

784711
p. 3

AGRICULTURAL

GEOGRAPHY

LIBRARY
AUG 13 1958
U. S. DEPARTMENT OF AGRICULTURE

OF

LATIN

AMERICA



FOREIGN AGRICULTURAL SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE

Committee of Associate Authors

Wilhelm Anderson

Gustave Burmeister

Nelson P. Guidry

Reginald G. Hainsworth

Arthur G. Kevorkian

Clarence M. Purves

Ruth P. Schottroff

Kathryn H. Wylie

Acknowledgments

The committee wishes to acknowledge its indebtedness to Arnold C. Owedal, Soil Scientist, Soil Conservation Service, who assisted in the preparation of the soil map and accompanying text.

In the Foreign Agricultural Service, Reginald G. Hainsworth, Economic Geographer, compiled the annual rainfall and soil maps and prepared the text for the climatic and soil sections, as well as the text for introduction, land forms and resources, and land utilization, and much of the crop and livestock text. Nelson P. Guidry, Economic Geographer, compiled and prepared the Latin American and world working base maps, the monthly rainfall orientation, and topographic maps, and the world and United States-Latin American trade maps. He also wrote the text for native vegetation. Ruth P. Schottroff, Economic Geographer, performed the statistical research on and preparation of the crop, livestock, and population dot distribution and circle maps and wrote the text on population. Arthur G. Kevorkian, Chief, Latin American Branch, and Kathryn H. Wylie, Assistant Chief in that branch, collaborated in the overall preparation of the Geography and prepared the text for the world and United States-Latin American trade maps and for the food per capita and self-sufficiency maps.

AGRICULTURAL

GEOGRAPHY

OF

LATIN

AMERICA



Contents

	Page
Land forms and resources	1
Production and consumption of agricultural products	6
Transportation	8
Relief	10
Climate	12
Vegetation	18
Soils	22
Population	25
Land use	31
Crops and livestock pattern	34
Corn	36
Wheat	40
Oats	44
Rye	45
Barley	45
Rice	46
Potatoes	48
Flax	49
Sugarcane	50
Tobacco	52
Cotton	54
Coffee	56
Cacao	58
Bananas	59
Citrus fruit	60
Apples and pears	61
Grapes	62
Dry beans	63
Peanuts	64
Manioc	65
Cattle	66
Swine	68
Sheep	70
Goats	72
Mules and asses	74
Horses	75
Meat	76
Wool	77
Latin America in international trade	78

May 1958

Introduction

This agricultural geography is intended to fulfill a long-time demand for a graphic report on factors underlying Latin America's agriculture. It has been prepared with the mutual trade interests of Latin America and the United States uppermost in mind, and is designed especially for use by the agricultural producer and trader, the business and government administrator, the professional man, the instructor, and the student.

Specially, the geography presents the distribution of Latin America's production of crops and livestock, and relates it to the requirements of the people. It pictures the trade between the United States and Latin America, and indicates the relation of that trade to world trade. It shows in general the climate, vegetation, and soil conditions that account to a considerable degree for the distribution of agricultural products—a distribution that gives rise to production of Temperate Zone commodities on the fertile plains of Argentina, coffee and cacao in the Tropics and subtropics, and sugar on the rich lands of Cuba.

The maps of Latin America were compiled on a base map adapted from "Map of the Americas." through the courtesy of the American Geographic Society of New York. For several international trade maps the Van der Grinten projection was used because on it the Eastern and Western Hemispheres are intact. To show the ocean currents and the relative size of Latin America and the United States, a Miller's cylindrical equal-area projection map was used.

For the maps and charts on production and population, data are from 1948 to 1956; accurate current data are not completely available now, and will not be at any foreseeable time.

For the density dot maps, a system of multiple uniform-size dots was used to show crop acreage and production and livestock numbers as nearly as possible in the production areas. Some generalization of the distribution of the dots was necessary because of the scale of the map and the general pattern of areas in which crops and livestock occurred. In many cases, the scales for individual maps were selected independently of other maps in order to best portray the subject matter. All the dot maps were prepared from data for the smallest statistical division for which figures are available or which are feasible on the scale of the map. The actual boundaries of the small divisions were printed in light nonphotographic blue on the base and therefore disappeared when the map was photographed for publication, for these boundaries could not be distinctly delimited and would greatly interfere with the presentation of the subject matter. For most of the crop maps, acreage rather than production was used since acreage is more stable than production. Only corn and wheat have dot maps for both acreage and production. This was done to show the relative variability in yields per acre.

Because of the importance of the Latin American market, a selection of maps has been devoted to the trade between the United States and Latin America—to both total and agricultural trade. These trade maps make up the last pages of this book, with exports shown in black and imports in red. For them, and for several other maps and charts, 1954 data were used; they are the latest comparable data available. (Text has been brought up to date wherever possible.) In that year, total trade was nearly balanced; the United States imported \$3.5 billion worth of products from Latin America and exported \$3.3 billion worth to it. In fact the United States does more business with Latin America than it does with all of Europe and with Asia, Africa, and Oceania combined. Nearly 80 percent of United States commercial exports go to Latin America.

Land Forms and Resources

The land area of Latin America extends all the way from the southern boundary of the United States to Cabo de Hornos (Cape Horn), Chile—from 33° N. to 56° S., covering 89 degrees of latitude. The distance is practically one-half that from the North Pole to the South Pole, and the 8 million square miles of land in the Western Hemisphere identified as Latin America represents about 15 percent of the earth's land area.

Fourteen of the Latin American Republics lie entirely in the Torrid Zone—in the hot middle belt of the earth. One of these, Ecuador, is even named for the Equator. Five of the remaining countries overlap either Cancer in the north or Capricorn in the south. Uruguay is the only one of the 20 Latin American Republics that lies wholly within the Temperate Zone.

In South America the widest part of the continent is in the Tropics—northward from Antofagasta, Chile, and São Paulo, Brazil. In North America, over half of Mexico is also in the Torrid Zone, as are the Republics of the Antilles and of Central America.

The common physiographic pattern of most of Latin America would be similar to the tropical lowlands of the Amazon Valley and the physical setting would be correspondingly unfavorable to the development of a high civilization were it not for the fact that altitude compensates for latitude over much of the area. The vast extent of the highlands determines the environmental conditions of Latin America south to the edge of the Argentine plains. The primary modifying factor is the unexampled mountain system of the Andes and its northern prolongation into Central America and Mexico. Only secondary in extent and importance is the Brazil Plateau.

Land Forms

The land form map of Latin America has been classified into four major groups, distinguished from one another on the basis of local relief and ruggedness: (1) plains, (2) plateaus and tablelands, (3) hill lands, (4) mountains.

Plains—surfaces with a local relief of less than 500 feet—make up about 42 percent of the land area in Latin America; in North America they make up only 26½ percent. The largest plains areas in Latin America are the valleys of the Amazon, Paraná, and Orinoco Rivers.

Plateaus and tablelands are elevated masses of land with moderately flat upland surfaces often dissected by stream valleys. About 33 percent of the land of Latin America is in this group. One of the largest is the Brazilian Plateau, which occupies the greater part of the southeastern part of Brazil. It is secondary in extent only to the Amazon River Valley. Another extensive plateau is the Patagonian, located in southern Argentina; and others are to be found in Mexico.

Hill lands have a local relief of from 500 to 2,000 feet, and are so dissected through stream erosion that few flat uplands occur. In many instances the hill lands are mountainlike in character in comparison to the adjacent plains. About 14 percent of the land area of Latin America falls into this category. The Guiana Highlands, which extend into southern Venezuela and northern Brazil and are still undeveloped, are believed to be of considerable potential value as a future area of settlement.

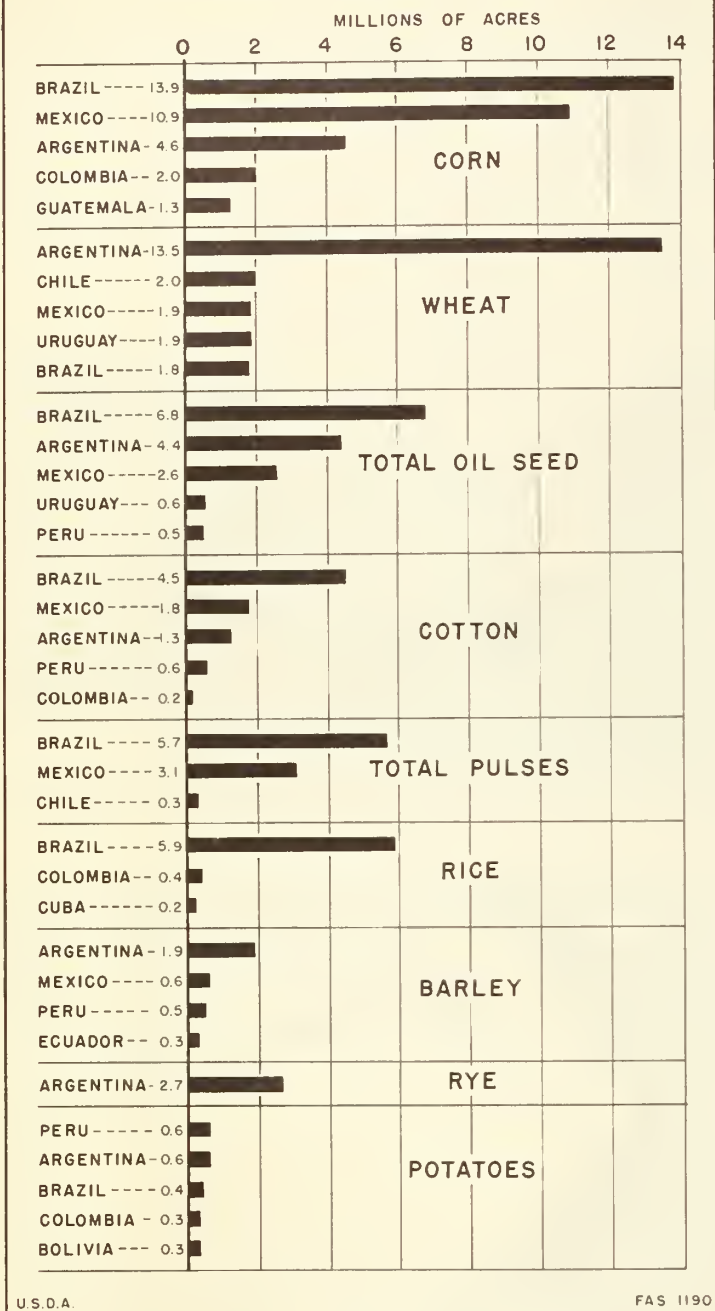
Other highland areas of Latin America are to be found in

Mexico, Central America, western Argentina, and near the Pacific coast of Chile.

Mountains, which have a local relief pattern usually over 2,000 feet, are generally more rugged than the hill lands and have a more complicated structure pattern. Approximately 11 percent of the Latin American terrain is in mountains. The Andes, with an average height of over 10,000 feet, are the highest of South America. They extend up the entire length of the South American Continent near the Pacific coast and into the western part of Mexico.



ACREAGE OF LEADING CROPS IN LATIN AMERICA, 1954



Cultivable Land

The land area in Latin America that has a topography suitable for crop production varies sharply from the plains area to the mountains. It is estimated that about 95 percent of the land in the plains is suitable for crop production, 75 percent in the plateaus, 25 percent in the hills, but only 5 percent in the mountain areas.

When climate and soil are considered, however, the percentages are much smaller. Less than 5 percent of the total land area of Latin America is cultivated. This compares with an average for the world of over 7 percent, a high of 37 percent for Europe, and an estimate of over 10 percent for the United States and Canada. Also, Latin America has only limited regions with an agricultural value comparable to that of the Corn and Wheat

Belts of the United States and Canada. However, it is credited with a proportion of well-watered land second only to that of Europe, although a considerable portion gets too much rain, which leaches the soil. No other continent except Europe has so small a proportion of land with a dry climate as has South America.

In Mexico the mountainous nature of the country makes cultivation of more than half of the land impossible. Lands in the highlands that have regular and sufficient rainfall or are artificially irrigated are scarce. The tropical lands that have sufficient moisture are fertile, but the presence of tropical diseases has retarded agricultural development. The remaining lands, which occupy an enormous expanse, are semidesert or desert and need irrigation to make them productive.

Central America provides sharp contrasts between (a) El Salvador's acre per capita of cultivable land—much of it not first-grade and needing advanced techniques for suitable utilization—its forests largely destroyed, and the ground water level falling steadily, and (b) Costa Rica's substantial stands of timber, localized concentrations of erosion-resistant soils, some excellent soil, and a quantity of fairly good unsettled farmland.

In South America, land with a slope of less than 8 percent that lends itself readily and safely to cultivation is extremely scarce except in the Pampas of Argentina, in parts of Patagonia, and in the Amazon Basin. The unfavorable situation of many of these level areas is because climatic variations run to the extremes of either too much or too little precipitation. The deficient rainfall that characterizes the great Peruvian desert extends across the highland of Bolivia into southern Argentina. In contrast the vast Amazon Basin of Brazil receives torrential rainfalls, and most of the region is densely covered by tropical forests. When the tree canopy is removed, the land suffers rapid leaching of principal mineral elements because of the violence of the tropical rains.

On the other hand, Latin America is using less than 40 percent of the land adapted to food crops, so the prospect of substantial expansion in food production exists by taking up new lands if possible or applying intensive agricultural farming practices on land now in cultivation. Latin America shows a favorable balance compared with North America and the Western European countries, which already have 55 to 60 percent of their suitable area in food crops, and Asia, which has over 80 percent. South America has more than four times as much cultivable land per capita as Asia and 50 percent more per capita than Europe.

There are some splendid unoccupied soils in Paraguay and eastern Bolivia, and the soil of the Argentine Pampas can take as much punishment as can perhaps any other in the world. Even Mexico has some rich farming areas, especially in the south, that are undeveloped and capable of producing tropical crops of high value.

Forest Resources

The forests of Latin America represent the largest reserve of unexploited forests in the world. Brazil alone contains about one-tenth of the forest area of the world, with an estimated 22 acres per capita, or about five times the per capita forest area of the United States. Although Latin America as a whole is endowed with far more forest area per capita than any other major region, the proportion of the forest area that is productive and accessible is smaller than that of the United States and the Western European countries. In Brazil, 60 percent of the forest is presently

inaccessible, so the country actually has less productive and accessible forest area than the United States.

A look at the distribution of forest resources among the 20 Latin American Republics shows an uneven pattern. For example, Brazil has 56 percent of its area in forests, Peru has 53 percent, while Argentina has 25 percent. Chile has 22 percent, while Uruguay has only 2 percent.

The qualitative appraisal of Latin America's forest reserve is even more important, since countries that have abundant supplies of softwoods have a great competitive advantage in developing and maintaining an industrial economy. Latin America's relative scarcity of softwoods is particularly significant. While well over half of the productive forested area of the United States and three-fourths of the European area consist of softwoods, Latin America has only 2 to 3 percent in softwoods. Hardwoods have great value, but so far they have been used more for specialty woods than for the general utility woods required in industry.

Productivity in Agriculture

In Latin America more than two-thirds of the people are directly dependent upon farming as a major source of income. They produce about one-tenth of the food and fiber output of the world. The sale of agricultural commodities is the chief source of foreign exchange in many countries. This exchange is needed to finance the capital equipment required for industrialization and for the transportation facilities as well as the purchasing of the foreign manufactured goods that are needed for domestic consumption.

During the past decade the per capita food supply inside Latin America has been increased, but extreme deficiencies in diet continue to characterize the area except for possibly the River Plata countries. The 2½ percent per year growth in population in Latin America, which incidentally is the highest in the world, exerts a steady pressure upon the productive capacity of the agricultural forces.

Despite the efforts of local government and the technical and economic assistance that has been furnished by other governments and private organizations, the productivity of the large amount of manpower in Latin American agriculture is still low. It is estimated that productivity per man-hour in agriculture may have been as little as one-fifth that of the United States before World War II. Owing to the rapid development in this country and the many problems that have confronted agricultural development in Latin America, the relationship probably has become even more unfavorable since that time.

In general the system of land tenure that dominates Latin America has not resulted in a satisfactory adjustment between population and land resources. Many authorities in the field have said that the primary problem is that a small group of landowners control most of the productive land of Latin America, and that many in this group key their production to immediate gains. This attitude has resulted in overconcentration on a few crops suitable for export, the holding of land unproductively to permit quick shifts into such crops as world markets indicate, and the development of a transportation and marketing mechanism adjusted to the demands of export markets rather than to the broadening of the domestic market.

Progress in Agriculture.—In 1955–56 the index of total production of principal crops and livestock in Latin America was

Index of volume of agricultural and livestock production in Latin America, by country, 1955–56 and 1956–57

[1935–39=100]

Country	Total		Per capita	
	1955–56	1956–57	1955–56	1956–57
Argentina.....	103	112	67	71
Bolivia.....	125	134	104	110
Brazil.....	152	150	110	106
Chile.....	140	137	93	88
Colombia.....	180	181	121	119
Costa Rica.....	208	233	128	137
Cuba.....	172	197	115	129
Dominican Republic.....	150	169	96	107
Ecuador.....	231	247	170	178
El Salvador.....	180	198	133	144
Guatemala.....	158	168	108	112
Haiti.....	150	124	116	95
Honduras.....	158	147	92	83
Mexico.....	258	250	157	148
Nicaragua.....	334	365	234	248
Panama.....	189	192	121	120
Paraguay.....	120	122	67	67
Peru.....	150	151	105	103
Uruguay.....	135	122	107	95
Venezuela.....	181	190	104	105

Index of total and per capita production of principal crops and livestock products in Latin America

1935–39=100

	Total Production	
	1954–55	1955–56
Total.....	141	141
Total, less Argentina.....	161	164
Food.....	144	143
Food, less Argentina.....	162	163
	Per Capita Production	
	1954–55	1955–56
Total.....	98	96
Total, less Argentina.....	114	114
Food.....	100	98
Food, less Argentina.....	113	113

Consumption of fertilizer in the Americas and in Europe

Area	Nitrogen		
	1936–38	1948–49	1954–55
	1,000 tons	1,000 tons	1,000 tons
South America.....	35	55	110
North and Central America.....	419	1,011	2,216
Europe, excluding U. S. S. R.....	1,430	1,776	2,833
	Phosphoric Acid (P ₂ O ₅)		
	1936–38	1948–49	1954–55
South America.....	24	88	121
North and Central America.....	784	1,985	2,480
Europe, excluding U. S. S. R.....	2,252	2,515	3,440
	Potash (K ₂ O)		
	1936–38	1948–49	1954–55
South America.....	11	20	55
North and Central America.....	460	1,084	1,974
Europe, excluding U. S. S. R.....	1,851	2,308	3,340



41 percent higher than the average annual output for the period 1935-39, although production per capita was 4 percent under the average. If Argentine production is deducted from the total, however, total production shows a 64-percent increase over prewar, and per capita output a 14-percent increase.

Production changes vary widely between countries, with Argentina showing a decline both in total and per capita output below prewar. On the other hand, Mexico and Central America have had a sharp increase in production, both total and per capita.

A review of the current agricultural situation in Latin American countries shows that considerable progress has been made in the use of machinery, fertilizer, fungicides, and pesticides in recent years. This can probably be attributed to the favorable level of farm commodity prices relative to the prices of these production aids, as well as to changes in the labor supply in some countries.

The number of tractors in Latin America rose from 20,000 in 1930 to 70,000 in 1948-49, but the rate of increase was well below that of North America and Western Europe. In 1948-49, Latin America still had only about 1.3 percent of the world's tractors on 6.3 percent of the world's cropland. Since then, progress has been better, and in 1954 the number of tractors used for agriculture in Latin America totaled 190,000. However, this still gave Latin America only 2.6 percent of the tractors in the world used for agriculture.

In Latin America as a whole the overwhelming bulk of draft power on farms continues to be supplied by animals. But, in North America the dependence on mechanical power is rising.

This permits a greater speed of operation and releases about 2.5 acres of land for each animal displaced.

The consumption of fertilizer in South America increased by over 130 percent from 1936-38 to 1948-49, and by 1954-55 had increased to over 300 percent. The production of nitrogen in Latin America is considerable, but it rose only from 240,000 tons in 1938 to 324,000 tons in 1954-55, whereas there was a four-fold increase in production in North America.

Immense progress was being made in the development of pesticides (insecticides, fungicides, and weed-killers) in Latin America, but here too consumption has tended to proceed most rapidly in countries where scientific agriculture is most advanced. Latin America is handicapped by lack of trained personnel to demonstrate efficiency of use and potential benefits and by such other factors as lack of equipment for application. Estimates indicate that insects take from one-tenth to one-fifth of most Latin American crops, especially the cereals.

Estimated tractor inventories in the Americas and in Europe

Year	Latin America	North America	Europe
	<i>1,000 units</i>	<i>1,000 units</i>	<i>1,000 units</i>
1930.....	20	1,020	110
1939.....	35	1,597	505
1949.....	70	3,700	501
1954.....	190	4,771	1,660
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
Percent increase 1954 over 1930.....	850.0	367.0	141.0

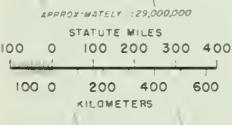


ATLANTIC OCEAN

PACIFIC OCEAN

SOUTH AMERICA IDENTIFICATION

- International boundary
- State or province boundary
- Road (selected)
- Pan-American highway
- ⊙ National capital
- Railroad (selected)
- Salt flat
- Marsh or swamp



LAND AREA OF 20 LATIN AMERICAN REPUBLICS



USDA FAS 1333

Production and Consumption Of Agricultural Products

Latin America is one of the agricultural surplus producing areas of the world. It does, however, need to import some rice, fats and oils, and dairy products. And, though the area as a whole is a surplus producer of wheat and corn, by and large the countries of the area, except Argentina and Uruguay, import wheat or wheat flour or both. The northern Republics of the area look north to the United States and Canada to supply their wheat needs, whereas much of Argentina's wheat goes to Europe. For rice, Latin America as a whole is deficit, mostly because Cuba needs large imports. But it is also a substantial producer, particularly Brazil and Ecuador. Coffee is by far the principal export from Latin America in terms of value, but the region also supplies the world large quantities of cacao, sugar, and cotton. Except for cotton, a good portion of these exports finds customers in the United States.

Production

Both production and trade in agricultural commodities have been rising in recent years. By 1950, total output in Latin America was almost a fifth higher than it was in prewar years, and, when Argentina's production is excluded, output was a third higher.

During the 20 years since 1937, Latin America has maintained or strengthened its share of world production for many crops, even though the world totals have been rising. Wheat, cotton, rice, tobacco, cacao, and sugar are examples. A few notable exceptions are corn, coffee, and bananas. But Latin America still produces four-fifths of the world's coffee and bananas and almost 12 percent of its corn.

A moderate flattening out of the upward production trend in the past 2 or 3 years indicates that the impetus toward even larger crops in northern Latin America may be slowing down. But production in Argentina is likely to increase over the next few years, so the total output for Latin America may be expected to continue moving up.

Surplus Producers

The principal surplus producing countries are Argentina with its corn, wheat, meat, and wool; Uruguay with its wheat and wool; Brazil with its coffee and cotton; Cuba with its sugar; Colombia with its coffee; Peru with cotton and sugar; and Mexico with cotton and coffee.

Certain of these countries are also deficit in agricultural commodities. Brazil, for example, must import two-thirds of its wheat requirements, and Cuba imports about one-third of its total food needs.

The surplus producers, by and large, produce for the export market. Brazil ships abroad about 80 percent of its total coffee output and about half of its cotton; Cuba exports 95 percent of its large sugar crop; Mexico exports 80 percent of its cotton and 85 percent of its coffee; and Argentina ships half its wheat production and usually a half to three-quarters of its corn.

Self-Sufficiency in Foods

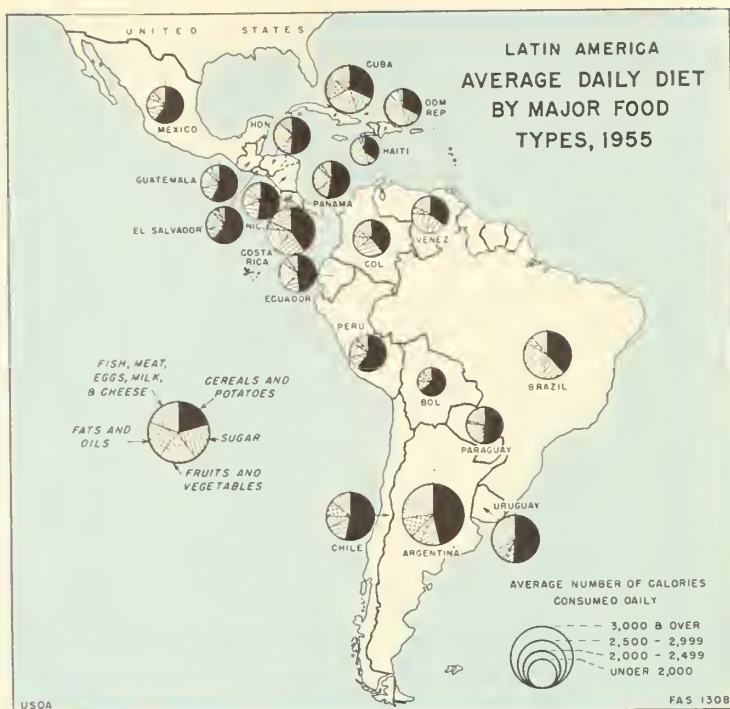
On the basis of the calorie value of the food consumed, Argentina is practically self-sufficient. Mexico is a close second. The Dominican Republic is third, supplying about 96 percent of its total food consumption in 1955.

These three countries, however, have widely differing levels of food intake, resulting partly from differences in per capita income and partly from differences in quantities of available foodstuffs. In Argentina, for example, production of grains, meats, dairy products, and fats (all important sources of calories) provides surpluses for export as well as supplies for an adequate per capita consumption of these foods within the country. Cuba on the other hand, imports a third of its food requirements, but its per capita calorie intake is high—about the same as Uruguay's and slightly less than Argentina's in number of calories consumed per day. Cuba's large sugar output provides the means to pay for heavy imports as well as a relatively high standard of food consumption.

Precise data for many of the Latin American countries are not available to allow accurate calculation of the degree of self-sufficiency or the level of food consumption, but according to recent estimates five of the countries produce 90 to 95 percent of their total food intake (Guatemala, Haiti, Honduras, Nicaragua, and Colombia), five others are 85 to 90 percent self-sufficient (Panama, Brazil, Ecuador, Peru, and Uruguay), three produce from 80 to 85 percent (Costa Rica, El Salvador, and Paraguay), another—Venezuela—imports a quarter of its food needs and two—Bolivia and Chile—about 30 percent of their total consumption. Bolivia, Chile, and Venezuela are all countries that earn most of their foreign exchange from export of mineral products, whereas the other countries of Latin America depend on agriculture to pay for imports of commodities they need from outside their borders.

Many of the countries are driving to become self-sufficient in the production of basic food items. This drive has resulted in increased food production particularly in the northern countries of the area. Mexico, for example, formerly an importer of sugar and wheat, now is self-sufficient in these products; the Dominican Republic, Colombia, and Panama, all net importers of rice just after the war, now grow all their requirements.

Seventeen countries import varying quantities of wheat; 7 of them import all of their total requirements. For most of the 17, wheat or flour or both are the most important import. An exception is Chile, where the principal import is sugar. Some years ago Chile was self-sufficient in wheat production, but output has not kept up with population growth, and it is now necessary to import about one-quarter of total consumption. Colombia and Ecuador have had some success in increasing wheat production, but Colombia still imports 40 percent of its total supply and Ecuador, about 60 percent. Brazil imports more wheat than all other Latin America countries combined. Although output is rising steadily, imports still account for 85 percent of total consumption.



Cuba is the principal rice importer in the Hemisphere. In 1955 it purchased from the United States more than half of its total consumption. Cuba is also the principal lard importer in the Hemisphere, importing most of its total consumption from the United States, too.

Levels and Composition Of Food Consumption

Increases in output as well as in purchasing power have led to a higher food consumption in several countries than obtained before the war. Argentina's consumption remains about the same; that country had high per capita food intake in the early years.

The levels of food consumption vary between countries ranging from a low of just under 1,700 calories per day in Bolivia to more than 3,000 calories in Argentina. The people in half of the countries appear to eat between 2,000 and 2,500 calories per day. Here, again, the available data may not measure all the food eaten because of unreported production or inadequate statistical procedures. Brazil and Chile consume between 2,500 and 2,750 per capita, with Uruguay, Costa Rica, and Cuba all eating more than 2,800 calories per day on an average. Compared with other areas of the world, Argentina ranks with the United States, Canada, Australia, and Denmark in total caloric intake; Bolivia and Haiti, on the other hand, are similar to Ceylon and India.

The countries with large Indian populations tend to get their principal calories from cereals and potatoes. In Bolivia, for example, 65 percent of the total food is cereals and potatoes, and in Mexico, Peru, and Guatemala the percentage is close to 60. In the Dominican Republic and Cuba, on the other hand, these foods supply only a third of the total. As expected, Argentina and Uruguay have the largest meat consumption. Meat, fish, eggs, and dairy products supply one-quarter of Argentina's total and one-third of Uruguay's.



The high proportion of total calories supplied by fruits and vegetables in Brazil and possibly in Haiti is accounted for by the fact that manioc has been included as a vegetable rather than as a cereal. In the tropical areas, bananas and plantains furnish a large percentage of the calories in the fruit and vegetable category.

Increases in the per capita income levels as well as expanded programs of development that will raise the productivity per worker are needed to enable the low-food-consuming countries to eat better than they now do. The countries in the middle brackets already are making progress and the next few years will probably see continued increase in the level of food intake as well as in the quality of the diet.



Transportation

Better transportation in Latin America is an important key to expanding national markets and developing the hinterland.

Many of the Republics have some good road systems. And travel by steamer and airplane is often as luxurious as it is anywhere else in the world. But in all of Latin America, transportation facilities are limited, although substantial advances have been made in the last decade.

The entire area has only about 85,000 miles of railroads—about one-third the mileage in the United States, which is less than half the size of Latin America. Argentina, Brazil, and Mexico have the most railway mileage in Latin America, but much of it needs improvement and renewal. All three countries in recent years have obtained large credits to rehabilitate their railway systems. In other Latin American countries, much of the railway system has long winding trackage, steep grades, and sharp curves as a result of the rough terrain of the area.

The highways of Latin America are getting much more attention than the railroads. In many areas, the belief is being expressed that further development of land transportation should stress the building of highways rather than the extension of railroads. The Pan-American highway system has given road building a tremendous stimulus. During the past decade, much effort has been made to connect the principal cities and farming areas by an adequate road system. Latin America now has about 430,000 miles of highways—less than a fifth of the mileage in the United States. More than 70 percent are unsurfaced; only about 35,000 miles are paved with cement or some type of bituminous material.

Air transportation was hailed hopefully in Latin America in the early 1940's as being suited to the area's requirements; it could avoid the forbidding geographical obstacles—the jungles, deserts, and high mountain ranges—that balked surface facilities. Air transport quickly became a boon to passengers, but it was slower in helping to solve the problem of moving bulk freight. Since 1950, however, bulk freight movement by air has been steadily improving. Many small operators are engaged in short-haul common-carrier services. These feeder services reach virtually all regions of the area.

Still, most of the heavy cargoes of Latin America move either by truck or by coastal steamer or river boat. In some countries, particularly Chile and Brazil, coastal shipping is vitally important. In fact, it is Brazil's only truly national transportation system.

In its rivers, Latin America has four of the world's greatest water systems—the Amazon, Río de la Plata, Magdalena, and Orinoco. Only on the Amazon, which is in effect an estuary, can oceangoing ships make their way far into the interior.

More than 25,000 miles of Latin America's rivers are navigable—15,000 miles of which are in Brazil. But most of Brazil's hundreds of rivers are laced with rapids and shoals, so that freight carried along them frequently has to be portaged. Even with these drawbacks, which add to the cost of transportation, considerable tonnage is moved annually over these rivers, not only in Brazil but elsewhere in Latin America. Argentina and Uruguay have the only important agricultural region in South America that is readily accessible by water highways.



LATIN AMERICA: HIGHWAY AND RAILROAD MILEAGE, 1955*

THOUSANDS OF MILE



SOUTH AMERICA TRANSPORTATION

- | | |
|--|--|
| Road or route (selected) | ▲ Airport or landing field |
| Pan American highway | ⚓ Seaplane anchorage |
| Highway or road proposed or under construction | ● City or town with an airport |
| — Navigable stream | ○ Other city or town |
| - - - Stream (selected) | — Railroad |
| — Salt flat | - - - Railroad, proposed or under construction |
| <u>Santos</u> Principal port (underlined) | — International boundary |



Relief

Relief (topography) is one of the important physical factors affecting agriculture in Latin America. Mountainous terrain restricts agriculture to high plateaus and small coastal and river plains in Central America and many South American countries.

There are few extensive areas of flat terrain in Mexico, Central America, and the Caribbean Islands. Plains and lowlands usually occur as narrow coastal plains and river valleys. Major exceptions are the wide coastal plains of the Yucatán Peninsula, which include areas in Honduras and Guatemala, and the even terrain of Cuba. Mexico is dominated by three mountain systems; the southern one extends into Central America and north-west Colombia.

Another mountain system extends southeastward from narrow plains in Nicaragua along the Isthmus into northwestern Colombia, and covers most of Costa Rica and Panama.

Seven physical divisions are important in South America:

The Andean Mountain system extends for over 4,000 miles along the west coast of South America. Its average height is about 10,000 feet but some volcanic peaks rise above 20,000 feet. The Andes is a complicated system of ranges, varying from 200 miles to 600 miles in width. Agriculture in the region is limited to mountain valleys and plateaus.

The Brazilian Highlands cover over one-half of Brazil. They extend from northeast Brazil to northern Uruguay. The region is characterized by steep escarpments along the eastern Atlantic coast. Irregular mountain ranges, 1,000 to over 5,000 feet, form high plateaus throughout the region.

The Guiana Highlands are similar, but less extensive. They

extend through southern Venezuela into northern Brazil and in the southern part of the Guianas.

The Orinoco Plain lies between the Andes of northwest Venezuela and the Guiana Highlands. It consists of an alluvial lowland with interstream ridges, low hills, and basins. It merges in the west with the Andes, and its lower portion projects seaward in the form of a delta into the Atlantic Ocean.

The Amazon Plain is the largest homogenous natural region in Latin America. It extends 2,000 miles from the Atlantic through Brazil to the Andes in Peru, and embraces part of Bolivia, Peru, Ecuador, Colombia, and Venezuela. It consists of level alluvial lowlands, or flood plains, and well-dissected undulating-to-rolling uplands. The flood plain extends irregularly along the Amazon River and its tributaries and consists of about 10 percent of the Amazon Plain. The rest is upland.

The Paraná-Paraguay Plain consists of the Pampa of Argentina and the Gran Chaco, taking in part of Argentina, Paraguay, and Bolivia. Along the Paraguay and Paraná Rivers are broad swamps and lagoons. In rainy seasons the flood waters create large lakes and confuse the drainage pattern. Most of the Pampa is a flat plain with slight undulations and isolated depressions.

The Patagonian Plateau, mainly in southern Argentina, is partly a piedmont plateau. Its major features can be attributed to water and wind erosion. Depressions, or basin like areas, are partly filled with water in winter that evaporates in summer and leaves a crust of salt, forming salt flats. A sub-Andine trough separates the plateau from the Andes in the west.



Climate

About half of Latin America has not been developed for production of most commercial agricultural commodities because it is too hot and humid, just as half the United States and Canada is too cold for them. The area has too much rainfall in most of its tropical lowlands and too little on the west coastal plains of Peru and northern Chile, western and southern Argentina, and northern Mexico. Because of its narrowness in the south, the South American Continent has only a relatively small area of the middle-latitude lowlands that are suitable for agriculture.

Principal agricultural producing regions of Latin America are in southeastern Brazil, the plains of the River Plata, Central Valley of Chile, irrigated coastal valleys of Peru, and the highlands of central Mexico and western Central America, and in the Andes where altitude offsets the tropical climate of these latitudes.

The tropical latitudes of South America, however, are favored with other highlands, the Brazilian and Guiana Highlands, where the climate makes for comfortable living and is suitable for the production of commercial agricultural products.

The great areas of potential production are in the tropical lowlands. These are the regions that will supply an increasing part of South America's economic products.

Climatic Diversity

Latin America has a highly varied climate, although most of the land lies within the Tropics, or low latitudes. The variety arises from the great length of the area, its separating two oceans—sometimes by a few miles only—and the presence of many mountains, among them some of the world's longest and highest. Throughout most of their length, the high mountain chains form an effective barrier, climatically as well as physically, greatly influencing the climatic pattern of this region.

Southern Mexico, Central America, and the Caribbean lie in the trade wind belt. Air masses passing over the warm waters of the Caribbean Sea and the Gulf of Mexico become very warm and moist. This, and the changes in pressure, and the accompanying changes in wind direction are important factors affecting the climate. In the northern part of Latin America—along the northwest coast of Mexico—the cool California current governs the climate to a great extent.

Climatic diversity is especially great in the Andes. There, as in any mountain region, the kind of climate depends on exposure to sunlight and to rain-bearing winds and on elevation; each 300–400 feet of altitude makes a difference of 1 degree in temperature.

South American climate resembles Africa's more closely than it does North America's; for most of North America lies in the intermediate latitudes, while both South America and Africa have broad expanses of territory within low latitudes.

However, South America projects far into temperate latitudes; it is the only southern continent that does so. It tapers poleward and its narrow southern portion is not subject to extremes either of heat or of cold. The Polar air masses around the southern tip of South America are maritime and moderate in temperature. Even in Tierra del Fuego—over 55° south of the Equator, the temperature averages above 32° F. in the coldest month. In general, temperatures unusual for a given latitude in South

America are to be found at the elevated levels of the Andean region, all the way from the Isthmus of Panama to Cape Horn.

Rainfall

The heaviest rainfall in Central America occurs between May and November. The driest months are January, February, and March, with an average of only 3 inches along the Pacific coast. An average annual rainfall of 254 inches has been recorded on the east coast of Nicaragua at San Juan del Norte.

