that answered the mailed questionnaires, recognized the importance of locational proximity of the labor force to residential areas, this factor should not be over-

looked. The changes in industrial methods and techniques of production, which require the use of one-story buildings and space for storage, loading and parking, will mean larger sites. The area requirements, however, will depend on the type of manufacturing, i.e., whether it is intensive or extensive, light or heavy, and on the economic or financial capability of each establishment. In addition, a site must be reasonably level, or if not, it should be one which can be graded at a reasonable expense. Other locational requirements include availability of utilities at or near the projected site, such as power, water and waste disposal facilities, and the creation of amenable surroundings.

Before the development of any industrial area is undertaken, a survey must be made in which all land areas suitable for industrial use must be included. Aside from the locational requirements noted above certain aims and goals should be borne in mind. These are: (1) the needs of all types of manufacturing rather than any particular group; and (2) the requirements of modest-size establishments as there are no giant companies in the Greater Manila Area.

Although each city or town within the Greater Manila Area is free to design or formulate its own zoning system and regulations, there must be a general plan for the area as a whole. The various communities must recognize that their economic, or more specifically industrial, development cannot be separated from one another, for it is an industrial economy that is regional rather than local in character. It must be realized that industrial development in any one of the communities is likely to benefit the whole region. With the increasing need of additional land for industrial use, the continued economic



development of the Greater Manila Area will depend on the availability of good industrial sites in the suburbs as well as in Manila.

There is also need for the revision of existing zoning laws in the light of modern manufacturing requirements. For those communities without zoning regulations, there is pressing need to adopt one. Promptness in making the needed revisions, or in adoption of zoning regulations, is essential. All the communities should take notice of the rapid housing and commercial developments going on, which are encroaching upon suitable industrial areas.

The need for a cooperative economic plan for all the localities within the Greater Manila Area as well as neighboring communities should be properly considered. To this end, it is hoped that a metropolitan planning agency will be created, to be charged not only with the planning of industrial land uses but also of commercial, residential transportation, and recreational land developments.

#### CONCLUSION

Many of the manufacturing establishments in the Greater Manila Area utilize imported raw materials and manufactured goods. Among these are textile mills; motor vehicle, machinery, electrical appliance and apparatus assembly plants; flour mills; chemical and pharmaceutical laboratories; paper mills; and fabricated metal factories. The location and distribution of these establishments in the region is due to a large measure to the development of Manila as the principal port of entry for imported materials. Manila and the suburbs also provide a large market, in addition to the availability of power, skilled labor, credit facilities, industrial

sites and other resources required in the development and expansion of manufacturing.

Specific factors of location for each major product group are not as distinct as those for establishments with approximately the same number of employees, regardless of the type of manufacturing activity. A small establishment (less than 50 employees) does not require the same location as a large establishment (e.g., one with 500 employees or more, although both belong to the same major product group. This difference in location requirement is due to varying economic capabilities. The large establishment can afford to have its several components located at different places while the small establishment must have all of its parts in one site.

A large number of the more recently organized manufacturing establishments (1955 onwards) with 100 employees or more are located in the suburbs, except those in Navotas, Caloocan and Pasay. This trend is closely related to the other types of land use developments. The availability of industrial sites at lower prices, compared with Manila or the more densely settled suburbs, is an important factor of location. The presence of few establishments, especially bakeries and tailoring and dress shops, with less than 50 employees is also indicative of the less intensively developed and relatively new residential neighborhoods in the suburbs.

The emergence of several planned industrial districts is a move apparently designed to attain a higher degree of efficiency in industrial land development, and in the utilization of facilities. Nevertheless, many an industrial plant are still found to be interspersed with other land uses.

Hence, a re-evaluation of existing zon-

ing laws and regulations of the several communities of the Greater Manila Area is in order. A zoning system is the basic guide in industrial planning. Planning should be done on a regional basis. The planning groups should get together as often as needed to correlate their plans for joint action. Industrial development,

however, should be planned along with other land uses, as the compatibility of one type of development with another is necessary.

\* \* \*

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## THE SUGAR INDUSTRY OF THE PHILIPPINES

ALEJANDRO R. APACIBLE

### THE SIGNIFICANCE OF THE SUGAR INDUSTRY

THE Philippines ranks seventh in world sugar production. And of its agricultural products, sugar impressively tops the list as major dollar earner of the country. In the 1962-63 crop year alone it produced 1,713,905 short tons worth ₱802 million.

The industry is a national endeavor that rests on no less than 20,000 Filipino sugar cane farmers, whose average landholding does not exceed 10 hectares.

Sugar means life to many Filipinos and to the Philippines itself. It is not only a leading foreign exchange earner but also a source of livelihood to millions of people. Some 218,000 workers are directly and fully employed by the industry. About 47,000 more are seasonally employed. Their earnings support more than a million dependents.

It is an industry that has paid the government the most taxes, direct or indirect. In 1957 alone, it paid a total of ₱71.33 million in taxes. Of this amount, ₱20.18 million was paid in the

form of direct taxes; ₱51.15 million as indirect taxes.

The service industries directly involved in the sugar industry employ more than 3 million others. Thousands more are engaged in the marketing and distribution of sugar allocated for local consumption.

### PAST DEVELOPMENT

It is believed that sugar cane was introduced to the Philippines through Java. In 1521 Magellan's historian, Pigafetta, wrote that the Spaniards found sugar cane extensively planted in the Philippines, and that there was a considerable production of low grade sugar. For two and a half centuries, the Spanish Government gave the industry the least attention, if any. Exports to the Pacific Coast of America were on record from about 1800. The United States in 1795 credited the Philippines with 134,645 kilos of sugar. In 1828 the Philippines sent seed pieces to Havana, and in 1848 the exports reached 23,000 tons.

During the last 40 years of the Spanish regime, sugar constituted from 22 to 58 per cent of the total value of all exports. Philippine sugar at that time was able to compete in the world's free market because it was produced under a family-type economy of self-sufficiency. From 1880 to 1899, Philippine sugar exports to the United States averaged approximately 200,000 short tons a year, or 58 per cent of Philippine sugar exports. Since that time to this date the United States has been the

principal market for Philippine sugar.<sup>1</sup>

The establishment in 1909 of free trade between the United States and the Philippines, otherwise known as the Payne-Aldrich Bill Tariff Law, allowed the free entry of Philippine sugar to the United States. This, however, limited the exportation to 300,000 short tons. In 1913, another incentive was given to the industry when the Underwood-

<sup>1</sup> Report of the National Federation of Sugarcane Planters and the Philippine Sugar Association, March 1960.

TABLE 1

PHILIPPINE EXPORTS OF SUGAR TO THE UNITED STATES AND ALL COUNTRIES,  
AVERAGE 1900-09, 1920-29 AND 1930-41, 1947-61.

