Modern

Brazil

IMMIGRATION & COLONIZATION COUNCIL
(PRESIDENCY)

Modern BRAZIL

RESOURCES
POSSIBILITIES

Rio de Janeiro
1949

MINISTRY OF FOREIGN AFFAIRS
Archives, Library and Map Collection

The purpose of this book is to present, in a light, pleasantly readable manner, an accurate description of Brazil — the land, the people and the possibilities. While following in general the lines adopted for the larger year-book "Brazil", care has been taken to condense the information given without sacrificing any of the more important points of interest to whoever may be contemplating, either a visit or else a new start in life overseas.

Profusely illustrated and documented with salient statistics, this survey paints a vivid picture of life in a great country of opportunity and many are the foreigners who will feel the urge to build up their fortunes in the welcoming atmosphere of freedom that Brazil offers to those that set foot on her shores.

The skill with which **Counsellor Carlos Alberto Gonçalves** has assembled material from so wide a variety of sources and welded it into so rich and attractive a whole, without losing sight of the practical aims of such a volume, reveals a perfect comprehension of the various aspects of the economic and social problem, and there is no doubt that this work will contribute actively to the cause of mutual understanding between peoples which is essential if international cooperation is to be maintained on a sound and permanent basis.

Jorge Latour

President of the Immigration and Colonization Council

SUMMARY OF CONTENTS

BRAZIL

Brazil was discovered on 22nd April, 1500, by the Portuguese Admiral Pedro Alvares Cabral. It was first given the name of "Ilha de Vera Cruz" (Isle of the True Cross), which was replaced not long afterwards by that of "Terra de Santa Cruz" (Land of the Holy Cross). Neither proved lasting and Brazil (spelt Brasil in Portuguese and Spanish) was evolved from "brazilwood", so called because of the brilliant red dye which gave the logs of this forest tree the hues of glowing embers ("brasas") and made them the chief export product in early days.

In 1530 Martim Afonso de Souza landed at Pernambuco with 400 colonists intent on opening up the newly discovered land. This expedition explored a great stretch of the Atlantic seaboard, founding a number of settlements such as Recife, Vitória, Rio de Janeiro, São Vicente and Cananéia.

The true conquest of the Brazilian hinterland has, however, always followed the course of the rivers, which provide relatively easy access as they strike deep into the heart of the country. The explorers set out from three principal centres: Belem, in the north; Bahia, in the centre, and São Paulo, in the south.

In 1637, the Spanish government (which held sway over Portugal for sixty years) organized an expedition that left Cametá, in the State of Pará, composed of 47 canoes manned by soldiers, Indians, slaves and women, numbering 2,000 in all. They were fortunate enough to reach Quito, the capital of Equador, and on the way they proceeded to occupy the whole vast area of the Amazon Valley, the colonization of which was pursued by members of the religious orders and veteran soldiers from Asia and Africa.

In the centre, the fringe of civilization was thrust inland chiefly owing to the development of stockraising and some of the old cattle trails along which the growing herds advanced in search of fresh pastures, are still in use today after three centuries have passed by.

The southern expeditions, organized by the "Paulistas", or inhabitants of São Paulo, were called "bandeiras" and those who took part in them "bandeirantes", a name which has now become a synonym of Paulista. The River Tieté supplied them with a waterway to carry them downstream and inland to the River Paraná and the prairies of Mato Grosso. Thence they spread to the farthest corners of the country in search of gold and precious stones, some even scaling the Andes and dropping down to the Pacific coast.

In the course of the first centuries after the discovery of Brazil, there was considerable intermarriage between Portuguese and Indians, giving rise to a race of "Mamelukes" (not to be confused with the Mamelukes of the Old World, of quite different origin). Daring explorers and energetic pioneers, these halfbreeds played an important part in moulding and consolidating the frontiers of the country until they acquired their present conformation.

In 1750, the Kings of Portugal and Spain resolved to establish the limits of their American colonies and it was decided that Portugal was to retain the ownership of all land occupied by Portuguese, and Spain that occupied by Spaniards. The Treaty signed at Madrid thus confirmed the territorial gains of the bandeirantes. Unfortunately, the frontiers laid down by this Treaty were not accurately delineated

and proved a source of endless controversy, stiffening, in particular, the resistance of the Jesuits of the "Sete Povos das Missões" (the Seven Missionary Settlements or "Peoples"), who only consented to submit to Portuguese rule in 1756 after two armies had been sent against them.

Other treaties were signed between Portugal and Spain in an attempt to settle the vexed frontier question in America, and Brazil was often affected. The claims of the Portuguese to a share in the River Plate, represented by their insistence in extending their dominion over what is now Uruguay down to the northern bank of the great estuary, were responsible for a century of armed conflicts with the Spaniards and eventually gave rise to the war between Brazil and Argentina, which only ended in 1826, by the mediation of England, with the independence of the "República Oriental" or Eastern Republic of Uruguay. This did not, however, curb the ambitions of Dictator Rosas in Buenos Aires who aimed at reconstituting the ancient Spanish viceroyalty of the River Plate which had included both Uruguay and Paraguay; in 1864, this idea, inherited by another dictator, Lopez of Paraguay, precipitated Brazil into the most exacting struggle that ever embroiled the country, the Paraguayan War.

Nevertheless, Brazil has always endeavoured to find a solution to frontier disputes by arbitration, and therein its claims have been justified and its prestige has gained increasing international significance.