In the Caribbean the rainfall is also heavier in summer. Moreover, it is heavier and more evenly distributed on the highlands than in the valleys. Average annual rainfall varies widely in the area—all the way from 20 to over 200 inches.

South America has three zones of climate—the Mata, the Sertas, and the Serra. The Mata takes in the coastal margin where abundant rainfall supports a tropical rain forest. The Sertas include the upland and other areas where scant rainfall permits the growth only of drought-resistant brushwood and grasses. The Serra is the area of mountain ranges that rises above the Sertas and induces enough rainfall to maintain luxuriant vegetation.

The widest expanse of uniformly heavy rainfall to be found anywhere in the world is in the Amazon Basin, open to the east and offering free access to the trade winds.

Para has an annual rainfall of 87 inches, Manaus 66, and more than 70 inches probably falls over an area of more than 2 million square miles, but weather-recording stations are few. Westward, as the Andes are approached, the rainfall is still heavier, since the easterly winds are forced to ascend. Iquitos has over 100 inches annually.

This heavy precipitation throughout the Amazon Basin ensures an abundance of water; the discharge of the Amazon far surpasses that of any other river in the world. The level of the river varies from season to season, however; for most of the basin lies south of the Equator, and the important southern tributaries of the river are in the Southern Hemisphere. This area has a marked dry season in August and September, when the level of the main river falls, and a wet season in March and April, when the southern tributaries flood and the level of the Amazon rises—sometimes as much as 40 feet, converting the whole basin into a vast swamp.

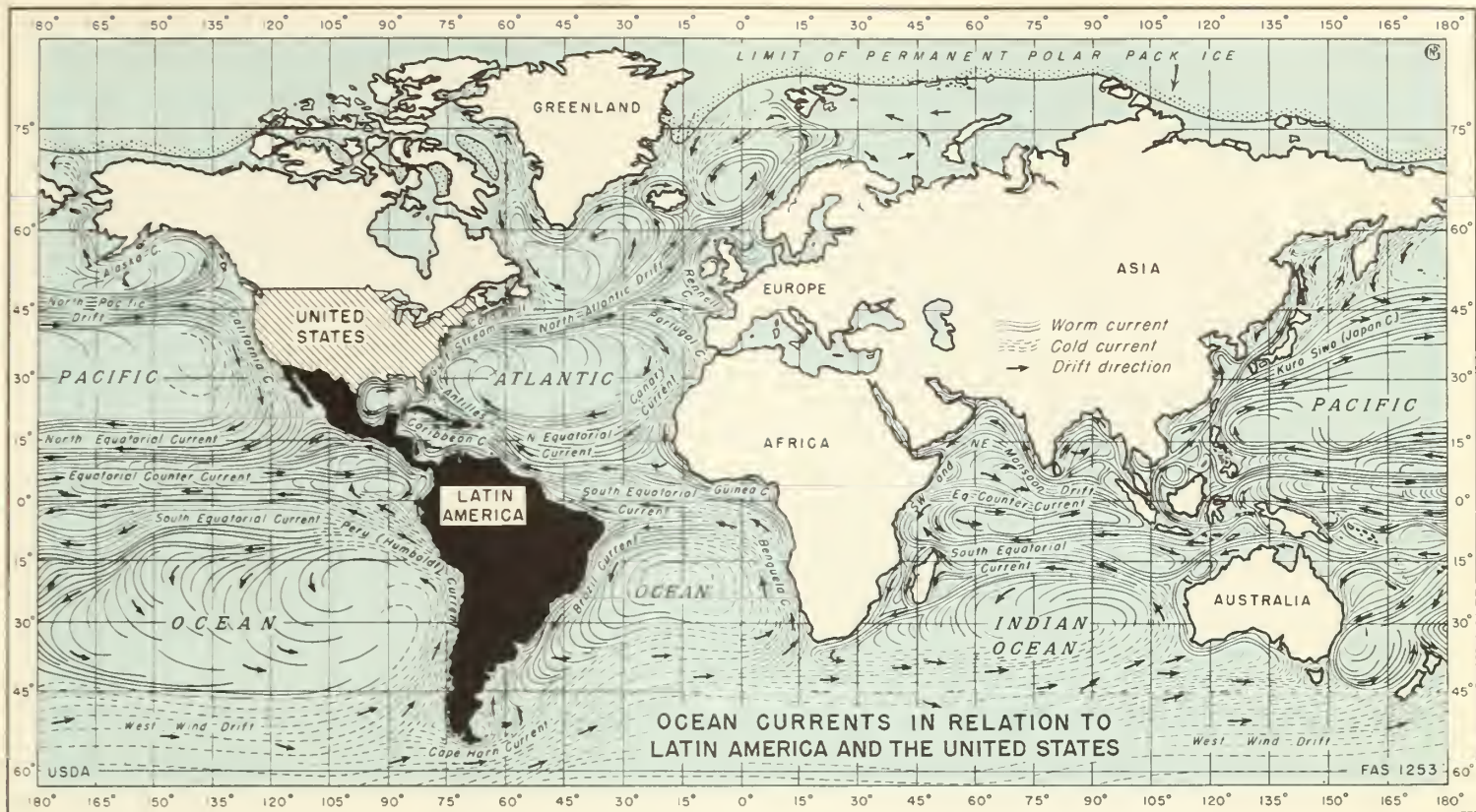
Separated from the Amazon Basin by the Andean Divide is another area of heavy rainfall—the west coast of Colombia, washed by the warm waters of the Equatorial Counter Current. It receives more than 100 inches annually and, in places, as much as 300 inches. Buenavista, for example, has 281 inches.

Here, the on-shore prevailing winds move inland throughout the year toward the lower pressure of the interior. The mountain ranges rising abruptly only a short distance inland forces the warm moisture-laden winds to release their moisture.

Distribution of Rainfall

Distribution of rainfall in South America is greatly affected by the strong ocean currents on the east and west coasts, and by the prevailing trade winds, the moisture content of which is determined by the high-pressure areas lying adjacent to the shores.

The permanent high-pressure areas are over the South Atlantic



and Pacific Oceans, between the 20th and 40th parallels. Trade winds originating from these areas will be dry upon reaching the land, and will tend rather to absorb than to deposit moisture.

The equatorial belt of low pressure overlies the northern half of South America throughout the year. There is an accumulation of warm ocean water in the western Atlantic in these latitudes, so all the easterly winds are warm and moist and lack the drying effect characteristic of trade winds farther south. These moisture-laden winds penetrate the interior to the Andes slopes, supplying a maximum amount of rainfall.

The South Equatorial Current splits at the northeast corner of the continent, going north at Natal, Brazil, and south from Recife, Brazil, bringing warm air to the eastern coast.

The cold Peru (Humboldt) Current flows close inshore on the west coast all the way from 40° S. to the Equator. There, near the border between Ecuador and Peru, the warm current is diverted; thence, south along the Peruvian and Chilean coasts to the neighborhood of Coquimbo is one of the most remarkable desert regions in the world. This section of coast is practically rainless, though the heavy mist that hangs over the land for much of the year provides a minimum of moisture. In passing over the land, the moist cool ocean air is warmed, with a consequent decrease in relative humidity; as a result the vapor does not condense until it has reached the high Andes, where temperatures are much lower than on the coast. The only break in the monotonous dryness comes at irregular, widely separated intervals. And the only continuous vegetation is in the narrow valleys cut by streams that flow down from the Andes; where there is enough water, it provides the basis for an intensive development of irrigated agriculture. Elsewhere, the country is barren and desolate.

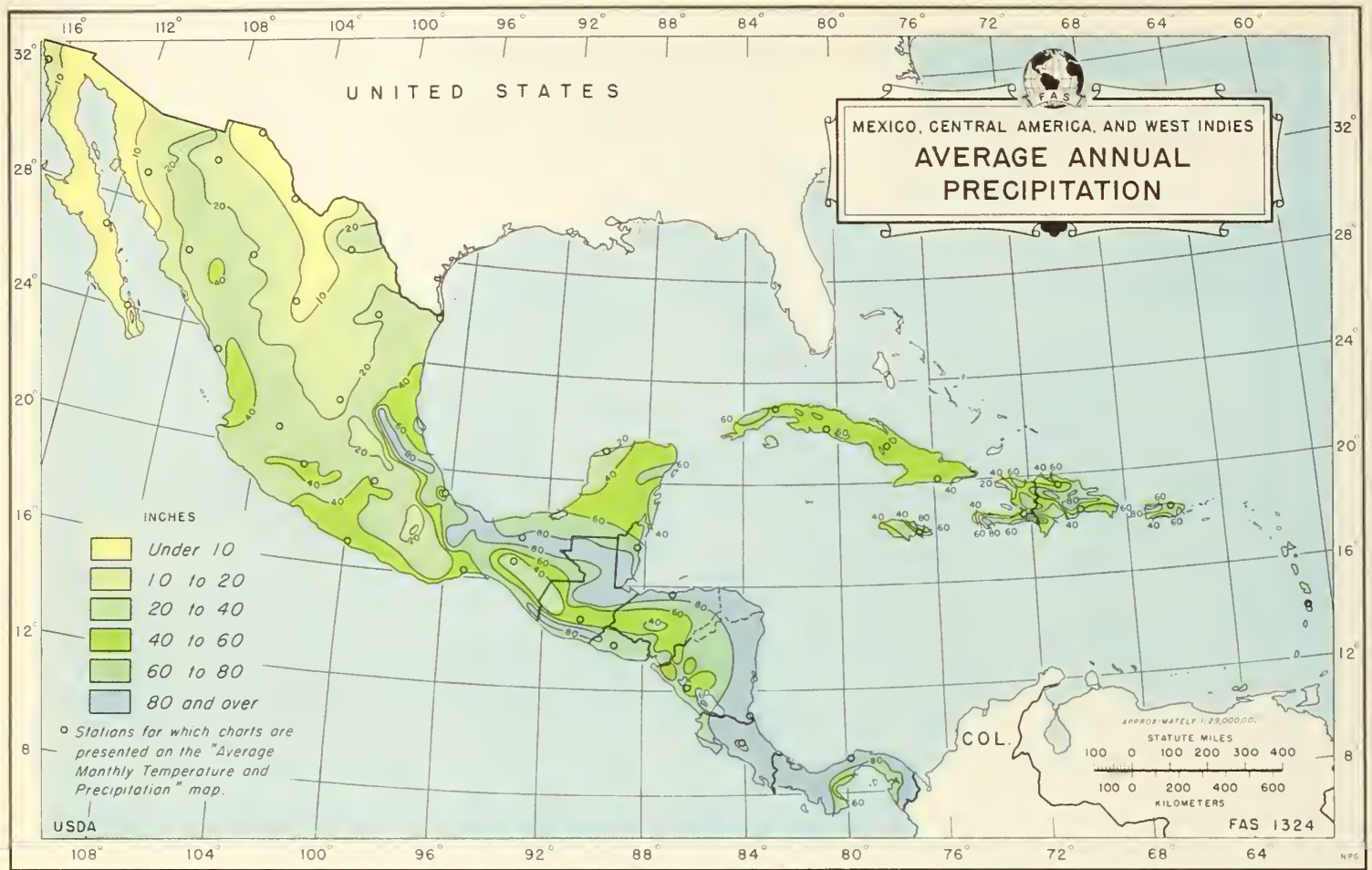
Halfway down the length of Chile, the rainfall increases, becoming moderate to heavy toward the south. The climate of Chile's southern coast is similar to that of the Pacific Coast of North America from Oregon to southeastern Alaska. The western slopes of the Andes have an annual rainfall of 100–200 inches. It is a region of dense forests on saturated swampy ground. Rain falls on 6 days out of 7 at Evanjelistas Island. The summer season has moderate rainfall but the winters are excessively wet. Condensation of moisture from the ocean progresses from the shores up to the crests of the Andes. By the time the air passes these elevations the moisture has been so depleted that the winds on the leeward slopes are dry, becoming more and more so as they are warmed on reaching lower levels.

The mountains cast a great rain shadow over southern Argentina. For example, Patagonia has less than 10 inches of rain, which is fairly evenly distributed throughout the year. Near the tip of South America, the contrast in rainfall is sharp: within 200 miles, it varies from 100 inches on the west slopes of the Andes to 10 inches on the east.

Temperature

Low latitudes are generally thought of as being intensely hot, with no cool season and with high average temperatures and humidity. Such extremes in high temperatures are found in the equatorial regions of South America; they compare to those that occur during a summer heat wave in the North American Corn Belt. But Mexico, too, lies in the low latitudes and does not necessarily have a hot climate because of its position on the map: its temperature is influenced greatly by altitude, nearness to water, atmospheric pressure, rainfall, and ocean currents.

The temperatures of Mexico can be thought of as falling into



three general classes: they are hot along the coast up to an elevation of 2,000 feet; temperate from 2,000 to 6,000 feet; and cold from 6,000 feet up. Temperatures in these regions are not stable, however. Severe winds along the coasts cause drops in temperature of as much as 50° F., and, in the dry areas, the temperature in summer and winter differs greatly. On the Central Plateau, it is relatively uniform, ranging from 50° to 70° F. On the east coast, it is lower; but in places sheltered from the wind the humidity seems to make the air feel hotter. In such valleys as the Balsas, there is no frost, but the highlands on either side have at least 20 frosts a year. The tip of Mexico, in Yucatan, can be considered tropical, with a generally uniform temperature and variable rainfall. The range in temperature from summer to winter is about 11° F. at Campeche to 7.5° at Progreso.

In Mexico as a whole the temperature range may be as much as 40° or 50° F. between January, the coldest month, and May, the warmest. Rainfall varies greatly—from as little as 2 inches in the State of Sonora to as much as 185 in the tropical lowlands of Tabasco.

Central America extends from the northern boundary of Guatemala at 18°3' N. to the southern boundary of Panama at 7°12' N. Hot humid swamps and lowlands run along both the east and west coasts, but in the interior are highlands with a temperate climate.

In temperature, South America is the most equable of all continents. Its greatest breadth lies across the Tropical Zone, where the mean annual range in temperature is small throughout the

world and especially so in this continent. In its inner Tropical Zone, between 10° N. and 10° S., the range is seldom more than 3 degrees.

In January the highest temperatures are found in the Gran Chaco regions of northern Argentina, Paraguay, and southern Bolivia. In July the hottest part of the continent is in Venezuela and the Guianas. At elevations between 3,500 and 5,500 feet the temperature varies from 70° F. to 65°; at the levels of 7,500 to 9,500 feet it seems to be uniform—from 60° to 57°; and at high levels of 11,000 to 15,000 feet the mean appears to be mostly between 50° and 40°.

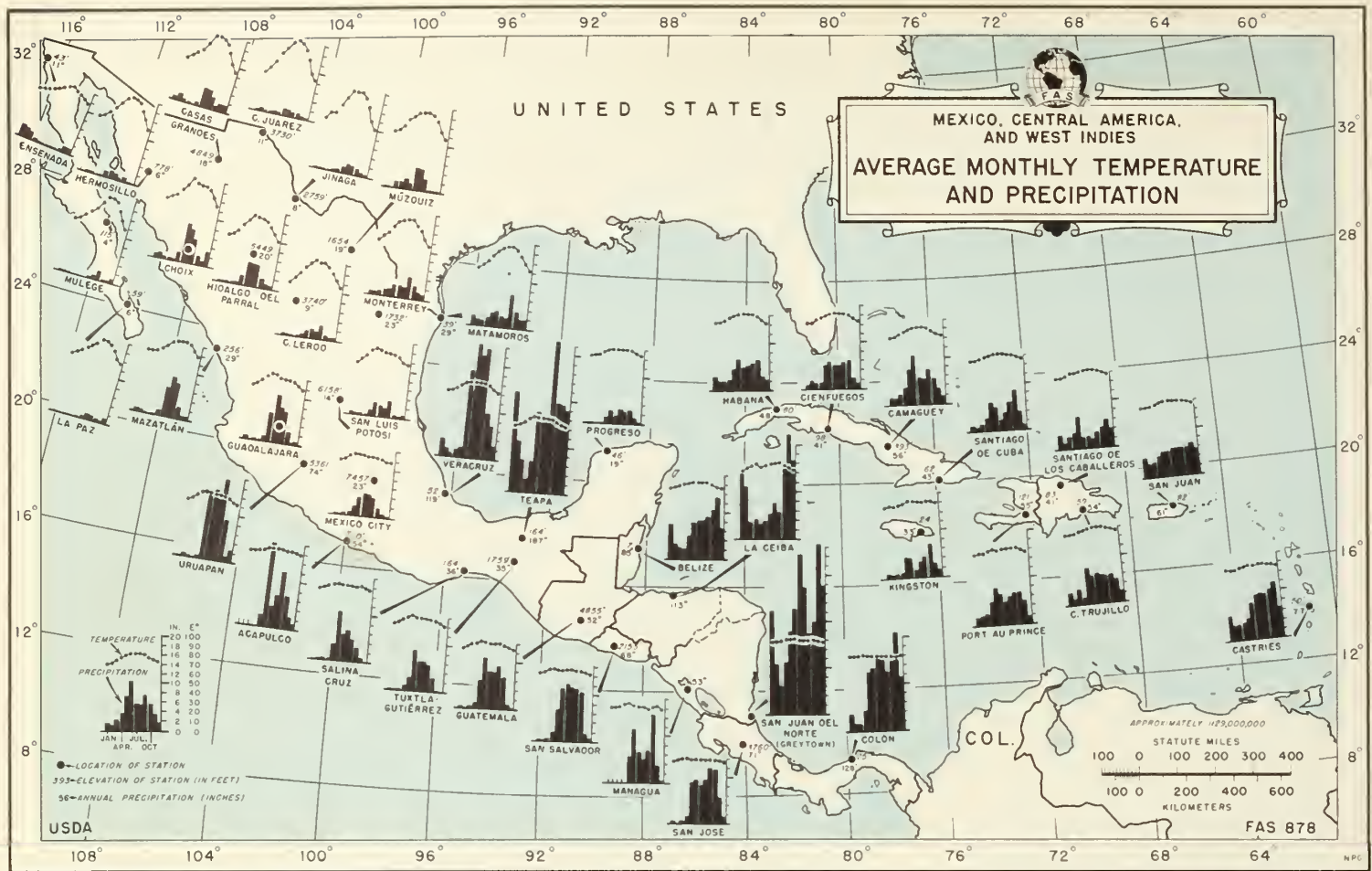
South America narrows so much to the south that the tempering effect of the oceans is felt from shore to shore. The region that shows the relatively moderate annual range of 20° F. and over is small, and would be even smaller were it not that, to a marked extent, the Andean barrier shuts off the zone at its east from Pacific influences.

The only part of South America that has a really continental climate is a small one in northwestern Argentina; there, at Catamarca, the maximum annual range in temperature is 30° F. At the Equator on the coast of Brazil the mean average temperature at sea level is 80° F., with scarcely any variation. At Rio de Janeiro the temperature seldom falls below 55° and is nearly always above 70°.

The differences in temperatures from one region to another in South America are due to several facts.

First, nearly all the continent down to the Tropic of Capricorn is above 70° F. for every month of the year. This is caused





by the powerful equatorial low pressure that rules in the heart of this northern half of the continent and by the constant inward movement of air from warm areas and over the warm Brazilian current.

Second, on the west coast, from Valparaiso northward to the Gulf of Guayaquil, the temperatures are unduly low throughout the year, considering the latitude. They are low for several reasons. In addition to the nearness of the cold Humboldt Current, there is an accumulation of colder water from the oceanic depths off the coasts; and, further, the winds in this region are associated with the Pacific anticyclone and thus are cold and almost rainless, and often envelope the coastal strip in mists that shut out the sun.

Third, the west coast from Valparaiso southward is much cooler in summer than the corresponding east coast but is warmer in winter. This is partly explained by the great difference in rainfall and therefore in cloudiness. During the summer when the sun is strong, nearly rainless Patagonia gets the full benefit from its heat, while clouds deprive the Chilean coast of much of this. In winter, radiation is small from the rain-soaked west coast, but active toward the Atlantic. Higher winter temperatures in Chile are also partly due to the northerly component in the frequent cyclonic storms passing east in the region of Cape Horn, as well as to the southward-moving current off the west coast from about 30° S.

Fourth, as the result of these special influences and other more general oceanic influences, the isotherms for January all curve concavely toward the northeast and are accordingly roughly concentric to one another; those for July are still concavely

curved toward the Antarctic in temperate latitudes. This convex-to-convex arrangement of the isotherms in the zone of about 30° S. indicates, for that latitude, the much smaller spread of temperature in the interior north-and-south corridor of the continent, than obtains on either coast. In the midlatitude continental interior, extremes of temperatures meet in the southern winter; this causes abrupt changes of temperature that come at that season in the plains of Matto Grosso.

Fifth, the coastal regions of the outer tropical zones (10°–20° N. S.)—even those washed by the relatively warm tropical Atlantic waters—tend to be cooler at all seasons than the interior. This is naturally marked in January, when the sun is overhead and well south of the Equator, and the cooler air from the north invades the coastal sections of Venezuela and the Guianas. However, it is quite apparent again in April and October from the mean temperature figures, though not from the widely spread isotherms. Even in July when the northern coasts of the continent might be expected to be warmer than the Amazon area, the latter still has a slightly higher temperature.

Finally, on either side of the whole Andean zone, from the Straits of Magellan northward to the Equator at least, great differences in temperature may exist between places not far apart. This is true because the great Andean chain serves as an effective barrier to temperature exchange. Thus, in January the temperature of Salta, Argentina, is 13° F. higher than that of Antofagasta, Chile, both of which are at sea level. Similarly, the great annual range on one side is 30° F. at Catamarca, Argentina, and on the other side, 10° on the Chilean coast.



Vegetation

Vegetation in Latin America is affected by a wide variation in climate and soils; the region extends through 89 degrees of latitude from the northern through the southern temperate zones. And, through its effect upon temperature and rainfall, topography exercises an important influence upon the form and species of natural vegetation within climatic regions.

The types, species, and density of natural vegetation are determined by the soil types associated with different climatic conditions. Therefore, they provide some indication of the types of crops and livestock that could be produced in various regions.

The map shows native vegetation in those areas undisturbed by man; in other areas it shows what is considered to have prevailed before he came. Types of vegetation are generalized, owing to scale of the map, and no attempt was made to indicate types of vegetation in mountainous areas.

Five major categories of natural vegetation are recognized in Latin America (according to "Plants and Plant Science of Latin America," edited by Frans Verdoorn): forest and wooded; grasslands; desert and semidesert; mountain; maritime, or littoral.

Forest and Wooded Regions

Forests and wooded regions occupy about 44 percent of the vegetation area of Latin America. These regions are classified by predominant variety and forms of vegetation as follows: (1) tropical and subtropical rain forests, (2) tropical deciduous forests, (3) Brazilian forest and savannah, (4) palm forest, (5) subantarctic bush forests, and (6) thorn forests.

Tropical and subtropical rain forests.—These forests prevail in areas of heavy rainfall with high even temperatures and alluvial soil. They often comprise heavy stands of broadleaf and evergreen varieties that grow to great heights, with smaller trees growing in the shade of larger ones. In some instances, they are scattered about grassy openings or over land where savannah grass covers the forest floor.

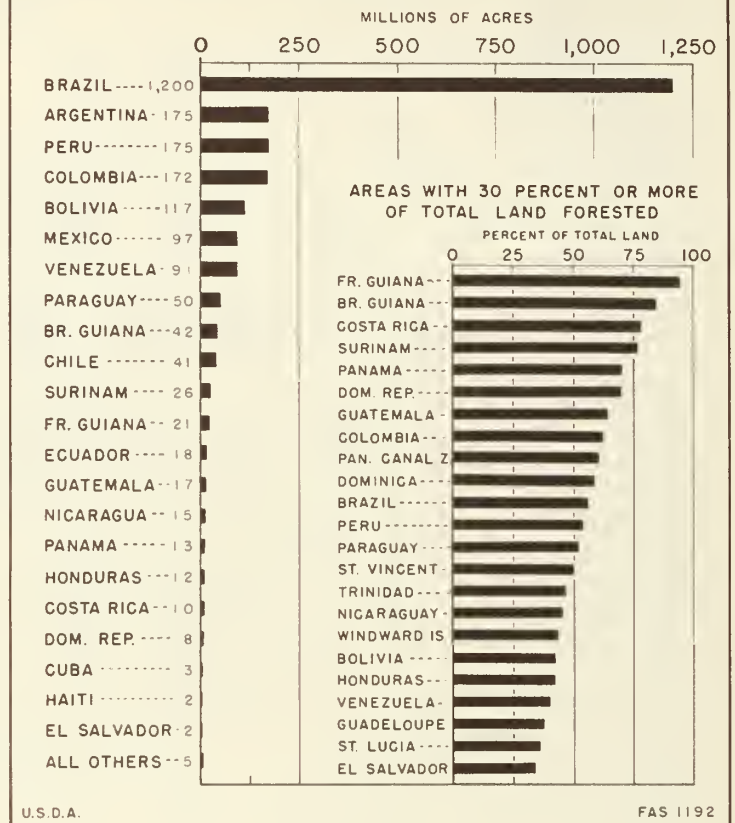
These forests are found from Mexico to Argentina. They cover most of the Guianas, southern and eastern Venezuela, and those portions of Colombia, Ecuador, Peru, and Bolivia drained by tributaries of the Amazon River.

Tropical deciduous forests.—These forests occur in tropical regions where climate causes loss of foliage during certain seasons. Trees are a mixture of evergreen and deciduous species. Forests vary in density according to types of soil and amount of rainfall. In many areas, forests are jungle type.

Extensive areas of tropical deciduous forests are found in the Orinoco River Basin and in adjacent Colombia. Some are found along the Pacific coast of Central America from Panama to Mexico and in portions of the Yucatan Peninsula. The arid northeast area of Brazil, known as the Caatinga, is basically an open scrub forest composed largely of deciduous trees. In the large Chaco area of northern Argentina, southern Bolivia, and western Paraguay, vegetation is a mixture of desert type forest and savannah. Trees often grow in salt-impregnated soils, marshes, or swampy associations.

South Brazilian forest and savannah.—This area differs from the tropical rain forest area of the Amazon Valley only in degree.

FORESTED LAND IN LATIN AMERICA 1954



Heavy rainfall and high temperatures develop jungle-type growth with tangled underbrush on the forest floor, whether in the selva or semideciduous forest. Some forests are dominated by Parana pine and scattered savannahs. These forests are found in the swampy areas of the Misiones and adjacent areas in southern Brazil.

Palm forest.—These forests, located in the north-central part of the Brazilian Plateau in the states of Maranhao and Para, are of a specialized type of vegetation. Toward the west the transition is to the Amazonian rain-forest, while to the south are intrusions of the Campos, and to the east large stands of the arid forests of the Caatinga.

Subantarctic beech forests.—These are heavy rain forests found in temperate or cool climates with high precipitation throughout most of the year. They consist mainly of broadleaf deciduous trees. Beech forests are found at low and medium elevations in areas of southern Chile that join the Patagonian steppe on the east. They are also found at higher elevations in areas of southern Brazil and the mountainous regions of South America.

A related rain forest is found upon the rainy slopes of the Andes in southern Chile. This is a dense forest of broadleaf and evergreen species. It differs from the tropical rain forests in a larger variety of trees and dense growth of underbrush.

Thorn forests.—These forests have developed in warm regions characterized by alternating wet and dry seasons. They provide a transition from tropical forest to desert scrub areas, and are composed of open growth, dense thickets, or small trees and deciduous shrubs.

Thorn forests are found along coastal plains throughout tropical and subtropical areas of Latin America. They occur along

the Pacific coast of Mexico, the Yucatan, and in small areas of Central America as far south as Costa Rica. They are found also in Ecuador, Peru, northwestern Colombia, coastal Venezuela, and coastal areas of the Caribbean Islands.

Grasslands

Grasslands provide the second largest category of vegetation in Latin America. Savannah, steppe, and prairie grasses account for about 30 percent of the native vegetation. They are found in treeless highland and lowland plains, particularly in the interior areas of South America.

The savannah regions.—The savannah regions shown on the map are composed of the true savannahs of Venezuela and northern Brazil, the Uruguayan savannahs, and the Campo of interior Brazil.

The true savannah areas are influenced by climate rather than soil. They usually have a season of 5 months or more without rain and a short season with heavy rains that flood much of the soil, which is often impervious. Predominant vegetation includes various bunch grasses and sedges with scattered woody plants.

The true savannahs are found extending along the Orinoco River above its delta and well into the drainage basin of the Meta and Parallel Rivers in Colombia. They are found also in Cuba, Hispaniola, and other Caribbean islands.

Uruguayan savannahs are found in Uruguay, the southern part of Rio Grande do Sul in Brazil, and in that portion of Argentina east of the Parana River. The terrain of this region is flat with grass predominant. It is bounded by prairielike regions of lesser rainfall on the west, and graduates into the more diverse forest and savannah zone of southern Brazil on the north.

The Brazilian Campo covers a large part of Matto Grosso and Brazilian states to the east, and is called prairie by some writers. The greater part of the region is covered by shrub and grassland with extensive areas of nearly treeless savannahs. The region has a marked dry season.

Steppe and prairie.—Steppe vegetation is a short grass that takes over from the desert scrub in cool regions as moisture increases. It is found in small patches along the eastern front of the Andes Mountains in the Patagonian Steppe, and in wetter areas of central Mexico.

Steppe grass is replaced by tall prairie grass where the climate is distinctly humid. This tall grass is found in southern Brazil, Uruguay, and in humid eastern zones of the Argentine Pampa.

The vast Pampean of eastern Argentina is the most extensive level grassland in South America. It is a prairie region that covers about one-third of Argentina. The Pampa is bordered on the west by the Monte, on the north by the Chaco, and on the northeast by the subtropical savannahs.

Deserts or Semidesert

Desert vegetation accounts for about 11 percent of the total vegetation of Latin America. Desert regions are classified in the following five groups according to type and density of vegetation.

Coastal deserts of Pacific South America.—This is an area of 50 to 100 miles wide, reaching from the sea up the west slopes of the Andean highlands and extending from northern Peru to the south of Coquimbo, Chile. Two of the most barren deserts in South America are in this region, those of northwestern Peru and

northern Chile. South American coastal deserts contain sparse vegetation. Only a few native trees are known in the entire area, and these are confined to water courses.

Patagonian-Fuegian Steppe.—This large region of southern Argentina and the Fuegian portion of Chile is characterized by a temperate or cold climate, windy, and very dry. The vegetation is essentially without trees and is dominated by very low plants bearing a cluster of leaves and plants growing in a dense cushionlike tuft. On the west this region is bordered by the subantarctic forests of southern Chile, while to the north and north-east it is bounded by the so-called Monte, or desert scrub.

Monte regions.—Desert scrub regions in the interior portions of central and northern Argentina, locally known as Monte, have a climate as dry as that of the Patagonian steppe, but somewhat warmer and essentially without a winter season.

Vegetation of this desert region is extremely drought resistant, and is often partly low trees. The desert scrub ascends lateral chains of the Andes to a considerable altitude, sometimes to about 10,000 feet, where it gives way to the Andean flora.

The desert scrub of northern Mexico and adjoining States of the United States is similar in appearance to the Monte of Argentina and shares with it the characteristic shrub found where the minimum rainfall permits any form of plant growth. Most of the arid depression south of the Central Plateau of Mexico, mainly the basin of the Rio Balsas, consists of transitional phases between thorn forest and tropical deciduous forests.

Transitional area of central Chile.—This region, which has a Mediterranean type of climate, is rich in herbaceous spring flora and evergreen shrubs. It is transitional between the wet subantarctic forest and the desert areas of northern Chile.

California chaparral.—This extends from the United States well into Mexico. It consists of dense growths of evergreen shrubs, commonly forming almost impenetrable thickets on slopes.

Mountain

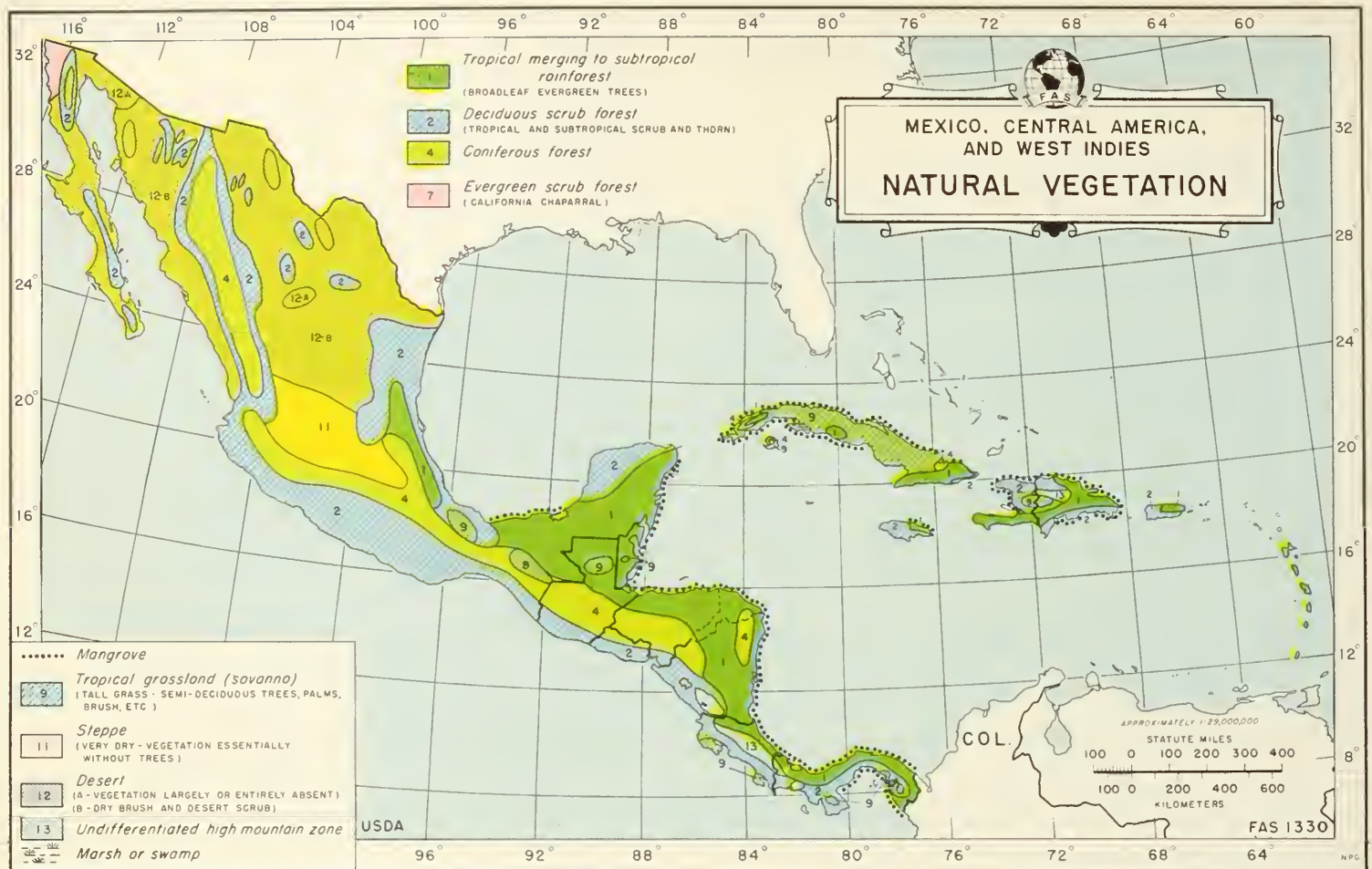
The mountain areas are occupied by a diversity of plant associations, but each vegetation type occupies such a narrow or otherwise limited area that further division would be possible only on a series of small-scale maps. This zone, or three different zones, comprises about 15 percent of the vegetation of Latin America.

Mexico, Central America, and the larger Caribbean islands.—Fine coniferous forests grow on the eastern and western Sierra Madre and in central and southern Mexico. A variety of trees and shrubby oaks are found in the zone of vegetation below the coniferous forests. Well-developed temperate forests of oak and pine are found in the central highlands of Guatemala and Honduras and south to northern Nicaragua. South of Nicaragua the temperate flora appears to have some affinity with that of the northern Andes in South America.

Species of pine are dominant in the mountain zone of Cuba and Hispaniola.

The northern Andes in Venezuela, Colombia, Ecuador, and northern Peru extend from the upper limit of the subtropical forest, usually 6,000 to 8,000 feet up to the timber line to an average altitude of 10,000 to 12,000 feet varying somewhat in different localities. The Amazonian slopes of the Andes are forest covered and receive heavy rainfall.

The transition from the desert coasts to the higher mountains



is often marked by grass steppes, which are green only in the rainy season, or by a shrub-herb zone, which is also brightly colored during the few wet months.

Areas above the timber line in the northern Andes, known as paramos, are subject to rains and heavy fogs throughout the year. These wet alpine meadows extend south to northern Peru, where they are known as jalcas. Farther south this zone is replaced by the drier puna. The characteristic paramo vegetation consists of herbaceous plants with thick roots and coriaceous leaves. The paramos cover vast expanses of the rolling plateau of the northern Andes. Their upper limit in places lies just below the line of perpetual snow. Throughout the paramo region, projections of bare rock and other topographic features preclude the development of vegetation.

The southern Andes of southern Peru, Bolivia, northern Chile, and Argentina support, in their high intermountain valleys, dry grasslands and, in many places, subdesert shrubs and trees, many of which are deciduous. The high altitudes of central and southern Peru have a remarkable alpine vegetation.

The puna flora comes in as altitude increases. It represents a dry temperate vegetation that may be traced along the margins of the forests surrounding the Amazon Basin as far south as the eastern margin of the Bolivian Plateau.

This puna flora also dominates large areas on the tableland in western and southern Bolivia, northern Chile, and northwestern Argentina. South of Peru the puna becomes very dry. In Bolivia and adjacent Chile most of the vegetation and practically all of the upright bushes are found along watercourses or in other places where some soil moisture accumulates. Below the puna

and above the coastal deserts on the western slope of the Andes, from southern Peru south along the margins of the Bolivian plateau, there is a well-marked belt; here, thickets of small shrubs, many of them resinous and evergreen, and plains with scattered bunch grass make up a distinctive formation. This is called the tola belt and can be classed either as desert or as marginal to the dry puna.