YEAR	TO ALL COUNTRIES			TO THE U.S.A.		
	QUANTITY <sup>1</sup>	VALUE <sup>2</sup>	% OF TOTAL VALUE OF TOTAL EXPORTS	QUANTITY <sup>1</sup>	VALUE <sup>2</sup>	% OF TOTAL VALUE OF SUGAR EXPORTS
1900-09	193,295	10,938	13	23,393	1,013	23
1910-19	208,515	3,985	19	103,783	6,444	56
1920-29	433,930	40,593	30	356,948	36,041	87
1930-	43,980	52,240	39	737,195	52,038	99
1931	752,932	49,926	48	752,284	49,944	99
1932	1,016,568	59,801	62	1,016,266	59,792	99
1933	1,078,653	64,333	61	1,078,595	64,328	99
1934	1,152,841	65,454	59	1,152,679	65,444	99
1935	516,233	32,990	35	515,377	32,949	99
1936	899,838	61,937	45	899,615	61,927	99
1937	871,045	57,706	38	868,088	57,610	99
1938	868,253	50,022	43	867,938	50,002	99
1939	874,728	49,673	32	874,728	49,673	100
1940	976,474	47,243	30	976,472	47,243	100
1941	576,185	28,615	18	576,185	28,615	100
1947	18,850	2,041	1	18,850	2,041	100
1948	258,249	22,162	7	216,770	21,092	100
1949	414,983	45,232	18	414,983	45,232	100
1950	420,475	45,906	14	415,048	45,310	100
1951	567,004	64,248	15	555,640	63,218	95
1952	793,357	89,881	26	793,357	89,881	95
1953	782,781	105,624	24	782,781	95,778	99
1954	869,403	95,778	26	852,446	103,752	99
1955	926,796	106,295	27	909,437	104,476	99
1956	893,596	100,609	22	844,657	95,813	98
1957	709,112	82,802	19	659,090	77,581	98
1958	969,599	115,533	23	922,708	111,951	98
1959	933,762	112,636	21	907,942	110,978	94
1960	1,089,847	133,484	24	1,022,664	128,826	97

<sup>1</sup> Metric tons.

<sup>2</sup> F.O.B. value in \$1,000.

SOURCES: Handbook of the Sugar and Other Industries in the Philippines, Sugar News Press, Inc.  
Central Bank Statistical Bulletin, Vol. XIII, No. 3.  
Central Bank News Digest, Vol. XIV, Nos. 1, 6 and 9.

Simons Bill abolished the limitation. This legislation gave way to the modernization of the sugar industry, resulting in the gradual replacement of native mills by centrals producing centrifugal sugar.

The first centrifugal mill was constructed 1910 in the town of San Jose, Mindoro. Operations started in 1911 with a daily capacity of 1,000 tons of cane. In 1912, Hawaiian capitalists constructed the first cooperative mill in San Carlos, Negros Occidental. Under this system, the central shared in the sugar produced in accordance with the terms and conditions agreed on by the milling company and the planter. The central provides the transportation for hauling the canes from the plantation to the mill. On the other hand, the planters obligated themselves to plant a certain area of their farms, harvest the canes and haul them to the central's loading station. Generally, railroads were installed by the milling companies, although canes in areas which could not be reached by railroad were hauled to the mill by trucks. The venture proved satisfactory and stimulated the construction of more centrals in Luzon as well as in the Visayas, particularly in Cebu, Leyte, Panay and Negros. By 1920, there were nineteen operating sugar centrals which increased to forty-four by 1930, and eventually to forty-five, when the record Philippine crop of 1,565,405 short tons was produced in 1934. The passage of the Jones-Costigan Act of 1934 limited the tax-free entry of Philippine sugar to the United States. During 1913-34, the production increased steadily from 260,622 to 1,565,405 short tons raw value, and represented 15 to 59 per cent, respectively, of the total value of Philippine exports.

The following is a chronological list of centrifugal mills established from

1911-30 in the Philippines:

<i>Date Established</i>	<i>Centrals</i>
1911	In Mindoro: Philippine Milling Company
1912	In Negros: San Isidro (De la Rama) (no longer in operation) Sta. Aniceta (De la Rama) (no longer in operation)
1914	In Luzon: Calamba Sugar Estate Central Azucarera de Calatagan (no longer in operation) Philippine Sugar Estates Dev. Co., Ltd. (no longer in operation)
	In Negros: San Carlos Milling Co., Inc.
1915	In Negros: Kabankalan Sugar Co., Inc. (Consolidated with Binalbagan Estate, Inc. in 1948)
1915	In Negros: Central Palma (Consolidated with Binalbagan Estate, Inc. in 1948)
1917	In Negros: Central San Isidro (Consolidated with Victorias Milling Co., Inc. 1947)
1918	In Negros: North Negros Sugar Co., Inc. (Consolidated with Victorias Milling Co., Inc. in 1947)
1919	In Luzon: Pampanga Sugar Mills
	In Negros: Central Azucarera de Bais Isabela Sugar Co., Inc. (Consolidated with Binalbagan Estate Inc., in 1948)
1920	In Negros: Bacolod Murcia Milling Co., Inc. La Carlota Sugar Central Ma-ao Sugar Central Co., Inc.

- Victorias Milling Co., Inc.  
(Consolidated with North  
Negros Sugar Co., Inc.)  
Hawaiian-Philippine Co.
- 1921 In Luzon  
Central Azucarera de Don  
Pedro<sup>2</sup>  
Mabalacat Sugar Dev. Co.,  
Inc. (no longer in operation)  
Pampanga Dev. Co., Inc.
- In Negros  
Binalbagan Estate, Inc.  
(Consolidated into the Binal-  
bagan Isabela Sugar Co., Inc.  
in 1948)  
Talisay-Silay Milling Co., Inc.
- In Panay  
Asturias Sugar Central
- 1924 In Panay:  
Pilar Sugar Central
- 1925 In Luzon:  
Hind Sugar Co.  
Luzon Sugar Company  
(no longer in operation)
- 1927 In Luzon:  
Bataan Sugar Co. (no longer  
in operation)  
Central Luzon Milling Co.,  
Inc. (no longer in operation)  
Nueva Ecija Sugar Mill Co.,  
Inc.
- In Negros:  
Central Azucarera del Danao  
Lopez Sugar Central Mill  
Co., Inc.
- 1928 In Luzon:  
Central Azucarera de Tarlac  
Mt. Arayat Sugar Co. (no  
longer in operation)
- In Panay:  
Central Sara-Ajuy (no longer  
in operation)
- 1929 In Luzon:  
Paniqui Sugar Mills, Inc.
- In Panay:  
Central Santos-Lopez
- In Cebu:  
Bogo-Medellin Milling Co.,  
Inc.
- In Leyte:  
Ormoc-Rosario
- 1930 In Luzon:  
Central Azucarera del Norte
- In Negros:  
Central Leonor (no longer in  
operation)
- In Panay:  
Central Lourdes (no longer  
in operation)  
Philippine Starch and Sugar  
Co. (no longer in operation)

<sup>2</sup> The first small central in Nasugbu erected by Vda. de Pedro P. Roxas y Herederos de A. R. Roxas, and dismantled in 1927, when the present plant was being built by the Mirless-Watson Co., Ltd. of Glasgow, Scotland. No new central has been erected since 1930.

