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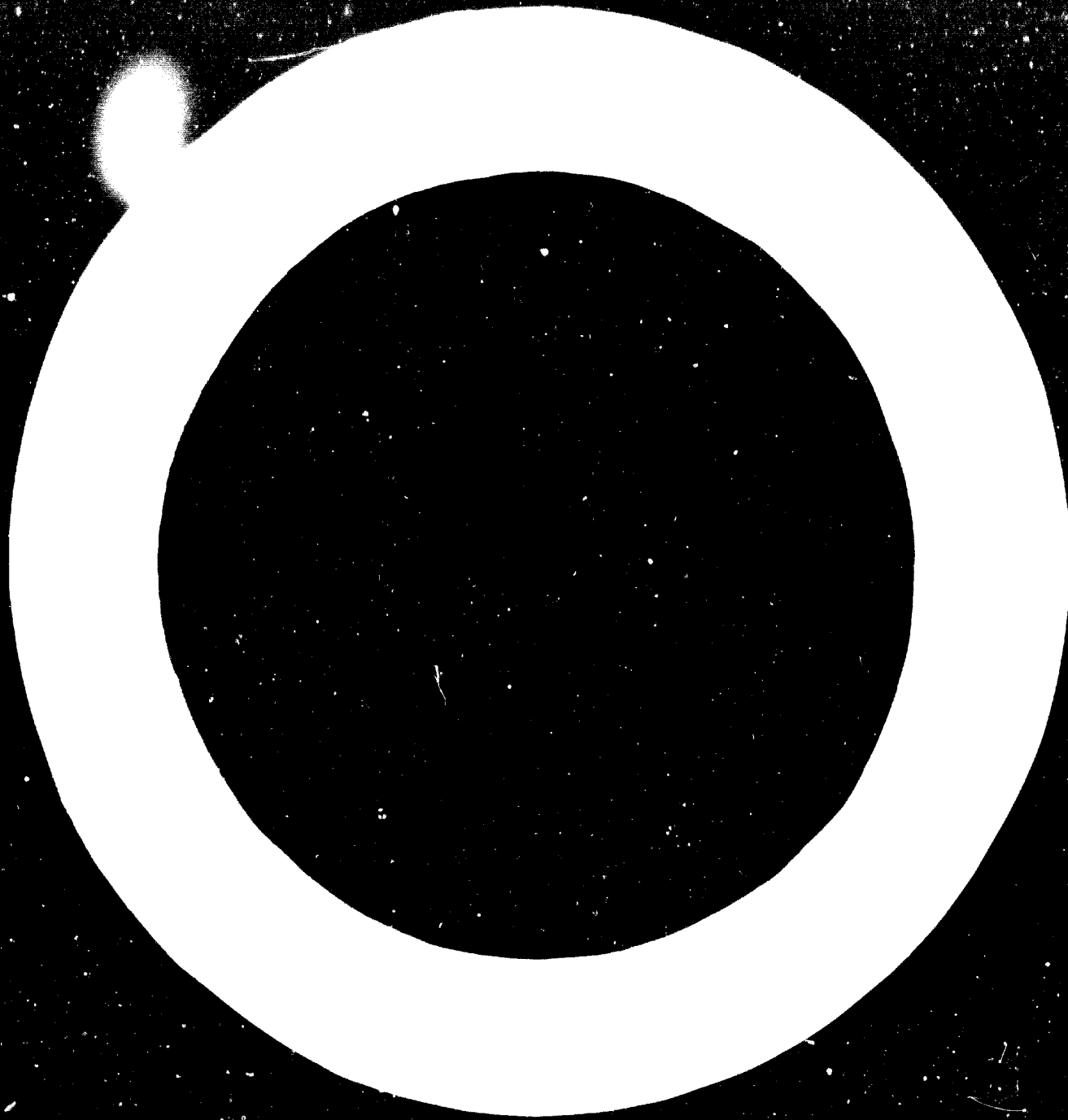
HOW TO CONDUCT A REALISTIC MARKETING, ECONOMIC
AND FINANCIAL STUDY OF THE GROWTH POTENTIAL OF
A PHARMACEUTICAL INDUSTRY IN A DEVELOPING COUNTRY ^{1/}

by

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INTRODUCTION: Stages of Development of a Pharmaceutical Industry and Markets Served

There would appear to be at least five basic stages in the development of national industries and markets for pharmaceutical products.

Countries in the first stage usually do not manufacture any drugs-- apart from some rudimentary galenicals--and only import very small quantities of a restricted range of pharmaceutical specialties. Many of the developing countries in Central Africa may be said to be in this stage. Countries in stage two tend to import a broader and more sophisticated range of pharmaceutical specialties, frequently in bulk containers for local repackaging. Stage three might be called transitional in that it is the first step in the establishment of a national pharmaceutical industry. This is when, in addition to importing significant quantities of pharmaceutical specialties, countries also begin to import half-finished or intermediate material for those products which are relatively simple to produce and for which the demand is highest. A number of countries in Africa, Asia and Latin America are now at this stage of development. In this stage, the market served by a country's industry is still essentially national, although it may be exporting a number of botanical or other raw materials for processing in countries with more advanced industries.

Countries in stage four typically import not only pharmaceutical specialties and half-finished products, but have also begun to manufacture a broad range of starting materials and to undertake a certain

amount of research and development. This stage implies that the country has a fairly well developed chemical industry. Moreover, by the time their pharmaceutical industry has reached this stage, the governments of most countries have begun to discourage the importation of finished products, to encourage manufacturing under license in their own market and to promote export to foreign markets. Countries in stage five usually have a well developed chemical industry, several decades of experience in the manufacture of pharmaceutical products, a highly successful R & D record, and tend to think in terms of world rather than national or regional markets.

The Growth of World Markets

Over the past two decades, the world market for pharmaceutical products has been growing at approximately 11 percent per year, from an estimated \$2.7 billion in 1950 to \$15.2 billion in 1967. Throughout the present decade, however, there appears to have been a slight decline in the industry's growth rate, since world output has been expanding at about 10 percent per year since 1960. The industry's growth rate is expected to slow down to about 9 percent in the 1970s, and the world market will be in the region of \$45 billion by 1980.

Table I shows the growth in world production of pharmaceutical products since 1950 and projections of its future growth.

Table I
ESTIMATED WORLD* OUTPUT
OF PHARMACEUTICAL PRODUCTS

<u>Year</u>	<u>Output</u>	<u>Average Annual Growth Rate %</u>	
1950	2.7		
1960	7.9	1950-1960	11.3%
1967	15.2	1960-1967	9.8%
1980	45.0	1967-1980	8.7%

*Excluding mainland China and other Communist countries in Asia

Sources: Stanford Research Institute, The World Pharmaceutical Industry (in press),
Chemische Industrie (1963 and 1968),
and United Nations, The Chemical Industry in Developing Countries, 1966

Table II shows the breakdown of world production by geographical area. As will be seen, the developing regions of the world account for a growing, but still very small, percentage of world output.