On several occasions, other peoples have attempted to gain a footing in Brazil, chief of these being the Dutch, especially the second time when the region of Pernambuco fell into their hands and was governed by a man of outstanding character and initiative, John Maurice, Count of Nassau-Siegen, for a period of seven years.

Various sporadic revolts, mostly of a local character, broke out during the period that preceded the declaration of independence. Patriotic at base, the most important was that known as the Tiradentes Conspiracy, headed by a group of intellectuals who plotted, wisely but not too well, to cast off the over-oppressive yoke of the mother country.

At the beginning of the XIXth century the invasion of Portugal by Napoleon obliged Dom João VI to cross the Atlantic with his Court. The arrival of the Portuguese monarch converted Brazil into a kingdom and stimulated progress in every branch of activity, due in no small measure to the cultured personalities of the men who accompanied him.

In 1816, Dom João VI returned to Portugal and in 1822, his son Dom Pedro, who had remained behind as Regent, proclaimed the independence of Brazil and was made Emperor with the title of Dom Pedro I. After ruling for nearly nine years, he abdicated in favour of his son, then barely five years of age.

Dom Pedro II, whose majority was declared in 1840, enjoyed a long reign, in the course of which the five-year war with Paraguay broke out, coming to an end in 1870 with the victory of Brazil. This war had a considerable influence on the situation of the country, for it stirred up a political and social movement tending towards the abolition of slavery and the adoption of a republican regime.

On 13th May, 1888, Princess Dona Isabel, then regent of the Empire, finally signed the "golden law" which did away with the abuse so long condemned by liberal thinkers but failed to provide for pecuniary indemnization of the slaveowners, thus precipitating a crisis in both the economic and political spheres.

Planters and ranchers abandoned the monarchical parties, and a change in the order of government became imminent; the last props of empire were swept away and the tide of evolution surged forward with the declaration of the Brazilian Republic on 15th November, 1889.

During the republican period Brazil has passed through a number of political and social phases and taken part in two world wars on the side of the Allies. Thus from 1889 to 1948, Brazil has followed the varying fortunes of nineteen presidents, including a governing board or Junta (1930) and Senhor Getulio Vargas who held the reins of government for the lengthy period of fifteen years (1930 to 1945).

The President-Elect is now General Eurico Gaspar Dutra, who took office on 31st January, 1946.

THE BRAZILIAN CONSTITUTION

The laws of Brazil, like those of the United States of America, are based on a written constitution, of which the following are some of the essential tenets incorporated in the Bill of Rights:

— Whosoever is born in Brazil, even of foreign parents, is Brazilian.

— The Constitution ensures to Brazilians and foreigners resident in Brazil, the inviolability of the rights concerning life, liberty, individual safety, and property.

— All men are equal in the eyes of the law.

— None can be obliged to do or forbear from doing anything except by virtue of the law.

— The law shall not impair any acquired right; the perfect juridical act is the **res judicata.**

— The law shall not exclude from appreciation by the Judiciary Power any injury to an individual right .

— The expression of thought is free and not subject to censorship, excepting as regards public performances and amusements.

— Anonymity is not allowed.

— The right of rejoinder is ensured.

— The publication of books and periodicals shall not depend upon a license from the public authorities. No propaganda in favour of war, violent methods of subverting political or social order, or race or class prejudice, shall, however, be tolerated.

— The secrecy of correspondence is inviolate.

— The liberty of creed and conscience is inviolate, and the free exercise of any religious cult is ensured except in the case of cults which disturb the public order or offend morality.

— None shall be deprived of any of his rights on account of his religious, philosophic or political convictions, unless he invokes them to exempt himself from any obligation, charge or service imposed by law on Brazilians in general, or refuse those legally provided to substitute such duties so as to satisfy conscientious objection.

— Any persons may assemble, unarmed, without the police intervening except for the purpose of keeping public order.

— The freedom of assembly for licit purposes is guaranteed. No association may be compulsorily dissolved, except by judicial decision.

— The organization, registration or operation of any political party, whose programme or action is contrary to the democratic regime, based on the plurality of parties and the guarantee of the fundamental rights of man, is prohibited.

— The exercise of any profession is free.

— The house of an individual is his inviolate place of refuge. None may make entrance therein by night, without the consent of the dweller.

— The right of ownership is guaranteed, except in the case of disappropriation for motives of public necessity or utility, or social interest, in exchange for just indemnification in cash and in advance.

— Industrial inventions belong to their authors, to whom by law a temporary privilege shall be guaranteed or, in the event that it be to the advantage of the community for the invention to become public property, a just award shall be granted.

— The property of industrial and commercial trade marks is ensured, as likewise the exclusive use of a firm name.

— The exclusive right of reproducing literary, artistic or scientific works (copyright) is ensured to their authors. The author's heirs shall enjoy this right for a period of time to be stipulated by law.

— The accused is assured of full defense, with all the means and recourses necessary thereto, as soon as the advice of prosecution (**nota de culpa**) has been issued, and this document, signed by the competent authority and bearing the name of the accuser and the witnesses, shall be delivered to the prisoner within twenty-four hours. Criminal procedure shall involve full argument on both sides.

— There shall be no penalty of death, banishment, confiscation, nor any of a perpetual character.

— There shall be no civil imprisonment for debt, fine or costs, except in the case of default by trustees.