The creation of the quota system in 1934 took away the incentive to increase production, such that in 1935 total production was only 695,133 short tons. However, production increased in 1941 to 1,147,149 short tons. The 1942 crop was caught by the second World War. Before the outbreak of the war, sugar represented 61 per cent of the total value of Philippine exports. The upward trend of sugar production suffered a death blow during the Japanese occupation. Fearful that whatever sugar produced would be confiscated by enemy troops for their own use, capitalists and farmers abandoned the cane fields and turned to other agricultural industries for their livelihood. Thus, the sugar industry was at a standstill from 1942 to 1945 — the years of enemy occupation. Some sugar lands were used by the Japanese for growing cotton to supply their textile mills. During the early part of the occupation many centrals were looted of their equipment, and their buildings were taken over and used as Japanese head-

TABLE 2

PHILIPPINE CENTRIFUGAL SUGAR PRODUCTION  
1912-13 to 1962-63

No.	CROP YEAR	No. OF MILLS	AREA CROPPED HECTARES	PICULS PER HECTARE	PRODUCTION SHORT TONS
1	1912-13	1			260,622.00
2	1913-14	5			232,001.00
3	1914-15	8			372,017.00
4	1915-16	9			226,974.00
5	1916-17	9			242,211.00
6	1917-18	10			218,724.00
7	1918-19	10			234,457.00
8	1919-20	16			286,344.00
9	1920-21	19			389,530.00
10	1921-22	22			257,681.78
11	1922-23	27			254,897.86
12	1923-24	27			353,438.16 (1)
13	1924-25	28			558,052.14
14	1925-26	30			413,438.37 (2)
15	1926-27	34			598,915.51
16	1927-28	36		66.99	643,510.53
17	1928-29	39		70.60	771,824.34
18	1929-30	44°		68.43	866,501.18
19	1930-31	46°		69.70	575,312.53
20	1931-32	46°		81.94	1,101,823.20
21	1932-33	46°		84.88	1,410,498.82
22	1933-34	45°		79.92	1,565,405.00
23	1934-35	46°		47.58	695,133.87 (3)
24	1935-36	47°		55.99	982,209.24
25	1936-37	47°		62.51	1,117,827.42
26	1937-38	47°	249,265.00	66.36	1,054,610.28
27	1938-39	44°			983,569.38
28	1939-40	43°			1,072,550.15
29	1940-41	42°			1,147,149.01
30	1941-42	29 )			332,589.00 (4)
31	1942-43	)			
32	1943-44	)			
33	1944-45	)			
34	1945-46	6			12,913.55
35	1946-47	17			84,580.76
36	1947-48	23	71,575.00	79.79	398,113.10
37	1948-49	27	116,994.00	89.37	729,364.83
38	1949-50	28	129,118.00	73.39	683,912.83
39	1950-51	27	154,607.00	86.52	935,220.13
40	1951-52	28	188,503.29	81.92	1,076,592.91
41	1952-53	25	209,264.59	77.72	1,133,904.18
42	1953-54	25	220,595.53	93.27	1,434,281.37
43	1954-55	25	218,442.67	90.07	1,371,406.77
44	1955-56	25	188,015.37	92.96	1,218,530.81
45	1956-57	25	178,005.96	92.12	1,142,959.63
46	1957-58	25	183,700.00	107.62	1,377,847.01
47	1958-59	25	195,691.00	111.93	1,512,173.05
48	1959-60	25	204,122.22	107.47	1,529,273.97
49	1960-61	24	208,750.69	100.42	1,461,451.11
50	1961-62	26	224,398.72	103.44	1,618,388.00
51	1962-63	25	238,219.63	104.79	1,713,904.93

- (1) Production up to this year includes moscovado sugar.  
 (2) Crop failure.  
 (3) Beginning of limitation and quota.  
 (4) Incomplete.  
 \* Includes U. P.

Note: Data in this table were taken from:  
 Philippine Sugar Association  
 Sugar News  
 Sugar Handbook, 1953 & 1961  
 Philippine Sugar Yearbook

quarters, and in some cases, for war purposes. When the Americans came to reoccupy the islands, the centrals utilized by the Japanese were bombed. A number were heavily damaged, and the rest was completely destroyed.

POST-WAR CHANGES IN THE INDUSTRY

After the Japanese occupation the sugar producers started to rehabilitate the industry in the face of a great demand for sugar in the local as well as in the American market. The government also helped in rehabilitation efforts as a way to strengthen her economy. The close Philippine-American trade relations at the time accelerated the comeback of the industry. Production, slowly but steadily, rose as the years went on. The first post-war production was 12,913.55 short tons, milled from the crop of 1945-46 by six centrals, all in Luzon. Many centrals could not operate as the rails and ties were looted. In most districts planting materials were also very scarce and in some, sugar cane had almost disappeared. The centrals in Negros and other Visayan mills were more badly damaged than those in Luzon.

In the crop year 1946-47, there were

17 operating mills; 1947-48, 23 mills; 1948-49, 27 mills; 1949-50, 24 mills; and 1962-63, 25 mills.

The rise in production was rapid in spite of the serious setbacks suffered by the industry. Out of 41 pre-war centrals, only 25 are operating at present.

Typhoons and other calamities like drought wrought much havoc on crops. There is however one consolation for the sugar industry: that while the area planted to sugar cane has not increased substantially (in fact it has decreased) production has gone up considerably, both in tons cane per hectare and piculs sugar per ton cane. The area reported as covered by sugar cane in 1962-63 is 237,975 hectares — the biggest area so far planted to sugar cane after World War II — with a production of 1,738,646 short tons sugar or an equivalent of 104.79 piculs per hectare; as compared to the crop year 1937-38, with an area of 249,265 hectares and a production of 1,054,610 short tons sugar, an average of 66.36 piculs sugar per hectare. Expressed another way it attained an increase of 38.45 piculs over a span of 25 years, an average increase of more than 1.5 piculs per hectare a year.

CROP SHARING BETWEEN THE PLANTERS AND MILLS °

In the absence of a milling agreement between the mill and a majority of the planters, the sharing of sugar and its by-products shall be as follows:

Group	Production in Piculs	Percent Share of Centrals	Percent Share of Planters
I	0 to 149,999	unspecified	unspecified
II	150,000 to 400,000	40.00	60.00
III	400,001 to 600,000	37.50	62.50
IV	600,001 to 900,000	35.00	65.00
V	900,001 to 1,200,000	32.50	67.50
VI	over 1,200,000	30.00	70.00

° Republic Act No. 809

The crop sharing in effect between the planters and mills in the various districts, as compiled by the Sugar Quota Administration, is as follows:

Mill District	Crop Planters %	Sharing Mill	Remarks
<i>Luzon</i>			
Canlubang	62	38	1958-59
	62½	37½	(1959-60 1963-64)
	63	37	(1964-65 1968-69)
Del Carmen	60	40	1958-59
Don Pedro	60	40	"
Manaoag	55	45	"
Mindoro	60	40	"
Norte	55	45	"
Paniqui	60	40	"
Pasudeco	60	40	"
Tarlac	60	40	"
<i>Visayas</i>			
Asturias	57½	42½	(1954-55 1966-67)
Bacolod-Murcia	60	40	(1953-54 1963-64)
			(1949-50)
Bais	61	39	(1950-51 1951-52)
	62	38	(1953-54 1951-52)
Binalbagan-Isabela	62	38	(1953-54 1954-55)
	62½	37½	(1958-59)
	65	35	1959-60
Bogo-Medellin	57½	42½	1952-53
	60	40	1953-54
Danao (*)	60	40	1958-59 (1952-53)
	63	37	(1957-58)
Hawaiian-Philippine	62½	36½	(1959-60 1963-64)
	61½	38½	1949-50
La Carlota	62	38	1950-51
	62½	37½	1951-52
	63	37	1952-53
	63½	36½	1953-54
	64	36	1954-55
	64½	35½	1955-56 (1956-57)
	65	35	(1963-64 1927-28)
Lopez	55	45	(1936-37)
	60	40	(1949-50 1957-58)
	62½	37½	(1952-53 1961-62)

\* Under R. A. No. 809, based on 1957-58 production of 273,980 piculs crop sharing shall be as indicated here, but planters have not signed milling contracts.