Table II
WORLD PRODUCTION OF
PHARMACEUTICAL PRODUCTS, 1960 & 1967
(millions of \$U.S. at manufacturers' prices)

Region	1960	%	1967	%
World	7900	100.0%	15200	100.0%
Africa	15	.2	60	.4
Americas	3700	46.8	5840	38.4
Latin America	280	4.8	860	5.6
North America	3320	42.0	4980	32.8
Asia	760	9.5	2280	15.1
Japan	490	6.2	1360	10.3
Other	270	3.4	730	4.8
Europe	3350	42.4	6860	45.1
Western Europe	2360	29.9	4860	32.0
Eastern Europe ⁽¹⁾	990	12.5	2000	13.1
Oceania	75	1.0	150	1.0

*Excluding mainland China and other Communist countries in Asia

(1) NOTE: The figures for Eastern Europe are open to question, primarily because of the exchange rate used and also because of differences in classification. For example, in The Chemical Industry in Developing Countries, prepared for the United Nations in 1965 by Verband der Chemischen Industrie e V, Federal Republic of Germany, p. 305, Table 2, the value of Poland's output in 1960 is estimated to have been U.S. \$74 million. But in Perspectives de l'Industrie des Produits Pharmaceutiques en Afrique de l'Est, UN/ECA, U/CN. 14/INR/91, 14 September 1965, p. 7, Poland's output of pharmaceutical products in 1960 is given as ZL 2754 million, which was equivalent to U.S. \$159 million at the official exchange rate of ZL 6 equals U.S. \$1, or U.S. \$146 million at the tourist rate of ZL 24 to U.S. \$1.

Sources: See Table I

The data shown in Table III indicate, however, just how rapidly the industry has been expanding in each of the developing regions. Moreover, because of currency devaluations and price declines for many pharmaceuticals, these figures considerably understate the real rate of the industry's growth in these regions.

Table III
PHARMACEUTICAL PRODUCTION IN THE
WORLD'S DEVELOPING REGIONS

Region	1960		1967		1960-67 % Inc.	Avg. Annual Growth - %
	\$U.S. (millions)	%	\$U.S. (millions)	%		
Africa (excl. S. Afr.)	10	1.5%	40	2.4%	300.0%	18.0
Asia (excl. Japan)	270	40.9	730	44.8	170.0	15.3
Latin America	<u>380</u>	<u>57.6</u>	<u>860</u>	<u>52.8</u>	<u>126.3</u>	<u>12.4</u>
Total Developing Countries	660	100.0	1630	100.0	147.0	13.8

Source: Stanford Research Institute, *ibid.*

Almost three-fourths of developing Africa's total production of pharmaceutical products is still accounted for by countries north of the Sahara. Most of the remainder is accounted for by countries in West Africa, especially Nigeria. India produces about half of developing Asia's output. In Latin America, however, pharmaceutical production is somewhat less heavily concentrated, although Argentina, Brazil and Mexico account for approximately two-thirds of the region's output.

As Table IV indicates, by 1980 these developing regions are expected to account for 18 percent of total world production.

Table IV
GROWTH IN PHARMACEUTICAL PRODUCTION 1960-1980
WORLD AND DEVELOPING COUNTRIES

Region	1960		1967		1975		1980	
	\$U.S. (Mil.)	%	\$U.S. (Mil.)	%	\$U.S. (Mil.)	%	\$U.S. (Mil.)	%
World	7900	100.0	15200	100.0	32000	100.0	45000	100.0
Developing Countries	660	8.4	1630	10.7	4400	13.8	8000	17.8

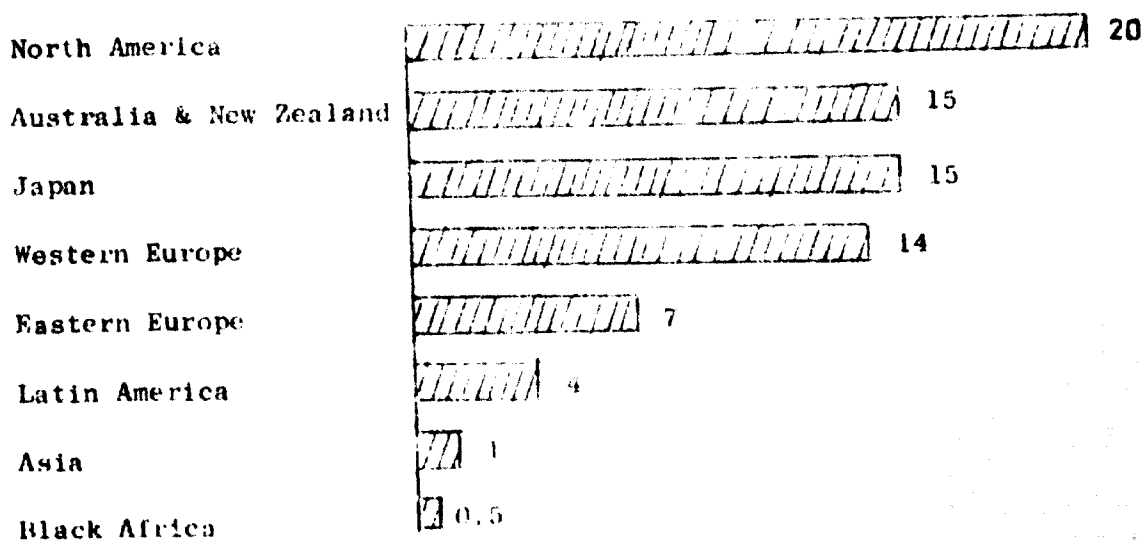
Source: Stanford Research Institute, *ibid.*

Thus, whereas in the developed regions of the world, production is expected to increase in the 1970s at an average rate of about 8 percent per year, in the developing countries it is expected to increase at a rate of 13 percent.

Consumption

Chart I shows the estimated per capita consumption of pharmaceutical products in different regions of the world. As will be noticed, throughout Black Africa, consumption is less than one fortieth of that of North America.

Chart I
ESTIMATED PER CAPITA CONSUMPTION OF PHARMACEUTICALS IN 1967
(\$U.S. at manufacturer's prices)



Source: Stanford Research Institute, *ibid.*

Throughout the 1970s, low levels of income and health resources (i.e., manpower and facilities) will make significant absolute increases in per capita consumption slow in most developing Asian and African countries. But the relative rate of increase will be high even in some of those countries with very low incomes. For example, between 1965 and 1975 the United Nations Economic Commission for Africa projects that there will be a 55 percent increase in average per capita consumption in East Africa. (1) In many Latin American countries, per capita consumption will by 1980 be in excess of \$10 per capita.