— The extradition of foreigners for political crimes or crimes of opinion shall not be granted, nor in any case shall that of a Brazilian subject.

— In such form as the law may prescribe, the public authorities shall grant judiciary aid to those in need.

— In peacetime, any person may, with his goods, enter Brazilian territory, remain therein or depart therefrom, so long as he complies with the legal regulations in force.

— The economic order must be organized in accordance with the principles of social justice, conciliating freedom of initiative with a true appreciation of the value of the labour of man. Work is ensured to all persons making it possible for them to enjoy a dignified standard of living. Work is a social obligation.

— Mines and other wealth of the subsoil, as well as waterfalls, constitute property distinct from that of the soil for the effects of industrial working and development.

— Usury in any form shall be liable to the penalties prescribed by law.

— Labour and social security legislation shall obey the following precepts, apart from any others designed to improve the condition of the workers:

I — a minimum wage high enough, in relation to the conditions in each region to satisfy the normal needs of the worker and his family;

II — prohibition of any differentiation in the wage paid for the same work on the grounds of age, sex, nationality or civil status;

III — payment of a higher wage for night work than for day work;

IV — direct compulsory sharing by the worker in the profits of the undertaking, according to such provisions and in such form as may be prescribed by law;

V — duration of eight hours maximum for each working day, except in the cases and conditions prescribed by law;

VI — a weekly day of rest, with pay, preferably on Sundays, and, within the limits of the technical requirements of the undertaking, the observance of civil and religious holidays (likewise with pay) in accordance with the local traditions;

VII — annual holidays with pay.

— The right to strike is recognized and the exercise thereof shall be regulated by law.

— All men have a right to a proper upbringing, which shall be provided at home and in school.

— Primary education is compulsory.

— Freedom of lecturing is guaranteed.

GEOGRAPHICAL SITUATION

The land of Brazil is situated in the eastern part of South America. It is surrounded by the Atlantic Ocean to the northeast and southeast; by the Guianas, Venezuela and Colombia to the north; and by Peru, Bolivia, Paraguay, Argentina and Uruguay to the west and south. The total frontier sums up to 23,127 kilometres or about 14,350 miles, including 7,407 kilometres (about 4,600 miles) of seaboard.

The total area of Brazil amounts to 8,516,037 square kilometres or roughly 3,385,000 square miles. It is a vast country occupying 1.7% or 1/60th of the area of the globe, 5.7% or rather less than 1/17th of the total dry land and nearly half (47.3%) of South America.

MOUNTAINS AND PLAINS

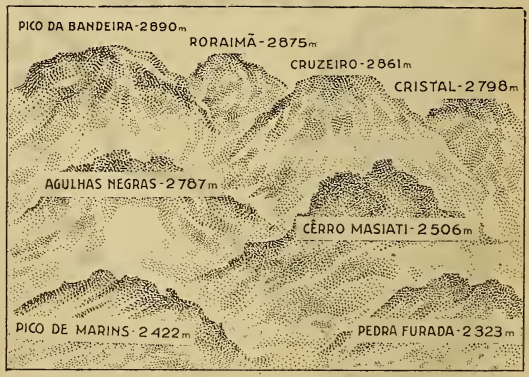
Brazil is by no means a country of high mountains, for its highest points are well below the 10,000-foot level. A bare 3% of its territory rises above 3,000 feet, while 40% of the total area extends in lowlands with an altitude of less than 65 feet. In fact the relief of Brazil may be divided up into 3/8 plains and 5/8 medium altitude highlands.

RIVERS

The river system of Brazil is one of the most extensive in the world, most of the rivers flowing through the highlands. In the northeastern region the watercourses are torrential after the rains, but tend to dry up completely during the dry season.

The watersheds culminate in the Central Massif, a mountain-ridged tableland in the middle of the country; this is of economic importance for the rivers that spread out in all directions are mostly navigable.

The **Amazon** is the largest and most typical river of the plains. With a total length of about 4,500 or 3,700 miles (depending on which



The highest peaks in Brazil

upper branch of the river is chosen as the main stream), it flows for more than 2,000 miles through Brazilian territory, increasing in width from a mile or so at the frontier to more than sixty miles at its mouth, where it pours from 200 to 500 thousand cubic feet of water per second into the Atlantic Ocean according to the season. With a drainage area of some 2,300,000 square miles, 1,850,000 in Brazil, the Amazon is one of the world's largest rivers.

The **São Francisco,** an upland river, runs northwards parallel to the coast for more than a thousand miles of navigable waterway, then swerves over rapids and cataracts to a final 820-foot leap over the serra to the Atlantic seaboard. Ever an easy means of access to the interior, it still links the north of the country to the south and craft of all shapes and sizes ply a busy trade upstream and down.

The **Paraná** forms the axis of the chief catchment basin of southern Brazil and most of the rivers draining the southern plateau are among its tributaries. Marking the western limit of the region for some distance, it serves as a means of communication between the Argentine Republic and the States of São Paulo, Paraná and Mato Grosso.