Ma-ao	62½	37½	1957-58
Ormoc-Rosario	55	45	1957-58
Pilar	60	40	(1954-55
			(1955-56
	62½	37½	(1950-51
			(1959-60
San Carlos	63	37	1952-53
	64	36	1953-54
Santos-Lopez	56	44	1954-55
	57	43	1955-56
	58½	41½	1956-57
	60	40	1957-58
			(1954-55
Talisay-Silay	62	38	(1958-59
			(1955-56
Victorias	64	36	(1973-74

#### HUMAN EFFORTS TOWARDS THE DEVELOPMENT OF THE INDUSTRY

The sugar industry has lived up to the expectation of those who pioneered improvements. Technological advances and discoveries in sugar agronomy, technology, by-products and marketing are taking place day by day, and our sugar producers must therefore keep abreast, and take advantage of these improvements lest they lose in the race for survival in a competitive world market.

The following are the principal organizations which aim to improve the sugar industry:

1. The Philippine Sugar Association — formally organized in 1923. Its organization was conceived two years previously by the late R. Renton Hind and his colleagues, including Filipinos, Americans, Spaniards, etc. This association pioneered research on the various phases of sugar production, particularly on improved methods of sugar cane growing, so that the progress and efficiency of the industry would be accelerated. The association's membership includes 24 of the 25 centrals in the Philippines, which finance the activities of the association, especially in the protection and defense of the interests and welfare of the industry.

2. National Federation of Sugarcane Planters — This federation represents the voice of the sugar producers in matters affecting their interests and welfare, and is credited for the initiative and persistence in the enactment of the Sugar Act of 1952, commonly known as the sugar sharing law, and of the act creating the Philippine Sugar Institute. Another major accomplishment of the members of the federation has been the formation of the Sugar Producers Marketing and Cooperative Association, which in a few years has obtained for the planters greater purchasing, marketing and financing facilities as well as relatively more reasonable level of prices for their sugar.

3. The Philippine Sugar Institute—created by R.A. No. 632, approved June 6, 1951. It is being financed by sugar cane planters and mill operators at the rate of ten centavos per picul on their respective shares of the sugar production for five years beginning with 1951-52 and ending with the 1955-56 crop. It may be said that its fundamental objective was to help in the early days of centrifugal sugar production. Alunan (1935) stated: "The cane fields and sugar plants are the real producers of wealth for the country . . ." This explains why the Philippines pro-

gressed more rapidly in 37 years of American sovereignty than it did during the 377 years of Spanish domination. He, however, cautioned producers: ". . . but let us not dwell unduly long on the significance and value in terms of pesos of this huge quantity of sugar, sure this crop is but an accident in the present economic structure of the country. The interest of the Philippines and the welfare of its inhabitants can be served if we divorce our thoughts in the meantime from sugar altogether and devote all our efforts and energies to devising ways and means of making our cane fields and sugar plants and machinery as productive of wealth as we now derive from sugar when sugar is no longer profitable." This word of the wise should be considered very well so that by 1974 we are prepared to face any economic disaster.

Research has made the sugar industry a highly competitive enterprise and has compelled our sugar producers to organize themselves and coordinate their efforts to achieve efficient and economic production. This is accomplished by (1) increasing production per unit area, (2) utilizing sugar and its by-products into some kind of consumers goods and (3) increasing per capita consumption in the Philippines. Believing that this goal is attainable only through a sugar research institution of their own, they succeeded in having a law enacted creating the Philippine Sugar Institute, exclusively financed by the sugar producers, precisely for the purpose of helping producers improve and lower their cost of cane production in the field and sugar manufacture in the factory. Sugar producers have voluntarily taxed themselves ten centavos per picul for the past five years, because they believe that their hope for growth lies in scientific research. The stabilization, protec-

tion and improvement of the Philippine sugar industry and of those engaged in it, including labor, as well as the protection of the interests of sugar consumers are the ultimate concern of sugar producers.

4. The Philippine Sugar Technologists — The Philippine Society of Sugar Technologists, which was first known as the Philippine Association of Sugar Technologists, was organized in the early '30s with members representing 25 sugar mill districts and the industry as a whole, in addition to 25 industrial members. The reactivation of the association after the war was inspired by the sugar producers and manufacturers and is patterned after similar societies in the United States and other sugar-producing countries. Its membership includes men from the field and factory where sugar is produced as well as others who are concerned with the welfare of the industry. This association is non-profit, whose members have gladly accepted the self-imposed task of helping improve and strengthen the sugar industry. As sugar production and marketing became a highly technical and competitive business, our sugar producers had to lean heavily on our technologists for their talents and skill in further improving competitive ability in the United States and the world free markets.

5. Sugar Quota Administration — Its predecessors were the United States Sugar Authority, which was instituted in the Philippines in 1934 to implement the allocation of our export quota among Philippine producers and to control the quantity of sugar that might be transported to the United States free of duty under the Tydings-McDuffie Act; the Domestic Sugar Administration, which was created in

TABLE 3  
COMPARATIVE DAILY CAPACITY AND PRODUCTION IN SHORT TONS OF  
PRE-WAR AND POST-WAR SUGAR CENTRALS

NAME OF CENTRALS	DATE ESTABLISHED	1940-41		1962-63		PRELIMINARY ESTIMATE 1963-64	
		DAILY CAPACITY	PRODUCTION	DAILY CAPACITY	PRODUCTION	DAILY CAPACITY	PRODUCTION
Bamban .....				750	18,364.52	750	25,501.14
Canlubang .....	1914	5,000	47,508	4,584	76,413.26	4,584	75,581.71
Del Carmen .....	1919	4,200	64,527	4,351	76,580.03	4,351	97,608.00
Don Pedro .....	1921	2,600	45,643	3,500	76,263.57	3,500	64,379.45
Phil. Milling Co. ....	1911	1,550	6,521				
Paniqui .....	1929	816	8,420	778	16,013.99	778	19,458.09
Pasudeco .....	1921	4,800	77,320	4,800	97,610.70	4,800	107,409.24
Hind Sugar Co. ....	1925	400	3,984	521	7,896.49	521	7,649.96
Central Azucarera del Norte <sup>o</sup> .....	1930	450	3,067	680	2,845.69	680	11,155.20
Tarlac .....	1928	6,000	60,348	6,155	99,571.38	6,155	133,374.36
Bacolod-Murcia .....	1920	3,500	46,045	3,500	95,466.83	3,500	99,680.64
Bais .....	1919	3,500	50,401	3,625	70,162.03	3,268	75,297.60
Binalbagan-Isabela .....	1921			7,670	187,722.43	8,497	232,635.07
Davao .....	1927	700	11,931	2,099	26,263.59	2,099	34,333.27
Hawaiian-Philippine .....	1920	3,300	66,612	4,128	101,855.24	4,128	101,094.00
La Carlota .....	1920	4,306	88,636	6,300	133,004.36	6,149	146,412.00
Lopez .....	1927	1,000	24,303	2,155	51,413.97	2,155	87,908.48
Ma-ao .....	1920	3,000	49,319	4,111	84,221.76	4,111	92,700.41
San Carlos .....	1914	2,625	42,376	2,931	61,355.13	2,931	71,114.40
Talisay-Silay .....	1921	4,000	51,787	3,621	82,750.25	3,621	83,080.44
Victorias .....	1920	2,300	52,136	7,586	171,516.01	4,829	196,401.24
Asturias .....	1921	1,350	15,124	1,258	26,330.38	1,258	30,906.39
Pilar .....	1924	900	17,316	2,034	45,480.31	2,034	52,987.20
Santos-Lopez .....	1929	1,000	13,844	1,952	37,499.88	1,952	41,514.56
Bogo-Medellin .....	1929	1,000	10,028	1,215	34,392.88	1,215	41,458.86
Ormoc-Rosario .....	1929	800	19,279	1,495	33,350.21	1,495	40,579.06
San Isidro (de la rama)-110 .....	1912	510	3,118		Not in operation		
Sta. Aniceta (de la rama)-400 ....	1912				" "		
Central Azucarera de Calatagan ...	1914	772	1,447		" "		
Phil. Sugar Estates Development Co., Ltd. ....	1914	750	5,271		" "		
Kabangkalan Sugar Co., Inc .....	1915	850	13,820		" "		
Central Palma .....	1916	600	9,136		" "		
Central San Isidro .....	1917	680	11,322		" "		
North Negros Sugar Co., Inc .....	1918	3,600	69,060		" "		
Isabela Sugar .....	1919	2,480	35,805		" "		
Mabalacat Sugar Development Co., Inc. ....	1921	256	2,697		" "		
Luzon Sugar Company .....	1925	500	5,196		" "		
Bataan Sugar Co. ....	1927	300	3,535		" "		
Central Luzon Milling Co., Inc. ...	1927	2,200	26,920		" "		
Nueva Ecija Sugar Mills .....	1927	331	1,361		" "		
Mt. Arayat Sugar Co., Inc. ....	1928	1,000	9,596		" "		
Central Sara-Ajuy .....	1928	750	6,432		" "		
Cebu Sugar Co., Inc. ....	1928	1,000	7,970		" "		
Central Leonor .....	1930	400	3,767		" "		
Central Lourdes .....	1930	220	992		" "		
Phil. Starch and Sugar Co. ....	1930	850	7,727		" "		
Binalbagan Estates Inc. ....	1921	3,022	54,148		" "		
<b>TOTAL .....</b>		<b>80,118</b>	<b>1,155,795</b>	<b>81,799</b>	<b>1,714,344.89</b>	<b>79,360</b>	<b>1,870,220.77</b>