(1) UNECA, E/CN. 14/INR/91 ibid.

STRUCTURE OF THE INDUSTRY

Excluding those in Eastern Europe, some 6,000 companies in the industrialized regions of the world account for about 80 percent of total production. The vast majority of these companies are small and have sales of less than U.S.\$ 10 million a year. Most of the larger companies manufacture both ethical and household medicaments, although ethical products now account for the bulk of their sales and the vast majority of their research expenditures and earnings.

The industry's relatively slight degree of concentration is, however, rapidly changing, partly because of the steady amalgamation of companies among both the larger and smaller manufacturers, e.g., Sandoz and Wander in Switzerland, Bristol Myers and Mead Johnson in the U.S., Corbiere, Diathera and Millot in France, etc.

Paradoxically, the continuing viability of many small, specialized firms--usually non-research oriented--is one of the features of the industry. The viability of such firms stems partly from the market demand for a wide variety of drugs, and the fact that economies of scale are usually not particularly important in many areas of drug production. Thus, the manufacturing costs of small firms do not represent a larger share of their total cost than do those of larger companies, but their marketing and administrative costs are proportionately higher.

COST STRUCTURE OF THE ITALIAN DRUG INDUSTRY (As Percent of Total Sales)

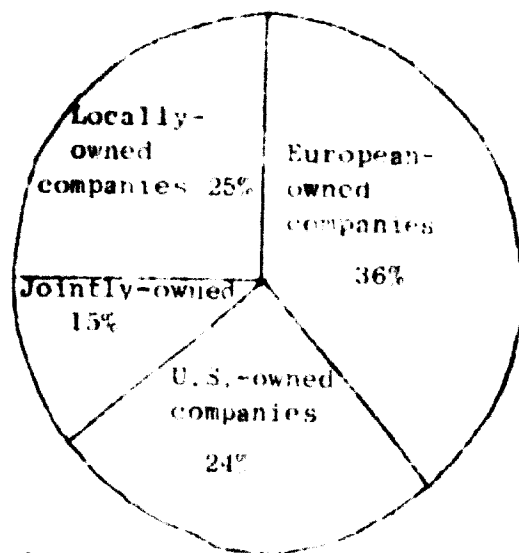
<u>Costs</u>	<u>Large Companies</u>	<u>Medium Companies</u>	<u>Small Companies</u>
Manufacturing	37	35	36
R&D	10	6	2
Marketing & Admin.	43	49	52
Net Income	10	10	10

Source: OECD, Pharmaceuticals Gaps in Technology Between Member Countries
CME(68)8, p. 49, 1968

In most developing countries, there has also been a marked trend toward concentration. For example, Brazil had 611 drug manufacturers in 1947. In the 1950s, changes in government policy with regard to imports "led to the establishment of a large number of manufacturing subsidiaries by foreign drug companies..."⁽¹⁾ Despite the disappearance of many national companies, the total number of drug manufacturers rose to 628 in 1954. In the late 1950s, the subsidiaries of American and European companies began to dominate the market and even the largest Brazilian companies had begun to be eclipsed by the superior technology, management skills and financial strength of foreign companies. Thus, by 1962 only one quarter of the Brazilian drug market was accounted for by locally owned establishments (see Chart II), and 13 companies accounted for 38 percent of the total market. The leading Brazilian-owned company placed eleventh and accounted for 3 percent of the market.

Chart II

DRUG MARKET SHARES IN BRAZIL



SOURCE: Adapted from Chemicals, Vol. 14, No. 3, *ibid.*, p. 28

(1) U.S. Department of Commerce, Business and Defense Services Administration, Chemicals, Vol. 14, No. 3, 1967, p. 26.

By 1963 there were only 432 drug manufacturers in Brazil, and 80 of these were classified as major industrial concerns. Only 36 were nationally owned companies. (1) Since then there has been a further decline in the number of drug manufacturers, and SRI estimates that by 1980 there will probably be less than 200 manufacturers, of which only about 50 will be of appreciable significance.

A Brazilian health official commented on the consequences of this trend several years ago: "This transfer of enterprises to the ownership of foreign organizations has no unfavorable effect--rather, a possible beneficial effect--as regards quality of the remedies, since they may be subject to a more rigorous standardization and control. There seems to be no unfavorable effect on the price, either, although data are not available to formulate a definite judgment on this point. At least, medicines in Brazil are still cheaper than in other great producing countries, such as the United States and Italy." However, he also noted some disadvantages, such as negative effects on the balance of payments, over-charging by the parent company, and especially, the lack of technological development within the country. (2)

With regard to these and other apparently negative aspects of foreign ownership, it should be remembered that Brazil and many other countries in a similar position are fortunate in having a potential market which is large enough to allow foreign companies to begin manufacturing there, and that by establishing subsidiaries in Brazil, these companies have helped

(1) Chemicals, *ibid.*, p. 28

(2) United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas, "The Introduction of Pharmaceuticals, Problem of Cost and Quality," by Raymundo Moniz de Aragao, E/CONF. 39/F/116, 1 Nov. 1962, pp. 2-3.

to reduce the outflow of the country's foreign reserves. Most of the large international companies would appear to have an "international conscience" insofar as they frequently do not try to repatriate the majority of their profits but plough them back into the industry's development. With regard to over-charging by the foreign companies (for intermediate products), this is a real threat and it is possible that some companies practice such a policy, especially when they cannot repatriate the profits they make from manufacturing in a foreign country. For most nonpatented ingredients, the solution would appear to lie in making subsidiaries purchase these on the competitive world market unless they can present justifiable reasons to the contrary. But with regard to patented ingredients, the problem will hopefully be resolved when the large international companies start providing detailed information on their cost structures and pricing policies. If they do not soon begin doing so, then the governments of many countries will be forced to employ cost accountants with considerable expertise in the industry whose primary responsibility will be to establish reasonable prices for these ingredients.

With regard to technological development, this needs to be further studied as it would seem that in a number of countries, importation of foreign technology has fostered rather than retarded the progress of the recipient country.