Maritime, or Littoral

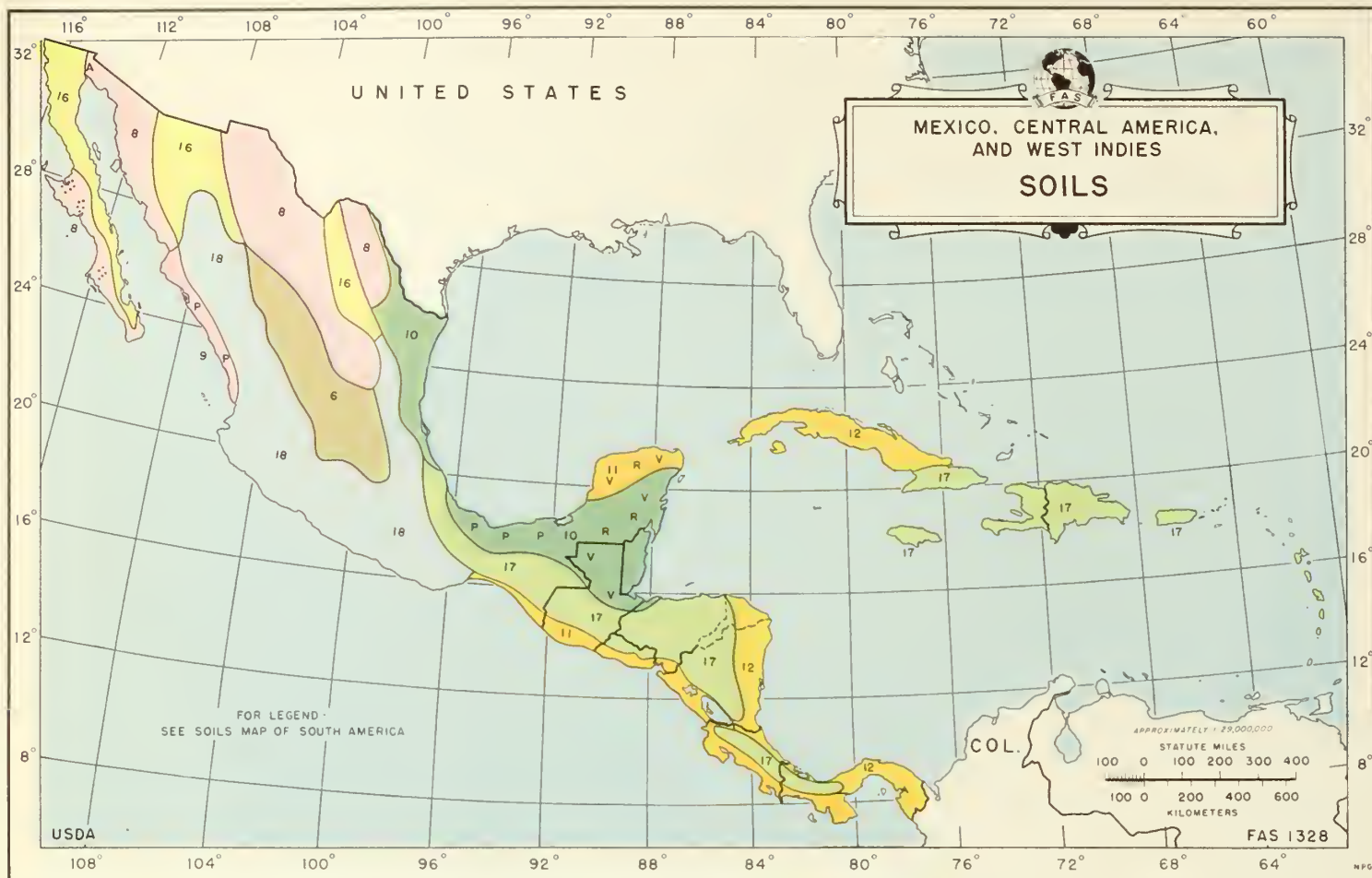
This zone occupies essentially the entire coastline of tropical American countries in wet regions. The outer part of the maritime zone consists of lower plants and a few capillary stem plants. The inner part consists of mangrove swamps. Where open beaches occur, they are often occupied by species of Ipomoea and various grasses; and mudbanks are sometimes extensive and support a cover of sedges. On the Pacific coast this type of littoral vegetation occurs well up the Gulf of California, and from southern Baja California south to southern Ecuador.

The mangrove formations are found on the Caribbean coasts and on the Atlantic coast south to Brazil.

It is obviously impossible to cover thoroughly the effect of geographic factors on plant life of Latin America in a general discussion of this length. It must also be realized that there may be other opinions of equal or greater merit.

In general it may be pointed out that some of the major problems of tropical American agriculture are those of the Amazon and Orinoco River Basins, of the Caribbean Littoral of Central America, and of the lowlands of southern Mexico—the great rain-forest areas that have proved difficult to develop.





Soils

The kind of soil is determined by five factors—climate, vegetation (and other living matter), parent material, age, and relief. Climate and vegetation are the dynamic factors. They act on parent material to form soil. They must have time to exert their influence—hence, the factor, age; and the significance of all of these is conditioned by relief, or the slope of the land. Every unique combination of these factors is likely to give rise to a unique kind of soil; and, obviously, Latin America with its great range in climate and other factors has many, many kinds of soils.

Even within the smallest countries, many kinds of soils occur, and only on large-scale maps can the distribution of all types be shown. The accompanying small-scale soil map, therefore, and also this discussion, are of necessity highly generalized; but they are highly generalized not only because of the small scale of the map and the brevity of this text, but also because information about soils of large parts of Latin America is exceedingly scarce.

Soils of the Plains and Hills

The long-time effects of climate and vegetation are strongly reflected in soils of the plains and hills and have, to a large extent, determined the distribution of the principal kinds of soils. For example, in the humid Tropics, both savanna-covered as well as forested, the predominant soils are Latosols; whereas in the temperate semiarid grasslands, Chestnut and Brown soils are most extensive.

As compared with the soils of the mountains, the soils of the plains and hills are much easier to cultivate because of the more favorable slopes, the general absence or scarcity of stones, and the greater depth of soil. However, the soils on those plains in the humid regions are commonly lower in fertility than those of the mountains.

Alluvial soils, as a group, are an important exception to these generalizations. Alluvial soils lie on those plains that are now occasionally flooded or have been subject to such flooding until recently. This group includes only young soils made up of materials deposited rather recently by water; it does not include soils developed from old alluvial deposits that reflect strongly the influence of climate and vegetation. While large individual areas of alluvial soils are uncommon and their total extent is not great, small areas are numerous; narrow strips occur along nearly every stream.

Alluvial soils are very important to agriculture. While all are not highly fertile, they generally are more fertile than the soils in adjacent uplands. In humid areas, where the upland soils tend to be low in fertility, this difference may be great. In arid areas, this difference may be small, although even there alluvial soils tend to be more productive than the nearby upland soils. Perhaps more important, especially in arid lands, is the fact that alluvial soils in general are better suited for irrigation than the associated upland soils. And, in some countries, such as Mexico, these are the soils on which much of the crop production takes place. Of course, they may be too salty or too alkaline in spots, especially in arid regions, and they may be too



wet, except for rice, in many places, especially in humid regions, and flooding may be a hazard nearly everywhere. However, these deficiencies generally can be corrected—or at least they can be controlled.

Unlike the alluvial soils, which are young and consist essentially of unaltered alluvial parent material, the Latosols of the wet-dry and continuously wet Tropics are old, and the parent material from which they were formed have undergone drastic changes. Many contain laterite, a material which becomes rock-like upon severe drying. In fact, this material has already become hard in some places, and thereby virtually made the soils nonarable, and is a potential hazard in many others. Latosols are mainly red, highly leached, and low in plant nutrients. Although rich in clay, they have low nutrient-holding capacity and high phosphate-fixing capacity. However, Latosols have some important advantages. Perhaps most important is a climate that imposes fewer restrictions than it does in temperate and cool regions. While much has yet to be learned about how to best manage Latosols, research and experience indicate that under excellent management, the productive potential of many is high.

Red-Yellow Podzolic soils, which are more common to the subtropics than Tropics, are much like the Latosol. The Red-Yellow Podzolic soils are similarly low in plant nutrients, but their nutrient-holding capacity is perhaps a little higher and they are more susceptible to erosion.

Gray-Brown Podzolic soils are somewhat leached but moderately fertile soils of humid, temperate regions. They are of small extent in Latin America, where they occur principally in the southern part of Argentina. Under good management, including liming and fertilization, they can be highly productive of many crops.

In striking contrast to the Latosols are the Chernozem soils. They have developed under a luxuriant grass cover in a temperate subhumid climate, are black, highly fertile, generously supplied with organic matter, and have an excellent structure. Nevertheless, yields of grains and grasses, the principal crops, are not especially high on Chernozems on the average because rainfall is erratic and often low.

Like the Chernozems, the Chestnut soils in cool regions and the Reddish-Chestnut soils in warm have developed under grass, but the climate has been drier and the grass shorter. Under still drier climates and also sparser grass cover, the Brown soils have developed in cool regions and Reddish Brown soils in the warm. In addition to being predominantly brown in color, these four groups of soils have a rather conspicuous layer of accumulated lime in the subsoil; this accumulation is closer to the surface in the Brown and Reddish Brown than in the Chestnut and Reddish Chestnut. All are generally high in plant nutrients, but their productivity is severely limited by aridity, the limitations being greater on the Brown and Reddish Brown than on the Chestnut and Reddish Chestnut. In Latin America, these soils are used mainly for grazing. Many would be highly productive under irrigation.

In the most arid parts of Latin America, Sierozem, Desert, and Red Desert soils predominate. These are mainly gray, although in the arid Tropics they commonly have a reddish tinge and are classed as Red Desert. While all these soils are generally high in many plant nutrients, they are low in organic matter and hence low in nitrogen. They are high in lime and many also con-

tain generous but not highly detrimental amounts of readily soluble salts. Under their natural arid conditions, these soils are unproductive, although in most places they do support a sparse vegetation—enough for limited grazing. If irrigated, productivity is likely to be high, but phosphorus and nitrogen fertilizers are needed for high yields.

Red Mediterranean soils, of which there are some areas in eastern Brazil, are moderately well supplied with calcium and other plant nutrients.

The Black and Dark Gray soils of wet-dry Tropics consist of clays that crack deeply when they dry. While these soils are moderately high in plant nutrients and reasonably productive, they are difficult to manage. For they are heavy to cultivate, and the moisture range over which they can be safely tilled is narrow.

In addition to those soils of the plains and hills that occupy rather extensive areas, several occur in small areas—at least too small to show on the accompanying soils map. Most important among these are the alluvial soils, which have already been discussed. But there are others. Lithosols, which are most common to mountains but also occur on plains and hills, are soils that are too shallow and too stony for ordinary cultivation. Bog and Half-Bog soils are naturally wet and consist of peat or muck in the topmost one to several feet. Ground-Water Laterites are wet soils, too, but they consist of mineral matter rather than peat or muck; they are the commonly poorly drained associates of Latosols. Planosols, which have impeded drainage but are not necessarily poorly drained, are distinguished by a heavy, dense, impermeable layer, the top of which is between 1 and 2 feet from the surface. Rendzinas are shallow, black, highly calcareous soils that overlie limestone. Solonchak soils are distinguished by containing so much salt that it alone prevents or seriously retards the growth of most plants, and Solonetz soils are so highly alkaline that this property alone is detrimental. Soils classed as Sands consist entirely of sand that is uniform to a depth of several to many feet.

Soils of Mountains

Most soils of mountains are young in relation to most soils of the plains and hills and, consequently, tend to be more fertile. The contrast in fertility is greatest between soils of those mountains which have received deposits of volcanic materials in relatively late geologic times and the soils of the old humid plains which have not. Many of the mountainous areas of Latin America have received such deposits; but even where they have not, the more rapid natural erosion has kept the predominant soils there young. In fact, it has been so rapid that in many places there is no soil at all; but more commonly, Lithosols have developed. These are young soils that are still shallow and stony. Where the climate is favorable, such soils support vegetation, even luxuriant vegetation in some places.

While Lithosols are predominant, there are also many other soils. Not only are all the soils common to the plains and hills represented in the mountainous areas, too, but also several more.

Perhaps the most important additional group is the Ando soils. These are black or dark-brown soils high in organic matter that have developed on volcanic materials, mainly ash, in humid and subhumid Tropics. Ando soils are moderately fertile, and productive of trees and a variety of crops.

Population

The estimated population of Latin America in 1956 was 180 million. This represents about 7 percent of the world's population, and is slightly less than the population of the United States, Canada, and Alaska combined. In land area, however, Latin America is almost identical with its northern neighbors.

Latin America's population has more than doubled during the past half century. It is increasing at a world high rate of 2½ percent, but the range is from a low of 2 percent in some countries to a high of 4 percent in others. In the rest of the world the rate of increase is only 0.8 to 2 percent.

Three-fourths of the people of Latin America live on one-fourth of the land area, principally in the highlands, and most Latin Americans live within 150 miles of the coast. In South America, for example, the east coast is densely populated, whereas the interior is sparsely settled. In fact the whole interior of South America east of the Andes and north of the Tropic of Capricorn probably has fewer inhabitants than the island of Puerto Rico, though the difference in size is nearly a thousandfold. This enormous hinterland of several million square miles includes the tropical forest of Amazonia as far as the vicinity of Pará, the valley of the Orinoco, and the upper basin of the Paraguay.

Throughout this vast region, settlements are located on the rivers in widely scattered areas where the people live in and around small villages. They do so because rivers are the principal, and sometimes only, links with outside areas. In recent years, however, the isolation of these settlements has been modified considerably by air service. Patagonia, behind the narrow belt of coast settlement and including the southern Andes below the region of the Chilean lakes and the islands below Puerto Montt, is another very large area of thinly diffused population.

In Mexico the population is concentrated in the Central Plateau area, with the northern and southern areas of the country thinly populated. In Central America the concentration of population is in the western highland areas.

Predominant racial types of people in Latin America vary from country to country, and the degree to which any particular element predominates is neither uniform as between countries nor fixed in any of them. Three countries, Argentina, Uruguay, and Costa Rica, can be classified as white. The first two are overwhelmingly so; their percentage of white population is considerably higher than that of the United States.

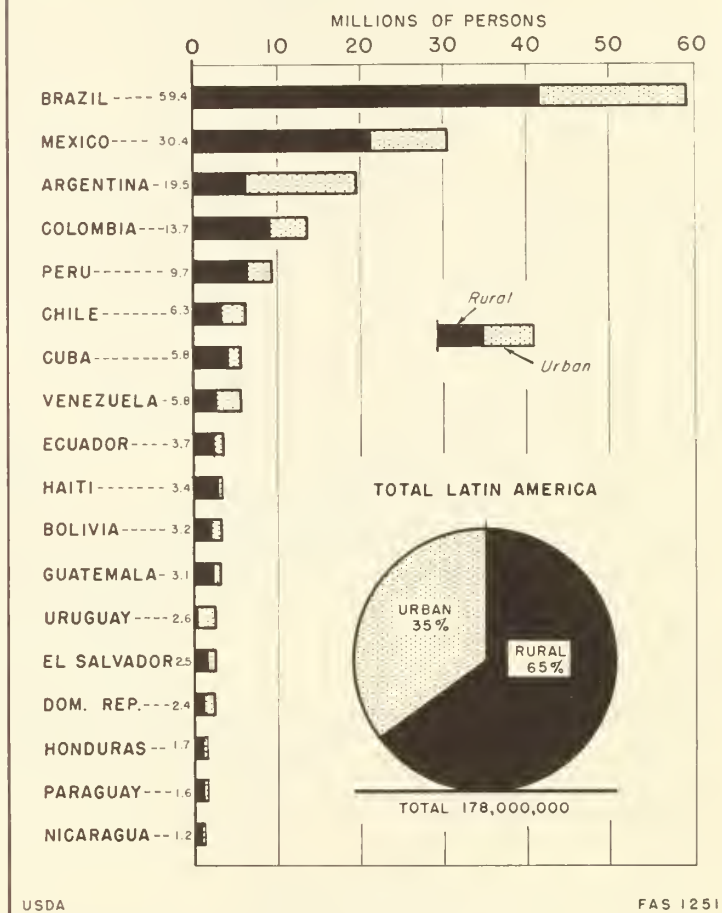
Five countries are predominantly Indian in their racial composition; they probably rank as follows: Guatemala, Bolivia, Ecuador, Peru, and Mexico. By its very size, Brazil represents a variety of ethnic groups that defy uniform cataloging. The remainder of Latin America has a mixed racial pattern.

The rural population of Latin America is an estimated 115 million—65 percent of the total. The greatest percent of rural population is found in the Caribbean area and in Central America, where 73 percent of the population is rural. In some of the Caribbean islands the rural population exceeds 85 percent. The Dominican Republic has a low of 56 percent, whereas its next-door neighbor, Haiti, has an extremely high percent of rural population.

Percentage figures for rural population are dropping in many sections of Latin America.

In that part of the world, increasing industrial development in recent years has created a movement of population from rural

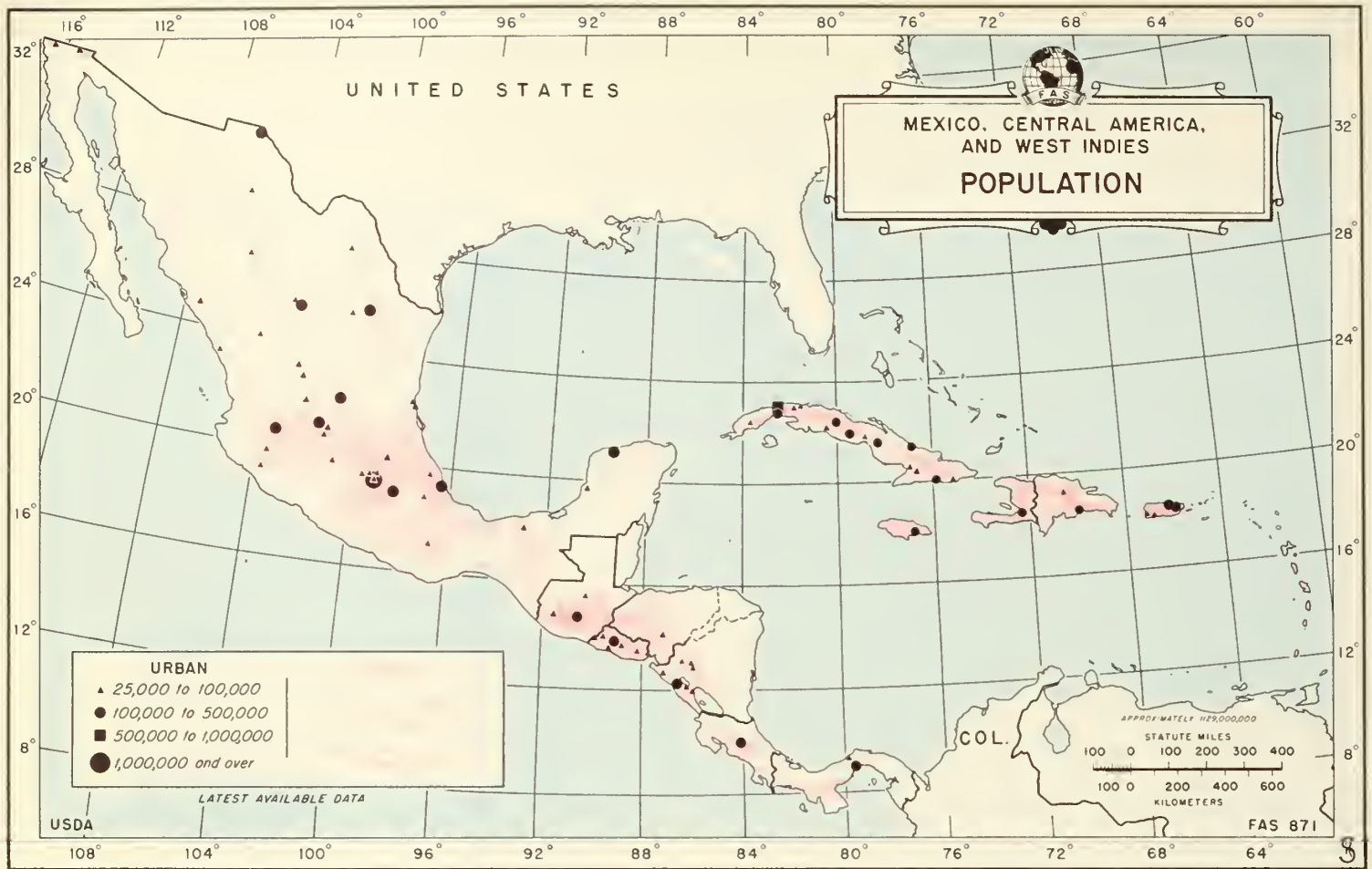
RURAL AND URBAN POPULATION OF LATIN AMERICAN REPUBLICS WITH OVER ONE MILLION PERSONS IN 1956



areas and small towns to the cities, where employment may be obtained more readily. Thus, the city population is increasing much faster than is population in the country as a whole. Too, the population of the larger cities is increasing at a much faster rate than that of the smaller cities.

At present Latin America has 67 cities with a population over 100,000; the United States has 234 cities in this class. There are 4 cities in Latin America with a population of over 2 million—Buenos Aires, the largest city in Latin America, now has an estimated 5,744,100 people; Mexico City, 4,460,400; São Paulo, 3,069,626; and Rio de Janeiro, 2,895,700.

Brazil's largest concentration of population is in a comparatively narrow coastal belt that extends from the State of Maranhão, with a break of low population in southern Bahia and northern Espírito Santo, to the southern limits of the Republic. In the south the area expands westward up onto the highlands of Minas Gerais and São Paulo, to narrow again on the plateau of Paraná. It is estimated that 94 percent of the Brazilians live on the east and southeastern Atlantic coast, which contains about 36 percent of Brazil's land area. The other 6 percent is scattered over almost two-thirds of the country. The densely populated southern part of Brazil, with about 55 million people, has 28 percent more people than all the countries of western South America combined, including Bolivia and Paraguay.



Brazil has 12 percent of its total population concentrated in 11 cities with a population over 100,000 each, all of which are located in the southeastern part of the Republic on or near the Atlantic coast.

The rural population of Brazil is centered around small cities which do not interlap. There are some 140 cities in Brazil with a population over 10,000 and many small towns with a population around 2,500. In the vast almost-unpopulated interior, settlements are found here and there, always on some river and usually located far apart.

In Argentina, the heaviest concentration of people is in the rich agricultural lands of the Pampa and in the northern Province of Tucumán. The Chaco region, in northern Argentina, remains scantily inhabited. The area is subject to flooding during the rainy season and has the highest temperatures recorded in South America. Also, disease, inadequate roads, and lack of public utilities contribute to its undesirability as a permanent home under present conditions. The western arid mountain region of Argentina is also scantily populated, as is the Patagonia area in the south, which covers about one-third of the land area of the country but has only 2 percent of the total population. It is a cold, dry, windswept area that is not likely ever to have a dense population, owing not only to the severe climate, but to poor soils and several other factors. About 66 percent of Argentina's total population is urban. The population of Buenos Aires, over 5.7 million, is out of proportion to the total population of Argentina.

Uruguay has a greater percent of urban population than has

any other Latin American country. The people are concentrated in the city of Montevideo (which has over one-third of the population) and the surrounding areas and in smaller cities on the Rio de la Plata and Uruguay Rivers. In the interior the population is widely scattered; most of them live on large live-stock ranches. There are only three or four cities with a population over 10,000 in the interior, and they are located near the Brazilian border.

Bolivia and Paraguay, the two inland Republics of South America, are scantily populated, and about 70 percent of their population is in the rural areas. La Paz, the capital of Bolivia, and Asunción, the capital of Paraguay, are the only cities with a population of over 100,000.

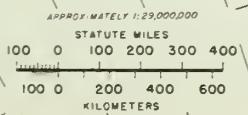
Paraguay's largest area which lies west of the Paraguay River in the Chaco region and comprises 60 percent of the total land area is scantily populated. Most of the 1.6 million Paraguayans live east of the Paraguay River, on the flat plains and gently rolling hills that constitute about 25 percent of the country's land. This area ends abruptly at a high cliff formation that extends from near the city of Encarnación north to the border of Brazil. The remainder of the land east of this formation, known as the Paraná Plateau, has adequate rainfall and is densely forested but scantily populated.

Bolivia's total population is small and unevenly distributed. Less than a third of the country is populated. About 60 percent of the Bolivians are pure Indians, who, with the exception of some 87,000 aboriginals living in the eastern jungles, prefer to live in the highlands bordering the high Andes Mountains.



POPULATION OF LATIN AMERICA

COUNTRIES	10	20	30	40	50
BRAZIL-----	55.8				
MEXICO-----	28.1				
ARGENTINA----	8.4				
COLOMBIA-----	12.1				
PERU-----	9.0				
CHILE-----	6.1				
CUBA-----	5.8				
VENEZUELA----	5.5				
ECUADOR-----	3.5				
HAITI-----	3.2				
BOLIVIA-----	3.1				
GUATEMALA----	3.0				
URUGUAY-----	2.5				
DOM REPUBLIC--	2.3				
PUERTO RICO--	2.2				
EL SALVADOR--	2.1				
OTHERS-----	10.7				



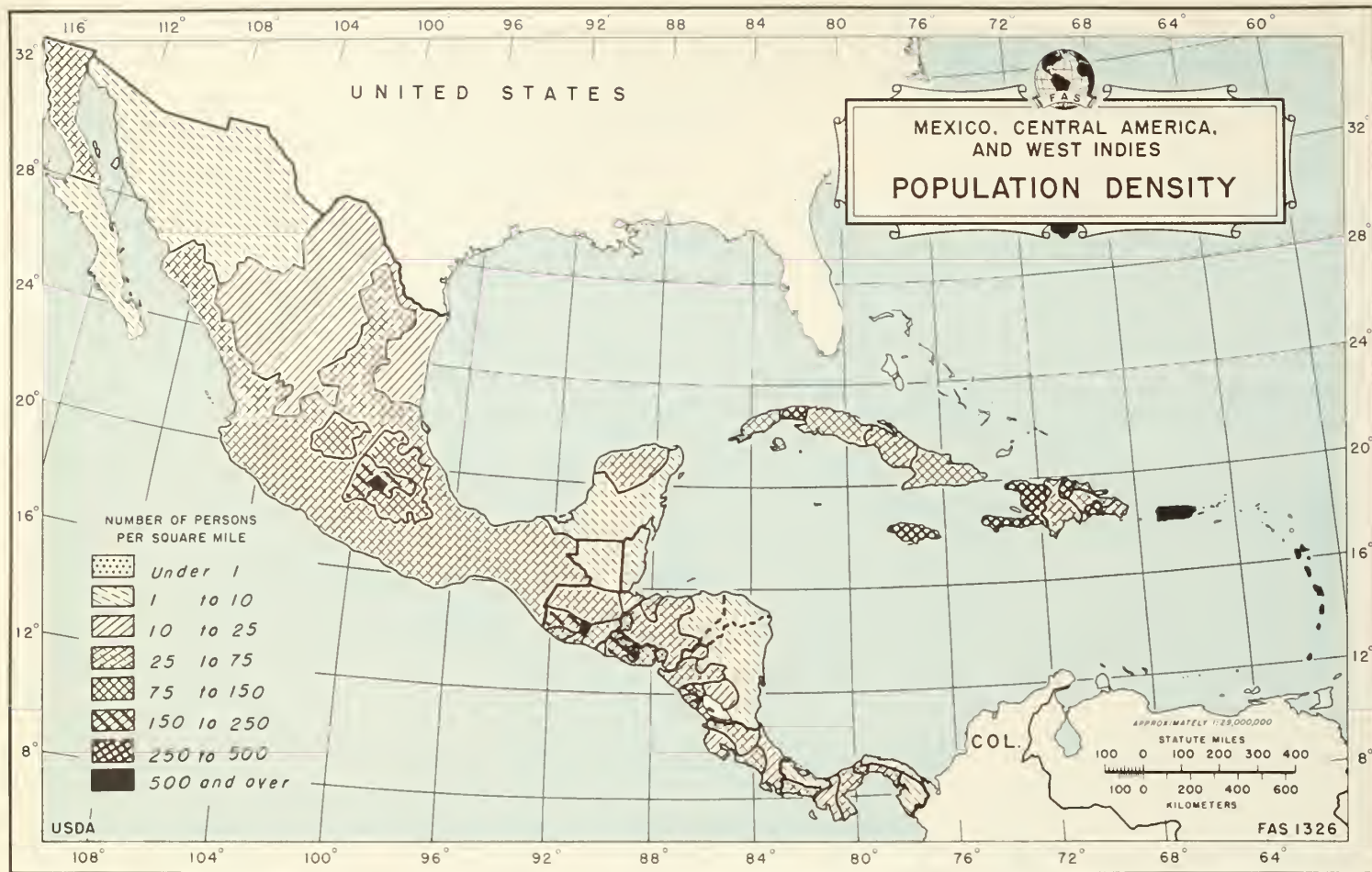
SOUTH AMERICA POPULATION

- URBAN
- ▲ 25,000 to 100,000
 - 100,000 to 500,000
 - 500,000 to 1,000,000
 - 1,000,000 and over

LATEST AVAILABLE DATA

USDA

FAS 872



Heavy concentrations of rural population are found in a few areas, such as in the vicinity of Cochabamba and other towns. In outlying areas the rural population is so scanty that an adequate labor supply for developing agriculture and livestock raising is not available.

Chile's first 600 miles south of the Peruvian border is a hot rainless area that is almost uninhabited, and its next 400 miles to the south is a semidesert with scant population. Adjacent to this area the majority of the people live in a central valley lying between the Andes and the Coastal Range. About 55 percent of Chile's population is rural. The three largest cities, Santiago, with a population of 1,412,600; Valparíso, 219,400; and Concepción, with 124,700, are in central Chile. From Concepción to Puerto Montt the population gradually decreases; the last 1,000 miles of southern Chile is an almost unpopulated wild forested country with a severe climate.

In Peru and Ecuador most of the inhabitants dwell in the old Inca lands of the high Sierra country, where protected valleys and plateau floor between the Andean ranges offer sites for an intensive agriculture or grazing of flocks. About 70 percent of the population of Peru is rural. Peru's largest cities are Lima, the capital, with a population over 1,000,000, Trujillo and Chiclayo, with about 100,000 each. All are on the west coast. Arequipa, with a population of 120,000, is located in the interior on a plateau. Peru's population density is 18 per square mile, but this low average is due in large part to the sparsity of population in the Amazon lowlands. The 4 eastern Departments of Loreto, Amazonas, San Martín, and Madre de Dios embrace 43 percent of the total land area, but have only 7.7 percent of the

national population. The 1940 population census listed 2,847,196 persons as Indians—45.86 percent of the population as against 57.60 percent in 1876. Most of the Indians are still to be found in the Sierra, but many have moved to the coast because of the better economic opportunities offered there and also in consequence of army service. Ecuador has 2 cities with a population over 100,000: Quito, 215,400, and Guayaquil with 262,600. About 66 percent of the population of Ecuador is rural; most of them live in the central valley and intermountain basins. The eastern lowlands are scantily populated.

Colombia's heaviest density of population is found in regions of the central plateau of Cundinamarca, such as the Sabana de Bogotá, the valley of the Cauca, and the lands tributary to the important city of Medellín. About 66 percent of Colombia's population is rural.

Venezuela's population is about evenly divided between rural and urban areas. The most thickly settled area is in the highland zone that extends from the vicinity of Caracas west by Valencia and thence in a southwesterly direction toward the main chain of the northern Andes.

In Central America, over 90 percent of the population is settled in the upland belt of the interior and among the foothills on the Pacific side. Except in localities where the large-scale cultivation of bananas is carried on, few people live in the low jungle-covered plain along the Caribbean. Panama is the exception in that most of its inhabitants are found along or near the two coasts.

Mexico ranks second to Brazil in population numbers. And, as in Brazil, large areas of Mexico are unpopulated because of unfavorable topography or climate. While many localities have



a relatively high population density, as the Valley of Jalisco about Guadalajara, the largest is in the heart of the Central Plateau and surrounding the federal capital. This area occupies about 16 percent of the total land area of the Republic and has about 55 percent of the population. The rural population of Mexico has been estimated by some to be about 70 percent—about 10 percent more than that of South America.

Seventeen cities in Mexico have a population of over 100,000; almost all of them are located in the central part of the country. The exceptions are Ciudad Juárez, with a population of 128,800, located in the north on the border of the United States; Veracruz, 123,400, Mexico's largest seaport; and Monterrey and Torreón, in northern Mexico. Both of the latter are industrial cities in the mining district.

Population Density

The number of persons per square mile in Latin America varies in density from 5 persons in the Guianas in South America to 1,350 persons in the Barbados Islands in the Caribbean.

South America has a population density of about 16 persons a square mile; the United States has about 54.

Because Latin America has such a concentration of population in some areas and almost no population in others, the density for a country as a whole is misleading, since the data are an average for the entire area and do not portray the density pattern in its true sense. The population map with actual data plotted by dots and symbols helps to make clear the distribution of people within the broad average patterns of densities per square mile.

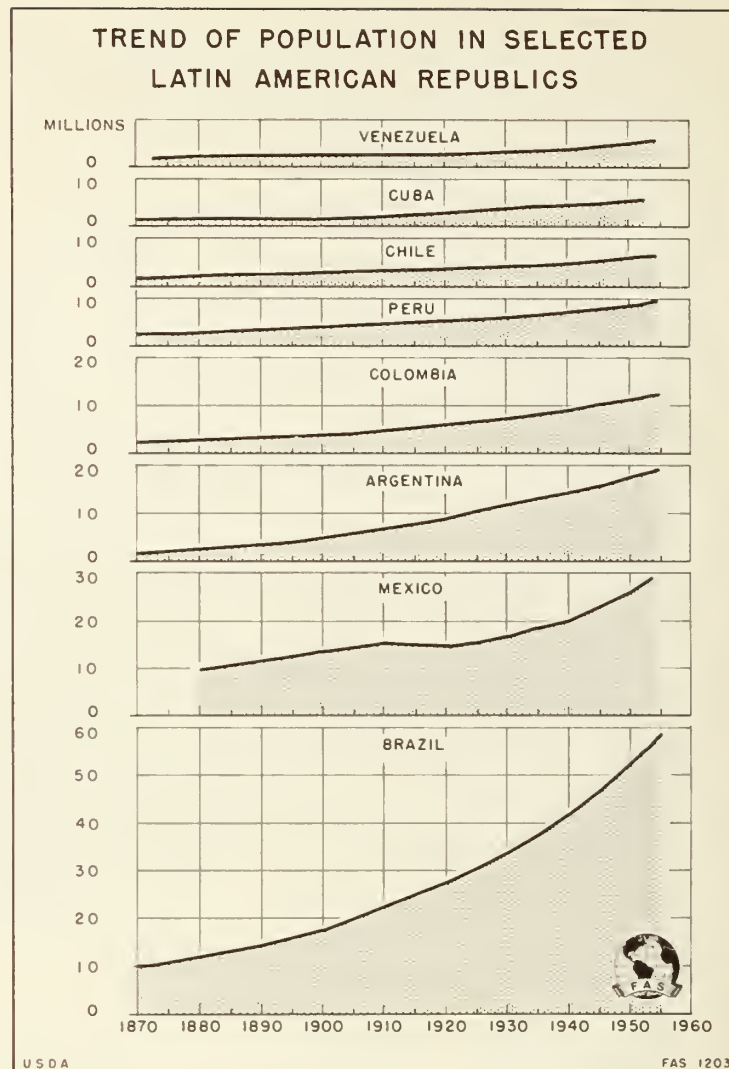
In Brazil the density of population per square mile varies from 0.2 person in the State of Rio Branco to a high of 144.6 in Rio de Janeiro. (The Federal District has over 5,000 persons per square mile.) In the northeastern States of Brazil in the area of Cera around the bulge to Sergipe, the density of population ranges from 46 to 100 persons per square mile; in Bahia and Minas Gerais it decreases to around 28 persons. The southern States all have a density of over 40 persons per square mile. The large inland States of Mato Grosso, with 1.08, and Goiaz, with 5.13, are uninhabited in many areas. The Amazon River Basin has a density of less than 1 person per square mile.

Argentina has a density of 18 persons per square mile, the same as Brazil. The small interior Province of Tucumán has the highest density for a Province—56.9 persons per square mile. Santa Cruz in the south has the lowest density, 0.2 person. The central Provinces range from 15.5 to 36.7. All other Provinces have less than 10 persons per square mile.

The other countries of South America vary from 10 to 28 persons per square mile except the Guianas, where the population is mostly concentrated along the coast.

The Central American countries have a population density of from 8 persons per square mile in British Honduras to 264 in El Salvador.

The Caribbean Islands are all densely populated. Haiti, for instance, is said to have a density of population greater than that of any other Latin American country. It has an average of 317 persons per square mile. The greatest concentration of population to be found on any islands, however, is in the Barbados Islands, which have a density of 1,350.



Mexico has an average of 39 persons per square mile, but population density varies from over 100 to 1.3.

Conclusions

The population of Latin America has increased from an estimated 72 million in 1900 to 180 million in 1956—150 percent. The average birth rate per thousand is between 40 and 50—more than double that of the United States. In some countries—Argentina, for example—declines appear to be under way. The spreading tendency to greater literacy and more urbanization and the adoption of cultural characteristics of the modern Western civilizations could lower birth rates generally.

At the same time, the increase in control of tropical diseases, in public health, and in medical attention and child care could sharply cut Latin America's high death rate—20 to 30 per thousand.

Many factors favor a continued increase; yet, there are many obstacles to be overcome before a greater and more evenly distributed population can adequately be provided for in Latin America and a reasonably high standard of living maintained.