\* Now San Mariano.

SOURCES: A Handbook of the Sugar Industries in the Philippines, 1953.  
Sugar News.  
Weekly Comparative News Report, 1962-63 Crop.

January 1936 by Executive Order No. 14 to allocate domestic sugar allotments under Act No. 4166; and the Philippine Sugar Administration, which was created in September 1937 by Executive Order No. 118, which took over the functions of the Domestic Sugar Administration and of the Sugar Division of the office of the High Commissioner of the Philippines.

The sugar industry has established itself as one of the safest fields of investment in agriculture, manufacturing and trade as is evidenced by the amount of money put into it by both governmental and private banking and credit institutions in the Philippines. Taking the government interests alone the Philippine National Bank, which supplies the bulk of the credit requirements of sugar cane producers, has extended loans to the industry averaging more than ₱100 million for the past year (1951 to 1954 inclusive), while the Rehabilitation Finance Corporation's financial aids to the industry have totalled ₱38.38 million (from January 2, 1947, when it started operations, to September 30, 1955). Of the total amount, ₱23.33 million represent loans to sugar cane farms and ₱62.05 million for the rehabilitation and modernization of 17 sugar centrals. The total loans and capital of about ₱230.00 million for the production of 1953-54 crop constituted almost 34 per cent of the money in circulation (₱676.6 million) and 18.75 per cent of the total money supply (₱1,226.6 million) on January 1, 1955.

6. *The Sugar News*, a publication initiated by Mr. R. Renton Hind, was contemporaneous with the beginning of the modernization of the Philippine sugar industry. Gordon (1935) said that "After years of hard and un-

profitable work, the sugar industry was eventually established as the largest industry of the Islands, and contributed to the activities of the Philippine Sugar Association and other associations interested in the sugar industry." Since its establishment in 1919, *The Sugar News* has published 39 volumes.

#### THE PRODUCTION AND EXPORT OF PHILIPPINE SUGAR

From 1927 to 1938, area planted to sugar increased consistently except for substantial dips (in 1934-35) of 26.0 per cent compared to the previous year, and in 1937-38, of 11.3 per cent. A minor dip of 1.0 per cent took place in 1930-31. In absolute terms, available statistics indicate that the pre-war sugar area covered a minimum average of 137,815 hectares in 1927-28 to the maximum of 283,269 hectares in 1933-34. From this pre-war area high, it went down to 71,575 hectares or by 74.7 per cent in 1947-48 due to voluntary destruction of many sugar farms during the war. From this post-war low, sugar area moved up to post-war peak of 220,596 hectares in 1953-54 or by 208.2 per cent, dipping by 1.0, 13.9 and 5.3 percent during the succeeding years and again moving up consistently through to 216,484 hectares in 1961-62. The post-war peak area, however, was 22.1 per cent below the pre-war peak area of 283,269 hectares in 1933-34.

Philippine capacity to produce centrifugal sugar had already shown strength in 1931-32 to 1933-34, again in 1936-37 to 1937-38 and 1939-40 to 1940-41. Output during those crop years exceeded the one million mark with pre-war peak established in 1933-34 amounting to 1,578,379 short tons. Post-war output records even greater strength with the one million mark having been exceeded from

1951-52 to 1961-62. The last year represented post-war peak production in the amount of 1,601,387 short tons, which exceeded the pre-war peak by 1.5 per cent.

Yield per hectare indicates the tremendous increase in productivity during the later years. From 1928 to 1938, a high of 84.88 piculs was recorded in 1932-33 and a low of 47.58 in 1934-35. The eleven-year period indicated a pre-war average yield of 68.63 piculs.

After the war, yield per hectare indicated a low of 73.39 piculs in 1949-50 to the high of 110.86 piculs in 1958-59. Output per hectare was above 100 piculs from 1957-58 to 1961-62, indicating the tremendous increase in productivity. This proves the capacity of the sugar industry to expand depending upon the increase in quota that the Philippine sugar industry is entitled to in the U.S. market.

The 1963-64 increase in newly opened

sugar cane fields is about 82,000 hectares or nearly 40% of the increase in 1961-62 crop year which was 200,000 hectares. This brings an estimated total of 282,000 hectares of additional cane fields under cultivation following the start of the sugar boom in the world markets.

The two most important causes for these tremendous increases in field production, which will need eight centrals with the capacity of Hawaiian-Philippine Milling Company, are the high price of sugar and the Land Reform Code. Many ricelands were converted to sugar lands after the implementation of the land reform code. \*

With the increase in sugar cane fields, production would increase to cope up with the demands in the world market and the quota of the Philippines to the U. S. market.

\* From the speech of Senator Oscar Ledesma, V M C Gazette.

TABLE 4  
AREA, PRODUCTION AND YIELD PER HECTARE  
1947-48 - 1963-64

YEAR	No. OF MILLS	AREA CROPPED (HECTARES)	PRODUCTION SHORT TONS DUE CANE	Tc/HA.	Ps/HA.	Ps/Tc	ACTUAL SUGAR BAGGED
1945-46	6		12,884				
1946-47	17		84,483.14				
1947-48	23	71,575.00	398,150.42	45.50	79.79	1.75	398,113.10
1948-49	27	116,994.00	728,968.68	47.74	89.37	1.87	729,368.10
1949-50	28	129,118.00	660,705.76	41.00	73.39	1.79	692,763.30
1950-51	27	154,607.00	933,698.89	48.21	86.62	1.81	935,204.41
1951-52	28	188,503.29	1,076,516.00	47.91	81.92	1.71	1,076,392.30
1952-53	25	209,264.59	1,133,858.67	45.29	77.72	1.72	1,133,904.18
1953-54	25	220,595.53	1,434,475.38	53.62	93.27	1.74	1,434,281.38
1954-55	25	218,442.67	1,371,762.77	51.99	90.07	1.73	1,371,406.14
1955-56	25	188,015.37	1,218,523.65	52.45	92.96	1.77	1,218,624.31
1956-57	25	178,005.96	1,143,205.64	50.66	92.12	1.82	1,142,959.63
1957-58	25	183,700.09	1,378,297.48	57.48	107.62	1.86	1,377,847.01
1958-59	25	195,691.00	1,512,637.94	62.43	110.86	1.78	1,512,179.95
1959-60	25	204,122.22	1,529,273.97	61.96	107.46	1.74	1,528,834.38
1960-61	24	208,750.69	1,451,450.88	54.91	97.32	1.77	1,451,452.57
1961-62	26	224,398.72	1,618,388.00	58.37	103.44	1.77	1,618,395.64
1962-63	25	243,658.20	1,713,904.93	58.40	100.89	1.75	
1963-64	25	281,191.8736	1,971,530.77		100.56		

\* Preliminary Crop Estimate.