TECHNOLOGY

As one group of experts has said, "The modern pharmaceutical industry is very different from the large-scale compounding of pharmaceutical products of earlier times...[and is now] highly specialized, with the various jobs requiring intricate equipment and a wide variety of specialists

in different branches of science. These include physicians, pharmacologists, biochemists, micro-biologists, chemists, statisticians, engineers, instrumentation technologists, artists and those trained in business management. "(1)

The starting materials utilized by the pharmaceutical industry fall into two main groups: a) natural materials from animal, vegetable or micro-biological sources, and b) synthetic medicinal chemicals. With the possible exception of one or two countries in Asia and Latin America, no developing country has a sufficiently advanced chemical industry to begin to economically produce synthetic medicinal chemicals. Importing these products from the more highly developed countries of Europe, North America and Japan would therefore appear to be the only recourse open to developing countries.

The nutrient media required to produce antibiotics and other drugs based on fermentation technology include such materials as sugars, starches and proteins which are available in many developing countries. Other raw materials include organic chemicals to act as precursors and solvents for extraction. Although most of these materials are not produced in developing countries, they can readily be imported at fairly low prices. Thus a developing country wishing to start producing some types of antibiotics could do so; but, given the low world prices of most of the non-patented antibiotics, problems of quality control and the economies of scale involved in their manufacture, it would not be feasible for most developing countries to encourage the establishment of such plants unless their own market were sufficiently large to make it economical or unless they could export them to other countries, the

(1) United Nations Economic Commission for Asia and the Far East, Industrial Development in Asia and the Far East, a Sectoral Study on the Pharmaceutical Industry, New York, 1966, p. 467

prospects for which appear discouraging, given the present reluctance of most developing countries to engage in even inter-regional trade in drugs.

A number of drugs derived from animal and vegetable sources have been produced in small quantities in most developing countries for several decades, and the origins of some of them can be traced back thousands of years. As these products (e.g., quinine, reserpine, digitalis, insulin, adrenalin, pepsin, etc.) and the processes used in the manufacture are so well known, it is not necessary to dwell on them, except to say that it would appear that many developing countries have failed to exploit their "natural resources" not only from the point of view of their own needs for pharmaceutical products, but also from the point of view of their export potential. (1)

Sera and vaccines are being manufactured in an ever-increasing number of developing countries. But unfortunately most developing countries do not place sufficient stress on prophylaxis. If they did, they could considerably decrease their needs for many drugs.

(1) Cf the Congo's experience with quinine, in Cahiers Economiques et Sociaux, "Le Secteur Pharmaceutique dans l'Economie Sanitaire du Congo, 1955-1965," Vol. 5, No. 1, 1967, p. 100 and passim.

MARKETS FOR PHARMACEUTICAL PRODUCTS IN DEVELOPING COUNTRIES

In most developed and developing countries, there is only a moderate degree of correlation between per capita income and per capita consumption of pharmaceutical products. In most developing countries there would appear to be almost a secular trend for pharmaceutical consumption to rise faster than GNP.¹ This is understandable in view of the increasing tendency for the populations of these countries to become less mistrustful of modern medicine. In some countries, such as many of those in Africa, this is largely the result of the expansion of government sponsored health services. In others, such as many of those in Latin America, this is still largely the result of increases in privately financed medical care.

The health plans of developing countries should provide an indication of what the country's needs are likely to be for pharmaceutical products and what impact the achievement of the plans' objectives is likely to have on the country's disease spectrum. Unfortunately, in most of these health plans only the 'inputs' in terms of desired increases in hospital beds, other health facilities, and medical and paramedical manpower are planned and very little is said about what impact these increases may have on the country's health problems or requirements for pharmaceutical products.

Moreover, in most developing countries virtually all of the planning activities are concerned with government sponsored health services, especially those supported by allocations from the central government, which in many countries--notably those in Latin America--account for only a small proportion of the total resources expended on health, and an even smaller fraction of the total market for pharmaceutical products.

1. Dr. Salvador Diaz, Dr. Carlos Montoya, Mr. Mario Vera, "Medical Expenditure in Chile," First Latin-American Regional Assembly of the World Medical Association, Santiago, Chile, mimeographed document, 1965.

As many of the world's leading pharmaceutical companies have discovered after spending large sums of money on R & D programs, there is little relationship between the major health problems of most developing countries and the size and structure of these countries' drug markets. For example, WHO states that, besides malaria, "Hundreds of millions of people are estimated to be affected in varying degrees by one or several parasitic diseases: there are about 200 million with schistosomiasis, 190 million with filariasis, 450 million with hookworm, 50 million with onchocerciasis, and 650 million with ascariasis..."⁽¹⁾ But important as these diseases are in terms of worldwide morbidity and mortality, they are relatively insignificant in terms of the effective demand for products used to treat them--even in those countries where their incidence is highest. To a certain extent this is a reflection of the overall paucity of the health services of developing countries. But it is also a reflection of the poor distribution of health services in most of these countries. Whereas most of those suffering from these diseases live in rural areas, most of the health services are concentrated in the capitals and a few other large cities and towns. Thus, data concerning a country's health problems usually encompass the entire population, but those concerning the consumption of pharmaceutical products--in the case of most developing countries--relate to the relatively small, more fortunate segment of the population which has access to health services. The health problems of

(1) World Health Organization, The Second Ten Years of the World Health Organization, 1958 - 1967, Geneva, 1968, p. 175. NOTE: According to a number of other sources these figures would appear to underestimate the prevalence of many of these diseases. For example, there are probably about 1 billion people afflicted by ascariasis.

this segment are usually quite different from those of the country as a whole. For example, the health services of many developing countries are so highly concentrated on the urban population that in a number of these countries "Motor Vehicle Accidents (A. 138) appear to account for just as large a proportion of total admissions to hospitals as they do in developed countries."⁽¹⁾

Thus the relative size and growth of a given country's markets for pharmaceutical products is considerably affected by the availability, utilization, and geographical distribution of health services--including the traditional practitioners--within the country.

The United States and most other developed countries usually have about one hospital bed for each 100 of their population. In Black Africa and in Asia, most countries consider themselves fortunate if they have one bed per 1,000 population. Ethiopia and Pakistan, for example, have about one bed for every 3,000 population. Most Latin American countries have one bed for every 200 to 600 people.

Moreover, there are great variations in what different countries designate as being a hospital bed. In the statistics of some developing countries, many officially included hospital beds are little more than camp cots or mattresses; nor is it unusual for two or more patients to occupy the same bed. This is one reason why hospital occupancy rates sometimes appear to exceed 100 per cent.

The level of care is usually more closely related to the availability of trained medical manpower than to numbers of beds. It is frequently easier for a country to increase the availability of hospital beds than it is to increase the availability of professional level manpower.

(1) Cf. WHO, World Health Statistics Report, Vol. 21, Nos. 2-3, 1968, pp. 148-239. NOTE: a number of other explanations could be advanced to partially explain this phenomenon, such as poor driving conditions, lower levels of driving competence, etc., in developing countries. But these do not detract from the fact that hospital utilization and other statistics pertaining to the number of patients treated for different conditions do not usually reflect a developing country's overall health problems.