Perhaps the greatest handicap to progress in Latin America are inadequate transportation systems for marketing the products of the land and insufficient hydroelectric power for industrialization.

Land Use

The agricultural productivity of Latin America is remarkably low, except in certain highly specialized areas. Not only is much productive land not cultivated, but even that which is in crops, as a general rule, yields very little per unit of area or per unit of manpower. Important exceptions are export crops like sugar, coffee, cotton, and bananas; these are produced in great quantities by a plantation type of agriculture.

The general picture of agricultural production in Latin America, especially of foodstuffs, is one of small farms, individually owned or rented and cultivated, and yielding slightly more than subsistence. Excluded from this general picture is most of the agriculture of Argentina.

Even today a majority of the food producers of Latin American countries rely upon fire to clean the brush, destroy insects and their eggs, kill weeds and their seeds, and loosen the soil so that a hand tool can be used to plant seed. The hand tool, however, is insufficient to keep subsequent crops of weeds under control or to destroy new invasions of insect pests, since the exposed and loosened soil is easily leached or washed away by the strong seasonal rains. Thus, it becomes impossible for the farmer to continue cropping the same piece of land for more than one, two, or three seasons. So he moves to new land, cleans it by fire, and proceeds as before. As a result, great areas become deforested, even in sparsely populated regions, and erosion is far more serious and widespread in Latin America than would be expected.

Since an exhausted plot of land may not yield another good crop for as many as 15 years, the total acreage needed for food production under this system of "land rotation" is very great. For various reasons, including health factors and the establishment of large landed estates or speculative holdings of idle land in the flatter valley bottoms, the food-producing farmer tends to cultivate the hillsides. This adds to the seriousness of erosion and increases the small farmer's isolation and his difficulties in getting produce to market.

Budgets for development of road building, public health, and a better land utilization pattern for agriculture have been increasing. In addition, many students have returned from training abroad in all the professions, including agriculture; most of these students studied in the United States.

The land area of the countries of Latin America varies from 8,000 square miles in El Salvador to 3,287,000 in Brazil. There is also a wide variation in the land-use pattern. The smaller countries have a much higher percentage of their land in cultivation than the large ones do; El Salvador has 25 percent of its land cultivated, whereas Brazil has only 2 percent.

Almost 25 percent of Latin America's land is unproductive. The high mountain system extending from northern Mexico to the southern part of South America near the western coast occupies a considerable portion of the land, much of which is inaccessible and unproductive. Parts of Latin America are arid; one of the driest areas in the world is in northern Chile. Other areas have an uneven distribution of seasonal rainfall. Still other areas have too much rainfall; that, combined with high temperatures, supports a dense vegetation which remains unproductive for commercial agricultural commodities. All of these conditions contribute to the unproductiveness of Latin America as a whole.

Mexico

Mexico has an immense territory in the northern part of the country that is arid, and without adequate irrigation it is unproductive. In fact, about 33 percent of Mexico's land is considered unproductive. The mountains in northern Mexico are rugged; some are of relatively recent volcanic origin, and sufficient soil has not formed to support vegetation even if there was adequate rainfall.

About 34 percent of Mexico's land is considered to have sufficient soil and precipitation for pasturage of some kind; 20 percent is forested; 9 percent is cultivated; and only 4 percent is reported as potential productive land. The land in Mexico having the greatest productive capacity for commercial agricultural commodities lies in the great Central Plateau, where the soil is fertile and the altitude is suitable for temperate climate crops and comfortable human habitation.

Central America

The productive agricultural area of Central America lies in the highlands near the west coast, except for the extensive banana plantations in the coastal area on the Gulf of Mexico. As in Mexico, about 9 percent of the total area of Central America is in cultivation. In some individual countries, however, the percentage is much higher. Central America has sufficient annual rainfall for crop production, but the uneven seasonal distribution is a great disadvantage in many areas.

About 52 percent of the land in Central America is forested, and from it comes a great variety of forest products. Some of the finest mahogany comes from Honduras, for example. About 10 percent of the land of Central America is in pasture; 15 percent is potential productive land; and about 14 percent is unproductive.

Central America, with its variation in physical features, can qualify as both a temperate and tropical area. Its high plateaus provide pleasant habitation for man and vegetation, and its lowlands are suitable for tropical products.

The Caribbean Islands

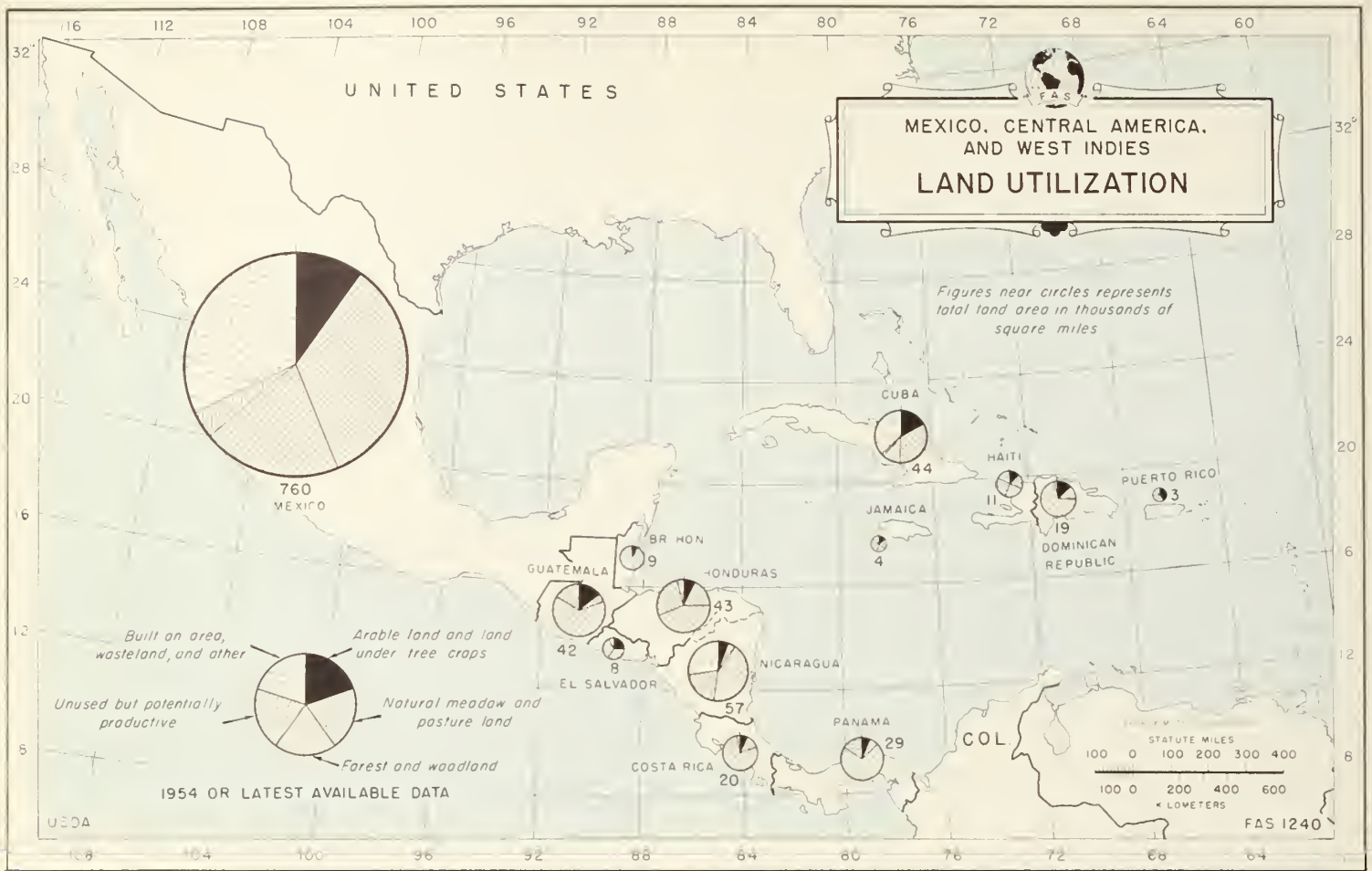
The land in the densely populated Caribbean Islands is utilized for the production of agricultural commodities to a much greater extent than is that in continental Latin America. About 17 percent of the land of the Caribbeans is cultivated; 26 percent is in pasture land; 27 percent, forested; 5 percent, potentially productive; and 25 percent, unproductive.

Sugar production occupies the largest part of the cultivated land. However, the islands produce a wide variety of tropical products in their relatively small area, for their elevation ranges all the way from 5,000 feet to a few feet above sea level. Most of the islands lie in the path of the hurricanes and suffer periodically from severe damage to the crops.

South America

South America, the largest land area in Latin America, has only 4 percent of its total land area in cultivation of agricultural products; 47 percent is forested; 18 percent is pasture land; and 31 percent is either unproductive or, in some areas, potentially productive for agricultural products.

Many of the hinterland areas of this vast territory have not



been accurately surveyed, and the land use must be estimated from the best reports and statistics available.

Brazil has 48 percent of the land in South America within its borders, but cultivates only 2 percent of it. Most of the cultivated land is in the southern States and near the east Atlantic coast. Of the rest, 12 percent is in pasture land; 56 percent is forest land, most of which lies in the great Amazon Basin; and 30 percent has not been classified, but 3 percent of it is potentially productive land for agricultural products and possibly a much greater percentage could be used to advantage. It is rather striking that such a relatively small portion of the country, in the south and southeast, has most of the population and agricultural resources of the entire country.

Uruguay, one of the smallest countries in South America, has almost all of its land utilized for agricultural purposes. About 12 percent of the land is in cultivation, in the Rio de la Plata area; 68 percent is pasture or grazing land; about 9 percent is potentially productive. Uruguay has little forested land, most of which lies along the rivers, and scarcely any waste land.

Argentina ranks second in the percentage of its land area in cultivation; about 11 percent is cultivated, mostly in the Rio de la Plata and nearby areas. Of the remainder, 41 percent is in pasture and grazing land, 25 percent forested, and 23 percent unproductive. Much of Argentina's unproductive land is in the desert area in the west, which crosses the Andes Mountains from Chile and Bolivia and enters Argentina; the Chaco region in the north, with its uneven distribution of seasonal rainfall; and the high mountains in the northwest.

The Guianas and Bolivia have the smallest amount of agri-

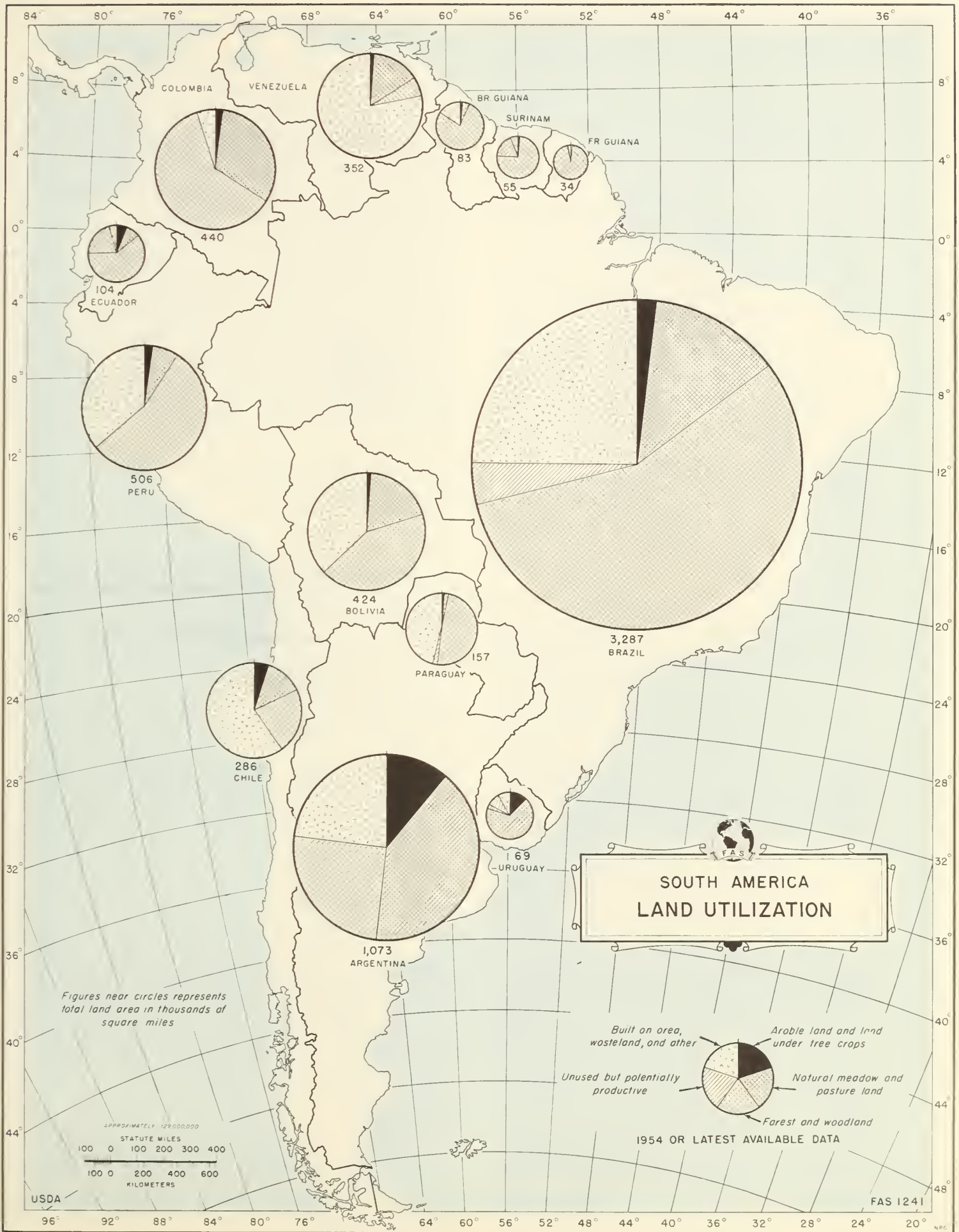
cultural productive land in South America. Each of these areas, however, has a considerable amount of forest land and land that could be utilized for pasture and grazing. Bolivia has a great amount of unproductive land in the southern desert area and the high mountains in the west.

Chile has about 5 percent of its land cultivated, all of it in the Central Valley. Over half of the land in Chile is either in desert or it has an unfavorable climate for agriculture, as has that of the southern part of the country.

Colombia cultivates less than 3 percent of its total land area; 24 percent is used for pasture or grazing; 17 percent is forested; and the remainder is barren or undeveloped or in such things as roads and cities. The best cropland is in pastures—in large land holdings, some of them Spanish grants, and most of the crops are grown on hill lands—a kind of land use that gives rise to such problems as erosion. Most of the pastures and crops are in the western half of Colombia, which is the most closely integrated part of the country.

The Pacific coast countries and Venezuela have vast mountain and lowland areas that are unproductive. However, they also have areas that are highly utilized for agricultural production; these are in their valleys and on their plateaus where soil and rainfall, temperature, and other climatic conditions are favorable to agricultural production.

In general the agricultural picture of Latin America is still one of low levels of living, low productivity, a low degree of mechanization or industrialization, and great underdevelopment of internal commerce—all of which are somewhat associated with the present land utilization pattern.



Crop and Livestock Pattern

The diversity of climate, soils, and topography of Latin America create a unique pattern for its crops and livestock. Those suited to temperate climates thrive in the Tropics.

The most important physical factors in determining the crop pattern of Latin America are the extensive areas of relatively poor soils, predominate tropical climate, and an uneven distribution of rainfall.

Latin America's livestock industry is based partly and in some places entirely on locally grown feed and on pasture. Imported feed rarely changes the livestock pattern.

The diversity of crops and livestock in Latin America is astounding. However, there are many disadvantages for an efficient agricultural industry throughout the entire area. Much of it is arid and without sufficient water supply for adequate irrigation. Some areas have too much rainfall; others with sufficient annual rainfall have an uneven seasonal distribution of rain. In many areas the soil cannot retain moisture because of its structure. Other areas have infertile and leached soils. Much of the land is rugged, and the comparative newness of recent lava deposits leaves many areas without adequate soil to provide for agriculture. The immense Andes Mountain range extending down the full length of Latin America affects the climate of its entire area. All these contribute to the low production of commercial agricultural commodities.

South America

The cropland of South America, like the population, is mostly relatively near the coastal areas of the continent, with the heaviest concentrations in the temperate-climate regions with deep fertile soils, adequate rainfall, and favorable topography. In 1954 the total land in cultivated crops, not including tree crops, amounted to about 89 million acres; 64 percent of this was in the grain crops, constituting about 6 percent of the total grain area of the world. Wheat and corn occupied about an equal amount of acreage, each having around 23 percent of the total cropland of South America; rice had about 8 percent, and all other grains, about 10 percent.

Oilseeds accounted for almost 15 percent of the cropland and cotton almost 10 percent, with the remainder devoted to the various pulse crops, tobacco, potatoes, sugarcane, and other crops.

The big grain belt lies out of the Tropics in the Pampas of Argentina, Uruguay, the southern States of Brazil, and in the Central Valley of Chile. A considerable amount of grain, however, is produced in the valleys and on the plateaus of the Andean Mountains in Colombia, Venezuela, Ecuador, and Peru. At no place in South America are the small grain crops of any great importance, and, where they are grown, it is usually for feed.

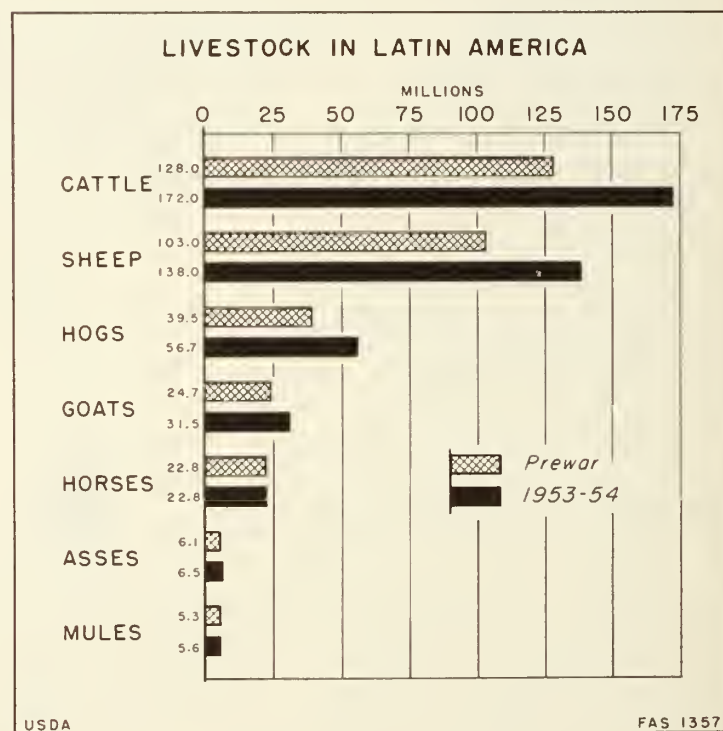
Beans, potatoes, and manioc are planted wherever there are people in the remote areas, and provide the chief subsistence crops. Beans, however, are more widely grown than either potatoes or manioc.

The tropical crops—coffee, cacao, and quinine—are important United States imports. They are, of course, tree crops and are not generally considered in the cultivated land pattern. Also important, but not part of the cropland pattern, are such commodities as the fibers (abaca, hemp, jute, and kapok) together with chicle, rotonone (for insecticides), and cinchona (for

quinine). Other tree crops provide important oils, such as castor bean, oiticica (drying oil), tung, palm, and babassu.

Irrigation has been important to the people of Peru and Chile since before the Spaniards conquered South America. Argentina now has about 3.5 million acres irrigated; Chile has 3.4 million, and Peru, 3 million. Any overall enlarged program of agriculture in Latin America will most certainly be associated with an extension of irrigation projects.

Livestock raising is the principal agricultural industry of South America, and the people are justifiably proud of the high class of livestock they produce in the important livestock areas. The largest of these in South America are in the temperate climate regions having sufficient rainfall for an abundant pasturage. The most prominent cattle areas are in Argentina, Uruguay, and southern Brazil. The great sheep areas are the Patagonia region in southern Argentina, southern Chile, Uruguay. Even the remote Falkland Islands have about 600,000 sheep. Hogs, like subsistence crops, are widely distributed. Wherever there are



any people, there is likely to be a pig or two. South America does not seem to have any specific hog-producing area.

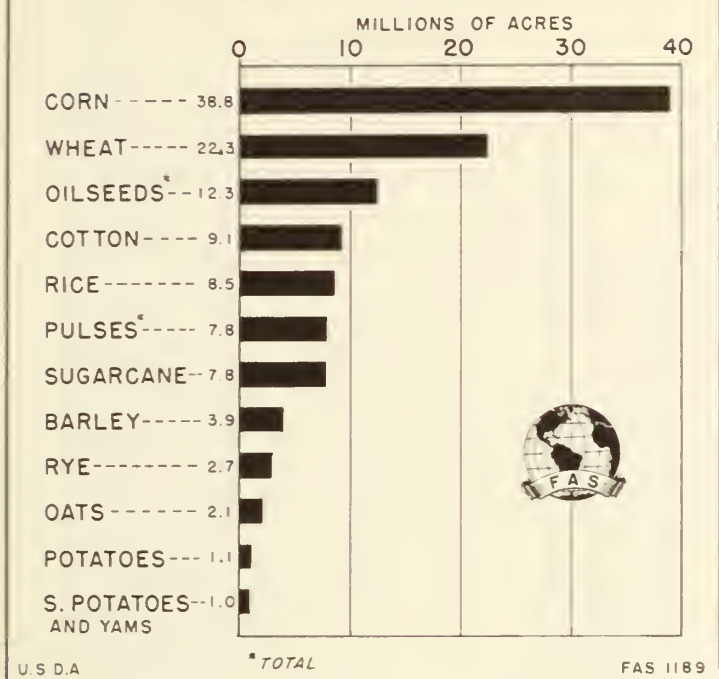
A considerable number of livestock are found in the valleys of the Andean Mountains in Colombia, Venezuela, Ecuador, and Peru. The tropical lowlands are not suitable for raising livestock of any kind to a great extent.

Mexico

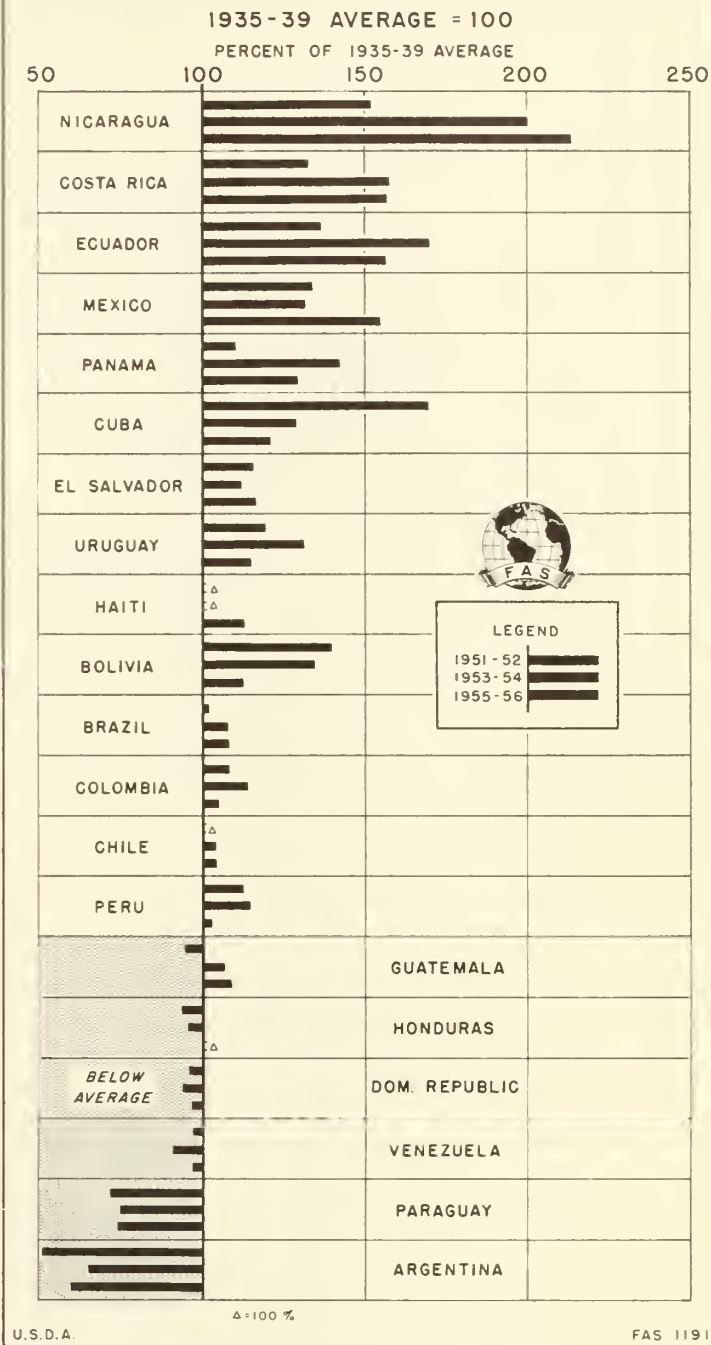
Mexico lies entirely within the subtropics and Tropics. However, its altitude compensates for its latitude and provides the characteristics of a temperate climate in much of the area, favoring the production of crops and livestock usually associated with the Temperate Zone.

Corn and dry beans have, by far, the greatest acreage of any

ACREAGE OF PRINCIPAL CROPS IN LATIN AMERICA, 1954



PER CAPITA PRODUCTION OF CROPS AND LIVESTOCK PRODUCTS IN LATIN AMERICA



crops and each State in Mexico has some. The greatest concentration of corn acreage in Mexico is in the States of Jalisco, Veracruz, Guanajuato, Mexico, Michoacán, and Zacatecas. These States comprise a belt extending across the central part of Mexico from the Gulf of Mexico to the Pacific Ocean. States having a low acreage in corn are in the areas of extreme dryness, or where it is too hot and humid. The bean acreage follows closely the pattern of corn, although it is not so heavy. The adjoining States of Jalisco and Guanajuato lead in acreage of beans.

The wheat belt of Mexico lies in the Central Plateau States, where temperatures are moderate, soils good, and precipitation sufficient during the growing season. Sonora, a northern State bordering the United States, has the largest acreage of wheat of any one State in Mexico. It also has the best yield per acre.

Cotton, another important crop in Mexico, is grown chiefly in the irrigated areas of the northern States, with the heaviest acreage in the State of Tamaulipas in the northeast portion of Mexico, bordering the State of Texas in the United States.

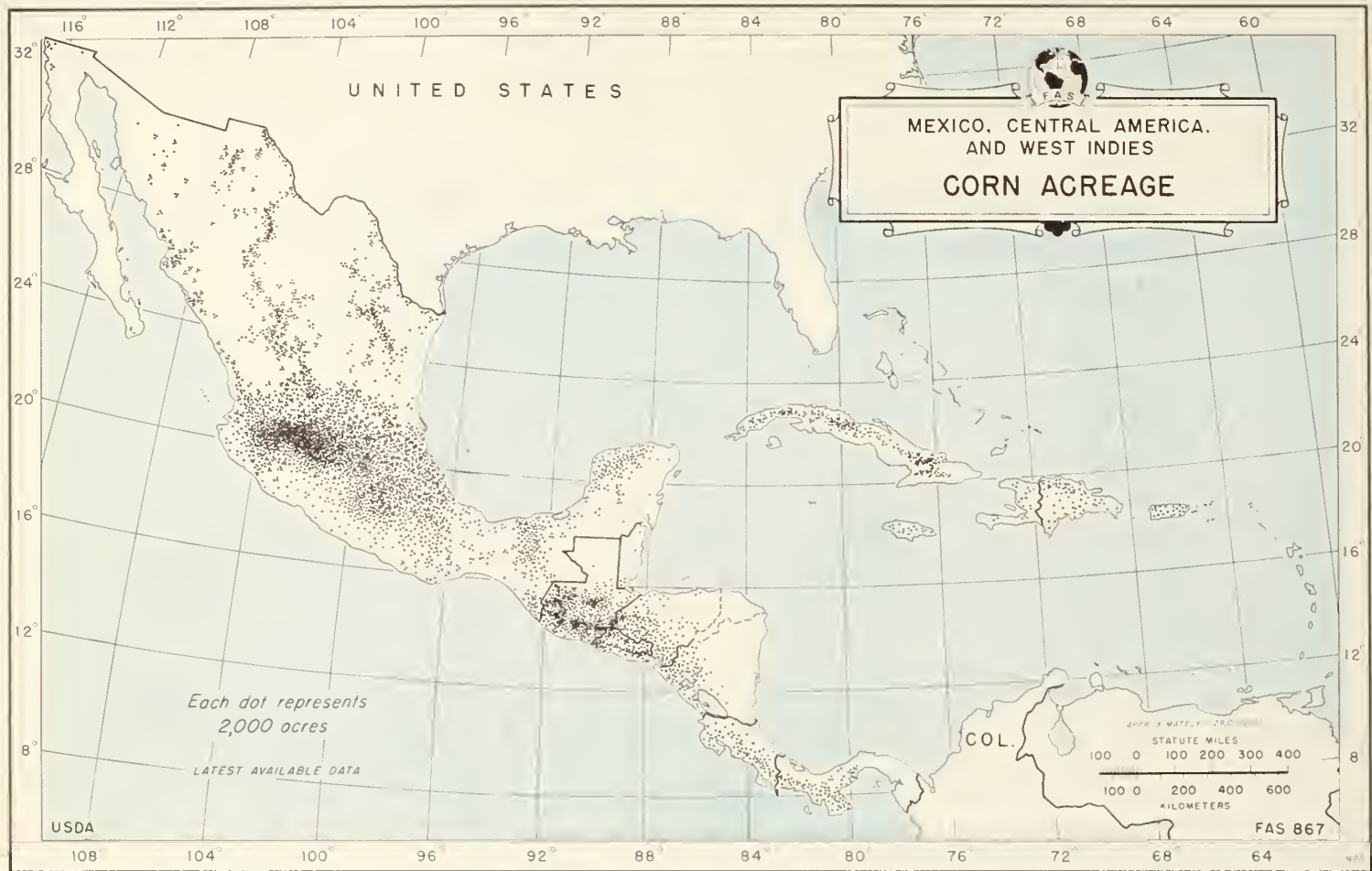
The diversity of crops that may be grown in Mexico is remarkable—tropical crops on the lowlands and in the valleys, tropical tree crops on the lower hillsides, the temperate-climate grain crops on the plateaus, and the semitropical crops in the irrigated areas. Mexico also has an adequate labor supply for its agricultural industry.

Mexico has a thriving livestock industry. Cattle lead all other livestock in numbers. About 34 percent of the cattle are in the northern States, 25 percent in the Central Plateau States, 15 percent in the southern Gulf States, 15 percent in the northwest Pacific Coast States, and the remainder in the southern Pacific Coast States. Goats are second in numbers, with about 60 percent in the northern States, and 30 percent on the Central Plateau. The remaining 10 percent is distributed throughout the other

States. Sheep and hogs about equal in numbers, and hogs are well distributed, whereas sheep are mostly in the higher and cooler areas.

Central America

Like Mexico, Central America lies in the Tropics, yet the altitude in the west provides a suitable climate for the production of temperate and subtropical crops. The agricultural area, where most of the cultivated land is, lies on the Pacific side of Central America. Corn and beans are the most widely grown food crops and are grown in all the countries. Rice and sugarcane, however, are also important crops in the area, with the banana plantations on the Caribbean side in the lowlands where climate and



soils are favorable. Central America supplies a great portion of the bananas consumed in the United States.

Cattle are the principal livestock produced in Central America. Guatemala and Honduras are the largest producers. Few sheep are raised and scarcely any goats. Hogs are widely distributed, as in other Latin American countries, wherever the population is.

The Caribbean Islands

The Caribbean Islands have a diversified agricultural pattern, but corn and beans are the subsistence crops raised. On the larger islands, like Cuba, Jamaica, and the Dominican Republic, sugarcane, fine tobaccos, and coffee are important commercial agricultural crops. Bananas and other tropical fruits are widely grown.

The livestock pattern follows that of the other Latin American countries, with cattle leading, hogs second and widely distributed, and few sheep and goats.

Corn

Corn is one of the Americas most valuable contributions to the agriculture and food resources of the world. It was first cultivated in the Andean region of South America. From there it spread to Central America and finally to North America. The early civilizations of Peru, Central America, and Mexico were based upon the culture of corn.

Temperature requirements. Corn's southern origin is indicated by its relatively high temperature requirements. Good results

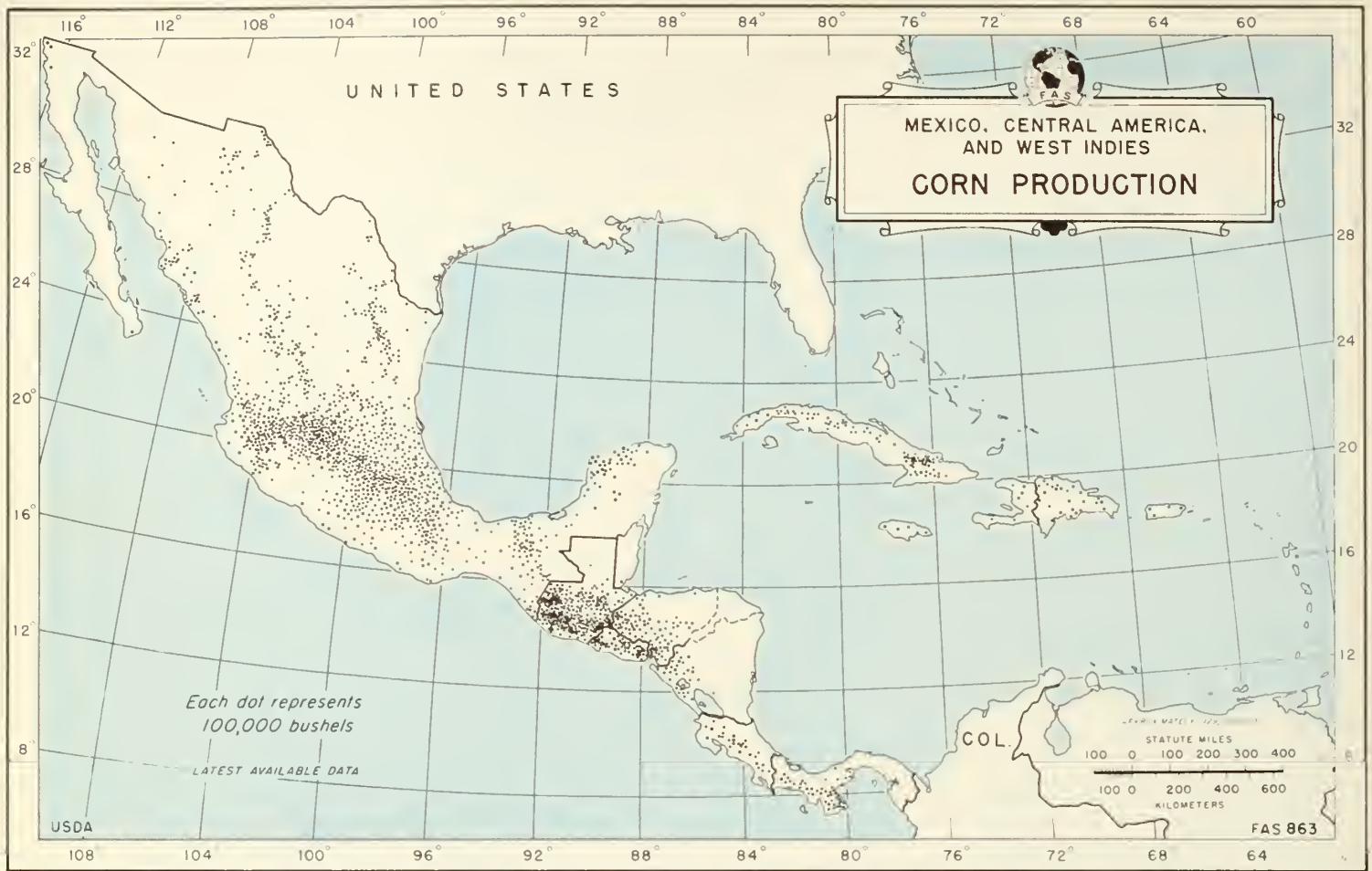
are obtained from crops that have a growing season of 140 days or more, with a mean summer temperature of around 75° F., and with night temperatures exceeding 58° F. According to O. E. Baker in the *Geography of World Agriculture*, "Practically no corn is grown where the mean summer temperature is less than 66° F., or where the average night temperature during the three summer months falls below 55° F."

Thus, temperature requirements set definite limits to corn production. But there is a significant difference in the temperature demands of different varieties. Some may be grown in a season of less than 100 days, while other, late-maturing types require a growing season of 180 days and a mean summer temperature of 80° F. Also, corn for fodder or silage may be raised in cooler regions than corn grown strictly for grain. In general, corn is a crop that can be grown successfully throughout the humid Tropics, the humid subtropics, and the warmer parts of the regions with middle latitude climates.

Moisture requirements. Lack of rainfall is a second climatic limitation. The approximate limit is reached when mean summer precipitation falls below 8 inches. There are notable recessions and extensions from that line, largely because of edaphic conditions.

Soil requirements. Where production is near the aridity limit, soil structure becomes increasingly important in controlling the amount of water available to the plants and, consequently, in shaping conditions either favorable or unfavorable for corn production. Shallow profiles of medium-textured topsoil (A-horizon), with a heavy compact subsoil (B-horizon) or hardpan, are





a desirable soil structure because the root system of the plant is shallow. Rainwater seeps very slowly into the subsoil, and what little penetrates the lower strata is out of reach of the plant roots. Most of the moisture or water is held in the shallow surface layer, from where it is rapidly dissipated through evaporation. Similarly, in deep, light, sandy soils, or soils with a porous, sandy subsoil, rainwater seeps rapidly down to the ground water horizon leaving the topsoil dry. In both cases, periods of dry weather are a serious hazard to summer crops and make such soils unsuited to corn production.