SOURCES: Sugar News  
Farmers  
Industrial Philippines

The Laurel-Langley Agreement permits the Philippines to ask the United States for possible increases in sugar quota when other nations are permitted to do so. Since other countries had already sought and obtained an increase in their respective quotas, it would seem incumbent on the part of the Philippine government to request for its share. The Philippine sugar quota in the United States market has been frozen since 1934 to 980,000 short tons, which was 16.55 per cent of U. S. sugar consumption. Maintaining the 1934 ratio, the absolute quota for the Philippines would mean 1,529,220 short tons. The 1961-62 output and the increase in productivity strongly support Philippine capacity to supply even an additional 500,000 short tons yearly if these were on a more or less permanent basis.

United States sugar consumption in 1959 increased by 40.6 per cent compared to 1934. Since then, the Philippines never had its permanent share of the increase although other foreign suppliers already had theirs.

Under the Laurel-Langley Agreement, Philippine sugar enjoys two kinds of quotas in the United States market:

1. Absolute quota — Under the absolute quota, the Philippines is entitled every year to export 980,000 tons of sugar.

2. Tariff-free quota — Under the tariff-free quota, Philippine sugar entering the United States does not pay the usual full tariff duty imposed on sugar but only fractions of such duty according to the following schedule:

- January 1, 1956 to December 31, 1958  
— 5%
- January 1, 1959 to December 31, 1961  
— 10%

January 1, 1962 to December 31, 1964  
— 20%

January 1, 1965 to December 1, 1967  
— 40%

January 1, 1968 to December 31, 1970  
— 60%

January 1, 1971 to December 31, 1973  
— 80%

January 1, 1974 to July 3, 1974 — 100%

A yearly additional quota of 70,000 tons was granted to the Philippines effective July 1, 1962 under the latest U. S. Sugar Act, raising the total absolute quota to 1,050,000 tons. This additional quota of 70,000 tons is good up to 1966.

Whenever the United States is not on diplomatic relations with any country (currently Cuba) any quota otherwise specified for it under the U.S. Sugar Act of 1962 is not granted. The quantity so withheld has been designated as a "global quota." A quota of 1,635,000 tons has been reserved for Cuba. While the U. S. and Cuba are not on diplomatic relations, any foreign supplier, including the Philippines, may sell additional quantities of sugar within this quota.

The Laurel-Langley Agreement's adverse effects would be felt not only by the sugar industry but also by the whole Philippine economy, because the global quota system would reduce dollar proceeds from sugar exports by nearly two-thirds or about \$70 million yearly. It would result in the withdrawal of American domestic prices paid on Philippine sugar exports to the United States.

The Laurel-Langley Agreement's cessation in 1947 would likewise impose full duties on Philippine sugar exports to the American market, an occurrence which would definitely reduce, if not totally

wipe out, receipts of foreign exchange from this source.

On the average, the sugar industry has been contributing over P270 million annually to the country's national income, aside from huge amounts of taxes being paid by mill owners and planters. The industry earns more than \$110 million in foreign exchange for the country yearly.

These contributions of the industry to the country's economy, aside from supporting over three million people directly and indirectly dependent on it for livelihood, brings to the fore the serious consequences to the country as a whole, if the industry is subjected to the global quota system and forced to sell at world market prices by virtue of the cessation of the operations of the Laurel-Langlely Agreement.

The first impact of this occurrence to the industry would be a drastic reduction in its foreign exchange receipts by not less than \$70 million yearly. The industry may still be able to survive the second year but will be forced to cut its operations by over one-half. The third year, however, may see the industry wiped out, resulting in an annual loss of \$110 million in foreign exchange earnings for the country.

Even if the United States granted the Philippines an increase of 70,000 tons on so-called permanent quota, the more serious concern and trying problem of the industry should be the seeking of a satisfactory answer to this question: "What happens to the Philippine Sugar Industry after 1974?"

By that year the Philippines would be subjected to full duty and to competition with all other foreign sup-

pliers of sugar to the U.S. at world market prices.

#### PROSPECT

Secretary Freeman, in promoting sugar production in the U.S. mainland, faces the main problem of stepping up the capacity of processing facilities. Until longer range commitments are made both the sugar cane and sugar beet producers can not afford to expand. It is predicted that sugar consumption in the United States alone would be 12,500,000 tons by 1980. Mr. Guy Manuel, President of Spreckles Sugar Company, predicted that in 25 years it would be 14,000,000 tons. This expansion program is not enough for the increasing requirements of the United States. On the other hand, the average sugar consumption of the Free World in 1961 was 43 pounds or 19 kilos per person. The underdeveloped nations consumed much less than 10 pounds or 4.5 kilos per person. As these nations develop, their consumption will be much more than what it is today. In the next 25 years the world's consumption is expected to be between 100 and 125 million tons or a hundred per cent increase over that produced today. Expansion plans in the Philippine Sugar Industry can therefore be considered a sound investment. Our factory capacities should be given priority in such a program.

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## BOOK REVIEWS

*Pacific Basin Biogeography: A Symposium.* 563 pp. with plates and illustrations; Tenth Pacific Science Congress, Honolulu, Hawaii, 1961; Bishop Museum Press, Honolulu, 1963; \$12.00.

This collection of scientific papers read at the Tenth Pacific Science Congress in Honolulu in 1961 is indeed a welcome contribution to Pacific studies. For the past ten years, our knowledge of the Oceanic world has grown at an exceedingly rapid pace. This current volume, therefore, is another worthy addition. It has clarified so many problems (and brought to light many others, as has always been the case when scientists meet) relative to the spread, evolution, and relationships of fauna and flora in the Pacific area. The papers on the problem of land-bridge connections of the Pacific basin with the Asiatic mainland and with western North America are illuminating.

The first part of this volume is divided into three: I-A deals with the Bering Arc Relationships; I-B deals with Tropical Pacific relationships; and I-D presents a summary discussion of the different papers. Part II deals with specific problems on modification of biotic balance of island faunas and floras in the area. It includes six papers on specialized studies like the history of change in the biota of Clipperton Island, the fauna of the Malacca straits, etc.

The problem of the existence of "lost continents" and huge land-bridges connecting the Pacific islands to the surrounding continents has equally received considerable treatment. This alleged "prehistoric connection" has long fascinated not only adventurers but also

a number of scholars. It is not surprising to find that in the past—

So many continents and land-bridges have been built in and across the Pacific by biologists that, were they all plotted on a map, there would be little space left for water. Whenever a particularly puzzling problem arises, the simplest thing seems to be to build a continent or bridge, rather than to admit at the hands of nature, or to consider the data at hand inadequate for solving the problem. If the central and eastern Pacific ever included large land areas and land bridges, there should be some indication of the consequent peculiar development of the faunas and floras, but there is no such evidence (Zimmerman, p. 478, quoting a work previously published in *American Naturalist* 76:282, 1942).