SOME ECONOMIC AND FINANCIAL CONSIDERATIONS

The decision to build a pharmaceutical industry in a developing country is basically a capital budgeting problem--the rate of return from investing in a pharmaceutical plant should equal or exceed the next best alternative use of capital (i.e., the opportunity cost). The incremental revenues from the investment in pharmaceutical production can come from export sales or from domestic sales. If we assume that exports will not be significant, the bulk of the revenue must come from the difference between the total cost of production of the plant and the equivalent cost of imported products. The choice is between buying and making a particular product.

If we also assume that a developing country will not be in a position to synthesize intermediates, the decision involves the costs of production of a plant to formulate dosage forms of imported intermediates. Although the establishment of a formulation operation is certainly not as complex as the production of intermediates, it is not without its pitfalls. Such problems as incompatibilities, stability, sterility and accuracy must be overcome for each product. In comparing alternatives, we must therefore also compare the quality of imported products with those that are produced domestically in order for the comparison to be meaningful. The production of finished dosage forms does not merely involve tableting or the production of liquids, ampoules or capsules, but should involve some measure of quality control over production to provide medicaments of adequate quality. It is therefore incumbent upon the decision maker to determine what skills are needed in order to undertake the task. If the skills, equipment or chemicals do not exist or cannot be obtained economically, pharmaceutical production should not in most countries be considered until they have reached a higher level of development.

However, if the necessary skills and capital are available for such an undertaking, the decision is essentially a capital budgeting decision. The estimation of market sizes for pharmaceutical products in a developing country is essential for determining what the revenue from the pharmaceutical plant will be. In the decision making process, one must accept the basic premise that the wide variety of pharmaceuticals that are consumed in even the most underdeveloped of developing nations precludes production of all products. In developing statistics for the decision, the collection of data is substantially reduced because of the dis-economies of scale of small production runs. Statistics on markets must be collected for products whose use is widespread, and whose value is relatively high. In an economy which relies strictly on imports, estimation of markets should rely heavily on the availability of detailed import statistics. Some statistics should be available from customs offices, from importers, and from customers (e.g., wholesaler, retailers, health facilities and physicians, etc.) for the products. In many developing countries, government agencies and hospitals may be substantial consumers of particular products. If a particular government suspects that the value of product X is high enough to warrant production by a national pharmaceutical plant, then the state itself should use all the resources at its command to garner the necessary statistics to make the decision. The basic information is what is the pattern of consumption of the particular product. A reliable source of information on use of the product would be estimates of uses at present prices. Since the medical and pharmaceutical communities in most developing countries are quite small, a survey of users or retail distributors requesting statistics on consumption of the product would frequently suffice. The sampling procedure should not be difficult or complex.

However, sales of distributors or agents usually serve as a more accurate measure of usage and would involve less effort on the part of the government. The difficulties involved in surveys of distributors, importers or agents is that direct shipments from manufacturers to some users bypass these channels. In any case, such a possibility would not necessarily preclude surveys of users.

Decisions concerning the establishment of a pharmaceutical industry must be based on analyses of individual products of high volume and value. Since decisions are oriented toward the future rather than the past, the estimates of demand needed for the decision must not be limited to present and past markets but must include factors such as increase in population, per capita income or the necessity of achieving a particular health goal, and projected changes in the disease spectrum. For particular products and for the market as a whole, it is necessary to estimate effective demand--need plus ability to pay. In a private market, one must estimate the population at risk, those who have a need for the product, and their potential needs based on present and future estimates of the prevalence of the conditions to be treated. This estimate is the maximum potential market for the product and must be modified to reflect the influence of several factors, e.g., inaccessibility of certain segments of the population to medical care, the inability of large segments of the population to afford the product at present or expected future prices, and the influence of cultural factors which mitigate against consumption of the product. Thus, such factors as urbanization, income distribution, culture, and government actions which affect any of the above enter into market estimations.

Furthermore, factors which affect the production function of the pharmaceutical plant must be taken into consideration, i.e., cost of intermediates, power, water, labor, equipment, buildings, and the effects of size of plant must be developed in order to complete the capital budgeting analysis.

METHODOLOGICAL CONSIDERATIONS IN THE ESTABLISHMENT OF INDIGENOUS PHARMACEUTICAL PRODUCTION

There are several alternatives open to developing countries when considering how to meet their growing requirements for pharmaceutical products.

For some countries with relatively small markets, it will obviously be easier, more economical and safer for them to continue to import finished products rather than to try to encourage the establishment of even rudimentary manufacturing facilities. These countries should continue to import--on a competitive basis--pharmaceutical specialties from reputable foreign suppliers until such time as it can be demonstrated that they could effect fairly substantial savings in foreign exchange by beginning to import intermediate products for subsequent processing. It should be remembered that over the past few years, there have been major declines in the prices of most of the more essential pharmaceutical products, due to the expiration of a number of important patents and the introduction of more efficient manufacturing techniques. If these countries channel most of their import requirements--especially those for government health programs--through a central agency and buy many of the more commonly used drugs in bulk containers, even greater economies are possible. (1)

In this respect, although, as the Economic Commission for Africa has indicated, it may be possible to establish a factory capable of manufacturing 25 million aspirin tablets for U.S. \$59,300, and that if these 25 million aspirin tablets are sold for \$125,000, this will leave a profit of \$33,000 after deducting manufacturing costs and other expenses of \$92,000, (2) it is evident these would be fairly expensive aspirin tablets and that it

(1) CF Cahiers Economiques et Sociaux, ibid.

(2) UNECA, E/CN. 14/INR/91, ibid.

would be possible to buy them cheaper from a more efficient manufacturer. Moreover, if, because of lack of demand, only two-thirds of these aspirins were sold, the factory would not be viable.

The question as to when a developing country should become largely independent of imported pharmaceutical specialties and start actively encouraging either nationally owned companies, joint ventures, or foreign firms to undertake an ever-increasing share of the operations involved in manufacturing pharmaceutical products within their own frontiers is a difficult one, even without the emotional problem of prestige and the more objective motive of restricting outflows of foreign exchange.

In many of the developing countries in Asia and Latin America, there were numerous small producers of drugs long before the "therapeutic revolution" began to manifest itself in the 1930s. Brazil, for example, already had 35 drug manufacturing enterprises in 1889, 60 in 1907, and 186 in 1920.⁽¹⁾ India, Pakistan, Ceylon and many other developing countries in Asia and other parts of the world have centuries of experience in the manufacture of natural pharmaceutical products from vegetable and animal sources. But most developing countries are still desperately in need of foreign assistance if they are to establish a pharmaceutical industry capable of manufacturing modern drugs.