However, corn is grown on a great variety of soils. Fair drainage is essential as poorly drained soils are too cold in the spring. Furthermore, corn demands good soil aeration. Corn grows successfully over a wide range of soil reaction, pH 5 to 8, although yields are usually adversely affected by degrees of acidity represented by pH values less than 5.5. The prairie soils are the best suited for corn, since they fulfill its requirements most completely and are to be found in regions where the climate is especially favorable.

Corn also requires an abundance of readily available plant nutrients during its period of rapid growth in the late summer. Nitrates are especially in demand then.

Corn areas. Brazil is the largest corn producer in Latin America, with Argentina and Mexico ranking second and third. Brazil is a tropical country and, as a result, corn is its most important grain. The total production averaged over 260 million bushels in the last 3 years.

Over most of Brazil, geographic conditions are favorable for corn. Thus, appreciable quantities are produced even in the

dry northeastern States. In the Amazon Basin, where the tilled area is very limited, corn and manioc are the main food crops. More than two-thirds of the corn, however, is grown in São Paulo, Minas Gerais, and Rio Grande do Sul. Elsewhere it is grown in combination with manioc or on young coffee plantations among the coffee trees.

Argentina exports nearly all of the corn exported from Latin America. Normally, Argentina, with its corn belt immediately adjacent to ports of export, ships from two-thirds to three-fourths of its annual production. Shipments of corn are made to European markets for livestock feed, principally to the United Kingdom, the Netherlands, France, Belgium, Germany, and Denmark.

Argentina during the 1955-56 marketing season, ranked next to the United States and the Union of South Africa as a corn exporter, with about 80 percent of the crop grown for export. In the 4 preceding years Argentina had been second to the United States in corn exports—though considerably behind the United States. The area suitable for corn production in Argentina, especially the area with optimal conditions, is limited. Much of the country is either too dry or too cold. The Provinces of Buenos Aires and Santa Fe contain over 75 percent of the corn acreage of the country. Yields fluctuate materially from year to year, chiefly because of extreme variations in rainfall.

Corn production in Mexico is of great local importance. Here the crop is grown largely for human use—tortillas and corn porridge—but part of it is fed to livestock, especially hogs. The country is generally self-sufficient in corn and even





exports some small quantities occasionally, though at other times it requires small imports.

Mexican corn fields are generally small, and rather primitive methods of culture are employed. Several crops a year are produced in various areas.

Corn occupies nearly 60 percent of Mexico's tilled land and accounts for over 80 percent of the acreage in grains. But in the dry States of the northwest—Chihuahua, Sonora, and Baja California—production is small. Here, as well as in other semi-arid portions of Mexico, corn must be grown under irrigation.

The upper limit of corn in Mexico is about 10,300 feet, except on the Titicaca Plateau, where corn has been found at altitudes as high as 12,800. Although corn is grown in every State in Mexico, about 80 percent of the total crop is grown in the temperate areas of the Central Plateau.

Colombia ranks fourth in Latin America in corn acreage, production, and yield. Over half the corn of Colombia is grown in the neighborhood of Bogotá and in the four States of Cundinamarca, Antioquia, Bolivar, and Boyaca. Corn is produced at elevations as much as 10,000 feet, and under 3,000 feet two crops a year can be produced.

In Uruguay, about half as much corn as wheat is produced. The greatest concentration of corn production is found near the Rio de la Plata in the hinterland of Montevideo.

The other countries of South America produce a limited amount of corn now, as they have for years.

The natives of Chile have grown corn since 1541, and, in the

whole country north of Valdivia, have used it as food for hundreds of years. Most Chilean corn is used locally. Many varieties are particularly resistant to adverse climatic conditions in the different mountain valleys. South of Concepción the climate is not at all adapted to corn raising on any large scale. The days may be warm but the nights are nearly always cool, so that corn develops slowly.

Central America, Guatemala, Honduras, and El Salvador are the heaviest producers of corn.

Wheat

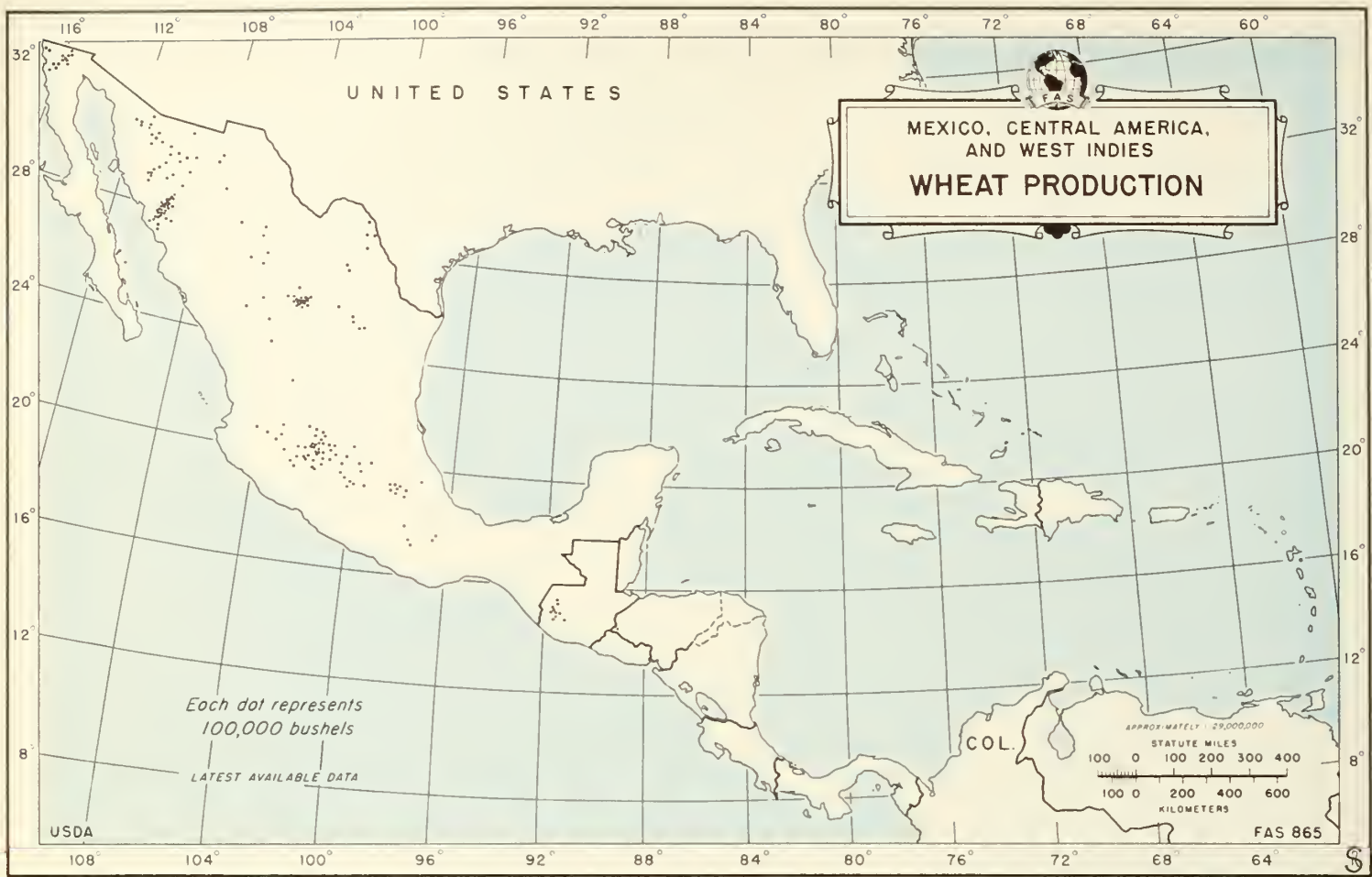
Wheat is one of the world's basic foods. For the greater part of the world's people, bread or cereals constitute the principal dietary staple. However, while wheat has no rival as a bread crop, there is some question as to whether it or rice is the more important food crop.

The many cultivated varieties of wheat make it adaptable to a fairly broad range of climatic conditions. Consequently, it is found distributed throughout Latin America as well as the rest of the world. Also, because of the many kinds of wheat there is great variability in the yield per acre.

Spring wheat production is more hazardous than winter wheat production. Since winter wheat matures earlier than the spring-sown crop, it is more likely to escape damage from drought and rust.

Temperature requirements. Wheat is grown under rather high temperature conditions, provided the period of high temperatures





does not coincide with periods of high atmospheric humidity. The combination of high temperature and high humidity is fatal to wheat.

Dr. O. E. Baker, well-known U. S. Department of Agriculture economist, claims that where the average temperature for the 2 months preceding harvest exceeds 68° F., and where the rainfall amounts to 50 inches or more annually, there will be little or no wheat grown.

Wheat requires a growing season of at least 100 days. The production of wheat in regions with short growing seasons is subject to a considerable frost hazard prior to maturity. In spite of temperature limitations for wheat in the higher altitudes of Latin America, only barley, potatoes, and certain hay crops are grown under colder conditions than wheat. According to F. Schindler (in *Handbuch des Getreidebaus*, Berlin, 1923), the northern limit of economical wheat production corresponds with the May Isotherm of 50° F. This would apply to the 50° temperatures in the high altitudes of Latin America.

Moisture requirements. The most important wheat producing areas have an annual precipitation of less than 32 inches. Moisture conditions are best analyzed on the basis of the efficiency of precipitation and humidity, rather than from the standpoint of annual rainfall alone. In areas of high efficiency of precipitation—where the rainfall is sufficient in the growing season and with the crop grown under conditions of alternate fallow and cropping—wheat has been grown with as little as 10 inches of annual precipitation.

The seasonal distribution of precipitation in the grassland areas is ideal for wheat production, and especially for the growing

of high-protein wheats. However, since these regions are characterized by a high variability in rainfall, yields may fluctuate materially from season to season. High rainfall alone does not exclude wheat, except where combined with high temperatures, thereby favoring the development of various fungus diseases.

In certain areas adapted to both spring and winter wheat, the relative importance of these two types is greatly influenced by prevailing moisture conditions during the fall. Dry falls, unfavorable to the germination and establishment of winter wheat, result in increased acreages of spring wheat and also of spring-sown barley.

While wheat will grow in relatively dry climates, the yields obtained in dry regions are not only low but also extremely variable. Many of the wheat producing areas of the world border on distinct minimal-moisture areas and in some places, extend into them.

Soil requirements. Wheat is grown in many different soils but the fertile silts, silt-loams, or clay loams, and especially those soils that contain certain amounts of lime and humus, are the most favorable. The best wheat soils are fertile, have good waterholding capacities and fair-to-good drainage. Very sandy soils are not suited to wheat production. Because wheat is grown mainly in subhumid and semiarid areas, the soils are either neutral or slightly alkaline in reaction. This enables the crop to withstand moderate concentrations of soluble salts and carbonates. Strongly saline or alkaline conditions are unsuitable.

The Chernozem and Chesnut soils are especially good for wheat production. Chernozem is better than Chesnut soils, which are found in areas with higher P-E index of precipitation effective-



ness. Good wheat soils contain fairly large amounts of available phosphorus, which promotes the formation of grain.

Sufficient organic matter is required in soils to promote good tilth. Some liberation of nitrogen is desirable for the stimulation of growth and the production of high-quality, high-protein wheats.

Wheat areas. Most of the countries of Latin America have some wheat acreage, varying from 2 percent in Guatemala to as much as 36 percent of the cropland in Uruguay. Argentina is the largest producer, with a 1954–56 average of about 246 million bushels. This is over 6 times the production of Chile, the second largest wheat producer; yet in Argentina only about 16 percent of the cropland is occupied by wheat.

Argentina's wheat area is crescent shaped. It extends from Mar del Plata to north of Bahia Blanca, and from there northward to Villa Maria and the region west of Santa Fe. In latitude it corresponds to the northern half of Texas, Oklahoma, and Kansas south of Topeka parallel. Winters in Argentina are milder than in the United States, and over much of the area the precipitation is relatively low, varying from 8 inches on the western margin to 30 inches on the eastern margin of the crescent.

Argentine wheat is of good quality, although the protein content is lower than that of American Hard Winter wheats. The Argentine crop is harvested in November, December, and early January.

The temperatures exceed 68° F. and the rainfall amounts to over 50 inches annually, thereby limiting the northern expansion of wheat in Argentina.

In the remainder of Argentina wheat expansion is limited by lack of rainfall. The country becomes increasingly dry as the interior is approached. The climate, especially in the interior regions, is typical of grassland country—too uncertain for many crops.

Owing to its small population and low total consumption, Argentina occupies a prominent place as an export country. During the 3 years 1953–54 through 1955–56 (July–June), Argentina was exceeded only by the United States and Canada as a wheat exporter.

Mexico is the second largest producer in Latin America—though up to 1956 Chile was second. Most of Mexico's wheat is grown in the southern part of the plateau, with some scattered production in the northern area of the country. Chile now ranks third, with Uruguay and Brazil following in that order.

Colombia, Ecuador, Peru, Bolivia, and Guatemala all produce some wheat, but quantities are small and most of it is grown in the highlands.

Oats

Oats, one of the last food grains to be domesticated, is probably the most robust grain grown. It has a well-developed root system and responds well to good soils and to the application of fertilizers.

The crop grows well under the same conditions of soil and moisture as wheat. Oats, however, do much better on cold wet soils than other grains, and most of the light strongly acid soils are suited to oats. Alkaline and saline soils may, if climatic conditions are favorable, produce oats where wheat and barley would not grow.

Oats are important as a rotation crop. They can withstand



a great deal of moisture—in fact, they do not grow well under dry, sunny conditions. Their superior qualities as a feed crop insure them a place on good soils.

If hot summers are not favorable to oats, neither are cold winters for a winter-sown crop. Oats are excellent as a spring-sown crop and usually require from 80 to 110 days for maturity, with an average temperature of from 60° to 70° F.

Because oats are not suited to the Tropics climatically, they are grown only in those areas of Latin America that lie outside the Tropics, or where altitude compensates for latitude in tempering the climate.

Argentina is the principal oats-producing country in Latin America. The crop is grown mainly on the fringe of the grain belt, where the temperatures are mild and rainfall sufficient. Argentina is the only country in Latin America exporting substantial quantities of oats, and, during the 3 years 1953–54 through 1955–56, it ranked as either the world's second or third largest oats exporter.

Oats are raised in the southern part of the Central Valley of Chile chiefly in the Provinces of Cautin, Malleco, and Valdivia. Chile ranks second to Argentina in the production of oats.

Oats are grown to some extent in southern Brazil. About two-thirds of the acreage is in the State of Rio Grande do Sul where climatic conditions are favorable. Parana and Santa Catarina each have a small acreage.

Uruguay produces some oats, too, chiefly for feed grain. On the high plateaus in Ecuador and Bolivia, oats are grown in those areas where the rainfall is sufficient and temperatures moderate.

Mexico ranks next to Chile in oats acreage, with 90 percent of the acreage in the northern State of Chihuahua.



Rye

Rye is historically a younger crop than either wheat or barley. It is an important grain crop in some parts of the world, especially in northern Europe, where it is used for bread.

Relatively poor soils will produce rye much better than they will wheat. Moreover, rye does not respond to plant nutrients as well as wheat, so on good soil wheat will produce a much higher yield than rye. Rye seems to be able to withstand excessive moist cool weather better than wheat, yet it is not as resistant to soil moisture as oats.

Rye does not grow well in tropical countries except in the high altitudes; it does not tolerate heat with high humidity. It is the most winter-hardy of all grains, and the yield is much higher when fall sown. The fall-sown rye forms more stalks than the spring sown; so the yield is greater.

Latin America does not have a high acreage in rye. Argentina is the greatest producer. Rye grows well in Argentina in the cooler areas of the grain belt and on the poorer soils to the west and south of the wheat-growing area. Argentine rye is said to be better for making bread than the European rye. A considerable acreage is used for pasture.

Rye is also grown to a limited extent in Brazil, in the States of Rio Grande do Sul, Parana, Santa Catarina, and São Paulo, also in Minas Gerais and Bahia. Chile has some rye in the Provinces of Bio-Bio and Cautin. Ecuador and Venezuela produce a little in the highlands. In other Latin American countries, rye production is so small that it is not in their statistics.

Rye is more or less an "in between crop." Its food value is not as high as that of some other grain crops, nor is rye popular as a feed crop. Where soils and climate are not suitable for other grain crops rye may be grown as a substitute.



Barley

Barley is one of the oldest domesticated grains. It is grown in Europe, the United States, and parts of South America, primarily for feed grain and the making of malt. In other regions, semiarid areas of North Africa, barley soup is an important food.

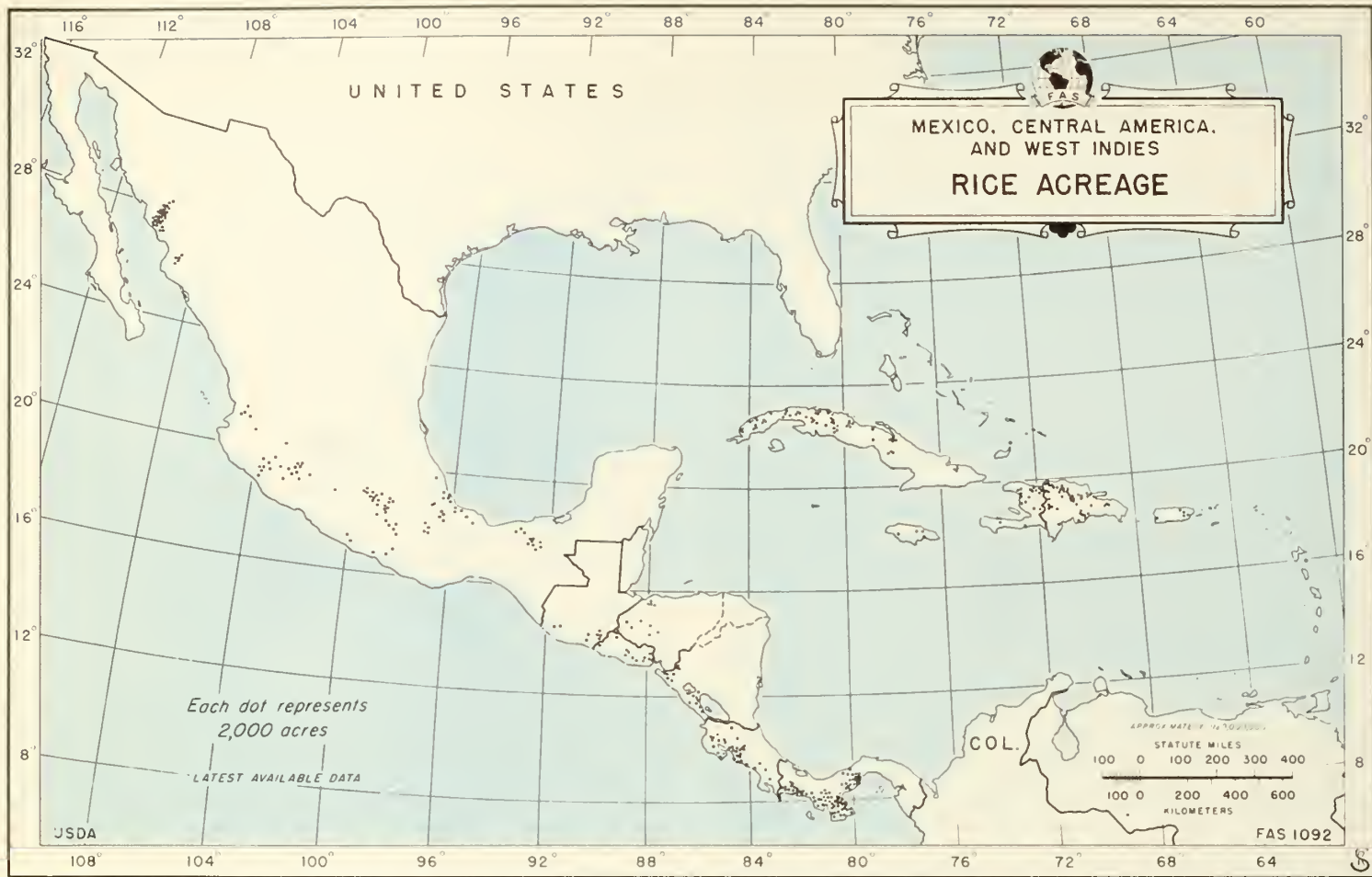
Barley thrives best on fertile, porous soils, requiring even better soils than wheat. But when used for feed grains it can be grown on poorer soils.

Barley has a very short growing period, a minimum of about 90 days. Spring-sown barley requires less time to grow than spring-sown wheat, rye, or oats; therefore it will grow in higher latitudes and higher altitudes than any other cereal crop. Winter-sown barley, however, is not as hardy as winter-sown wheat and cannot withstand the severe winters of the high latitudes. During the growing period, temperatures should range from 60° to 65° F. A warm dry climate is desirable during the ripening period.

In the Tropics, barley is usually grown at the higher altitudes, as it does not thrive in the warm humid regions. It is resistant to dry heat and can be produced almost to the limit of cultivated land in the semiarid climates.

Argentina ranks first among the Latin American countries as a producer of barley. During 1953-54, this country was the world's second largest barley exporter, the next year it was the fourth, and by 1955-56 it had risen to third place.

Some barley is grown in certain highland areas of Latin America, such as the Mexican Plateau, the Bolivian Plateau, and the highlands of Colombia, Ecuador, and Peru. Barley is also raised in the southern States of Brazil; the Provinces of Santiago, O'Higgins, Valparaiso, and Coquimbo in Chile; and in Uruguay.



Rice

Rice is one of the world's oldest foods. It originated somewhere between southern India and Cochin-China and from there spread to Egypt and North Africa. Rice was grown in Italy in 1468 and introduced into South Carolina about 1685.

It supplies the major food requirements for about half the world's population, and is also used as feed and for the manufacture of alcohol, rice starch, acetic acid, vinegar, and other products.

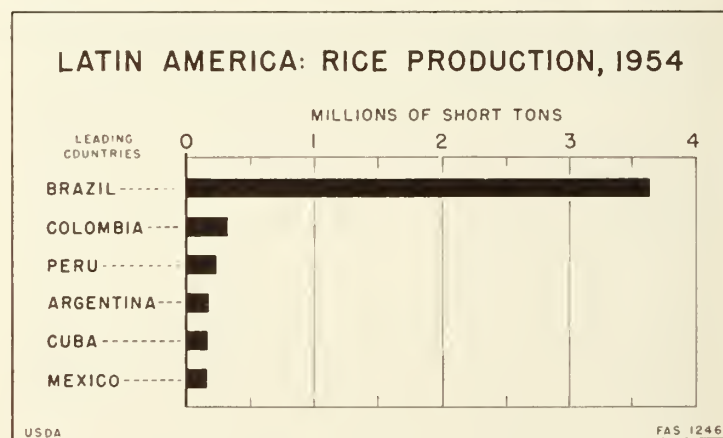
Rice is not a typical tropical plant. It does well in extremely hot humid areas, yet it is grown in the cool highland areas of Latin America.

A satisfactory climate for rice has high temperatures during the growing season, abundant moisture, and, generally, high humidity. This type of climate usually precludes the production of other cereals, especially during the growing season for rice, which varies from 3 to 7 months. In Venezuela and Colombia, the climate is such that two or more crops can be grown each year.

Minimum temperatures for germination of rice have been estimated at 50° to 55° F. for subtropical varieties, and probably from 60° to 68° F. for equatorial ones.

There are two main groups of rice—upland, or dry, rice, and paddy rice. Upland rice is grown without irrigation or flooding, but requires plenty of soil moisture. Paddy rice grows like a swamp plant in shallow water during the vegetation growth.

About half of the rice grown in South America is planted on rolling to hilly lands without irrigation. The main reason for

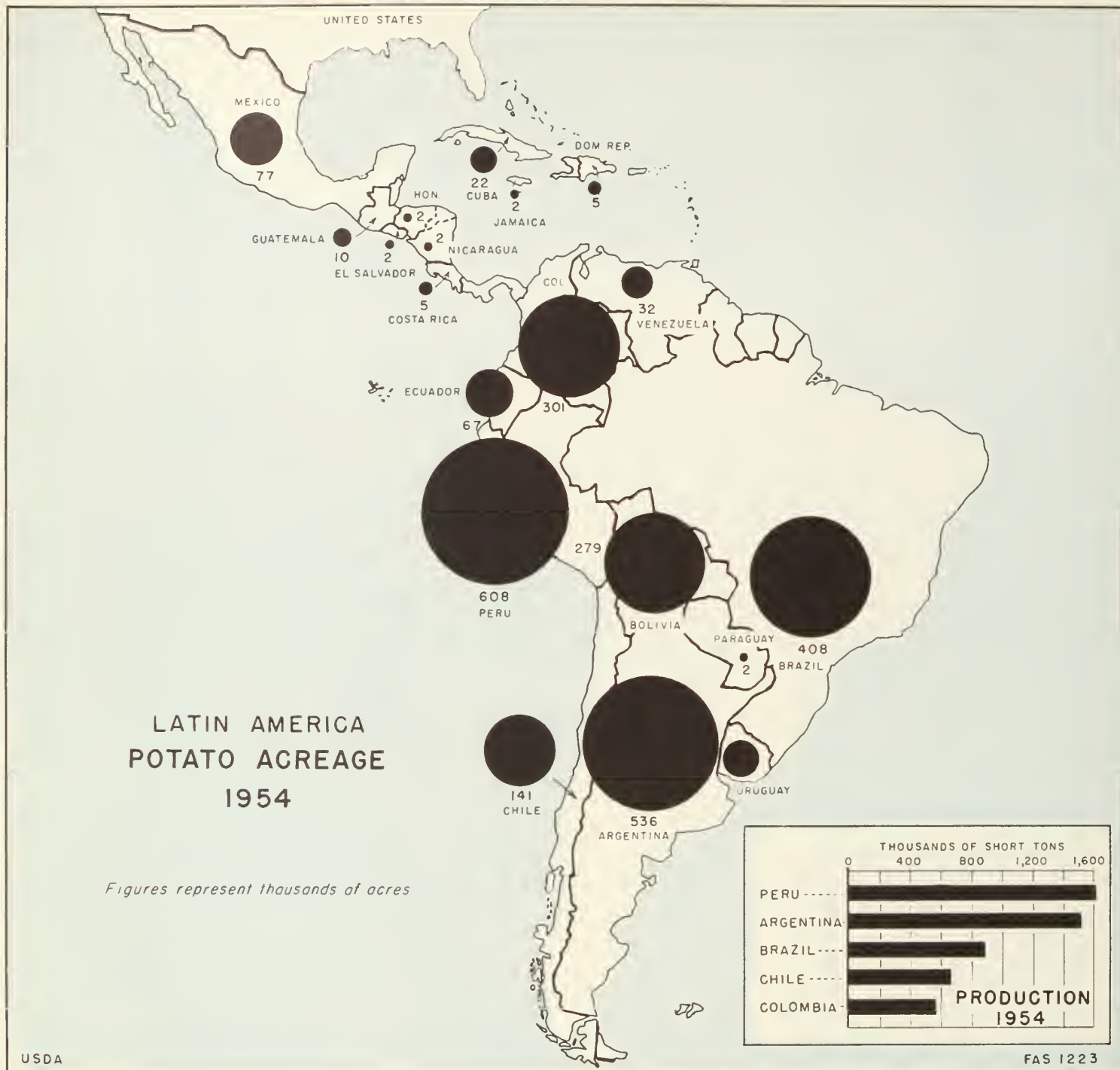


irrigating rice is to cultivate it. Rice will tolerate water that grass and weeds cannot grow in.

Rice is produced on a variety of soils. Paddy rice culture, however, can be successfully carried out on soils containing a certain amount of clay in the subsoil. The outstanding requirement of the soil is its ability to hold water over the surface for a considerable period. The alluvial soils with impervious subsoils are ideal for the crop, and so are the clays or clay loams with impermeable clay or clay loam subsoils.

In Latin America the cultivation of rice ranges from 28° N. in Mexico to 36° S. in the central valley of Chile. Brazil is the principal rice grower in Latin America. It produces over 3.5 million short tons per year and could produce more. Now, it grows two-thirds of the rice grown in the Western Hemisphere.





Potatoes

The potato occupies an important place in human nutrition: the average world production far exceeds that of cereals. In general it is agreed that the potato originated in the central Andean region of South America. The potato thrives best in a climate with cool fairly humid summers. The heavier-yielding areas are those with maximum normal temperatures of 65° F.: here, yields of 200 bushels have been reported, as contrasted to 120 and 180 bushels where normal temperatures during the growing seasons are 69° to 73° F., and even 60 to 80 bushels per acre where they are above 73°.

The potato plant demands at least 10 inches of rain during the growing season, or it must receive that much moisture from irrigation.

Potatoes are grown in a wide range of soil conditions. But, according to M. F. Morgan (in U. S. Dept. Agri. Yearbook, 1938). "Loam, fine sandy loam, or silt loam soils having deep, mellow subsoils with especially good under-drainage are the most desirable. . . . A high state of chemical fertility must be either naturally present or artificially provided. The potassium requirements are relatively high."

Various areas where soils are not ideal for potato production have been modified by cropping and cultural practices, as well as by heavy applications of fertilizers so that relatively high yields are obtained. When organic matter is used to build up light sandy soils, material increases in yields occur and production is better stabilized.

The six leading potato producers of Latin America are Peru, Argentina, Brazil, Colombia, Bolivia, and Chile.



Flax

Flax has been grown for its fiber and seed for such a long time that it is not known whether it was first planted for food or cloth. Flaxseed, mixed with grain or other seed and ground into meal, is still used for food in Ethiopia, India, the USSR, and, to some extent, in other countries.

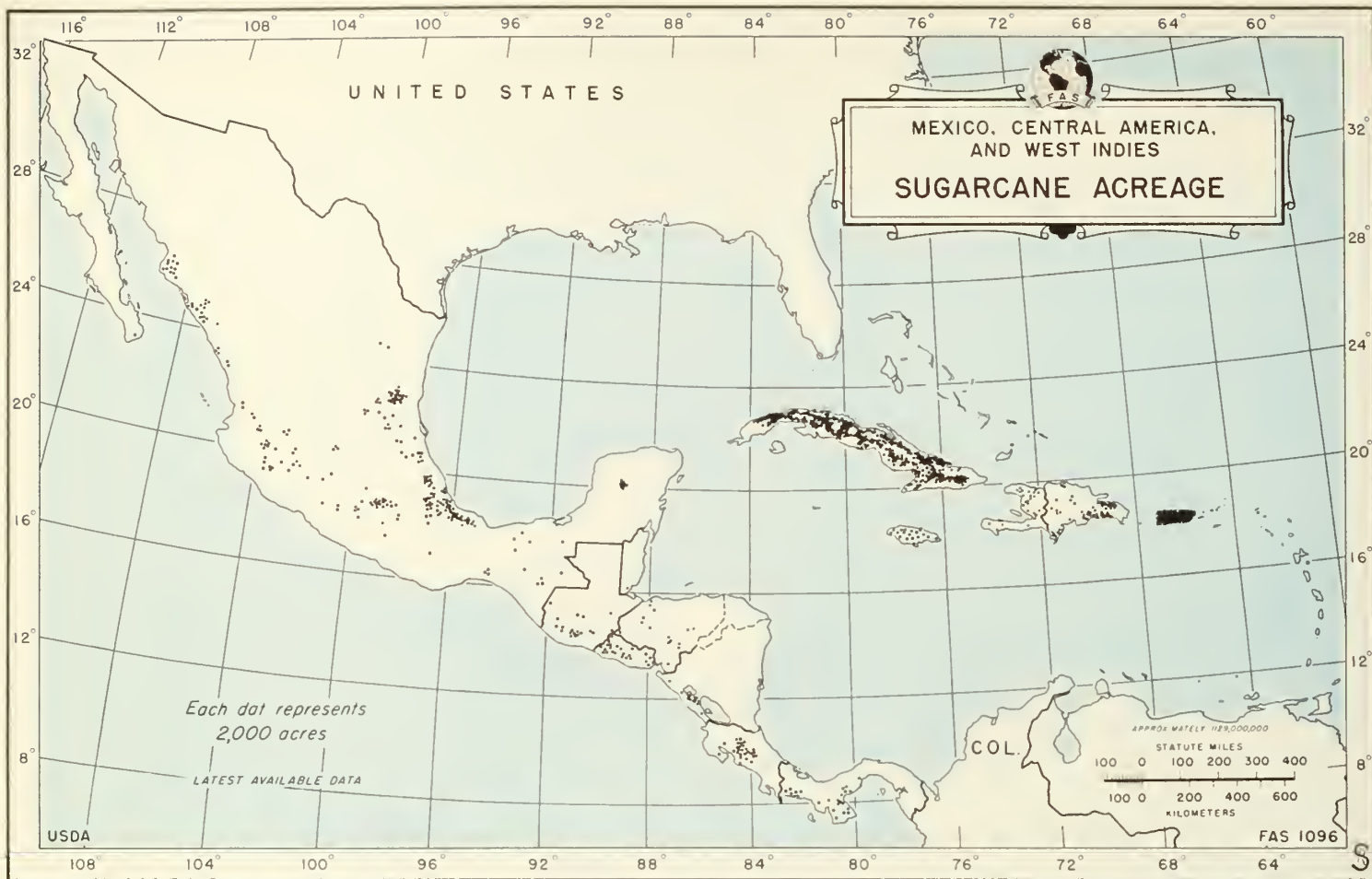
The making of fine linen is an ancient art but, with the availability of cheaper cotton goods, the importance of fiber flax has diminished until, at the present time, flax may be considered primarily as an oilseed crop except in Europe and the USSR. There are two distinct types of flax—the seed flax, grown for its seed and oil, and the fiber flax, grown for fiber and linen production.

Flax has specific moisture and temperature requirements be-

cause its root system is highly dependent on surface soil moisture. Though it requires rainfall and a moderately cool climate, flax is not exacting in its soil requirements. In Latin America, most flaxseed is sown in June–September, and harvested in November and December.

Argentina ranks first in the production of flaxseed, but the output has declined sharply from the 60-million bushel prewar average. It is grown mainly in the Provinces of Buenos Aires, Santa Fe, Cordoba, and Entre Rios, where both climate and soil are exceptionally favorable. Argentine flaxseed contains about 1 pound more oil per bushel than United States northern-grown flaxseed.

The Uruguayan flaxseed-producing area is adjacent to the Argentine area, and has the same favorable growth factors. Uruguay ranks next to Argentina in production.



Sugarcane

The first sugar in the Western Hemisphere was made in 1510. Gonzales de Velosa is given credit as the founder of the sugar industry in the Caribbean area.

Sugarcane is a perennial. The first crop is called plant cane and ripens in 12 to 24 months, depending on local climatic conditions. Succeeding crops are called the stubble or ratoon crops, usually produce at intervals of about 1 year, and yield less than the first crop.

A sugarcane-producing area should have from 50 to 65 inches of rain annually. E. W. Brandes (in U. S. Dept. Agr. Yearbook, 1923) states that "the more nearly the weather approaches humid tropical conditions . . . the better will be its effect on the rapidly growing crop."

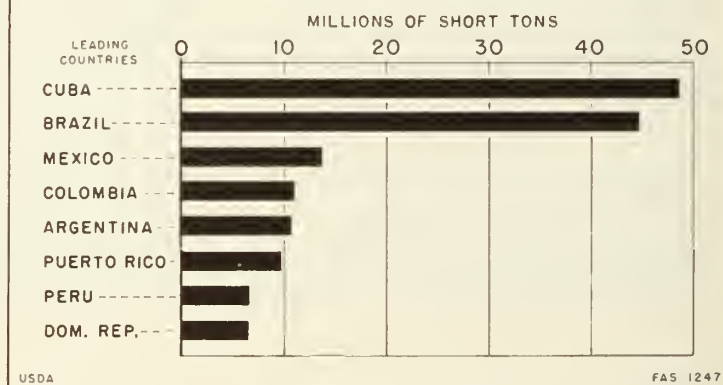
Sugarcane will grow on a variety of soils, but does best on loamy, moderately acid to moderately alkaline soils and is grown in the Tropics primarily on red soils, which are developed under forest vegetation. These soils are often low in lime and plant nutrients. Good cane soils have the ability to retain moisture, are deep and friable, and must have good drainage.

In Latin America the four largest sugarcane producers are Cuba, with 50 million short tons; Brazil, 45 million; Mexico, 13 million; and Colombia, with 11 million.

In Cuba sugarcane is the main crop and the principal export product. It occupies about one-half of the cropland. Most of the cane is planted from September to November, and is usually harvested about 15 months later. Cuba has the largest acreage and output of sugarcane.

Brazil is the second largest producer, with about 45 million

LATIN AMERICA: SUGARCANE PRODUCTION, 1954



short tons, and stands second in acreage, with about 2.5 million. The old sugar-producing area on the northeast coast is no longer the dominant producer it once was. In the south the principal center of production lies in São Paulo, with areas in Rio de Janeiro and Minas Gerais.

Mexico is the third largest producer. Its sugar region is located in the coastal lowlands of central Veracruz. Next in importance is the Chietla-Zacatepec region of Morelos and adjacent southwestern Puebla. On the dry Pacific coast, cane must be grown under irrigation.

Colombia is the fourth largest sugarcane producer, with about 11 million short tons on less than 400,000 acres, mostly in a small east-central area.