One case is in order in connection with this "land-bridge and continent building" as an answer to serious problems like migration and evolution.

To explain the distribution of certain species of moths on a Polynesian island, for example, Meyrick wrote in 1926 that there is absolutely no other explanation possible for the distribution of this species except to accept the assumption that they came by way of a land-bridge, at the time when the South Pacific rose 12,000 feet above sea level during the Eocene period. The paper of H. W. Menard and Edwin L. Hamilton on the *Paleogeography of the Tropical Pacific* dispels this notion and shattered Meyrick's arguments. From other papers, the reader can also gather sufficient

(Continued on page 104)



## EFFECTIVE USE OF POISONED BAITS AGAINST HOUSE ANTS AND COCKROACHES AND GARDEN ANTS

LEOPOLDO B. UICHANCO

ANTS and cockroaches can be quite a nuisance in Philippine homes in the lowlands. On the other hand, Baguio, at an elevation of about 1300 meters, and other high localities in this country, are remarkably free from these vermins. These insects invade and pollute food and ruin electric and optical equipment, and other valuable articles. Cockroaches taint food and tobacco so they become unfit for human consumption, because of disagreeable odor and taste, and they chew up clothing, paper, felt, leather, and the like, to say nothing of their role as disease carriers. The fluid they secrete in attaching their egg-cases to textiles, book edges, or glass surfaces, causes corrosion. House ant and roach species are widely distributed over the inhabited world, particularly in the tropics, where they migrated from country to country as stowaways in shipholds, luggage, packing cases, and woodwork. They insinuate themselves as squatters in homes of rich and poor alike; they are not choosy about the company they keep. They nest and make their headquarters in drawers, woodwork, piles of old papers and clothing, and in many other secretive ways where they are seldom disturbed by normal housecleaning.

Space spraying with household insecticides has been found to give only very temporary relief and the results are often disappointing. Owing to the ubiquitous nature of these insects, and the difficulty of locating their breeding places, fumigation is sometimes recommended. However, the practice is not generally feasible for the average householder, be-

sides the great inconvenience it entails. Hence, the author decided to limit his choice to the use of poisoned baits in his home on the campus of the University of the Philippines College of Agriculture, College, Laguna.

A good number of insecticides are locally available. Many are safe and doubtless suitable for poisoning the bait. However, locating the proper bait which is at the same time inexpensive and reasonably attractive to make a worthwhile kill of the pests proved to be tedious and rather frustrating. Repeated observations were made on empty dishes left after each meal in the kitchen sink for cleaning in an effort to pinpoint the particular food constituents which best lure *Monomorium destructor* Jerdon and other house ants. Various fruit juices, sweets, frying lard, butter, salted fish, meat scraps, rice morsel, brown and refined sugar, and candy were tried alone or in combination, only to draw a blank. At long last the writer chanced upon a combination which was found to work. The resulting bait consisted of the following ingredients (measurements by volume):

sugar .....	40 parts
laundry starch ( <i>gawgaw</i> )	50 parts
Dieldrin, 50% W.P. (water-dispersible powder) .....	10 parts

Mix thoroughly and store in a wide-mouthed bottle with a close-fitting cap. Mixing can be done readily by repeatedly rotating the partly filled container with the cover on. Label and keep away from children and pets. The combina-

tion of starch with sugar was intended, not only to add bulk, but also to provide a dual-purpose bait for both the ants and the roaches.

For use, a wad of cotton, or a small square of folded old cloth pieces or tissue paper, is wetted and placed on a shallow container of convenient size, say, about 5 centimeters in diameter. Tops of tinned food containers serve the purpose. A generous layer of the poisoned bait is added and the various units are distributed among the ant and cockroach runs and in drawers, shelves, cabinets, and other dark corners. The pad is kept moist by adding a few drops of water as needed, every other day or so, depending on weather conditions. The bait should be discarded, the container washed clean, and a new bait prepared once a fortnight or thereabouts. Dry or old, moldy bait ceases to attract the pests.

No sooner did the author use this device than the cockroach problem in his house came to an end almost dramatically within a few days. No sight was then more rewarding than the hordes of rigid enemy corpses, *Periplaneta americana* L. and *P. australasiae* Fabr., lying stiffly on their backs, their upraised limbs crossed as if in abject desperation.

Incidentally, there are other unwelcome cockroach guests in Philippine homes: *Leucophaea maderae* (Fabr.), which is the giant among our cockroaches, *Pycnoscelas surinamensis* (L.), *Blatta orientalis* L., and *Neostylopyga rhombifolia* (Stoll), which is wingless even as adults. The author cannot forget a disagreeable experience with a very small house cockroach, *Diploptera minor* (Brunner), which ate an embarrassing big hole in the seat of his pants while on a trip through the grasslands in the interior of Cotabato province, Mindanao, some years ago. The pests evidently

lurked at daytime in the nipa shingles of the datu's home, where he and his companions arranged for accommodation after a whole day's hike on foot. It was while the weary travellers were fast asleep that the cockroaches took advantage and feasted on the hanging pair of pants. While the control method herein described will probably work also against these other species, no definite information can be given, inasmuch as they were not encountered in the present work.

The ants, however, indulged in minor but repeated guerrilla forays, and mopping-up operations with the poisoned bait have had to be resumed periodically. Nonetheless, even the ants have since ceased to be the exasperating nuisance they once were. The present method has now been in use successfully for over a year. Dieldrin was employed because it happened to be the only insecticide in powder form on hand, from the lot kindly presented by the Shell Chemical Company. No implication is made about its superiority over competitive insecticides, inasmuch as no attempt at a comparative study was made in the present instance.

For garden ants, such as the common harvester ants (*Myrmicinae*), *Pheidologeton* spp., which are graminivorous or carnivorous, the sugar-starch bait proved to be useless. The author found, however, a ready-made bait ingredient in the chicken laying mash supplied by poultry-feed dealers. Dieldrin was merely added to the mash, as in the foregoing bait. Instead of applying on wet pads, the poisoned mash was scattered sparingly on ant runways and nests, if these could be located. The natural humidity of the ground or the grass, before the sun gets too hot in the morning or after a shower, was sufficient to activate the bait. Good control was effected, not

only against *Pheidologeton*, but also against other soil-nesting ants, such as the closely related "fire ant," *Solenopsis geminata* L., and the ferocious ponerine ant, *Odontomachus infandus* Smith, which is equally a bad-tempered cousin, but not quite half the size, of the dreaded giant, inch-long Australian "bulldog ants," *Myrmecia* spp.<sup>1</sup>, with the evil reputation of chasing unwary people that haplessly stray too close to their quarters. The venom of the "bulldog ants" has been found to be closely related to that of bees and wasps.<sup>2</sup>

Of course, direct treatment of the garden-ant nest with pure Dieldrin powder would also work, as the author found in limited trials, but that alternative was much more expensive of material and the result too often peripheral. For that matter, the "water and oil treatment" described by Uichanco<sup>3</sup> would be not only much cheaper, because waste crankcase oil is used, but also more effective than the use of pure Dieldrin powder,

provided the nest could be located, which is not always easy.

Luring the garden ants to their death by tricking them with poisoned bait is quite unsporting, to be sure, but one cannot be too considerate when dealing with such vicious, ill-mannered ruffians, which seem to know instinctively how to plant their load of poison into the most sensitive part of the anatomy where it will hurt worst. Besides, *Pheidologeton* spp. are the notorious ants, locally known as *kuitib*, which not only take the joy out of gardening, but also at times drive people in confused flight out of their beds in the middle of the night. During heavy rains, as their nests get flooded, they swarm up to higher ground and in their panic respect no privacy in one's home. People who live in the tropics must have experienced at one time or another how it is to suffer momentary torture from hundreds of these biting and stinging little she-demons as they crawl angrily all over the victim's body.