VEGETATION

From the point of view of plant cover, Brazil may be divided into eight zones:

I. **Tropical forests** — These may be subdivided geographically into the **equatorial region** in the north, the slopes edging the **Atlantic seaboard** in the east, and the **Paraná Valley** in the southwest. The first of these forests, more luxuriant even than its African counterpart, covers the immense valley of the Amazon and has been called the **Brazilian hyleia.** Dense and sombre under the lofty canopy of its foliage, the monotony of the **selva** is only broken here and there by savannas suitable for stockraising. Among the extremely wide variety of flora, in view of their economic utility we may cite the rubber, chocolate, Brazil nut, rosewood and Brazilian teak trees, the guaraná vine, the ivory nut palm, and numerous other species ranging from palms yielding valuable oils to hardwoods of exquisite grain and colouring.

The forests of the **Atlantic seaboard** follow along the eastern rim of the Brazilian highland from Rio Grande do Norte to the north of Rio Grande do Sul. The valuable timber, growing unfortunately in mixed stands, includes the well-known hardwoods: jacarandá, peroba, cedar, cinnamon, uricurana, jatobá, araribá, and many others.

The **Paraná Valley** forests extend from the River Tieté, in the State of São Paulo, down to the State of Rio Grande do Sul.

II. The **coastal vegetation** covers the narrow belt of the Atlantic seaboard, with the following distinctive features:

Coconut groves of the common variety, **Cocos nocifera** L., growing right down to the beach;

Sandy spits, covered with wiry grasses, creeping vegetation and low scrub, to be found along the shores of Rio de Janeiro State;

Tidewater flats, typical of the low tropical coastline, flooded at high tide, but tending to become consolidated by the growth of mangroves and other stunted vegetation with aerial roots.

III. **Open scrub forest ("caatinga")** — A maze of cacti, saw-edge plants and thorny twisted trees characterizes a large part of the north-eastern backwoods. In this region rain never falls for months and sometimes even years at a stretch. Fortunately the oil-bearing **oiticica** tree and the **carnauba** wax palm are there to bolster up the local economy and the sword-leafed **caroa** yields an excellent fibre. Cattle graze on what pasture there is and, where water is available, small farming is carried on with cotton as the chief crop.

IV. **Scrub savanna ("cerrado")** — Intermediate between the scrub forest and the true savanna, this dry, windswept vegetation of rank grass dotted with low bushes and tortuous, stunted trees is typical of various upland regions in the States of Mato Grosso, Goiás, Minas Gerais, Maranhão, Piauí, Bahia and São Paulo.

V. **Open savanna and prairies ("campinas" and "campos")** — Magnificent prairies are to be found in the rolling grasslands of Rio Grande do Sul, famed for its herds of livestock, and also in Paraná, Santa Catarina and the south of Mato Grosso, often merging into savannas, a type of vegetation which is well represented on the extensive tableland dividing the watersheds of the Tocantins and São Francisco rivers in the centre of the country. The savanna is indeed the dominant form of vegetation in South America, whether it be called **campinas, campo** or **pampas,** and it is particularly characteristic of the west central region of Brazil.

VI. **Floodlands ("pantanal")** — The lowlands of Mato Grosso on the eastern bank of the River Paraguay derive their name from the floods which cover a part of them periodically, leaving the lush meadows even more luxuriant when the water runs off. Subject to varying seasons of heavy and scanty rainfall, the vegetation is on the whole of a savanna type, interspersed with patches of rainforest recalling the Amazon Valley, wooded slopes, palm groves, scrub, etc.

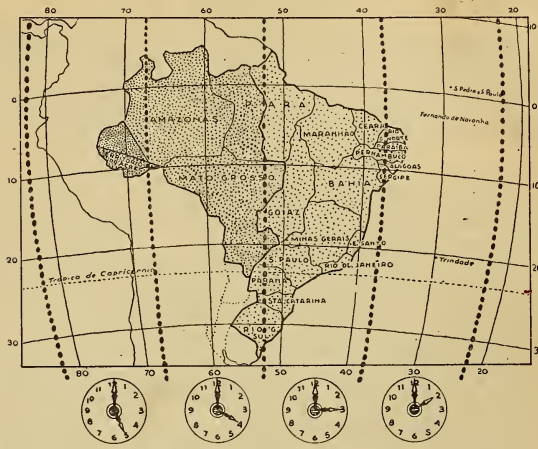
VII. **Babassu palm groves** — These palm groves tend to spread out from the river banks and cover a large part of the plain of Maranhão in the State of the same name, though they also occur in certain sections of the States of Minas Gerais, Mato Grosso, Goiás and Pará.

VIII. **Pine forests** — The Brazilian pine plays an important part in the economy of the country. Growing chiefly in the southern highlands, the largest and best stands are located in the States of Paraná, Santa Catarina and Rio Grande do Sul, an area which is estimated to bear over 200 million wild pine trees.

The Black Needles ("Agulhas Negras") rise to an altitude of 9,142 feet, dominating Itatiaia National Park. The three States of Rio de Janeiro, São Paulo and Minas Gerais can be seen from the summit.

PINEWOODS

Brasilian floro moy be divided up into vorious potterns of plont cover, of which the pine forest is the most chorocteristic. **Araucaria brasiliana,** Richord, is to be found on the southern uplonds where it hos given rise to importont extroctive industries. In Curiiromo – lond of the pinetree – there stond out three voluoble symbols of the vegetoble kingdom : the Pine, the Imbuio cabinet wood ond, tho Mottee teo trae.