**SOUTH AMERICA
SUGARCANE ACREAGE**

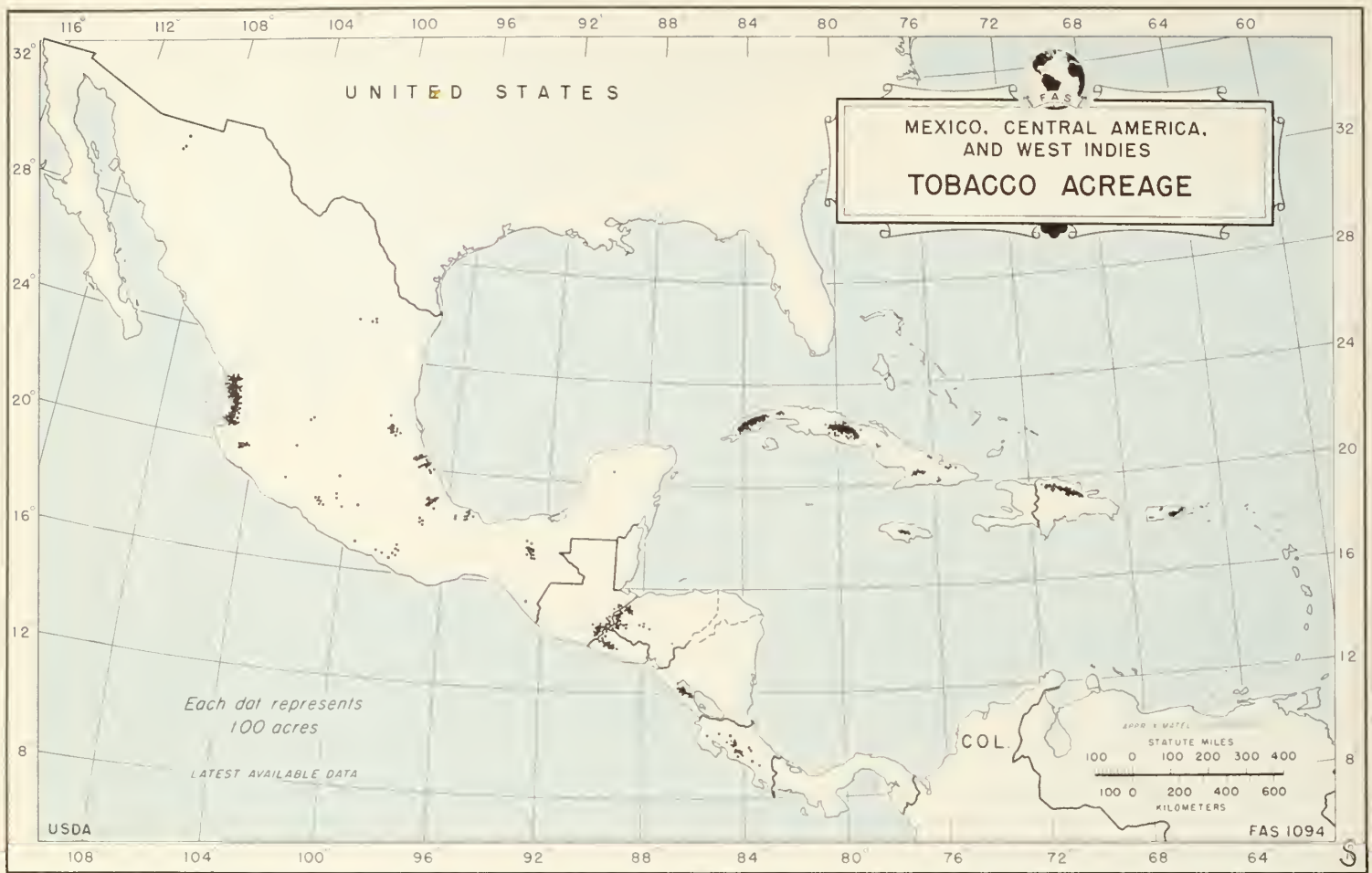
Each dot represents
2,000 acres
LATEST AVAILABLE DATA

APPROXIMATELY 1:29,000,000
STATUTE MILES
100 0 100 200 300 400
KILOMETERS
100 0 200 400 600

LATIN AMERICA	MILLIONS OF ACRES					PERCENT OF CROPLAND				
	0.5	1.0	1.5	2.0	2.5	10	20	30	40	50
CUBA	[Bar extending to 2.5]					[Bar extending to 45]				
BRAZIL	[Bar extending to 2.0]					[Bar extending to 25]				
ARGENTINA	[Bar extending to 1.5]					[Bar extending to 15]				
MEXICO	[Bar extending to 1.0]					[Bar extending to 10]				
COLOMBIA	[Bar extending to 0.5]					[Bar extending to 15]				
JAMAICA	[Bar extending to 0.5]					[Bar extending to 35]				
VENEZUELA	[Bar extending to 0.5]					[Bar extending to 10]				
PERU	[Bar extending to 0.5]					[Bar extending to 10]				

USDA

FAS 1097



Tobacco

Central America is the home of *Nicotiana Tabacum*, the genus from which most of the world's commercial tobacco is obtained. Today tobacco is grown in Latin America from 30° N. in Mexico to 34° S. in Uruguay, and many specialized varieties have been developed to supply various end uses. The growing season varies from 60 days for some tropical varieties to as much as 150 days in the cooler areas.

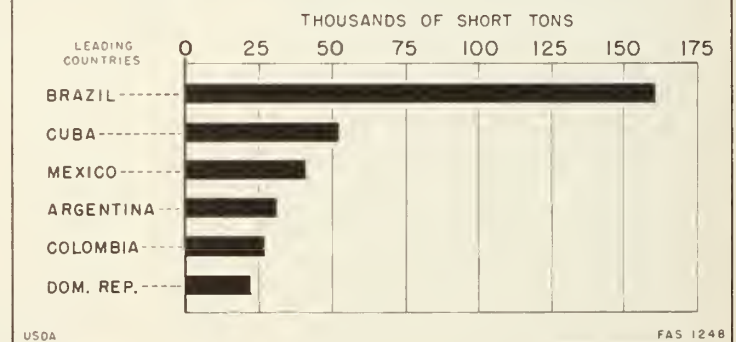
While tobacco can be grown over a wide range of climatic conditions, its commercial value is more sensitive to soil and climate than is any other important farm crop.

Since the plant has a rather limited root system, it is easily damaged by drought. And though it is capable of normal growth over a wide range of soil acidity, the quality can be lowered by either excessive acidity or alkalinity. Tobacco is also highly sensitive to both the availability and duration of nitrogen present in soils. There is, however, a wide variation in tolerance for both of these factors among the different tobacco types with different product uses. But there is a relationship between type of soil and the special characteristics of quality desired in the various kinds of tobacco.

In addition to climate, soil, and varietal differentiations, tobaccos vary according to the method of curing. Curing is in reality a function of climate because certain curing methods are dependent upon the climate for proper results. This is especially the case for air and sun curing in which climatical requirements are specific.

Brazil is the heaviest tobacco producer in Latin America, with

LATIN AMERICA: TOBACCO PRODUCTION, 1954



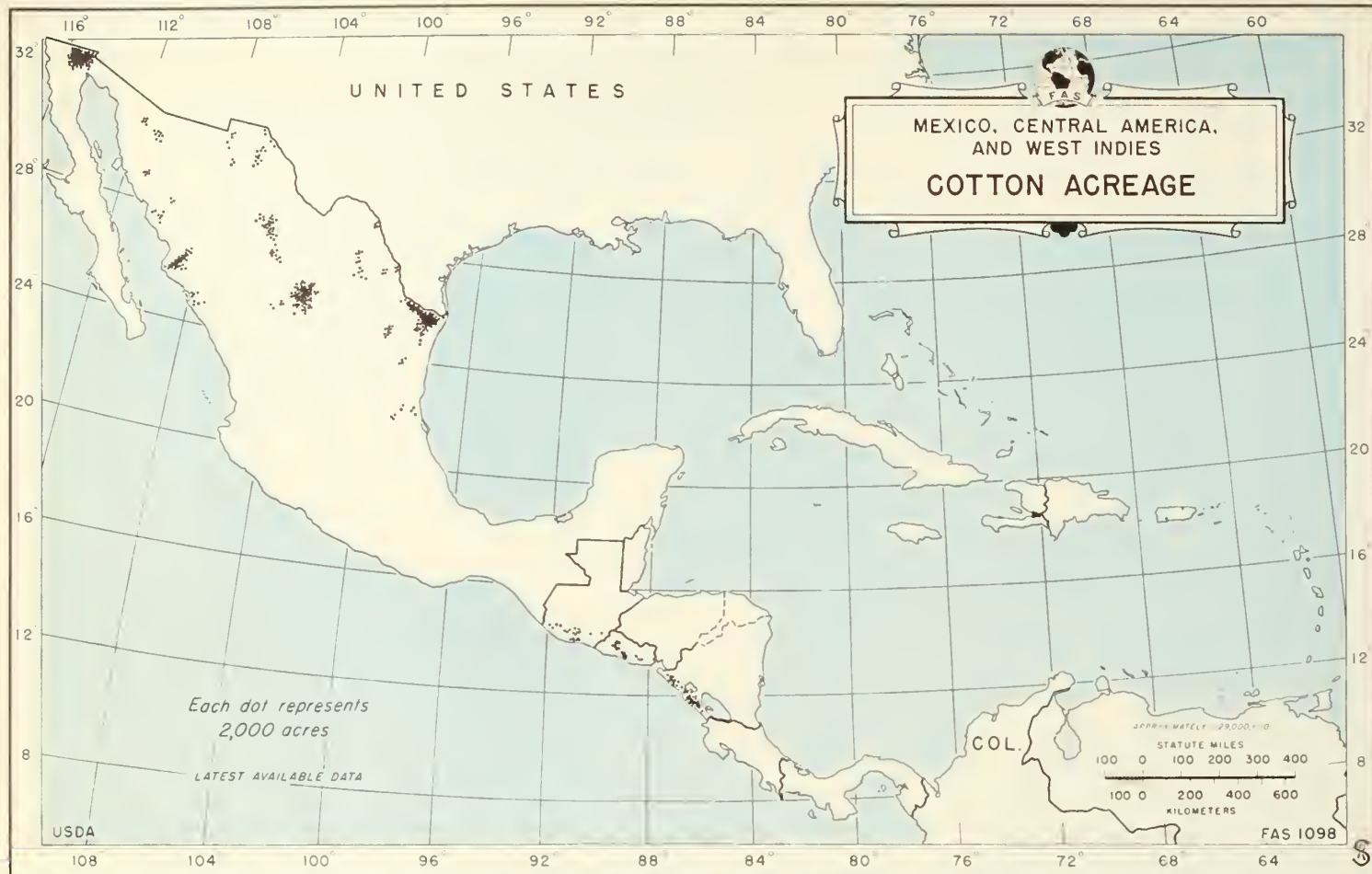
over 160,000 short tons and some production in every State. The major centers of production are located in Bahia, Rio Grande do Sul, Minas Gerais, and Santa Catarina.

Cuba is the second largest producer, with slightly over 50,000 short tons, about one-third the size of Brazil's production. In Cuba the tobacco soils are generally light, sandy loams with a good humus content. Cuban cigar tobacco is of very high quality.

Mexico ranks third in Latin American tobacco production, with about 40,000 short tons. Less than 0.25 of 1 percent of Mexico's cropland is devoted to tobacco compared to 3 percent in Cuba and the Dominican Republic.

Argentina produces about 30,000 short tons of tobacco on about 0.1 of 1 percent of its cropland. Colombia and the Dominican Republic each produces about 25,000 tons.





Cotton

Cotton growing is concentrated in certain areas of the Tropical and Temperate Zones of the world. In fact, 60 percent of the world's cotton is grown on less than 3 percent of the world's land, Dr. O. E. Baker points out.

Although the place and date of cotton's origin remain a mystery, cotton existed as early as 3,000 B. C. in the Indus Valley of India, and it was spun and woven by the pre-Inca civilization of Peru. Archaeologists have evidence that it was introduced into South America from Asia.

For successful cultivation, cotton requires from 180 to 200 frost-free days with an average temperature over 70° F. Though the highest yields are produced under irrigation, rain-grown cotton needs minimum rainfall during the growing season.

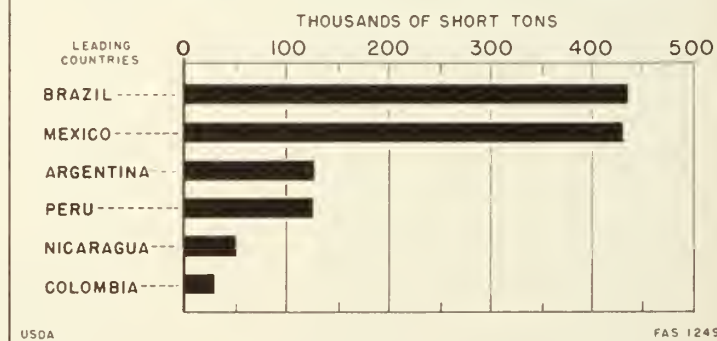
Cotton is grown commercially at altitudes from sea level to about 4,000 feet and in latitudes between 40 degrees N. and S.

Many soils are suitable for cotton production. Ideally they should be of good moisture-holding capacity, with favorable drainage and aeration. They should also be well supplied with organic matter, phosphorus, and potassium to be most productive. The cotton crop is successfully grown at various degrees of acidity, the most favorable range being pH 5.2 to 7.

Brazil has the largest acreage of cotton in Latin America but is second to Mexico in output. It has further possibilities as a producer but has certain natural limitations. Its coastal region is rather wet, its interior is subject to droughts, and most of the potential cotton land is not now accessible by road.

Mexico has only about one-half as much cotton acreage as Brazil but produces about half more cotton.

LATIN AMERICA: COTTON PRODUCTION, 1954



Both Argentina and Peru produce about 500,000 bales of cotton per year, yet Argentina's cotton acreage is 1,375,000 compared with about 555,000 acres for Peru. But Argentina has little irrigated cotton, while all of Peru's cotton is grown under irrigation. About 80 percent of Argentina's cotton is grown in the Chaco region. Peru is next to Egypt and Sudan in the production of extra long staple cotton. Most of Peru's cotton is grown in the coastal valleys. In the Central American countries especially Nicaragua, El Salvador, and Guatemala, cotton production has increased greatly during the past decade, reaching almost 380,000 bales in 1956-57. Total cotton exports from these three countries and Mexico were only slightly under 2.5 million bales in the previous season.





Coffee

Coffee was apparently first used about 600 A. D., in Ethiopia. There, extensive wild stands are still harvested. Over the centuries, the crop spread throughout the tropical and subtropical world, especially to the West Indies, and to Central and South America.

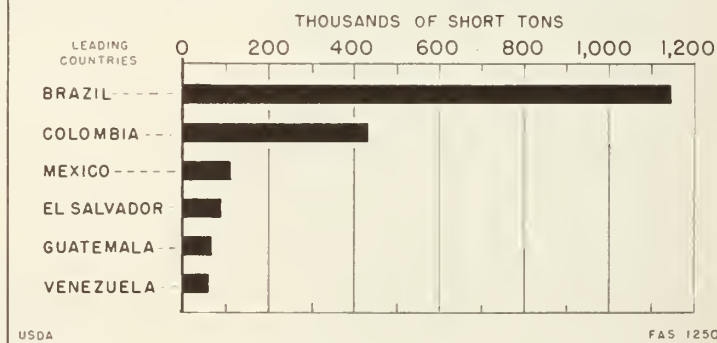
Coffee is actually a crop of the Tropics, but it is grown in some parts of the tropical regions where temperature characteristics are somewhat similar to those of the subtropics. Coffee requires temperatures from 60° F. to 78° F., depending on the species, and it requires from 50 to 90 inches of rainfall annually. Where less falls during growing season, some irrigation is necessary. In many regions with a pronounced dry season, coffee is grown under other trees, to shade it against too much sunshine and too much transpiration and to prevent excessive fruiting.

Coffee thrives on loamy soils that are rich in humus, deep, and well drained, without too much acid or alkaline. But coffee exhausts soils rapidly and they need large quantities of nitrogen and potash.

Brazil is the largest coffee-producing country not only in Latin America but in the world. With 12 percent of its cropland in coffee and an acreage of 8 million, Brazil produces about 1.3 million short tons of coffee.

The largest acreage of coffee in Brazil is found in the States of São Paulo and Parana, which have a total of about 10 million acres. In São Paulo the climate is excellent for coffee, but sometimes the cold south winds in winter—during August and September—do cause serious damage.

LATIN AMERICA: COFFEE PRODUCTION, 1954



Colombia is the second largest coffee producer in Latin America; plantations are located throughout the mountain area at elevations of from 3,000 to 6,000 feet, where temperatures are moderated by the altitude. The soils are partly of volcanic origin. The principal coffee-producing region is in the Departments of Caldas, Antioquia, and Valle de Cauca.

Mexico is the third largest coffee producer.

El Salvador is fourth largest in Latin America, and the principal producer in Central America.

Guatemala, the next largest in Latin America, has plantations along the Pacific slopes of the mountains from the Mexican to Salvadoran border. They are at elevations of from 2,500 to 5,000 feet.





Cacao

The cacao tree is indigenous to Latin America, which for many years after the discovery of America was the source of the world's supply of chocolate. The development of cacao trees in Africa followed, after disease ravaged the crop in Latin America, and changed the world supply picture materially.

The cacao is truly a tropical lowland tree, grown only in the equatorial areas, mostly within 20 degrees of latitude from the Equator. The trees cannot grow in areas that have prolonged dry seasons or in those where the temperature drops below 60° F. They can be grown on a variety of soils, but require considerable humus.

Latin America produces about one-third of the cacao beans produced in the world. Brazil is by far the heaviest producer

in Latin America and ranks second in world production and exports only to Ghana (Gold Coast), Africa. The largest producing area in Brazil is in the State of Bahia, which produces about 95 percent of the cacao grown in Brazil. Other South American countries producing a considerable amount of cacao are Ecuador, at one time the largest exporter of cacao in the world and now slowly building its crop up again after a severe slump due to disease and negligence; Venezuela, with about 65,000 acres; and Colombia.

In the Caribbean area the Dominican Republic ranks second to Brazil as a cacao producer. Cacao is produced in Mexico, too, in the States of Tabasco and Chiapas mainly; and in El Salvador, Costa Rica, Nicaragua, and Panama of Central America; Trinidad, Jamaica, Haiti, Cuba, and other Caribbean Islands where climatic and soil conditions permit.



Bananas

The use of bananas as a food dates back to prehistoric times. The banana is presumed to have had its origin in the humid tropical regions of southern Asia.

Banana plants were transported to the Caribbean Islands by Spanish priests in 1516. The first plantations in Latin America were started in Costa Rica in 1870, but the industry did not assume really large proportions until 1899. Today the business is well organized and flourishing.

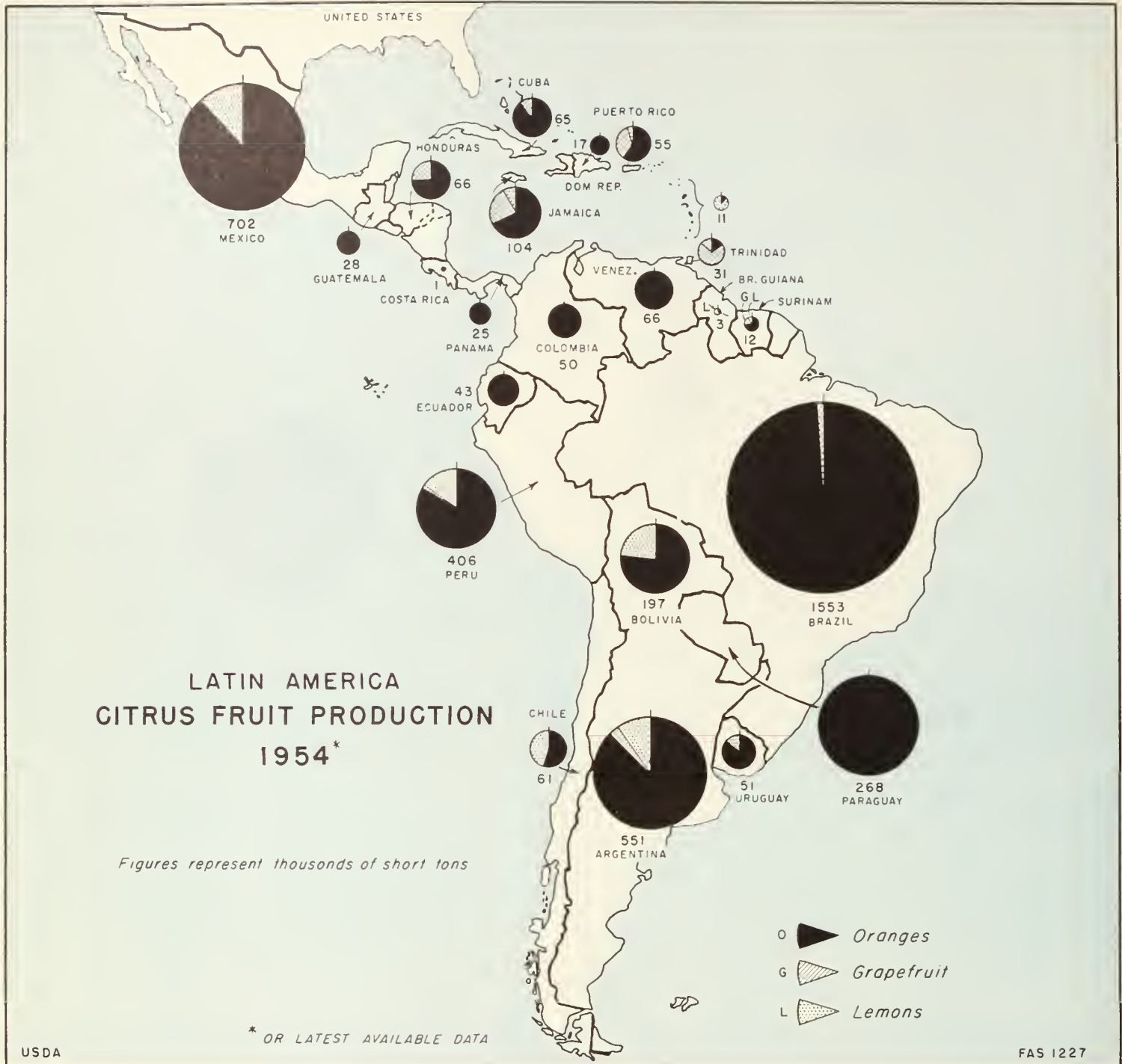
Bananas do best in a tropical climate with considerable rainfall and a sandy loam soil with good underdrainage and aeration. Bananas require an enormous supply of water. New plantations that have been established on the Pacific coast of Central America are irrigated.

Ideal conditions for banana cultivation are found on the Atlantic coast of Central America in an area extending back from the sea at elevations of not more than 250 feet, where the days are hot, nights humid, and rainfall from 80 to 200 inches annually.

Banana plants mature in about 12 months; after 11 months the stem that will bear fruit appears, and from 3 to 4 months are required to develop the bunch of bananas.

The heaviest and best-developed fruit comes from Central America. The average banana production per acre is from 175 to 225 bunches in Central America and 200 to 300 bunches in Jamaica, where more intensive cultivation is practiced.

Brazil leads all the countries of Latin America in the production of bananas. Brazilian bananas do not transport well, and thus have not received as full an acceptance in the export trade as those from some other areas have.



Citrus Fruits

Citrus fruit is widely grown in Latin America between 35° N. and 35° S. Most production is from small, little-cared-for plantings that produce fruit for local consumption. Of the 65 million boxes of oranges produced in 1956, not over 20 million were sold, graded, and packed in a commercial package, and not over 12 million were of export variety and grade. Commercial citrus industries are in Mexico, British Honduras, Surinam, Jamaica, Trinidad, Chile, Argentina, and Brazil.

In the Northern Hemisphere, citrus blooms from February to April and matures from November to May. In the Southern Hemisphere it blooms in August and September and matures from April to July. In these areas, blooming is controlled by

temperature changes. In tropical areas, such as Surinam, blooming is controlled by rainfall, which breaks prolonged droughts.

Citrus is irrigated in Mexico, Chile, Jamaica, and part of Argentina. Other areas have enough rain.

In Brazil and Jamaica, commercial citrus is grown at elevations of over 2,000 feet; in Surinam and the delta of Argentina, at 5 feet. Citrus soils range from heavy black and red loams to light sandy loams.

Latin America produces grapefruit in the West Indies, Surinam, Argentina, and Brazil; lemons in Surinam, Chile, Argentina, and Brazil. Oranges are produced in every country, and tangerines are an important crop. West Indian limes are grown in all tropical areas.



Apples and Pears

The apple is said to have been distributed from prehistoric times throughout Europe, where it is believed to be indigenous, and south of the Caucasus in north Iran.

Apples are the principal deciduous fruit crop of Latin America and make up over 75 percent of the crop.

Argentina produces over 500,000 short tons of apples and pears—2½ times as much as the rest of Latin America. Apples are a fruit of the more humid portion of the middle latitudes. They do not grow successfully in dry areas, except under irrigation. They cannot be grown where severe winter temperatures occur, and in general, grow at elevations that have a mean temperature of less than 75° F. during the growing season.

Probably no other fruit grown in the Americas has as many varieties as apples. Literature records something like 7,500 and the number of synonyms is much larger.

The pear grows wild throughout temperate Europe and western Asia, south of the Caucasus, and in northern Iran. Its history closely parallels that of the apple.

Pears, like apples, grow mainly in the middle latitudes and are not generally produced in the Tropics except at the higher altitudes here and there, as in Mexico. Pears also do not grow well in dry regions without irrigation, nor can they be produced in as cold areas as apples.

Argentina and Mexico produce 3 times as many apples as pears and in Chile and Uruguay the ratio is 10 to 1. Brazil produces 3 times as many pears as apples.



Grapes

The wine grape has been cultivated since prehistoric days in the area between the Black and Caspian Seas and in the territory around them.

The equatorial limit of grape production is determined largely by the need of the vine for a period of rest, without which grapes do not ripen thoroughly. Conditions differ somewhat according to latitude and variety of course, but little growth takes place when temperatures are less than 50° F. Accumulated temperatures of over 50° are necessary for the successful cultivation of grapes.

High humidity in the growing season, together with relatively low temperatures, is likely to cause mildew. Exposure—a com-

bination of slope of the land and orientation—is important in growing grapes. A northern exposure is unfavorable except in the lower latitudes; a southeastern exposure is considered best.

For wine grapes, the soils should not be too rich. But most grapes can be grown on various well-drained soils. More grapes are produced in Argentina than in all of the other Latin American countries combined. Production areas are centered in the Mendoza and San Juan irrigated districts.

Chile is the second largest grape producer in Latin America, with about 600,000 short tons per year. Good wines are produced in the Mediterranean-climate area from Santiago to the Bio Bio River. Brazil, the third largest grape producer in Latin America, produces about 330,000 short tons in the State of Rio Grande do Sul, north and west of Porto Alegre.



Dry Beans

Historically, beans, peas, and other members of the pulse family are among the oldest cultivated food plants. Beans were cultivated in the Nile Valley as early as 200 B. C.

As a general rule dry beans are the only crop grown in a given field. However in some areas where the winters are mild, some winter cover crop or a seed or forage crop may be grown also.

Beans are warm-season annuals, sensitive to extremes of temperature and requiring a relatively high humidity. Also, they require about the same temperatures as corn, and the plants are extremely susceptible to frost injury. The length of the growing season for mature beans is from 100 to 110 days.

Beans are grown on a wide variety of soils. The plant responds to an available supply of plant nutrients and organic matter. Soil fertility is usually less likely to limit bean production than other field crops. Soil aeration and temperature are important factors, especially for good stands. Heavy mineral soils and soils of organic origin are not suited for bean production. Clay soils are subject to puddling, while peat or muck soils are likely to produce more vine than seed. Medium loams of moderate fertility give the best yields.

Brazil produces 1.6 million short tons of dry beans, more than the total of all other countries in Latin America. Mexico is second in production, with 400,000 short tons on only half as much acreage as Brazil has devoted to beans. Practically every country in Latin America has some dry bean acreage.



Peanuts

Although the peanut (groundnut) is a native of Brazil, Argentina has in recent years been the leading producer in Latin America. Peanuts have long been used by native Indian tribes of South America and they are grown to some extent throughout all of Latin America.

The peanut is not a nut, but is a member of the pea family (Fabaceae). Since peanuts have the flavor and many other characteristics of true nuts, they are widely used for the same purpose. In Latin America, peanuts are most extensively used for the edible oil obtained when peanuts are crushed. From 700 to 900 pounds of oil may be obtained from a short ton of shelled peanuts, depending on the variety and quality of the crop and on the efficiency of crushing facilities. The cake or meal ob-

tained from crushing peanuts is used as a protein supplement in livestock rations.

The peanut is a warm-season crop, requiring a 4- to 5-month growing period with steady high temperature. The crop demands moderate moisture and is usually produced in areas having at least 40 inches of rain a year. Rain is the most important determiner of wide variations in production from year to year.

Soil conditions also influence yield and quality of the crop. The highest yields come from heavier even-textured soils, provided they are not too compact. The best quality of peanuts, however, is produced on light soils. Well-drained soil is essential.

Argentina produced around 350,000 short tons of peanuts in 1957. Brazil was the second largest Latin American producer, with 175,000 tons; and Mexico was third, with 70,000 tons.



Manioc

Manioc, sometimes known as cassava or yuca, is a tropical plant that grows a few feet in height and has tuberous roots. It is widely grown in the tropical areas of Latin America and possibly had its origin in Brazil.

The manioc plant requires a deep fertile soil with plenty of moisture, but too much rainfall causes the roots to decay. It thrives in the lowlands with a warm humid atmosphere; yet it can grow at altitudes as high as 1,500 or 2,000 feet if other conditions are favorable.

Manioc is a staple food for the Indians and others in many of the remote areas of the Tropics. As a food, it is rich in starches but low in proteins and fats. There are a number of varieties and none is edible in the raw state. The Indians

select the less potent for food; they grate or pound the roots to a pulp, which they soak in cold water to remove the harmful qualities of the root. The pulp is then dried and made into flour to be prepared in any form for food the natives prefer.

The roots do not have to be harvested at any definite time when they mature. They may be left in the ground until needed. This is a convenient arrangement for the natives who do not have adequate storing facilities.

Brazil is by far the largest producer of manioc in Latin America. It produces about 12.5 million tons annually. Manioc is grown throughout the country, with the States of Rio Grande do Norte and Bahia leading in acreage reported. Manioc is grown for commercial purposes in the heavy producing areas. Manioc flour is used in the United States as a food in the form of tapioca.



Cattle

Nearly 20 percent of the cattle of the world are in Latin America. In South America, cattle ranching is the main form of land use in most of the grassland regions. Wide areas are devoted to cattle raising in the Rio de la Plata region of Argentina and Uruguay, where ranching is highly developed and a fairly intensive industry.

Cattle and the manure they produce are essential to the agriculture of Latin America. The predominant portion of the Latin American livestock industry is based partly, or entirely, on locally grown feed.

Cattle in Latin America are descendants of Spanish and Portuguese breeds, introduced there long ago and modified since by crossbreeding with modern types of European cattle in Argentina, Uruguay, and southern Brazil, and with Indian cattle in some of the warmer areas. These European breeds can adapt themselves to severe winters if adequate shelter is provided, but they cannot withstand high temperatures.

Different breeds of cattle vary in heat tolerance. Among the dairy breeds, the Jersey has the highest coefficient of heat tolerance, and the Holsteir Friesian about the lowest. Because of their low heat tolerance, and also because of their low resistance to tropical diseases and pests, the European breeds generally do not thrive in tropical and subtropical areas.

The effort to develop animals that combine high production with high heat tolerance has been continued for over 50 years. In beef animals a fair amount of success has been achieved by crossing European cattle with the Indian Brahman. Many

of these crossbred animals are found in large numbers in many countries of Latin America.

Brazil was the largest cattle producer in Latin America in 1956, with over 64 million head of cattle, but, owing to the size of the country, it has less cattle per square mile than the other countries. The cattle of Brazil are well distributed in the corn and wheat belt along the coast and in the interior grazing lands.

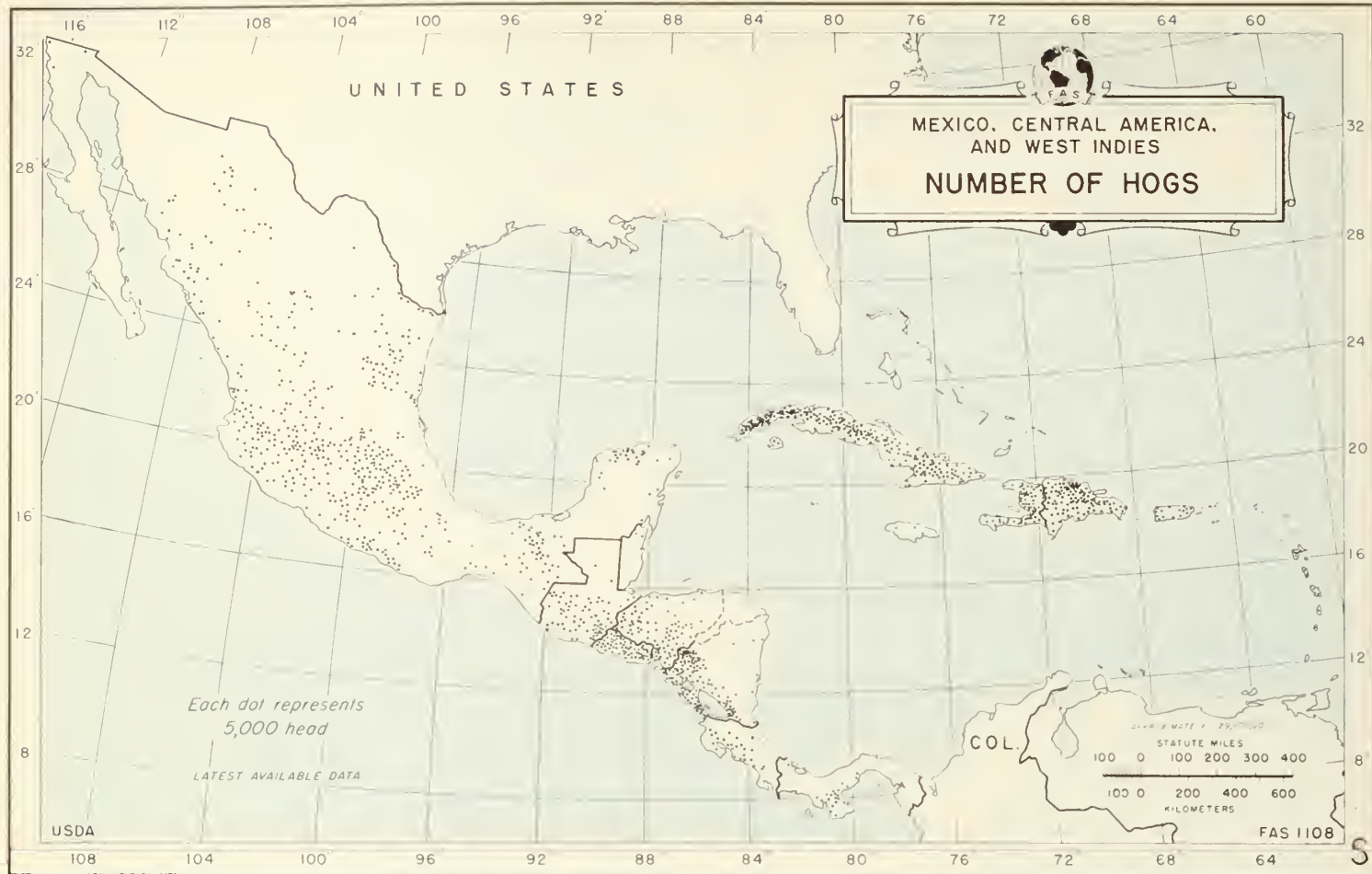
Argentina, with nearly 45 million head of cattle in 1956, was the second largest cattle producer. In Argentina the largest numbers of cattle are found in the Pampas, especially in the Province of Buenos Aires, with other important areas in west-central Santa Fe in Mesopotamia. Some wheat is grazed, and several varieties of sorghum are gaining importance, but corn is not used for the livestock industry. In the Pampa region, geographic factors are highly favorable to the cattle industry, but several hazards do exist. Summer droughts occur from time to time, and in the north the cattle tick creates a problem.

Mexico, with about 16 million head of cattle in 1956, was the third largest producer in Latin America. Many of the cattle are produced on small-scale farms where production is mainly for family use or local consumption.

Colombia, with less than 12,000,000 head, is the fourth largest cattle producer. Practically all of its cattle are in the Andean valleys of the west.

Uruguay, the fifth largest producer, has less than 7,305,000 head. Conditions in Uruguay are similar to those of the Pampa, but pasturage is even more important. Except for a small strip along the south coast, the entire country is devoted to cattle and sheep ranching.





Swine

It is not known definitely when pigs were first domesticated, but, from early Biblical times, they were herded, and lived primarily on the roots, nuts, and any other feed they could find in the wooded areas and on harvested fields.

In Latin America, where pigs are often kept near the house in more or less confinement, they can be fed some of the waste material that becomes available on every farm and in every farm household.

Of all the domestic animals the pig is the most economical converter of feed into meat and fat since it wastes the smallest amount of calories during conversion. Hogs are prolific, generally producing 2 litters per year of from 6 to 12 young. They yield much meat and fat because of their small bone system, and they are inexpensive to keep since they do not require many acres for pasture and for the production of feed, as beef and dairy cattle do.

Corn is one of the most efficient feeds for producing hogs, especially if supplemented by high-protein feeds. Hogs are raised throughout the corn-growing areas of Latin America. Brazil has the largest production of corn, as well as the highest number of hogs.

The feed used to raise hogs has a direct influence on the consistency of the pork fat, since the fat contained in the feed is deposited in the tissues and under the skin of the hog without any great change in its characteristics. When considerable quantities of peanuts or soybeans are fed to hogs, the fat is liquid at ordinary temperatures, and the resulting pork and bacon are

soft and flabby, characteristics which are not desired by consumers. Firm pork and bacon are produced from a barley, rye, and potato diet, which is very low in fat content. The corn diet produces a fat not quite as firm, and, while acceptable in the United States, it is frequently not acceptable in other markets.

Pigs are common farm animals throughout the world, in both the Tropics and subtropics and temperate regions. The countries with Mohammedan and Hindu religions have few or no hogs because of a religious taboo.

Brazil had over 37 million hogs in 1956, the largest number of any country in Latin America. The foraging capabilities of swine give these animals a significant place in the systems of farming common to the general farming lands of eastern Brazil. Many root for themselves in the forests and woodlots and are then rounded up at intervals for butchering. They furnish a cheap food supply that can be prepared and kept by the small farmer.