<sup>1</sup> William Morton Wheeler, *Ants: their Structure, Development and Behavior* (New York: Columbia University Press, 1913), 227-35.

<sup>2</sup> G. W. K. Cavill, F. L. Robertson, and F. B. Whitfield, "Venom and Venom Apparatus of the Bull Ant, *Myrmecia gulosa* (Fabr.)," *Science*, CXLVI (1964), 79-80.

<sup>3</sup> Leopoldo B. Uichanco, "Water and Oil Treatment against Soil-inhabiting Termites and Ants," *The Philippine Agriculturist*, XIX (1931), 601-3.

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(Continued from page 100)

evidence to deny the existence of enormous land-mass connections in the Pacific basin -- "at least since the rise of Cretaceous floras and faunas" (Zimmerman, p. 477).

Most of the papers presented in this symposium are the results of researches carried out on small islands. The advantage of this limited "areal study" lies in the fact that the data can be effectively controlled, thus making the testing of a hypothesis easier and having a closer observation of the processes of evolution possible. This is well illustrated by the papers on the distribution of plants and animals, which are, on the whole, excellent case studies on migration and adaptation. These are also timely treatises on the problem of floral and faunal affinities of the Pacific, more so today when many publications such as the *Kon-Tiki* and the *Aku-aku* can easily pass for scientific monographs.

One of the shortcomings which many of the papers have, and as noted by Forsberg, is that everyone has been on the lookout for a "disturbed situation" as the major locus of investigation. None of "the authors was able to say much about the 'biotic balance' that existed prior to the disturbance, or, indeed, to show that any such balance ever existed." I agree with Forsberg. However, if this is a shortcoming, then it is a challenging one, worthy of further investigation.

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*The Philippines: Nation of Islands.* Searchlight Book No. 23. By Alden Cutshall, D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey, 1964. 134 pp. Paperback. \$1.45.

The book is a comprehensive and highly informative treatise on the Philippines. The approach is quite different from that of ordinary handbooks about this country in that it combines history sociology, agriculture, natural resources, and commerce into a well-knit whole such as only a professionally trained geographer of the caliber of Professor Cutshall can do effectively. A few minor inaccuracies, however, have crept in. For instance, the prominence given in the introduction to volcanoes in the Philippine setting would give the unfamiliar reader a wrong impression; volcanism has played only a relatively minor and very localized role in the archipelago. The encomienda system, it is true, was one of the major causes of revolt in the first five decades of Spanish occupation,

but, because of attendant abuses, the practice was abandoned and conveniently forgotten toward the close of the 16th century. There has been a tendency to follow the practice of earlier American authors of downgrading Spanish accomplishment in its four centuries of rule, so, unwittingly perhaps, the American would shine by contrast. As a matter of fact economic exploitation and discrimination against the natives in filling the more responsible government positions were more or less common features to both colonizers. Improvement in the farming system, introduction of numerous economically important crops, mostly from tropical America, importation of good breeds of animals, installation of the vast irrigation system which continues to this day to be the backbone of the present government irrigation program, building of roads and bridges, improved building construction, and the like, were Spanish accomplishments. Contrary to the author's allegations, the Philippines, during the Spanish occupation, was regarded as a missionary empire, where the church and the state were one. In most Philippine localities the *padre cura* was the only Spaniard representing Spain, inasmuch as Spanish government officials were more interested in staying in Manila to exploit the lucrative galleon trade between Manila and Acapulco, which made Manila only a distributing center for Chinese goods and had little to do with Philippine products. Indeed, the power in towns and villages of the missionary priests is reflected in the saying during the Spanish occupation: "The *capitan general* is in Manila, far; the king is in Spain, farther still; God is in Heaven, very far." When the author said that "there are no hog farms, but most farmers and many villages or town residents keep a pig or two," he apparently was unaware that hog farming is a relatively large industry in the Philippines with a total investment of about P250 million, second only to cattle. The author's extravagant praise of certain living government officials lacks the objectivity of the historian, and suggests partisan bias with an eye to the 1965 general election.

However, these criticisms are not meant to be adverse; the author has to be dogmatic in most of his exposition so he could adjust to the limitation of a small volume. On the whole the book is quite authoritative, full of significant facts, and very readable. Like earlier treatises on the Philippines from the pen of chance visitors or other foreigners with only one year's experience or two in the country, the work is of value in that the author could readily identify significant matters which more seasoned residents ordinarily pass on as perfectly natural and commonplace.

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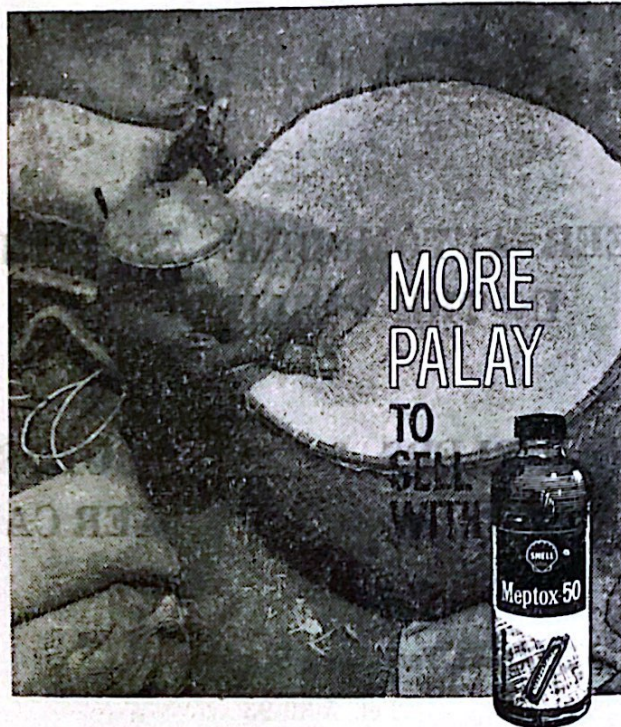
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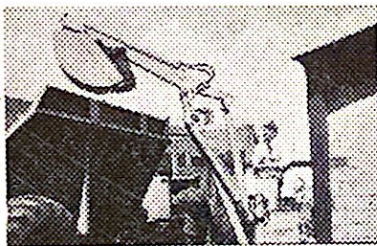
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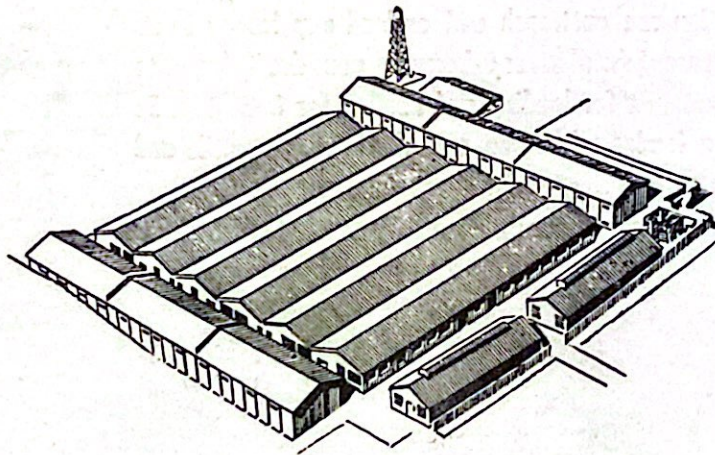
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