BRAZILIAN STANDARD TIME ZONES AND THEIR RELATION TO GREENWICH TIME

Clocks show the time at Greenwich when it is midday in Brazil

GEOGRAPHICAL DIVISION OF THE AREA OF BRAZIL INTO STANDARD TIME ZONES

Hours slow on Greenwich	CORRESPONDING REGIONS OF BRAZIL
2	Brazilian islands in the Atlantic such as Trindade and the Territory of Fernando de Noronha.
3	Units of the Federation: Amapá, Maranhão, Piauí, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, Bahia, Minas Gerais, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul, Goiás; and that part of Pará which lies to the east of a line drawn from the confluence of the Jari, the Xingu and the Amazon: northwards, following the Jari which forms the boundary of the Territory of Amapá; and southwards following the Xingu until it crosses the Goiás State line.
4	Units of the Federation: Rio Branco, Guaporé, Mato Grosso; that part of Pará which lies to the west of the line mentioned above; and that part of Amazonas which lies to the east of a straight line drawn south from Tabatinga, where the Amazon crosses the Brazilian frontier, to Porto Acre, both of these localities being included in this time zone.
5	Units of the Federation: The Territory of Acre and that part of Amazonas which lies to the west of the straight line mentioned above.

CLIMATE

The wide variety of climates enjoyed by Brazil is apt to strike whoever travels through the country for the first time. His surprise is only natural. The greater part of the Brazilian people live in the intertropical region where the sun passes through the zenith once or twice a year and this should induce great heat and consequently great discomfort. That this is not the case is due to the uneven nature of the land nearly all over the country, a very large part of which consists of uplands, where the altitude has a markedly lowering effect on the temperature, and also to the circulation of air, which keeps the atmosphere in constant movement over Brazilian territory.

Thus the configuration of the South American continent allows cold air masses from the polar regions to advance in a northeasterly direction forcing up the tropical air which acquires a flow from north to south and giving rise to periodical rainstorms to assist in tempering the sultry heat. It may therefore be affirmed that in the vast intertropical regions occupied by Brazil, the unchangingly hot damp climates, so greatly feared, do not exist. On the contrary, hot dry seasons usually alternate with the tropical rains, as is the case in the pleasant savanna country. Even in the depths of the Amazon Valley, where the equatorial forests run approximately parallel to the equator and a little below it, the steamy heat is dispelled by the breeze blowing up from the sea and the climate rendered supportable by the sharp drop in temperature at nightfall.

Tropical forests are also to be found stretching up the slopes of the mountain barriers that frown over the Atlantic or rim the basin of the Paraná. On the other hand the mountainous regions in the south of the country are endowed with a temperate climate and are even notoriously healthy, as may be seen from the numerous spas and holiday resorts such as Campos de Jordão, Nova Friburgo, Teresópolis, Poços de Caldas and Araxá.

Let us consider the various types of Brazilian climate in the light of Köppen's classification, which, apart from being the most rational, is that universally adopted.

The figure shows an enormous area covered with squared hatching which corresponds to the tropical savanna climate, type Aw, where more or less open grassland is to be found under the names of **campos cerrados** and **campinas.** In the northeast, a drier climate occurs, the hot semi-arid type BSh which is responsible for the formation of the open scrub forest or **caatinga.** The temperate climates, Cw and Cf, reign throughout the south of the country and thrust their way up well to the north of the tropic. Oases of temperate climate appear even in parts of Central Brazil, such as the Caipó and Pirineus ranges, where the altitude rises above 3,300 feet and the winters are cold and dry, while the summers are cooled by the rains.

The hot damp climates, Af and Am, are confined to the Amazon region, but even here the rainfall varies considerably, for "f" means that every month the precipitation exceeds 60 mm. (2.36 ins.), the limit above which the vegetation is not checked by a lack of humidity

and forms the true equatorial forest, whereas "m" indicates rains of the monsoon type with precipitation falling below 60 mm. in some months so that the vegetation is affected and growth is less luxuriant.

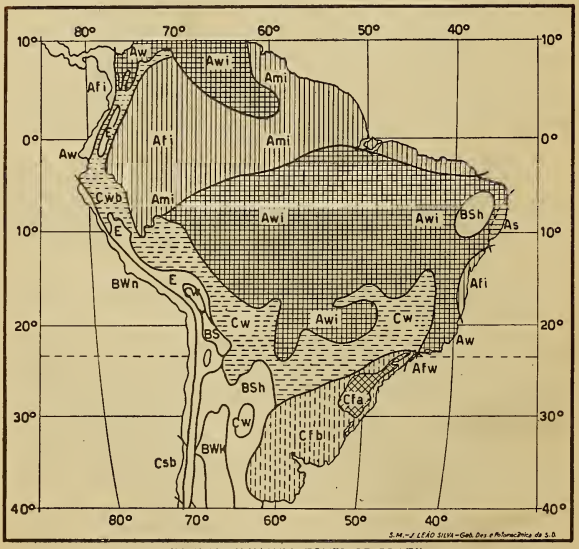
Despite this wide range of climates, the more extreme types which are so injurious to health are not present.

Brazil does not suffer from cyclones or other catastrophic natural phenomena.

It is a privileged country; seldom does winter strike with the harsh severity that brings unpleasantness and hardship to all living creatures in less favoured lands.

The "effective" temperatures are generally situated within the range of "comfort", and relative discomfort is only felt for short periods with the onslaught of a heat or cold wave.