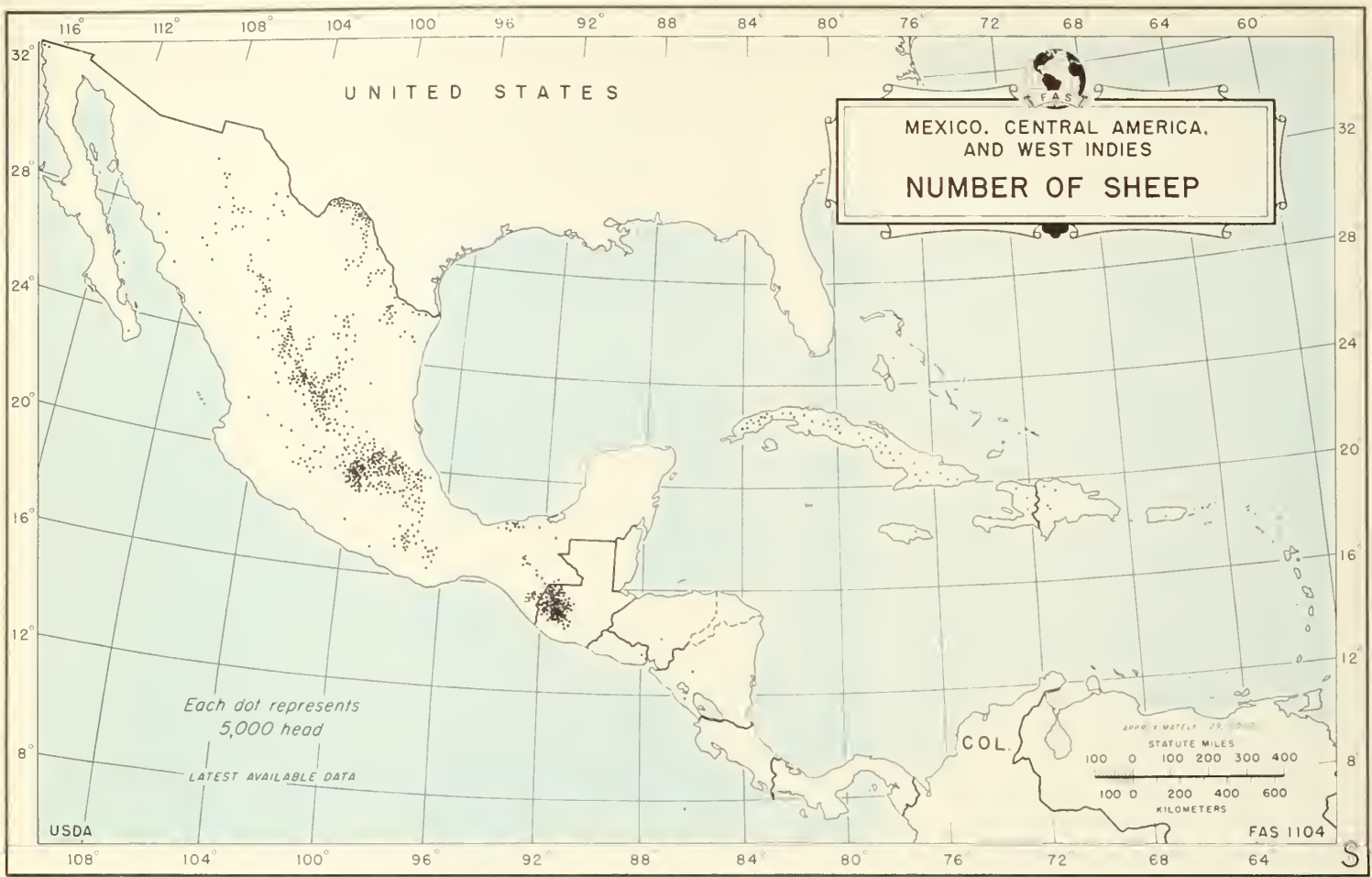
Mexico, the second largest hog producer in 1956, had about 8.2 million hogs, or less than 23 percent as many as Brazil. Mexico has ample corn production throughout the hog-producing areas and feed corn is usually ample.

Colombia ranks third as a producer of hogs, but had only about 2 million hogs in 1956.

In Argentina, the fourth largest producer of corn in Latin America, the hogs are in great contrast with the millions of cattle and sheep grazed on the Pampa. In 1956 there were only about 4 million hogs, mainly concentrated in the corn-producing lands.

The remaining countries of Latin America each produce about a million hogs or less, and the production areas are about the same as for corn.





Sheep

Sheep were probably domesticated in Western Asia and adjacent regions at least as far back as 10,000 B. C.

Sheep are excellent pasture animals, and are not so particular about their feeding as cattle. In humid regions they are able to graze rough lands not suitable for other purposes, and they even get some nourishment from fields that have been harvested. In semiarid to arid regions sheep thrive on the natural vegetation, unpalatable to horses and cattle, and they can get along longer with less water.

There are several hundred breeds of sheep, but only about a dozen are significant to the world industry. These can be divided into categories according to product, whether for wool, fur, meat, dual-purpose—both meat and wool—or triple-purpose—for meat, milk, and wool. The famous Merino breed furnishes a fairly short but very fine wool. In Argentina, where the Merino is declining in importance, only about 15 percent of the clip is Merino wool.

The Karakul is the only breed for fur production. The lambs should be slaughtered before they are 5 days old, since the quality of the skin deteriorates rapidly. These skins are known as Persian lamb or astrakhan fur.

The Rambouillet developed from the Merino is a good meat or wool producer. The Corriedale, developed in New Zealand, is considered a superior dual-purpose breed especially in the Patagonia and parts of Buenos Aires Province of Argentina.

The principal sheep-producing countries of Latin America are Argentina, Uruguay, Brazil, and Peru.

Argentina, the largest, has over 47 million sheep, concentrated mainly in three principal sheep-grazing areas: (1) The Pampa, including the Province of Buenos Aires and adjacent portions of La Pampa and Cordoba. (2) Patagonia, from Neuquen and Rio Negro to Tierra del Fuego, with heavy concentrations in Chubut and Santa Cruz; and (3) Mesopotamia. The principal types of sheep in Argentina are the Merino, Lincoln, Romney Marsh, and Corriedale. Argentina exports considerable lamb and mutton.

Uruguay, the second largest producer, has about 22 million sheep; they are important throughout most of the country. Principal breeds are Corriedales followed by Merinos and Romney Marsh. Uruguay has over 375 sheep per square mile, more than 7 times as many per square mile as Argentina even though Argentina has twice as many sheep.

Brazil is third in production with about 18 million head. Most of its sheep are concentrated in the southernmost State, where high temperatures prevent the yield of a high-grade fleece; but a constant importation of foreign blood has sustained the quality. Growing local demand for wool encourages the industry.

Peru, with about 17 million sheep, is the fourth largest sheep producer in Latin America. To the Peru Indian, sheep constitute an invaluable resource from which he obtains food and clothing. The sheep show an astonishing range in color, from black through innumerable shades to near-whites, and are small. Wool yield is less than in Argentina, and, even though it is unusually clean, it ranks low in quality because of the inferior breeds.

Bolivia is next in production, with slightly over 6 million head. All other of the countries in Latin America have less than 5 million head each.





Goats

The goat is an animal capable of thriving on pasture lands that cannot adequately support sheep. They are also kept on small farms, on a limited staked-out area and given a diversity of additional feeds.

The goat of Latin America is not a true goat, but a close relative of the mountain antelope of Europe and Asia. Milk goats, first brought to Mexico by the Spaniards, serve even to this day as milk animals for many families. In many semiarid regions, goats are kept for their milk, meat, and skins.

Specialized breeds are good milk producers, while others, such as the angora goats, furnish mohair.

The fat globules of goat milk are small and make goat's milk more easily digested than cow's milk. This has led to the establishment of commercial herds near many large cities that produce a product to fit the dietary needs of certain infants, invalids, and elderly persons.

The average consumption per capita of sheep and goat meat in Latin America during the 1934-38 period was 12.3 pounds, second only to the Oceania area.

In general, goat and kid skins are more sensitive to price changes than are other hides and skins. Goat meat is cheaper and less in demand than other meat, and the skins of goats and kids therefore represent a larger part of the value of the animal than the skins of calves and sheep.

Even so, higher prices of goat and kid skins ordinarily result not in increased flocks but in increased slaughtering and in the marketing of skins from sources generally not available. Goat

and kid skins amount to about 24 percent of all hides and skins produced in the world. About 95 percent is used for uppers and for lining footwear.

Mexico produces about 9 million goats, more than any other Latin American country. The goats are mostly in the higher areas of the country.

Brazil, with almost 9 million goats, ranks second. Nearly all its goats pick a precarious living from the arid vegetation of Sertas in northeast Brazil and supply subsistence for many families of meager resources. Goat and kid skins from Brazil are of excellent quality and command premium prices on the world markets.


Argentina ranks third in goat production, with about 5 million head. The Argentine goat browses the meager growth in all parts of the typical Monte country—in the dry northeast—where goat herding constitutes almost the sole occupation. Of all the domestic animals, it thrives best on the sparse vegetation and the rugged relief of much of the land. Especially around the Sierra de Cordoba, the Monte region has more than three-fourths of the goats in Argentina. Goat skins are an important item on the list of Argentine exports, since less than 30 percent are used at home.

Peru produces a little over 2 million head of goats and is the fourth largest goat-producing country in Latin America. Venezuela has nearly 1.3 million, or about 3.6 per square mile.

Jamaica, with about 350,000 goats, has about 80 per square mile, owing to the small size of the island.

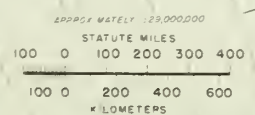
The remaining countries have less than 350,000 head each and all but Ecuador and Colombia have less than 100,000 each.




SOUTH AMERICA
NUMBER OF GOATS

Each dot represents
5,000 head

LATEST AVAILABLE DATA



LATIN AMERICA	MILLIONS OF GOATS		NUMBER OF GOATS PER SQUARE MILE	
	2	4	20	40
MEXICO	[Bar from 2 to 8]		[Bar from 20 to 35]	
BRAZIL	[Bar from 2 to 8]		[Bar from 20 to 35]	
ARGENTINA	[Bar from 2 to 4]		[Bar from 20 to 35]	
PERU	[Bar from 2 to 4]		[Bar from 20 to 35]	
VENEZUELA	[Bar from 2 to 4]		[Bar from 20 to 35]	
JAMAICA	[Bar from 2 to 4]		[Bar from 20 to 35]	
ECUADOR	[Bar from 2 to 4]		[Bar from 20 to 35]	
COLOMBIA	[Bar from 2 to 4]		[Bar from 20 to 35]	

USDA

FAS IIII



Mules and Asses

The mule is a much hardier animal than the horse and can perform heavy work in warm weather and is easier to feed. The mule inherits some of the sure-footedness of the donkey. It is a most useful animal in subtropical regions with long, warm summers and, often, rather poor kinds of feed.

Mules and asses are widely used in farming in Latin America. Practically every country has some. Brazil has nearly 5 million, and Mexico is second, with 4 million. Mules and asses, although becoming fewer in number, are still important in agriculture and as beasts of burden in Latin America. They thrive where the climate is especially warm and moist, as in parts of Brazil and Mexico. In Argentina, mules and asses are found in the arid plains and mountains, where they are better adapted to the

physical conditions of the countryside than the horse.

Donkeys do well in dry regions where feed is scarce and in mountains where sure-footedness is required.

While horse numbers in the world, between 1938 and 1954, dropped from 94.6 million to 75.2 million—about 20 percent—the number of mules and asses remained about the same, around 50 million head. In Latin America, however, the number of horses remained constant—about 23 million head, while mules and asses increased from 11.4 million to 12.1 million head—over 6 percent.

In Brazil horse numbers actually increased, from 6.4 million to 7.1 million, and mules and asses increased even more—3.6 million to 4.8 million, or about 33 percent.

In other words, horses have held their own in Latin America and mules and asses have increased.



Horses

Horses are best adapted to the temperate climates of the world. Warm humid climate causes high disease rates and appears to lead to a deterioration of the breeds. Other beasts of burden are better suited to high altitudes, desert areas, the Tropics, and low latitude regions, widely found in Latin America. Nevertheless, the number of horses in Latin America has remained about the same in the past 20 years—about 23 million—despite a drop in world numbers. In Brazil, Mexico, Colombia, and Uruguay, it has actually increased.

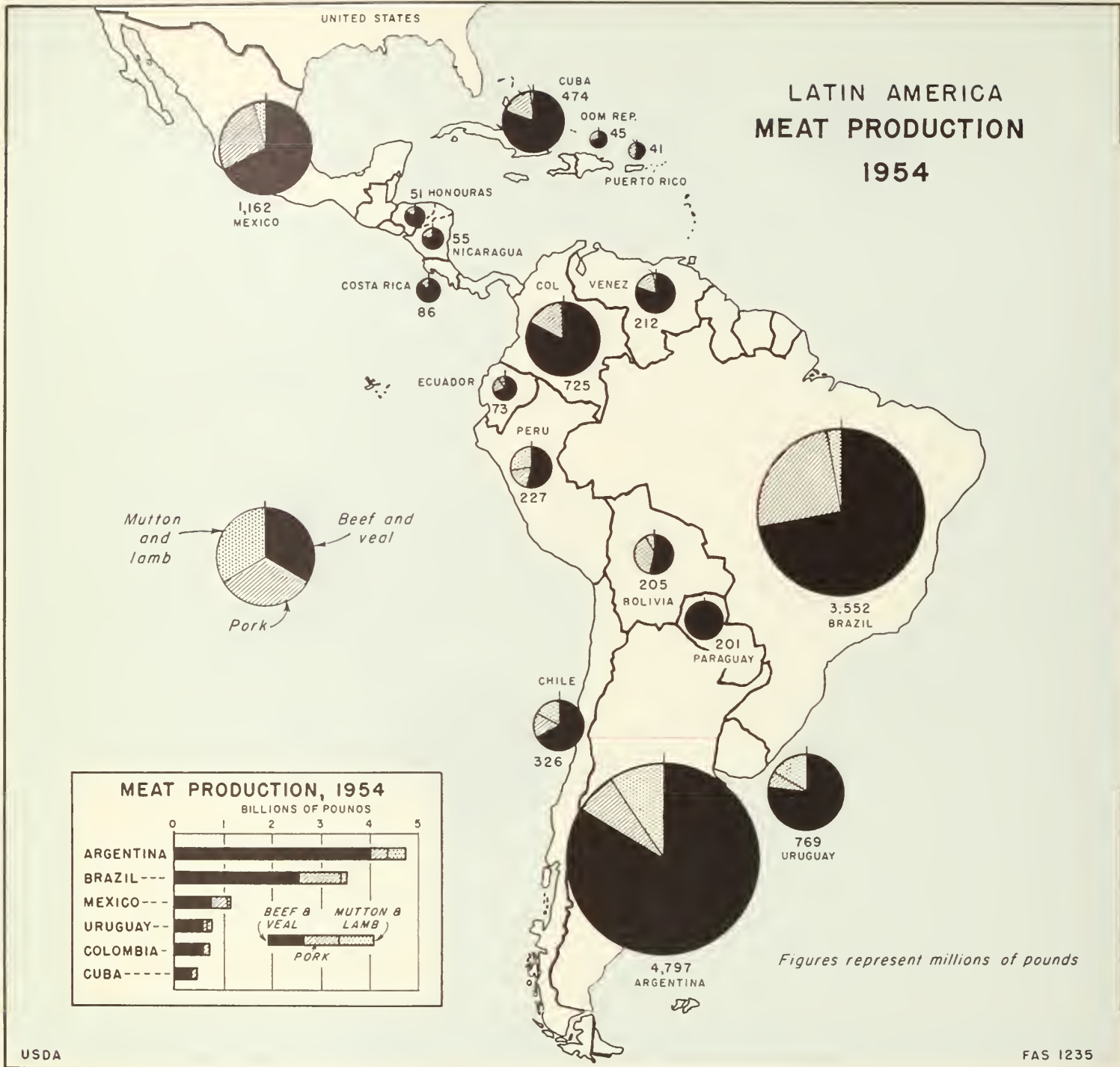
Argentina has a greater number of horses than has any other Latin America country—about 7,265,000 head. It has about 257 horses for every 1,000 people, or about 7 per square mile. Horses are used extensively on the cattle and sheep ranches, but

are declining in the farming areas as tractors increasingly take over.

Brazil has slightly over 7 million head of horses—almost as many as Argentina. There, they are used mostly on the cattle ranches in the south. Mexico is third in the number of horses with about 4 million, followed by Colombia with 1,159,000, and Uruguay with 645,000.

In Uruguay saddle horses are maintaining their numbers, but draft horses are gradually being replaced by mechanical power. Uruguay has about 9 horses per square mile and 267 per 1,000 people.

Outside of the 5 leading countries of Latin America in the number of horses, every country has some, varying from 1,000 to 500,000.



Meat

Argentina is the largest meat-producing country in Latin America, producing about 6.5 billion pounds per year. Argentinians consume over 250 pounds per capita and are the largest meat consumers in the world.

Uruguay is the second largest consumer per capita of meat in Latin America, and ranks fourth among the countries of the world, with a consumption of about 180 pounds. Other heavy meat consumption per capita countries in Latin America are Cuba, Chile, and Colombia.

Half of the total meat produced in the world is beef and veal; 40 percent is pork and the remaining 10 percent is about equally divided among mutton and lamb, goat and horsemeat.

In Latin America the output of beef far exceeds that of other

kinds of meat. In 1954, 75 percent was beef and veal. Pork accounted for over half of the other 25 percent and mutton and lamb the remainder.

Latin America produces about 24 percent of the world's beef, the largest of any area, about 15 percent of its mutton and lamb, and nearly 11 percent of its pork.

The four largest meat producers in Latin America in 1956 were Argentina, with 6,372 million pounds; Brazil, with 3,168 million pounds; Mexico, with 1,210 million; and Uruguay, with 617 million pounds. Paraguay produces practically all of its meat as beef and veal, and Argentina, 85 percent. For Mexico, about 30 percent of total meat production is pork, and Chile and Uruguay produce 15 percent of their total meat as mutton and lamb.



Wool

Wool is mentioned in some of the oldest records of human history. Rome produced the finest wool in the world in the time of its glory, and the sheep received the best of care. Their bodies were covered with skins to produce lustrous and waxy gloss; the fleece was combed and moistened with the rarest oils. The sheep houses were washed frequently and fumigated regularly. Until the second half of the 19th century, England, Spain, and, later, Germany were the most important wool-producing countries. Spain produced the finest wool, unchallenged in quality for centuries.

In Latin America, Argentina produces the largest amount of wool, about 386 million pounds—as much as is produced in all other Latin American countries. Uruguay is the second

largest, with 185 million pounds. About 80 percent of the wool from Argentina and Uruguay is of the Merino and crossbred types; the remainder is carpet wool.

At about the beginning of this century, shipments of wool from the Argentine Pampa equaled those of all products of the farm, while the aggregate of livestock produced was almost unree-fourths of the country's total foreign trade. Livestock and livestock products still hold the leading place in the Pampa.

In 1840 the first shipment of wool left Argentina. By 1895, sheep numbers had increased to 52 million. Later they dropped; but today they are again up to 47 million. Practically every wool-producing country of Latin America is a net exporter of wool, almost all of which goes to Europe. In fact, the area produces about 5½ times as much wool as it consumes.

Latin America in International Trade

The 20 Latin American Republics furnish about 10 percent (by value) of the world's exports, and take a somewhat smaller proportion of the world's imports. When the dependent areas of the Caribbean are included, the proportions are even larger.

The United States is the big supplier to Latin America and a big buyer there. It supplies just under half of all the products Latin America imports and takes only a slightly smaller percentage of all the commodities Latin America exports.

Almost two-thirds of Latin America's exports are agricultural items—coffee, cacao, sugar, wheat, corn, and meat, for example; but only 12 or 13 percent of its imports are agricultural products—wheat, lard, rice, and dairy products, among others.

Dollarwise, Venezuela exports more goods than does any other Latin American Republic. Most of its total comes from petroleum. The United States takes much less than half of Venezuela's total exports; but it is the final destination for part of the oil that goes from Venezuela to the Netherlands West Indies and Trinidad in large quantities as crude petroleum and is refined there and shipped to its final destination.

Brazil follows Venezuela as an exporter, but more than 40 percent of its exports go to the United States.

Argentina, the third largest exporter, sends most of its products to Europe. The only other exporters of significance in Latin America that ship more products to the rest of the world than to the United States are Peru and Uruguay. For Colombia, Cuba, and Mexico, the percentage of exports going to the United States is from two-thirds to three-quarters.

Of the importers in the area, Brazil is the biggest. Argentina, Venezuela, Mexico, and Colombia follow, in that order. For the United States, however, Mexico is the principal market, followed by Venezuela.

Total Latin American trade has gone up 375 percent, dollarwise, in the past 20 years, with the United States sharing on both the import and export sides. But much of this increase is the result of higher prices rather than greater volume of goods moved.

In these years, Latin America's share of the world market for some of its important export crops has varied. For wheat, its share has dropped somewhat, largely because of reduced crops in Argentina. For corn, too, it has dropped—in fact, it was cut almost in half. But for cotton, it has doubled, and the meat share now amounts to half of the world total.

On the import side, the past 20 years has seen a larger volume as well as a greater value of total imports. Most of the imports were industrial commodities, but agriculture has shared in the total rise. And this strengthening of import demand has come about despite the drive for self-sufficiency in food and fibers. In the 20 years the dollar value of United States agricultural exports to the 20 Republics of Latin America has multiplied over tenfold—from \$46 million before the war to a peak of \$560 million in 1952. In spite of some decline from this peak, the trend is again upward, and total exports for 1956 were \$483 million.

The United States is by far the principal market for Latin America's coffee, bananas, cacao, and other tropical products. And these Republics, in turn, are the main source of agricul-

tural products that the United States imports. They furnished more than half the \$3,948 million worth imported in 1956.

Although the value of agricultural exports to Latin America is much less than that of agricultural imports received by the United States from there, the market has grown rapidly during the past 20 years, and is particularly important for several United States export items. In 1955–56, for example, Venezuela alone took almost 80 percent of United States exports of dried whole milk; Cuba was the principal world market for lard and the second market for rice; and Latin America as a whole took more than 85 percent of the exports of fresh eggs, bacon, and ham, and was the principal world market for several other products, including wheat flour, oatmeal, hops, malt, cottonseed, and edible tallow.

On the whole the northern areas of Latin America are the principal markets for United States agriculture, although trade patterns have been shifting somewhat these past few years. Usually, Cuba, Mexico, Venezuela, and Colombia are the four biggest takers for the products of United States farms.

For the near future the Latin American Republics can be expected to maintain their share of about 10 percent of an expanding world trade. Over the next 10 years the principal exports probably will remain the same—coffee, petroleum, sugar, copper, cacao, iron ore, lead, and zinc. Their relative importance may shift somewhat, and the minor ones may increase in proportion to the total.

On the agricultural side, the next 10 years probably will see an increase in imports, as industrialization continues and purchasing power rises. But imports probably will be a smaller proportion of domestic consumption. The main item probably will continue to be wheat or flour or both, with wheat increasing as the countries mill more and more of their own requirements.

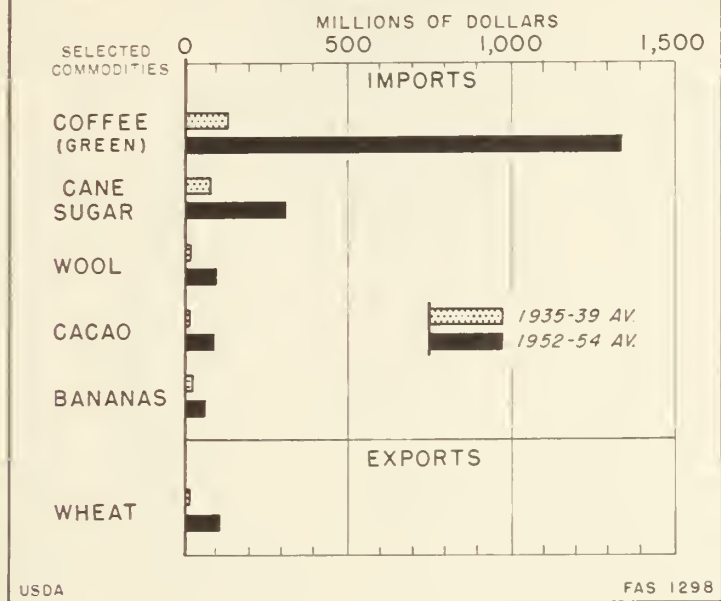
Coffee. By far the most important product that provides dollars and other exchange for the Latin American countries to pay for their needed imports is coffee. Imports into the United States from the 20 Republics averaged \$1.4 billion in 1952–54, a tenfold increase above prewar imports. For several countries, coffee is the principal exchange earner—Brazil is the first and Colombia is the second world supplier of this popular beverage.

Latin America still grows 78 percent of the world's coffee, but it is facing increasing competition from Africa, where production rose from 2.6 million bags before the war to 8.7 million in 1955–56. At the same time output in Latin America rose only from 36.4 million bags to 39.3 million.

Exports to the United States accounted for 56.7 percent of the world trade in coffee in 1956, but other areas of the world are taking more and more coffee. Total coffee consumption in the importing countries was at a record high in 1956, and consumption in the United States has been rising steadily since 1954. Of the 21 million bags imported in 1956, 47 percent was from Brazil and 41 percent from other Latin American countries.

Cacao. Although much less important than coffee in the total import picture, cacao imports into the United States from Latin America increased from just under \$15 million prewar to more than \$90 million in 1952–54. Brazil supplies twice as much

VALUE OF U.S. AGRICULTURAL TRADE WITH 20 LATIN AMERICAN REPUBLICS



as its nearest competitor, the Dominican Republic. Ecuador is third, and Venezuela fourth in the Latin American area. But that area is not the principal growing region for cacao as it is for coffee. First place goes to Africa, which produces 63 percent of the world total. The United States is the largest consumer of cacao beans, taking about a third of total world exports. Almost 60 percent go to Europe. For the Latin American countries, however, the United States was a better market, taking half of the exports of Brazil and Ecuador and a considerably higher percentage for the other countries.

Sugar. Cuba dominates the world export trade in sugar. It sends most of its output to the United States, and is by far the principal United States supplier, furnishing about 97 percent of total imports and thus providing the exchange that enables Cuba to be the principal Latin American market for United States agricultural exports.

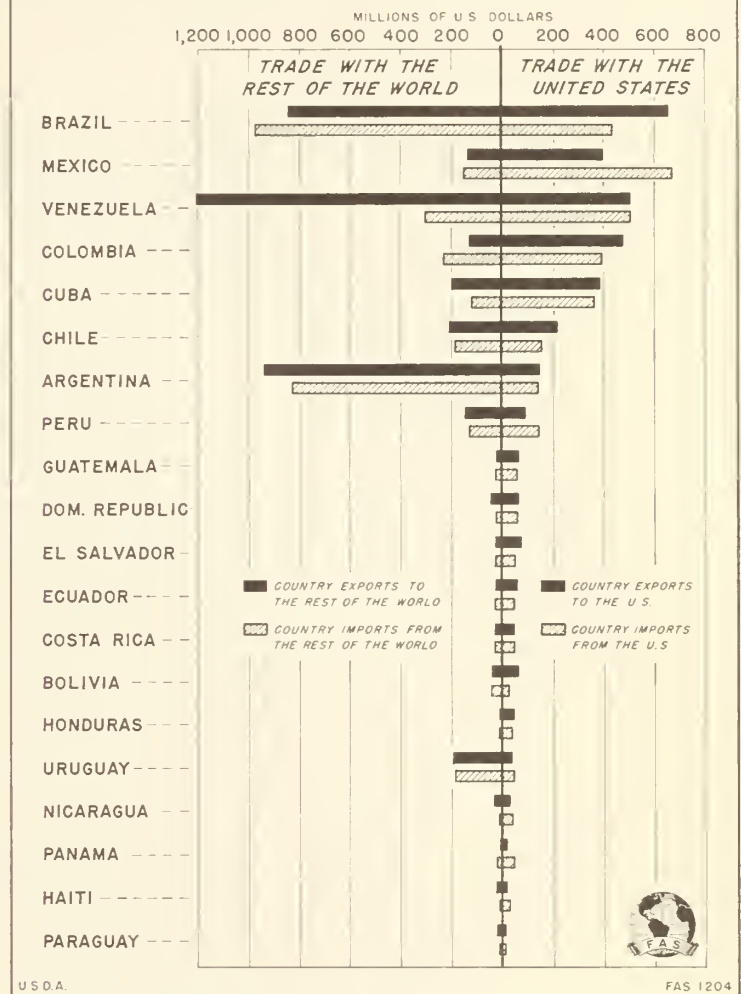
Of the minor suppliers, Peru is first, followed by the Dominican Republic and Mexico. Imports into the United States are governed by quota set by Congressional action. The dollar value of United States imports has increased by 3½ times since prewar years.

Bananas. Bananas are one of the tropical fruits that have found high favor in the United States market during the past half century. Although they are grown in most tropical areas, world exports are provided largely by the Latin American area. The United States is the principal market, and, recently, Ecuador has risen to top world exporter, followed by Honduras, Costa Rica, Panama, Guatemala, and Mexico.

In spite of severe disease problems, imports of bananas into the United States have grown from just under \$29 million before the war to \$62.5 million in 1952-54.

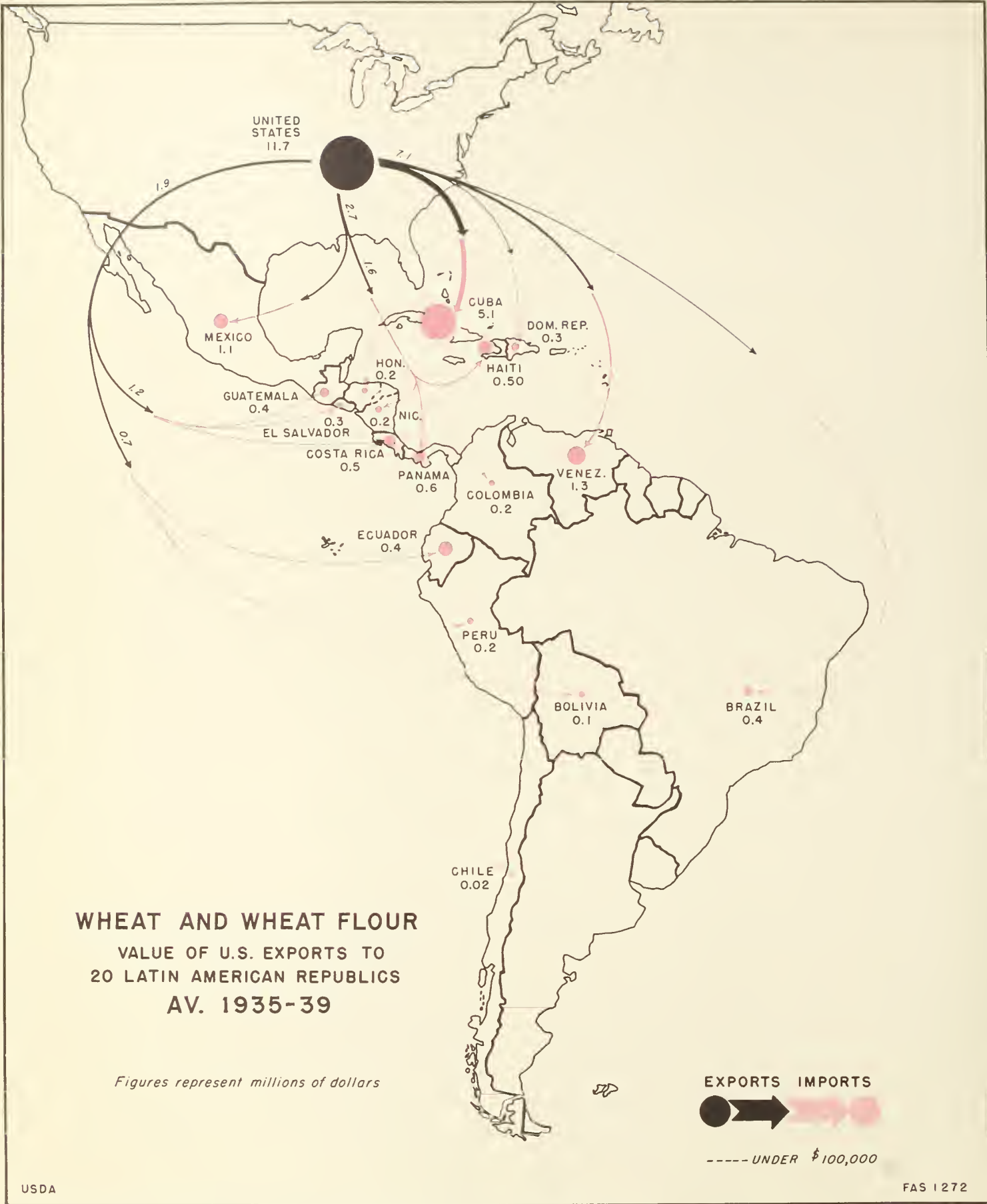
Wool. Wool is both a complementary and a supplementary import into the United States. Carpet wool is a complementary import, and the United States is the leading consumer and importer of this type of wool. It imports all of its carpet wool, principally from Argentina, New Zealand, India, Pakistan, Syria,

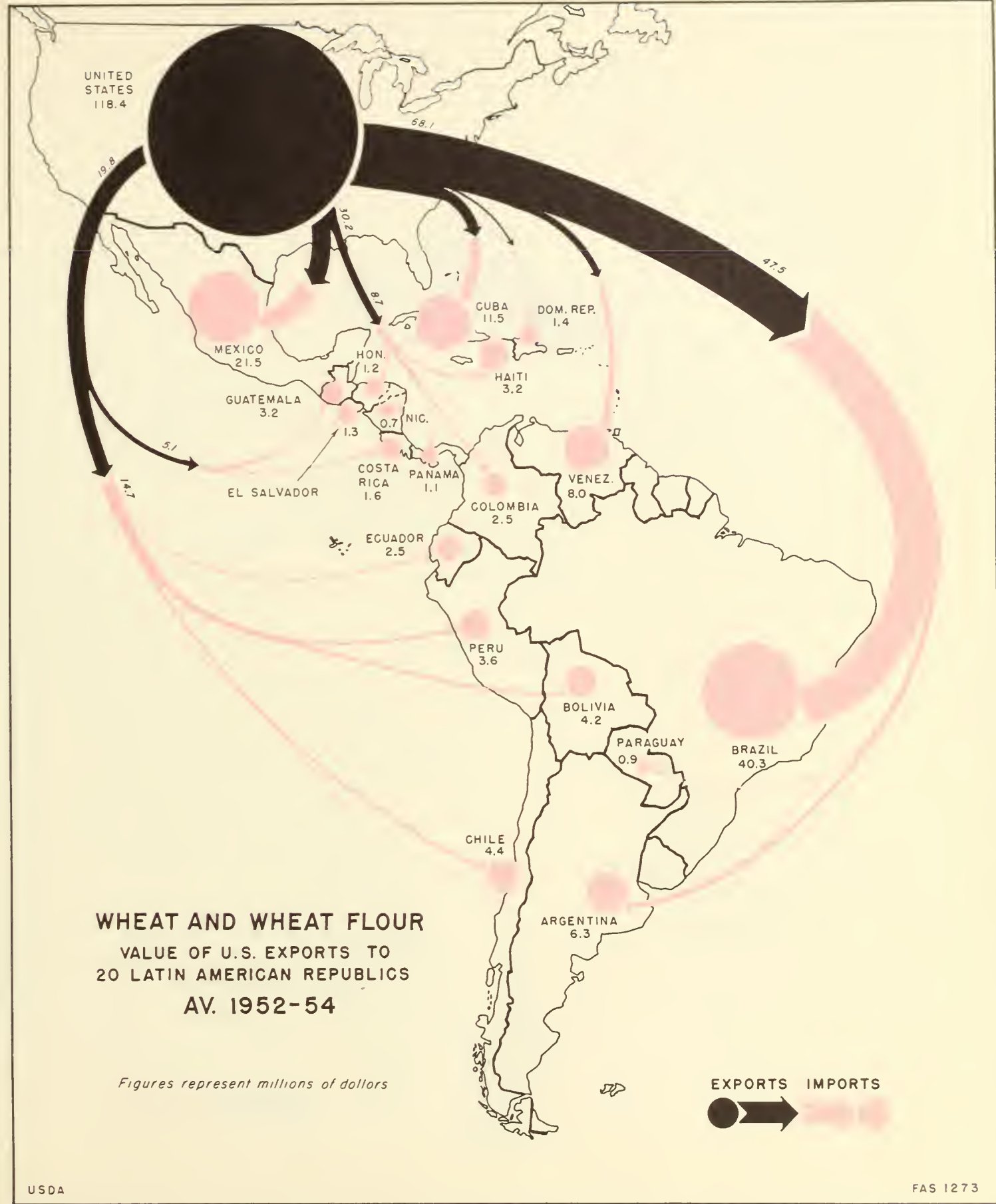
LATIN AMERICA: TOTAL TRADE AND TRADE WITH THE UNITED STATES, AVERAGE 1953-55



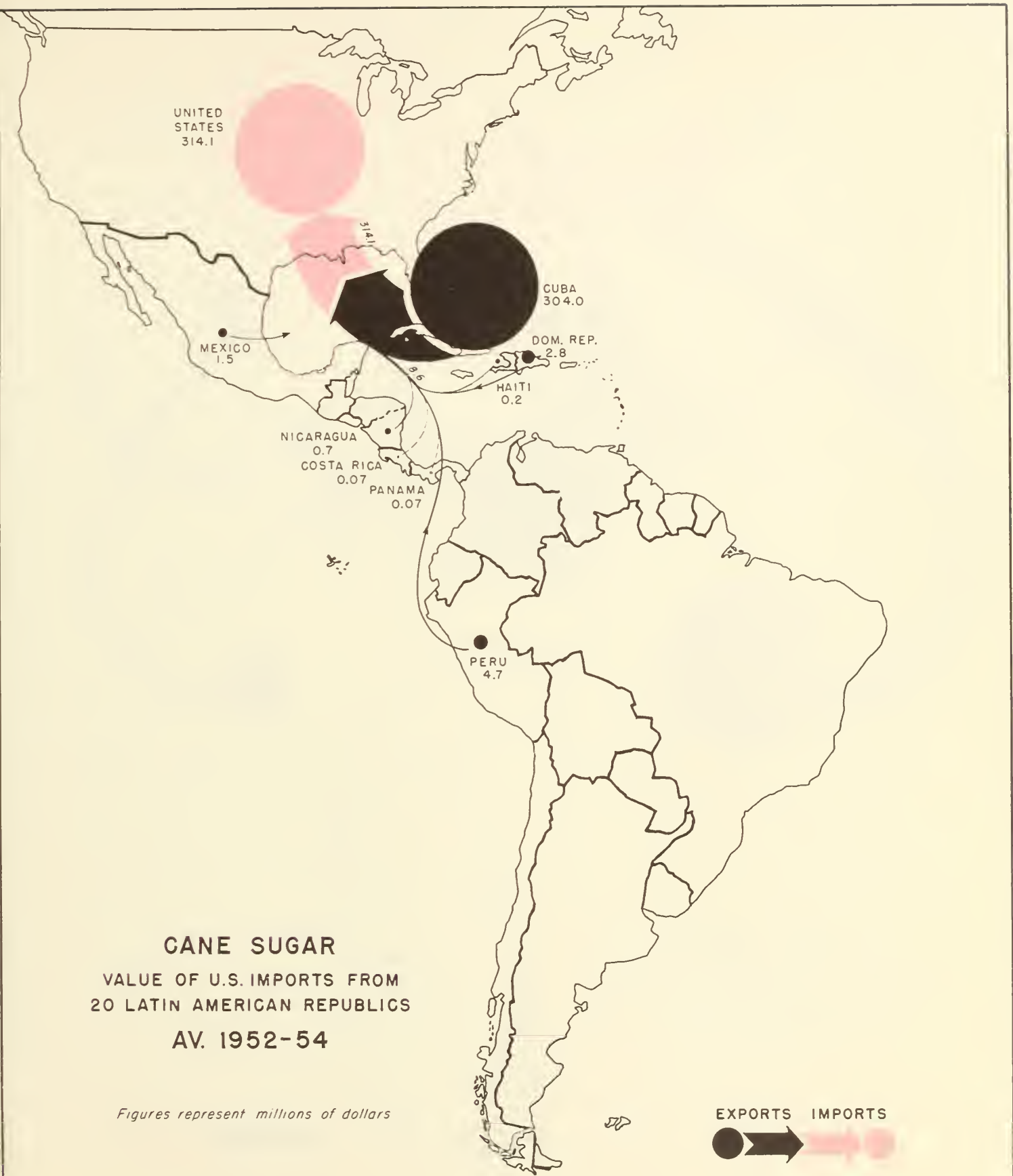
and Iraq. In addition the United States imports substantial quantities of apparel wool; Uruguay is the principal Latin American supplier to this market. Wool imports from Latin America have increased from \$15 million in prewar years to \$100 million in 1952-54.