In this respect, most of the large, research-oriented international companies with broad product lines, who between them account for over three-fourths of the world's pharmaceutical innovations, usually prefer to delay establishing manufacturing facilities in developing countries until they have a strong self-interest in doing so.

(1) Chemicals, *ibid.*, p. 25

Most of them are reluctant to establish manufacturing facilities in a number of the smaller developing countries because of such factors as:

- (1) The introduction of rigid price controls and long periods of "price freezes" on their products, during which no consideration is given to the rising costs of doing business.¹
- (2) The abrogation or the recognition of patents and brand names.
- (3) They may not be able to repatriate a reasonable proportion of their profits; their shareholders expect them to be able to pay them adequate dividends.
- (4) Problems concerned with the importation of adequate quantities of intermediates to allow them to operate their facilities at an efficient capacity.²
- (5) Having to build plants of uneconomical size which the local market is not big enough to support, and pressures to manufacture locally even those products which can only be economically manufactured in large batches at the parent company's home plant.³
- (6) The spectre of possible nationalization.
- (7) The imposition of low ceilings for return on investments which penalize the more efficient manufacturer. In this respect, no country has as yet defined what is a reasonable return on capital, but in view of the fact that the industry is one in which the risks are higher than in most manufacturing industries, anything much lower than 15 percent would be considered inadequate unless the potential for future growth is exceptional.

1. Cf. A.V. Mody, "Arbitrary Price Freeze Hits Growth," Commerce, Bombay, Vol. 116, No. 2574, April 5, 1968, pp. 8-10; and G.M. Parikh, "Drug Price Control: A Few Suggestions," Ibid., p. 15.

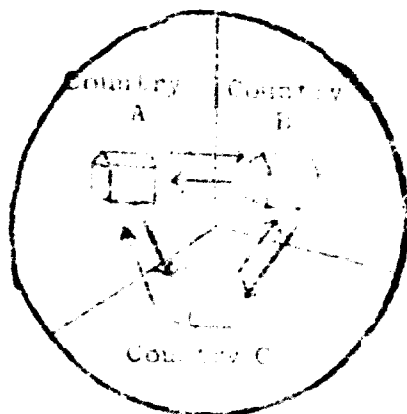
2. Wyndham Davies, The Pharmaceutical Industry, Oxford, Pergamon Press, 1967, pp. 28-33.

3. "Survey of Pharmaceutical Industry in Pakistan: Capacity Utilization," Pharmaceutical Industry, January 1968, pp. 17-17.

Bearing these factors in mind, the governments of developing countries must decide on what constitutes a reasonable system of inducements to attract foreign 'private enterprise' firms to establish manufacturing facilities in their countries. Moreover, these governments must also recognize that, due to smaller production runs and other factors influencing efficiency, the costs of locally manufactured products may well be higher than their imported equivalents.

For many developing countries with relatively small markets the solution would appear to lie in the establishment of a common pharmaceutical industry, i.e. with one manufacturing facility serving several countries. A proposal in the early 1960s by a pharmacist from the Ivory Coast that a group of African countries jointly participate in pharmaceutical production has remained a dead letter due to the reluctance of most developing African countries to pursue the matter further.¹

Another solution might be the establishment of a 'common market' for pharmaceutical products. For example, if three countries with small markets were to set up a common pharmaceutical market along the lines suggested by the diagram below and could induce three of the large, international companies with broad but hopefully not duplicated product lines to each set up a plant in one of the three countries, these countries might find that they became virtually self-sufficient.



¹ Cf. Harold Chapman, Pharmaceutical Development, 30 March 1963, p. 25.