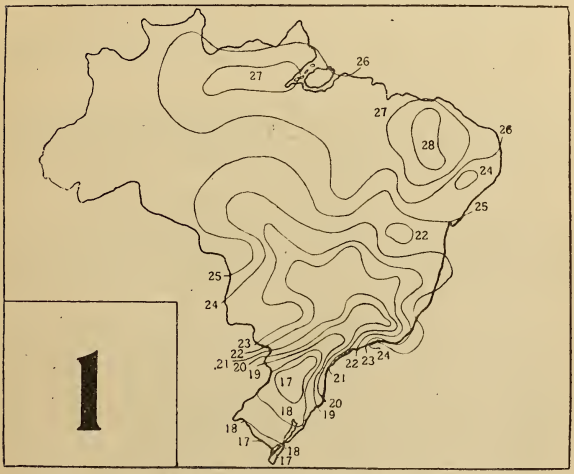
On the other hand, the variations in the temperature of the atmosphere are appreciable. Leaving out of consideration the temperate zone, where the seasons are sharply defined, it is remarkable that in the tropical regions, where seasonal changes are almost imperceptible, the diurnal temperature oscillations are so wide as to bring real relief to the most sensitive European.



PRINCIPAL CLIMATIC ZONES OF BRAZIL
Köppen's Classification

In addition to the yearly variations of temperature, it should be pointed out that the greater part of Brazilian territory is regularly invaded by cold polar air masses every six days or so; these incursions periodically force down the high temperatures and quite commonly reach as far north as the equatorial zone of the Amazon basin.

There are, therefore, no grounds for accusing the Brazilian climate of being monotonous or trying.



Isothermic chart of Brazil, based on monthly and yearly average temperatures in degrees Centigrade

TEMPERATURE — Figure I shows the monthly and yearly average temperatures, in degrees centigrade, throughout the territory of Brazil, giving some idea of climatic distribution and indicating the warmest and coolest regions.

The graph was plotted from data recorded in about 150 different localities and it will be seen that, excepting for a few minima of strictly local character in the neighbourhood of the highest mountains, the range covered is from 16° to 28° C. (60.8° to 82.4° F.).

The **coldest region** is situated in the mountainous zone of southern Brazil (Paraná, Santa Catarina and Rio Grande do Sul) and the **hottest** in the northeastern backwoods (Ceará).

Monthly averages reveal that the country may be divided into two regions by a belt running between parallels 15 and 20 across the States of Mato Grosso, Minas Gerais and Bahia.

To the south of this belt, the **hottest** and **coldest months** are, respectively, either January and July or February and August, the latter conditions prevailing along the seacoast owing to the thermic lag induced by the relative constancy of ocean temperatures.

North of this belt, there is little homogeneity, the **hottest month** varying from August to November in Central and Northern Brazil and from December to March on the northeast coast, and the **coolest** from January to March along the Lower Amazon and from June to July elsewhere.

The divergence between hottest and coldest monthly averages increases with the latitude from 1° C. (1.8° F.) in Amazonas to 12° C. (21.6° F.) in Rio Grande do Sul.

The difference between the highest maxima and the lowest minima observed in each locality likewise increases with the latitude and also with the distance inland, rising from 16° C. (28.8° F.) along the equatorial and northeastern seaboard to 48° C. (86.4° F.) in southern Mato Grosso and the west of Rio Grande do Sul.

The widest range of temperature recorded in any one locality is 87.5° F. in the Mato Grosso town of Bela Vista (max.: 108° F., min.: 20.5° F.), closely challenged by Alegrete, in Rio Grande do Sul, with 86.8° F. (max.: 108.7° F.; min.: 21.9° F.), while, taking the country as a whole, these figures advance to 97° F. (max.: 110.8 in Rio Branco, Bahia; min.: 13.8 in Palmas, Paraná).

These maximum temperatures tend to give a false impression of the reigning conditions, first because it may not be realized that, not only are they lower than in many other tropical countries, but they are also absolute maxima and hence of very rare occurrence, and secondly owing to failure to take into account the attenuating influences. Thus in the interior, the high diurnal variation shortens the duration of the effects of the high temperatures, not to mention the fact that the dry atmosphere of the backwoods assists perspiration to regulate the body temperature and consequently minimize the impression of heat. It is true that the seaboard is damper, but this disadvantage is offset by the invigorating action of the Atlantic breezes. In the Amazon Valley, where the winds are not very strong and the degree of humidity high, in compensation the maximum temperatures are lower. Finally, in any case the daily record shows that the humidity varies inversely with the temperature and the strength of the wind, so that the hottest hours are at the same time the driest and the least sultry.

This explains why one seldom "feels" the heat in Brazil, the effective range of temperature extending favourably from 64° to 76° F. — by no means an unbearable state of affairs.

It has already been pointed out that Brazil is subject to **cold waves.** These are generally preceded by a hot north wind which is deflected into the upper atmosphere by the cold front as it advances from the south, bringing with it the "Pampeiro" and the "Minguano", the cold dry winds of Rio Grande do Sul. When these air currents are strong enough to penetrate as far north as the Amazon Valley, they provoke a sudden chill or **"friagem"** which may be sharp enough

to kill the fish in the streams and rivers. At the same time the barometer rises and mist tends to form dissolving into a persistent drizzle.

Frost is common in southern Brazil, occurring chiefly in the States of Rio Grande do Sul, Santa Catarina and Paraná, and in some years the cold waves acquire so exceptional an intensity, that even snow is by no means a rare phenomenon.