Wheat and flour. On the export side, wheat and flour are the principal United States agricultural exports to Latin America. Varying quantities of United States wheat and/or flour go to 17 of the 20 Republics each year, and, in years when Argentina's crops are short, they go to the other 3 Republics, too—Argentina, Uruguay, and Paraguay. Mexico is now becoming self-sufficient in wheat, and the United States may not have a market there in the future. For the 1952-54 period, however, Mexico ranked second to Brazil as a Latin American market for wheat and flour. Usually, it is the northern countries that buy the largest quantities of wheat and flour. In the past 2 or 3 years, however, Brazil has become a large market for wheat grain. Colombia and Ecuador, like Mexico, are striving to become self-sufficient in wheat. Unlike Mexico, however, they are not yet in sight of their goal. Several of these northern Republics do not grow any of their own wheat, and probably will not try to do so because of unsuitable growing conditions. Several of them, however, are now processing imported wheat rather than purchasing the wheat in the form of flour as they once did.





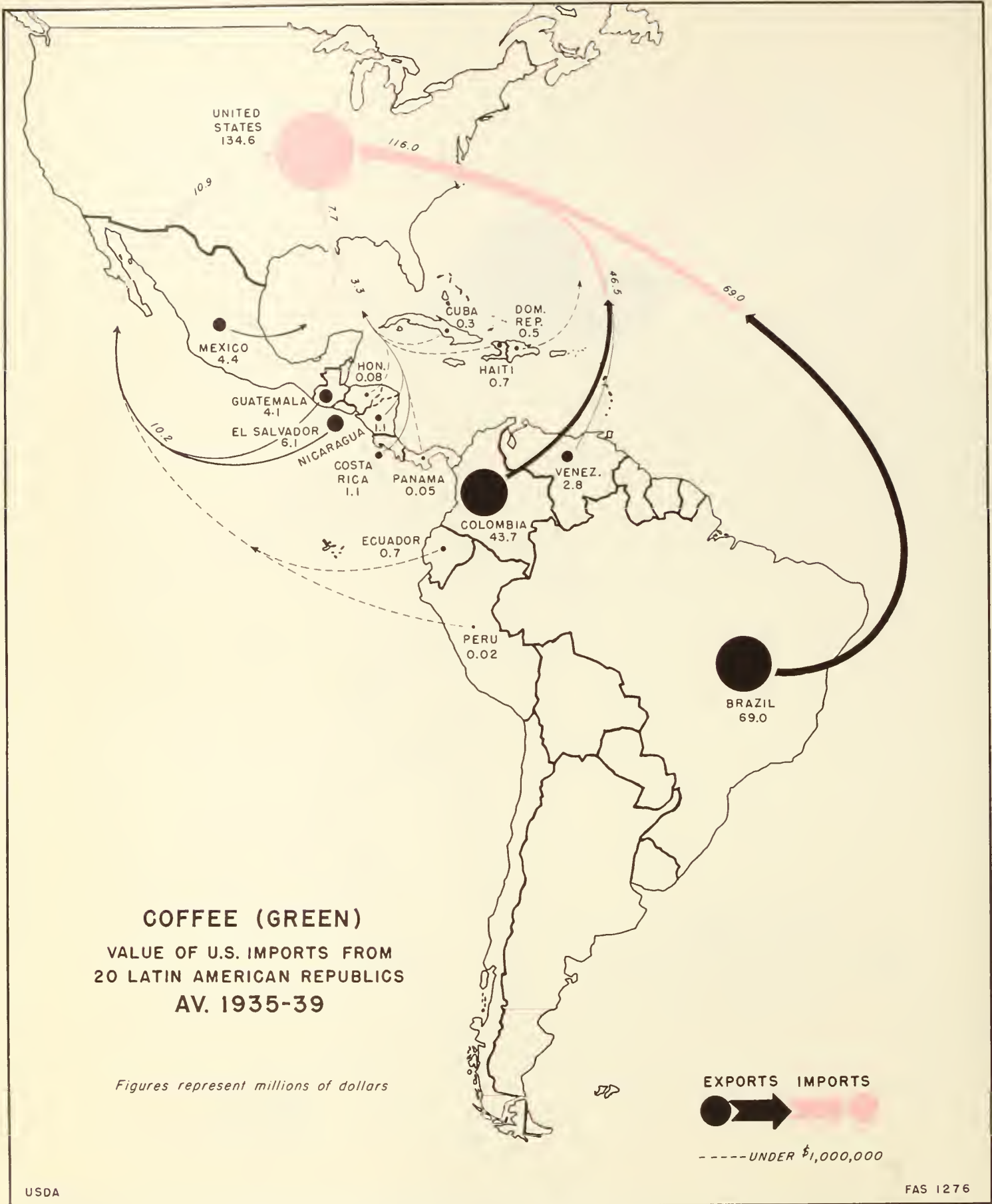




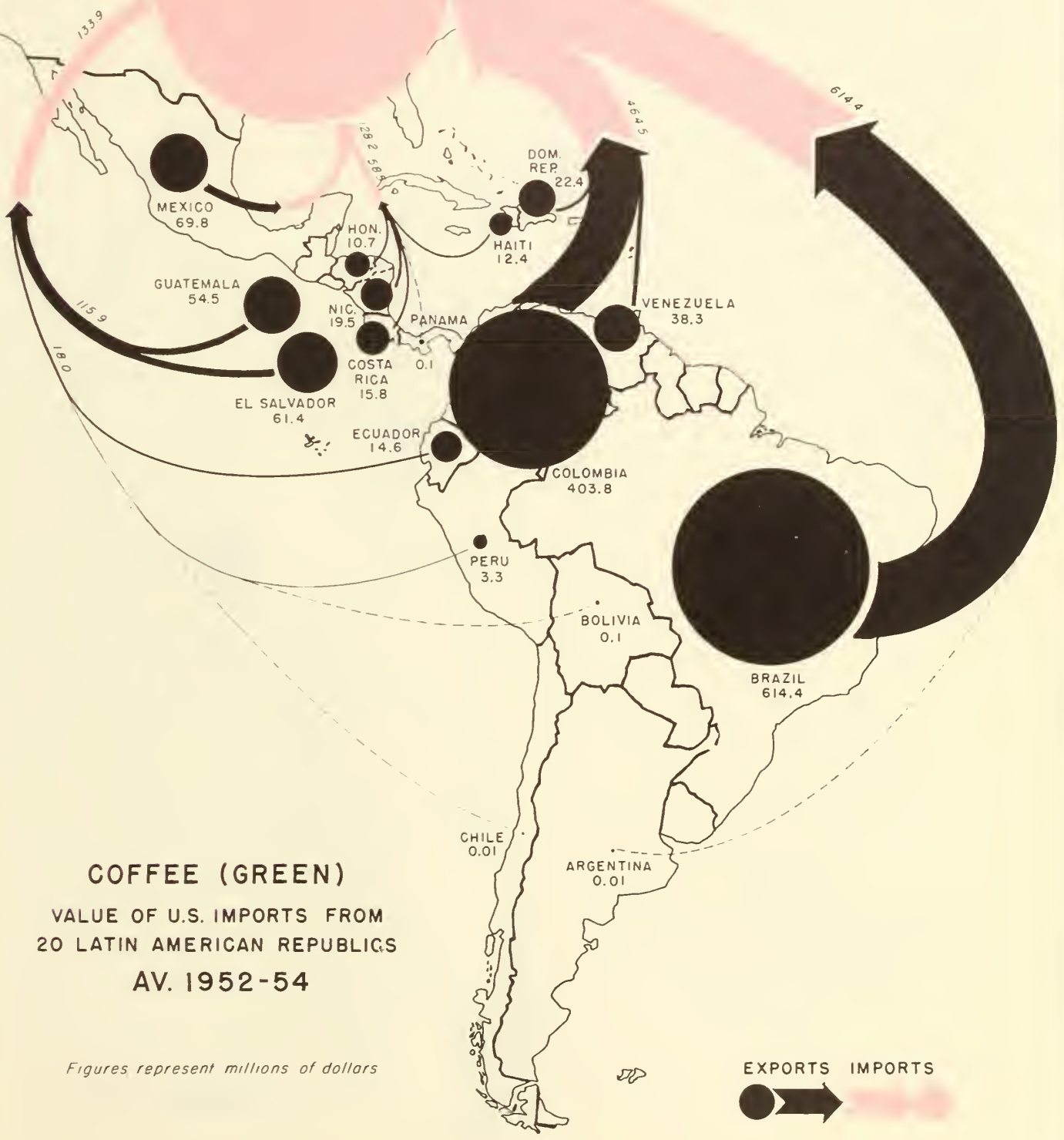
CANE SUGAR
VALUE OF U.S. IMPORTS FROM
20 LATIN AMERICAN REPUBLICS
AV. 1952-54

Figures represent millions of dollars

EXPORTS **IMPORTS**
 -----UNDER \$100,000



UNITED STATES
1,341.0



COFFEE (GREEN)
 VALUE OF U.S. IMPORTS FROM
 20 LATIN AMERICAN REPUBLICS
 AV. 1952-54

Figures represent millions of dollars

EXPORTS IMPORTS
 (Symbol: Black circle with arrow pointing right)
 ----- UNDER \$1,000,000



UNITED STATES
92.1



CACAO

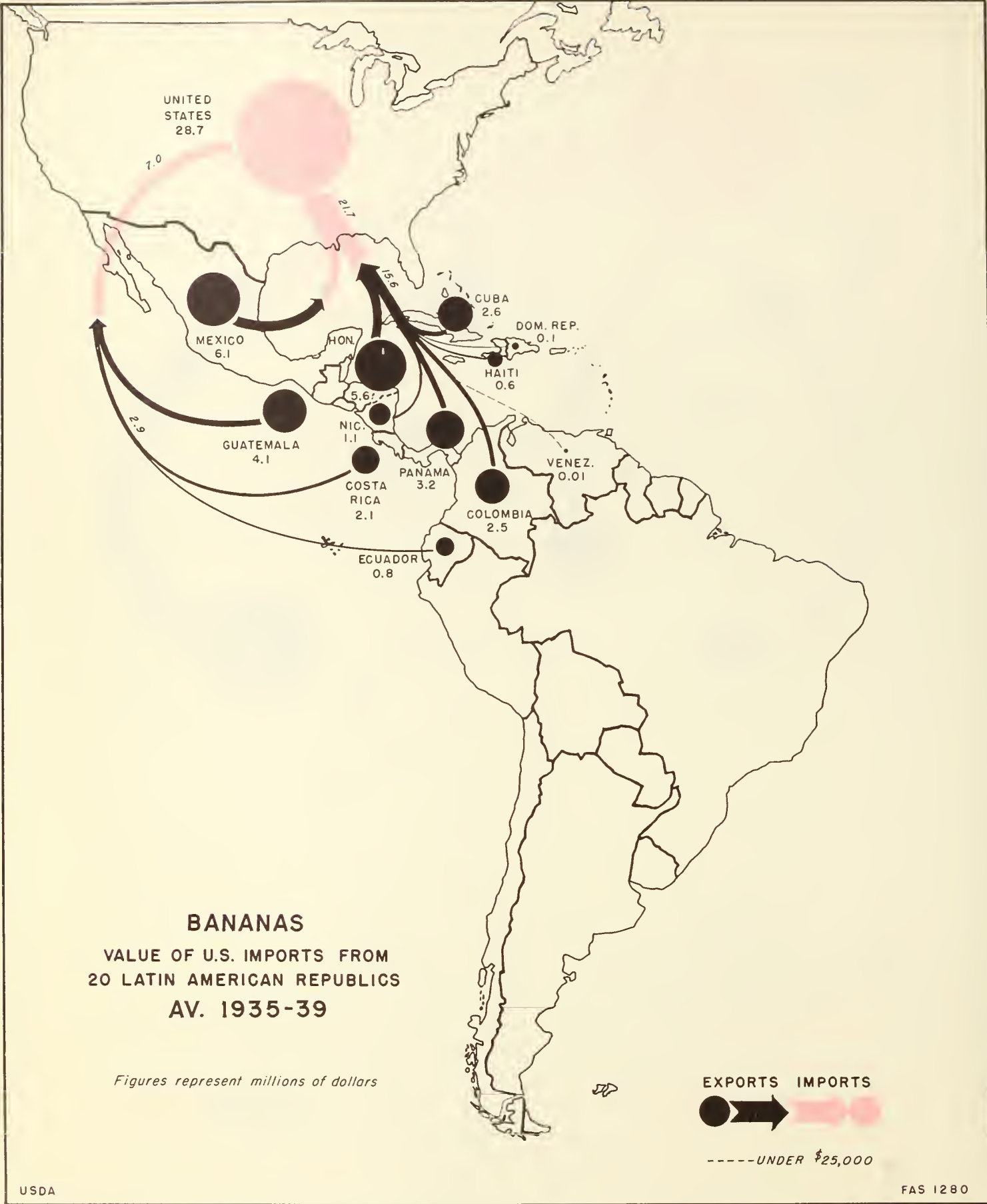
VALUE OF U.S. IMPORTS FROM
20 LATIN AMERICAN REPUBLICS
AV. 1952-54

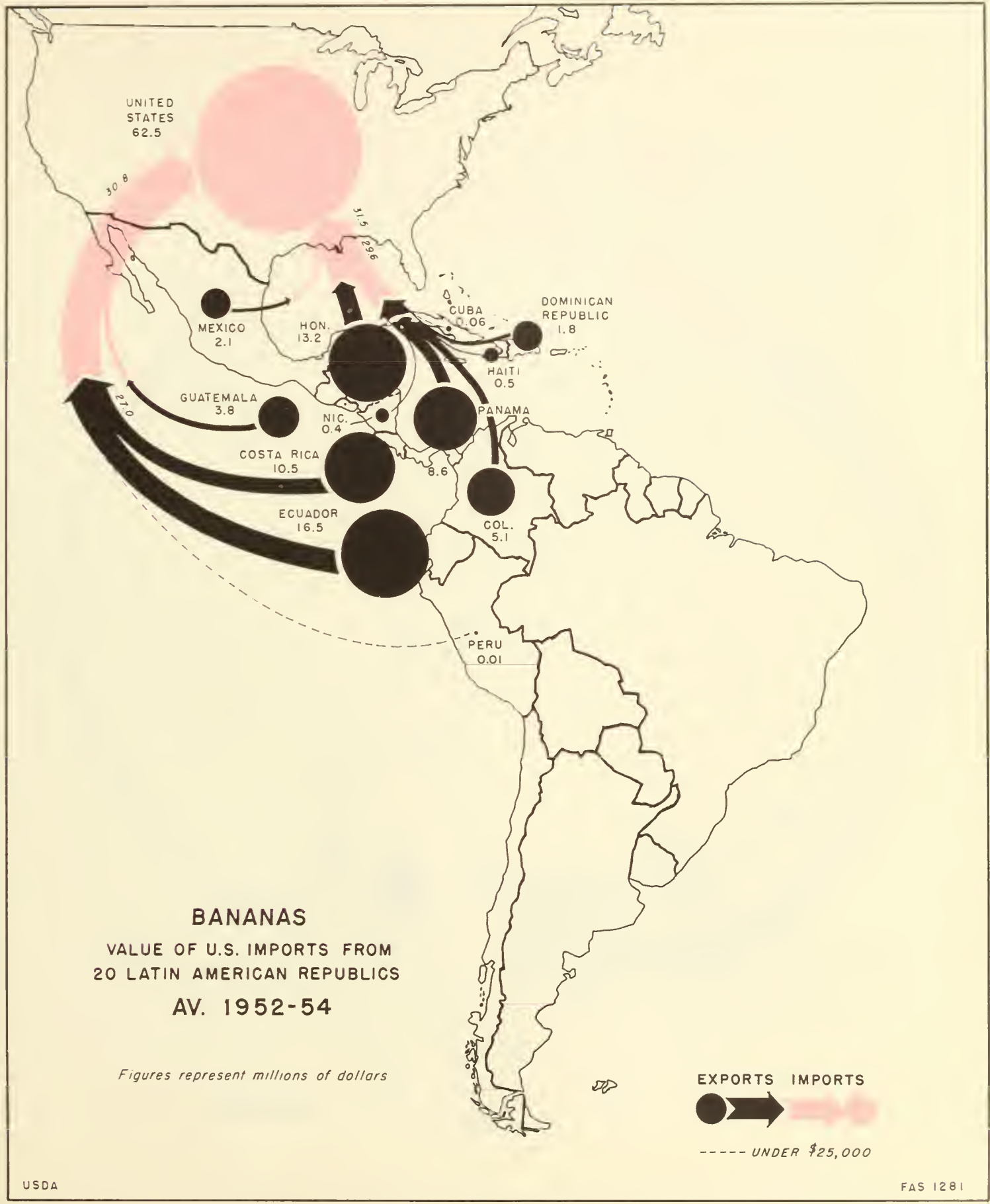
Figures represent millions of dollars

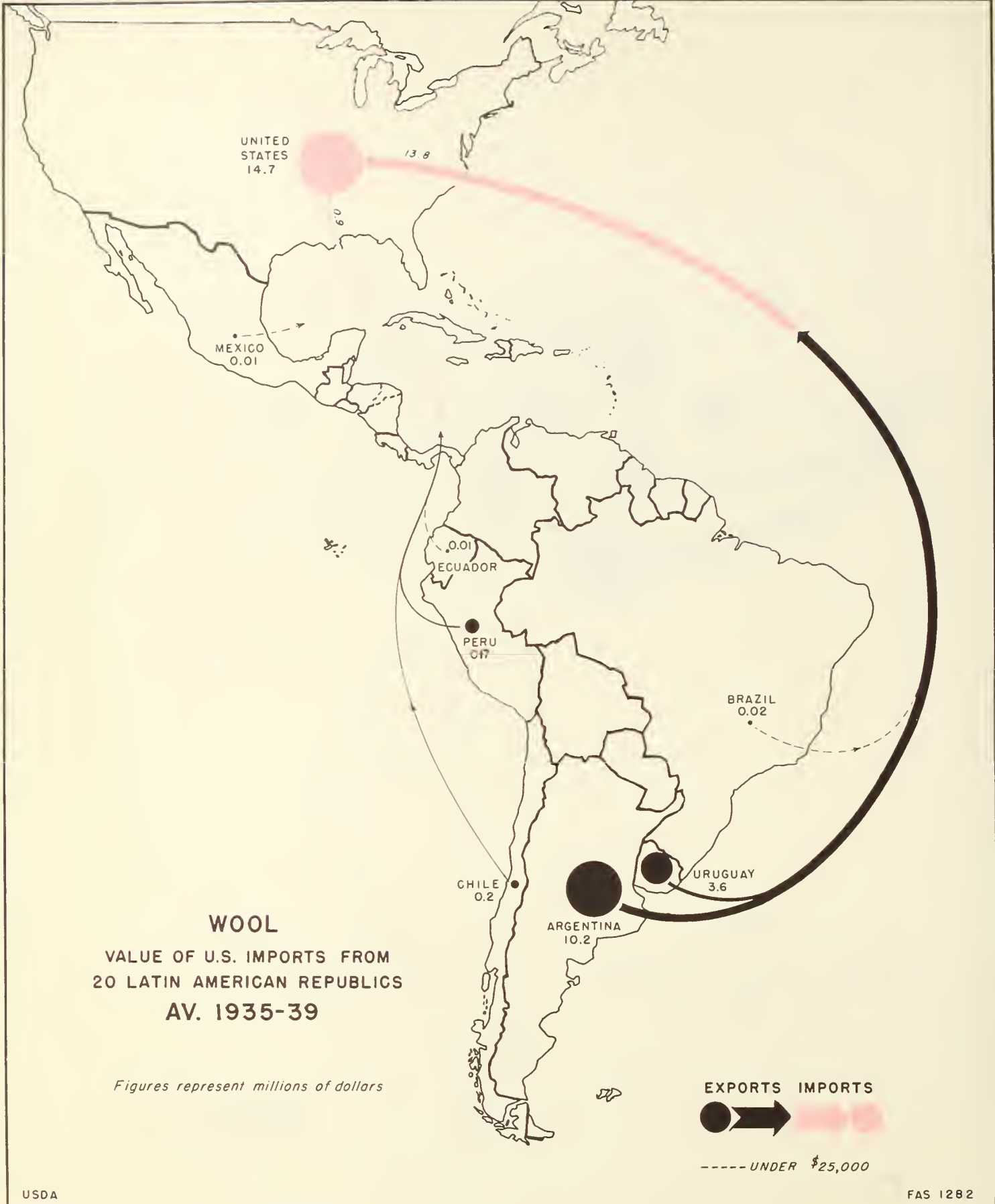
EXPORTS IMPORTS



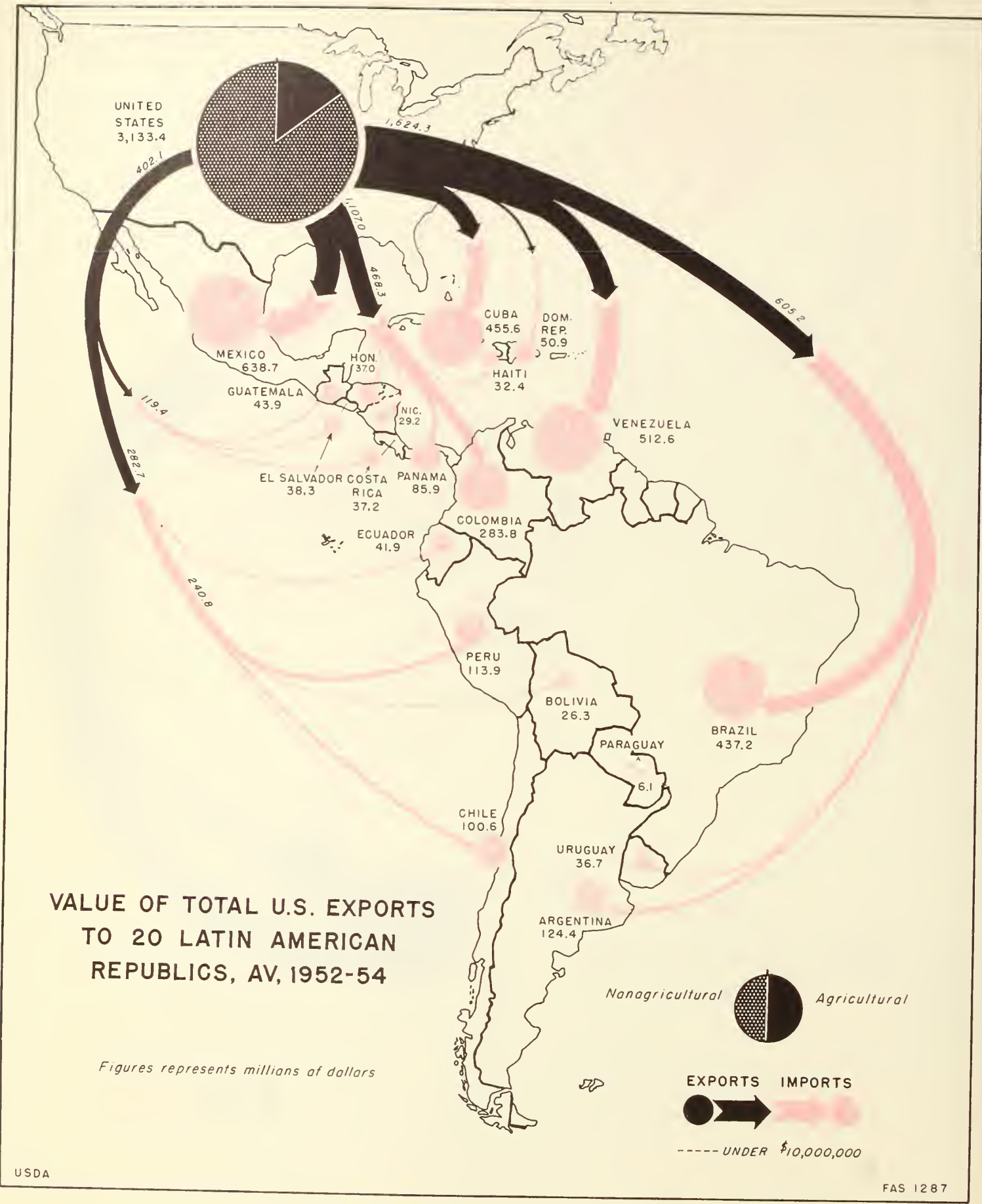
----- UNDER \$100,000











UNITED STATES
3,387.4

1,888.9

500.2

900.3

542.8

960.3



MEXICO
365.5



CUBA
422.2

DOM. REP.
60.2

HAITI
23.8

HON.
26.2

GUATEMALA
64.3

NIC.
24.6

COSTA RICA
33.0

EL SALVADOR
62.5

PANAMA
16.3

ECUADOR
49.3

COL.
451.9

VENEZUELA
446.2

PERU
82.8

BOLIVIA
54.4

PARAGUAY
6.2



BRAZIL
752.0

CHILE
243.9

URUGUAY
51.0

ARGENTINA
151.1

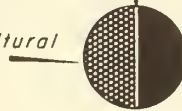
208.3

VALUE OF TOTAL U.S. IMPORTS
FROM 20 LATIN AMERICAN
REPUBLICS AV. 1952-54

Figures represent millions of dollars

Nonagricultural

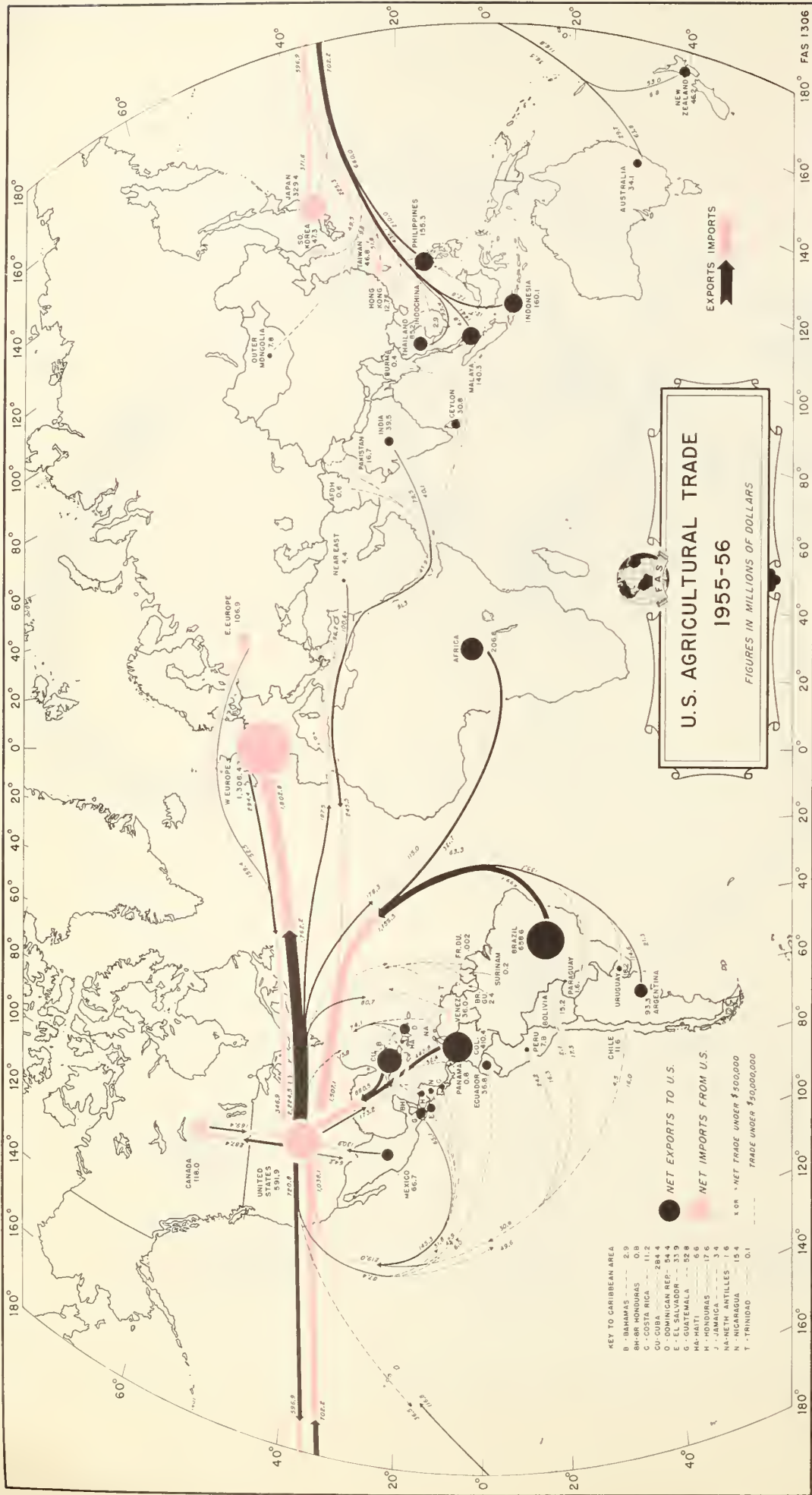
Agricultural



EXPORTS IMPORTS

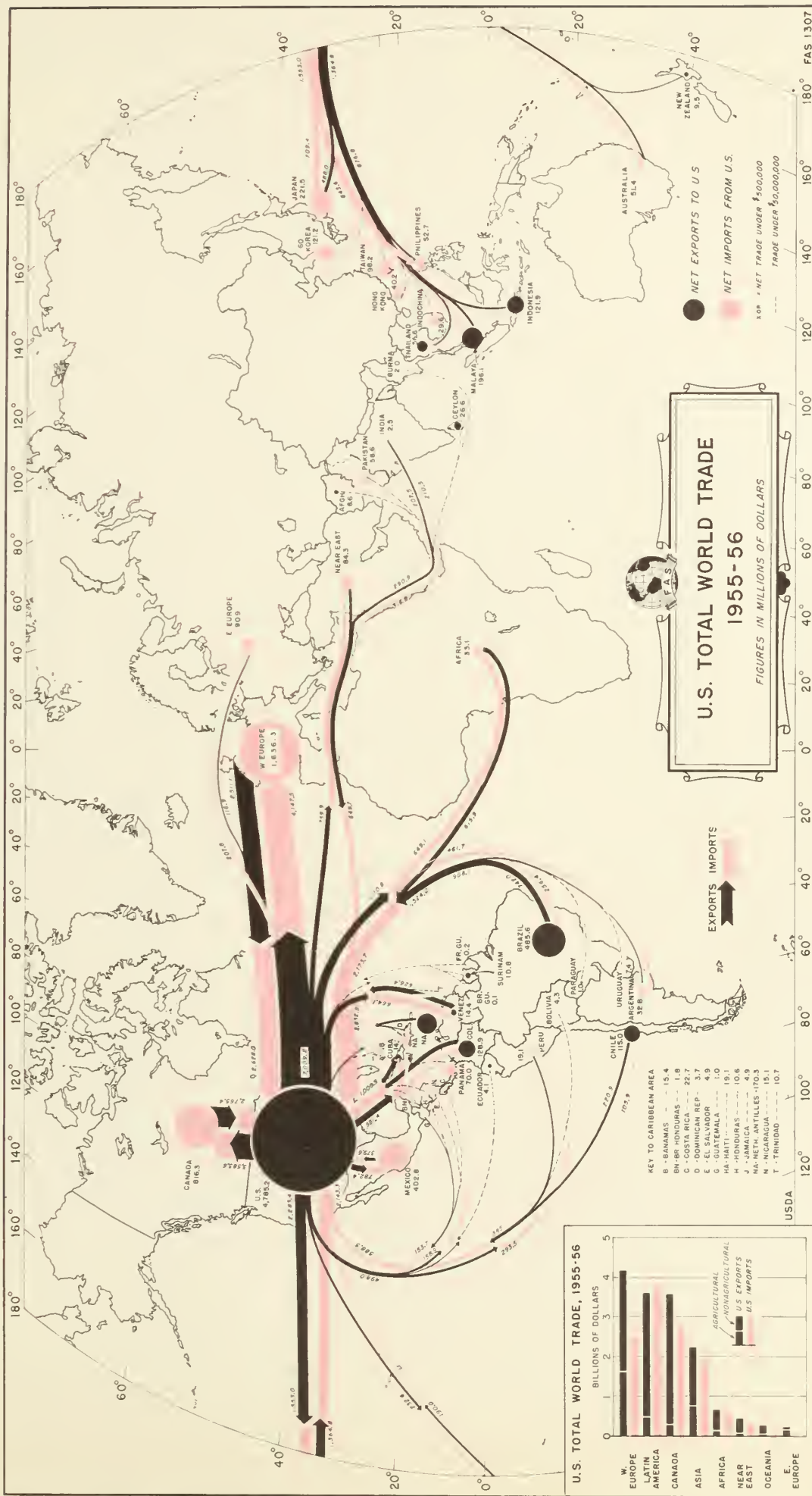


-----UNDER \$10,000,000



West Europe has long been the largest market for United States exports, especially for agricultural products. But United States imports from West Europe are predominantly nonagricultural—about \$2.5 billion out of \$4.1 billion. Latin America is the biggest supplier of goods to the United States; most of these are agricultural products—coffee, sugar, wool, cacao, among

others. United States exports to Latin America, as to Europe, are mostly nonagricultural items, such as machinery, metal products, and textiles. They make up \$3.1 billion in a \$3.6-billion total. In 1955–56 the United States had the largest total trade with Latin America—about \$7.4 billion; next was West Europe with \$6.7 billion, and Canada with \$6.3 billion.



Latin America is an important business partner for United States agriculturists. These 3 countries have freely convertible currencies and relatively healthy economies. Of the 3, Mexico is augmenting its output of products that it used to import so the United States is losing a market for wheat. The northern Republics especially have been big buyers. In 1956, for example, they took three-quarters of the total United States agricultural exports to the 20 Latin American Republics. Cuba, Mexico, and Venezuela took more than half of the total. These 3 countries have freely convertible currencies and relatively healthy economies. Of the 3, Mexico is augmenting its output of products that it used to import so the United States is losing a market for wheat.

Black-and-white prints of the maps and charts in this Geography are available except those on pages 1, 4, 5, 8-11, 20-23, 26, 27 and 80-95.

Price list

(Minimum charge of \$1 per order.)

Photographic prints, dull or glossy-----	}	5" × 7" 60¢ each.
		8" × 10" 75¢ each.
Positive photostat (wall size)-----		18" × 25" 80¢ each.

When ordering charts—

- (1) List negative number, title, and size. If ordering 5" × 7" or 8" × 10" prints, specify dull or glossy finish.
- (2) Give name and address of individual to whom the charts should be sent.
- (3) A purchase order will be accepted from State institutions. Orders from all others must be accompanied by a remittance.
- (4) Make all remittances payable to "Office of Information, USDA."
- (5) Send orders and remittances to the Office of Information, U. S. Department of Agriculture, Washington 25, D. C.

Orders from foreign countries are accepted. Please include a reasonable amount for postage.