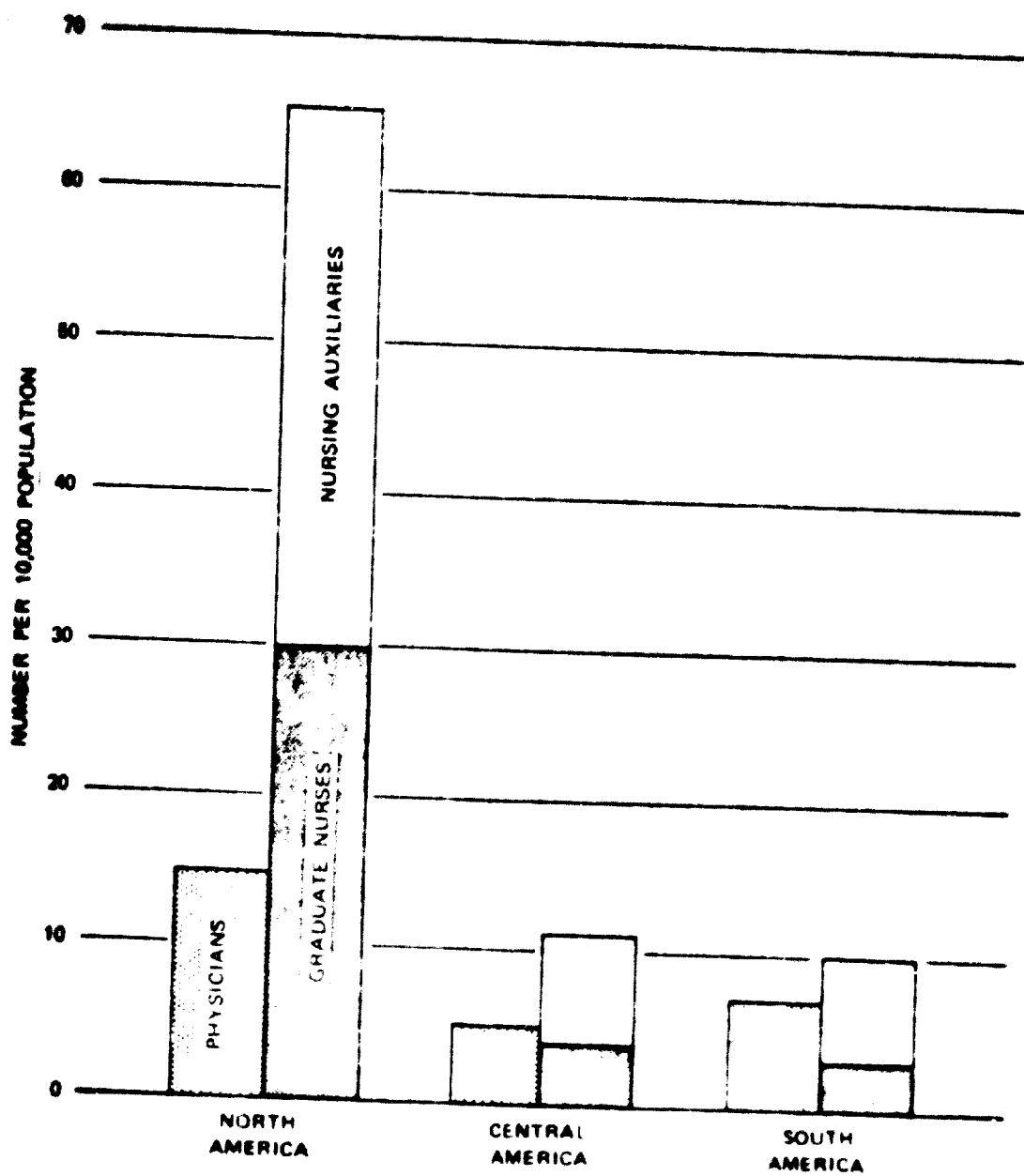


Figure 1 PHYSICIANS AND NURSING PERSONNEL PER 10,000 POPULATION IN THE THREE REGIONS OF THE AMERICAS 1964

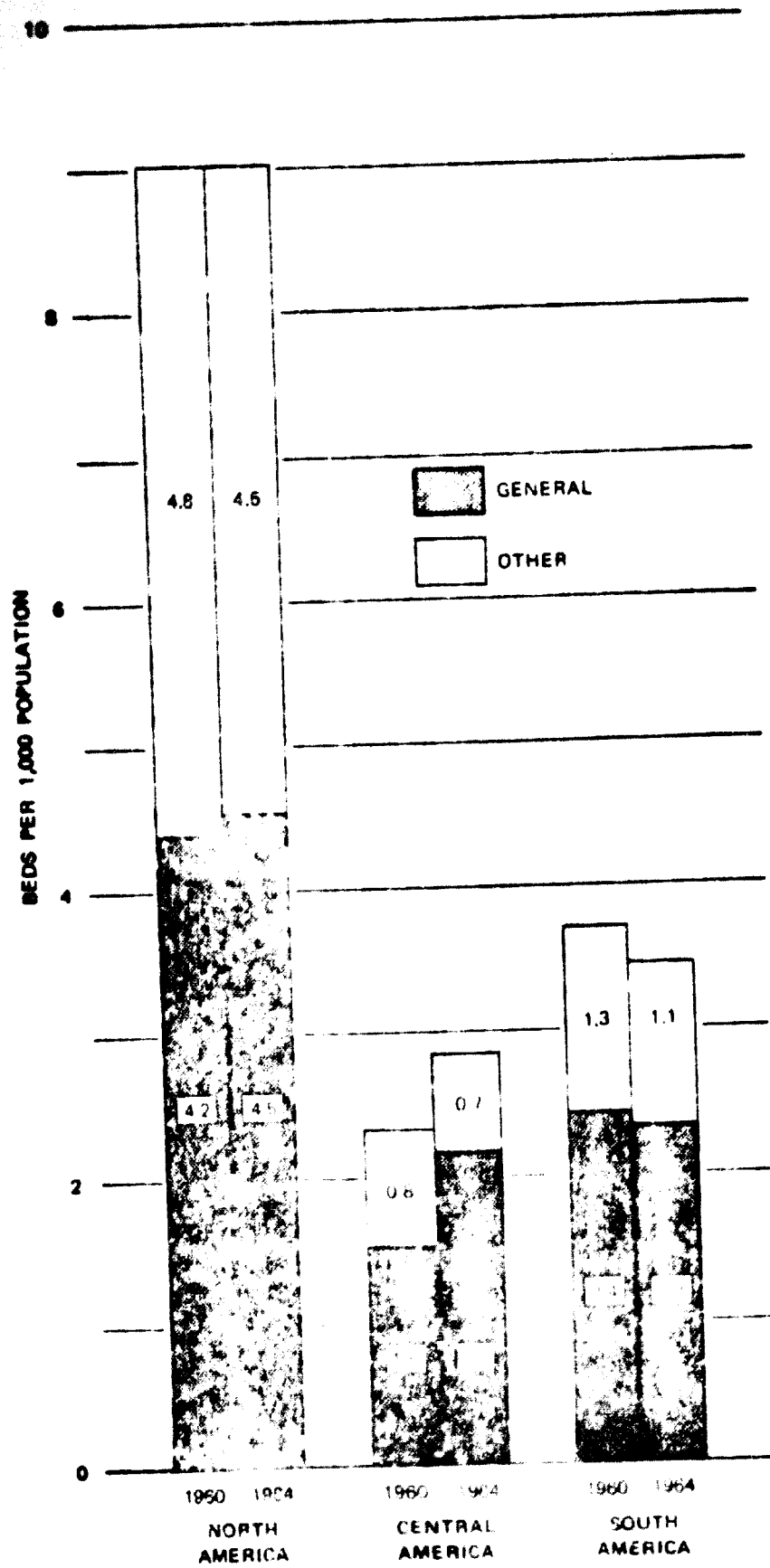


Figure 2 GENERAL AND OTHER HOSPITAL BEDS PER 1,000 POPULATION IN THE THREE REGIONS OF THE AMERICAS 1960 AND 1964

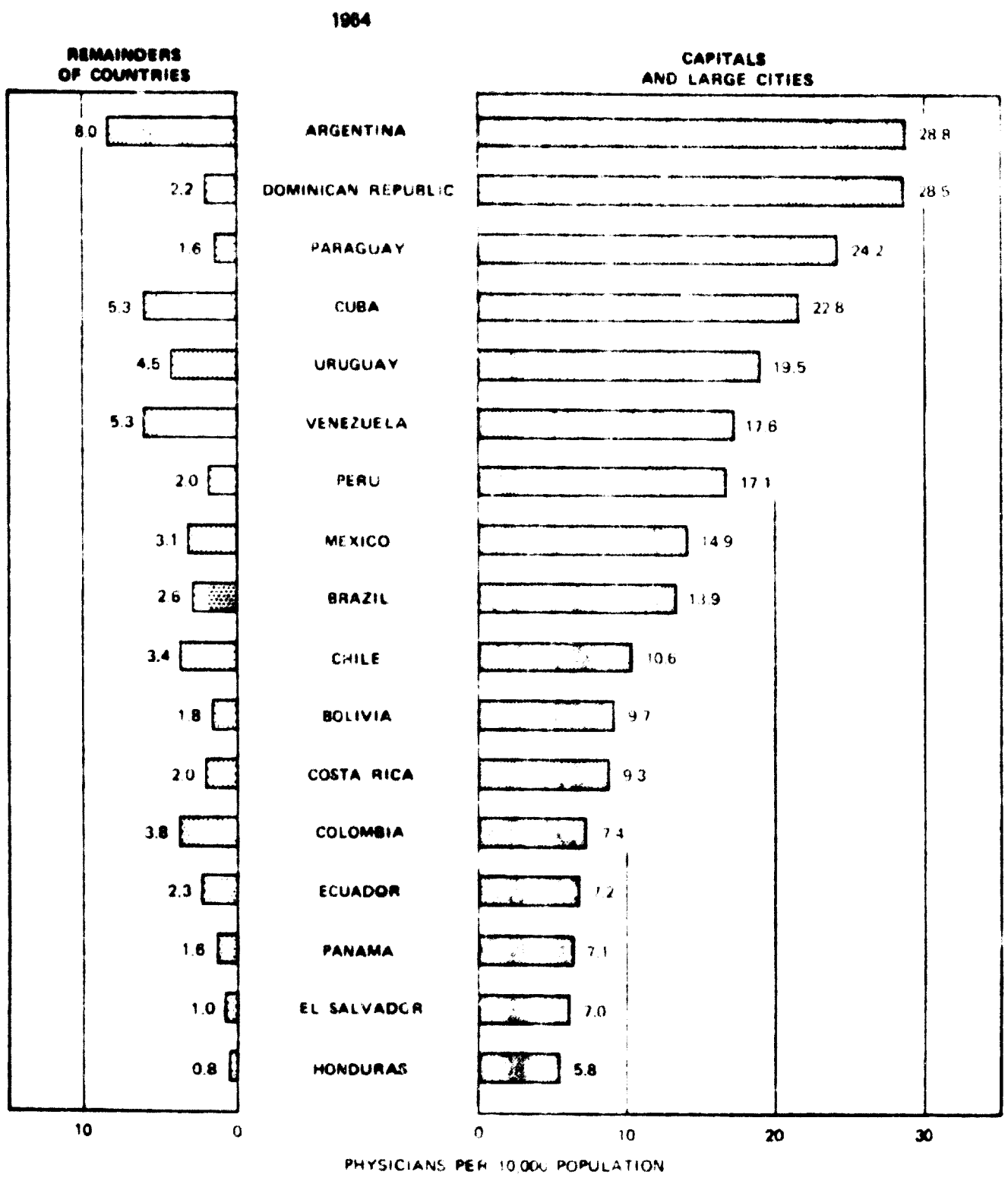