Generally speaking, the country may be divided according to annual rainfall into three zones: the **Amazon** region, the **sertão** or backwoods, and the **east coast**, the former being the wettest, and the second the driest of the three.

The **rainiest** regions of Brazil are: the Amazon valley, the stretches of the east coast from Salvador to Caravelas and from Angra to Paranaguá, the interior of Santa Catarina and the north of Rio Grande do Sul; the **least rainy:** the interior of the northeast, especially the central part of the States of Rio Grande do Norte, Paraíba and Pernambuco, and the zones bordering the São Francisco river between Pão de Açucar in Alagoas and Barra in Bahia.

The rainfall, in inches, of the following localities may be cited as being particularly abundant: Alto da Serra (São Paulo), 142.5; Clevelândia (Pará), 127.6; São Gabriel (Amazonas), 116.4; Remate de Males (Amazonas), 115.6; Belem (Pará), 110.4; Goiana (Pernambuco), 102.8; São Pedro (Rio de Janeiro), 95.3; Alto de Itatiaia (Rio de Janeiro), 95.1; Poços de Caldas (Minas Gerais), 90.7; Santos (São Paulo), 90.2; Teresópolis (Rio de Janeiro), 89.7; Ubatuba (São Paulo), 89.6; Petrópolis (Rio de Janeiro), 88.1; Ilhéus (Bahia), 83.3; Grajaú (Maranhão), 83.2.

It is interesting to note that the heaviest rainfall in 24 hours is recorded, not in the super-humid Amazon Valley, but in southern Brazil (south of Minas Gerais, State of Rio de Janeiro, east of São Paulo, Santa Catarina coast and north of Rio Grande do Sul) which is deluged with heavy persistent rain during the cold season of the year.

RAINY SEASONS — **Summer rains** fall over the greater part of continental Brazil (Minas Gerais. São Paulo, Rio de Janeiro, the Federal District, Espírito Santo, Goiás, Mato Grosso, Acre Territory, the interior of Bahia, the west of Pernambuco, and the south of Amazonas, Pará, Maranhão and Piauí), but are especially characteristic of central Brazil. They generally pour down in the afternoon, in the form of heavy showers accompanied by thunder and lightning.

Autumn rains dominate the northern equatorial coast, but the precipitation is distributed all the year round in the following average proportions: spring, 5%; summer, 30%; autumn, 50% and winter, 15%.

Winter rains are typical of the sea coast from Natal to Caravelas, dominated by the equatorial air masses.

The **rains** are **regularly distributed** over the south of Paraná, Santa Catarina and Rio Grande do Sul, where they occur in the form of **summer showers** in the interior, **frontal rains** on the southern plains and **frontal** and **mountain rains** in the uplands.

MISCELLANEOUS PHENOMENA

THUNDERSTORMS — Generally speaking, it may be said that thunderstorms are of fairly common occurrence, predominating in central and western Brazil (Goiás, north of Mato Grosso and Acre Territory, especially), where they average 100 to 150 a year. As one approaches the coast, the number diminishes gradually, the interior of the Atlantic States being visited by such storms on about 60 out of the 365 days, while 30 days is a good average on the southern and equatorial seaboards and only 10 along the coast from Natal to Caravelas, which is the region least subject to electrical disturbances.

Summer is the stormiest season and dark clouds generally begin to roll up towards evening, bursting into torrential rain garishly lit up by brilliant flashes of lightning. On the contrary in the cold season such thunderstorms as do occur, mostly precede the dawn.

HAIL, rare in Brazil, practically never falls on the northern States and only forms on the average every three years over central Brazil. From Rio de Janeiro and southern Minas Gerais southwards, it becomes rather more common and in some localities, such as Curitiba and Alegrete, the average rises to 1 hailstorm a year.

Though no month can be guaranteed free from hail, it generally falls in the summer.

FROST — The region most subject to frost extends over the States of Paraná, Santa Catarina and Rio Grande do Sul, though São Paulo often suffers severely; frost occasionally attacks the south of Mato Grosso and Minas Gerais and the west of Rio de Janeiro, where, by exception, it is locally common in the Itatiaia Range.

Frost is above all a winter phenomenon, but it also occurs in autumn and spring, when it does the most damage. April frosts are the earliest, the latest coming in November, while in June and July they are heaviest.

Frosty days reach a maximum of 25 a year in the west of Santa Catarina and the northeast of Rio Grande do Sul, as compared with 20 in the south of the latter State and less than 10 in the centre, while on the sea coast, in the centre of Santa Catarina and the interior of Paraná and São Paulo, the number varies from 5 to 15, Curitiba being the point where they are most common.

SNOW may be expected to fall in the coldest months of the year in some zones of southern Brazil, but only very lightly. It is most often observed in the southwest and northeast of Rio Grande do Sul, though it is traditionally recorded as having fallen in other parts of this State.

June, July and August are the most usual months but snowstorms do occasionally blow up as early as May or as late as September, as was the case in 1923.

The heaviest snowfalls on record are those of July, 1858; August, 1970; August, 1885, the heaviest of all, when even the seacoast was covered with a mantle of white, drifting as deep as 4.7 ins. at Bagé, 5.3 ins. at Rio Grande, and 8.6 ins. at Cacimbinhas; July, 1918, with 3.1 inches of snow at Caxias and São Francisco de Paula; August, 1924; and June and July, 1942.