Figure 3 PHYSICIANS PER 10,000 POPULATION IN COUNTRY CAPITALS, LARGE CITIES, AND REMAINDERS OF THE COUNTRIES IN LATIN AMERICA

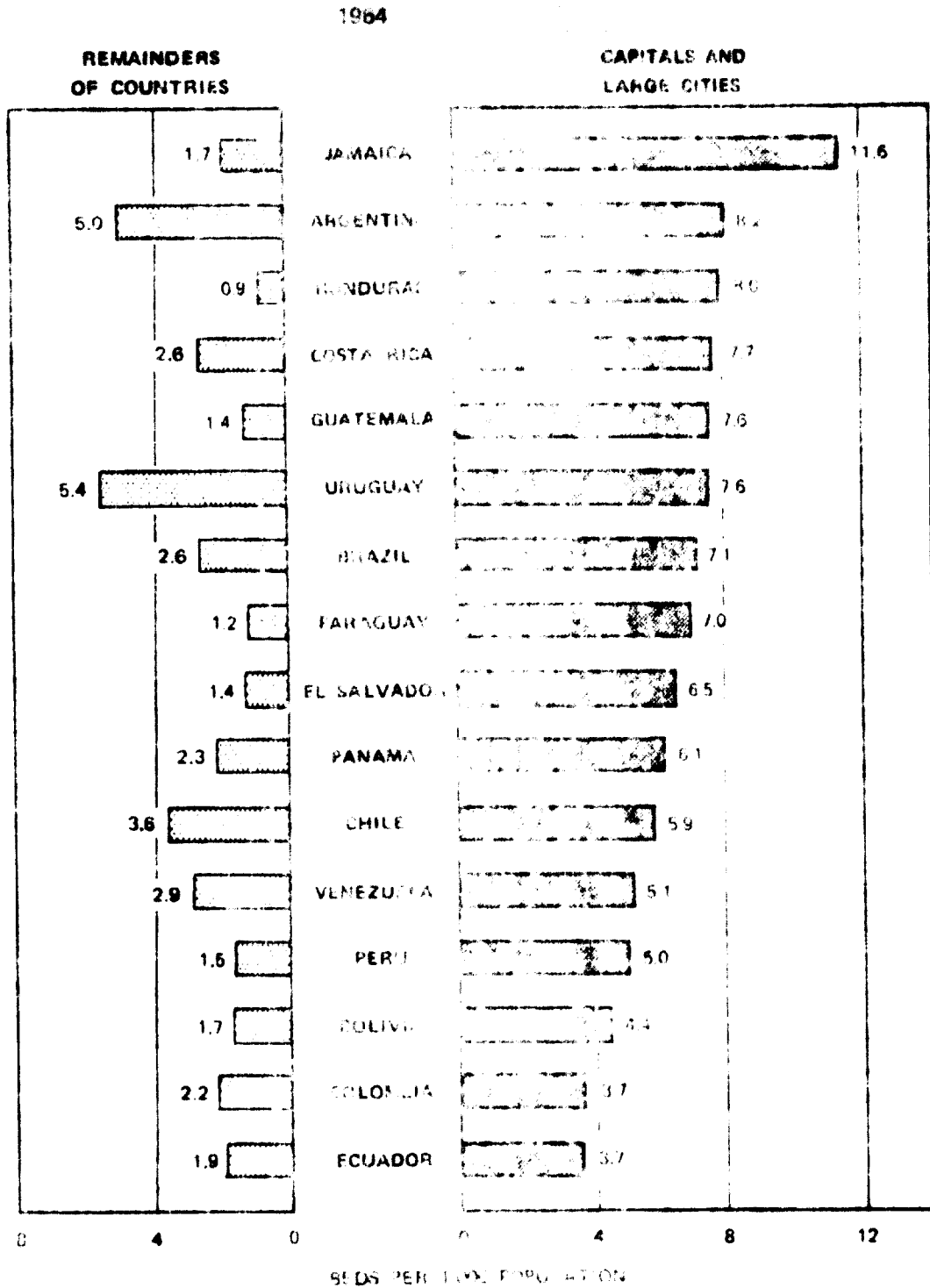


Figure 4 HOSPITAL BEDS PER 1,000 POPULATION IN COUNTRY CAPITALS, LARGE CITIES, AND REMAINDERS OF COUNTRIES IN LATIN AMERICA





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