MIST occurs irregularly all over the country, but less frequently in the "sertão", the central belt of territory where atmospheric humidity is at a minimum. The number of misty days amounts to less

than 10 in the northeast and Goiás (Remanso, 0; Quizeramobim, 5; Goiás, 5) and from 10 to 20 in the north of Minas Gerais, São Paulo and Mato Grosso. The regions where mist is most common are Acre Territory, Rio de Janeiro State, the eastern interior of Paraná and Santa Catarina, and the northeast of Rio Grande do Sul (Blumenau, 123; Curitiba, 76; Rio de Janeiro, 120; Rezende, 91; Alto de Itatiaia, 112; and Sena Madureira, 110 days). Mist is only moderately frequent along the Rio Grande do Sul seaboard (40 to 50 days), in the interior of the southern States (20 to 30 days), in the interior of São Paulo and the south of Minas Gerais (40 to 50 days), in the northern States (20 to 40 days) and along the coast from Natal to Porto Alegre (20 to 30 days) excepting, however, the region surrounding the capital of the country.

The coldest months of the year are those when mist is most liable to gather — generally due to radiation — for at such time the prevailing conditions are most favourable: a clear sky, temperature dropping sharply at night, little wind.

TEMPERATURE AND RAIN IN STATE CAPITALS

Yearly averages

CAPITALS	TEMPERATURE						RAIN		
	DIURNAL AVERAGE		ABSOLUTE MAXIMUM		ABSOLUTE MINIMUM		RAINFALL		Number rainy of days
	°C	°F	°C	°F	°C	°F	mm.	inches	
Manaus (Amazonas)	26.6	79.8	37.8	100.1	17.6	63.7	1,995	78.5	167
Belém (Pará)	25.6	78.2	35.1	95.2	18.5	65.3	2,805	110.8	250
São Luís (Maranhão)	26.5	79.7	34.8	94.7	19.6	67.3	2,087	82.8	150
Teresina (Piauí)	26.8	80.3	39.0	102.3	13.8	56.9	1,475	58.1	114
Fortaleza (Ceará)	26.3	79.4	36.0	96.8	9.0	49.1	1,191	46.9	113
Natal (Rio Grande do Norte)	26.2	79.2	32.7	90.9	16.9	62.4	1,525	60.0	128
João Pessoa (Paraíba)	25.1	77.2	34.5	94.1	16.8	62.2	1,717	67.6	207
Olinda (near Recife — Pernambuco)	25.7	78.3	33.4	92.2	17.8	64.2	1,537	60.5	204
Maceió (Alagoas)	25.6	78.2	33.9	93.0	17.0	62.6	1,315	51.8	195
Aracajú (Sergipe)	25.2	77.6	34.6	94.3	15.5	59.9	1,290	50.8	175
Salvadar (Bahia)	24.8	76.7	33.6	92.5	17.0	56.5	1,854	73.0	160
Vitória (Espírita Santo)	23.2	73.8	37.2	99.0	9.3	49.7	1,431	56.4	153
Federal District (Ria de Janeiro City)	22.7	72.9	39.0	102.3	10.2	50.4	1,050	41.4	140
Niterái (Ria de Janeiro)	22.4	72.3	41,8	107.3	7.9	47.0	1,225	48.2	136
Curitiba (Paraná)	16.2	61.2	34.6	94.3	6.3	44.0	1,352	53.2	179
Goiânia (Goiás)	23.9	75.1	37.8	100.1	7.2	45.7	1,684	66.4	113
Cuiabá (Mato Grosso)	25.6	78.2	39.8	103.7	1.2	34.2	1,394	55.0	137
Belo Horizonte (Minas Gerais)	20.7	69.3	35.2	95.5	1.2	34.2	1,472	58.0	172
Florianápolis (Santa Catarina)	20.5	69.0	36.0	96.8	1.3	34.3	1,351	53.2	139
Porto Alegre (Ria Grande da Sul)	19.1	66.4	40.4	111.2	0.7	33.3	1,242	48.8	124
Fernando de Noronha Territory	25.4	77.8	30.9	87.7	18.6	65.5	1,351	53.2	156

TERRITORIAL DIVISION

From the politico-administrative point of view, Brazil is divided into 20 States, 5 Territories and 1 Federal District.

Both States and Territories are subdivided into Municipalities ("Municípios") and the latter into Districts.

The States differ very widely in area, the largest, that of Amazonas, covering 1,592,625 square kilometres or roughly 615,000 square miles, while the smallest, Sergipe, can only boast an area of 21,057 square kilometres or 8,100 square miles. The same is true for the Municipalities.

It should be pointed out that the term municipality, derived from Roman law, represents a division of land and not necessarily a built-over area. The chief town in a district is known as its seat or "sede" and bears the same name as the district; it is classified as a township or "vila". But the chief town of a district may also be the chief town of a municipality, in which case it is raised to the rank of city ("cidade") and all three, city, municipality and district, bear the same name. Thus the city of Ouro Preto is the seat of both the municipality of Ouro Preto and the districto of Ouro Preto, whereas the township of Cachoeiro do Campo is the seat only of the district of Cachoeiro do Campo, which forms part of the municipality of Ouro Preto.

The Federal District (capital of the Republic and city of Rio de Janeiro) is considered both a Municipality and a District. Actually a large part of it is still open country.

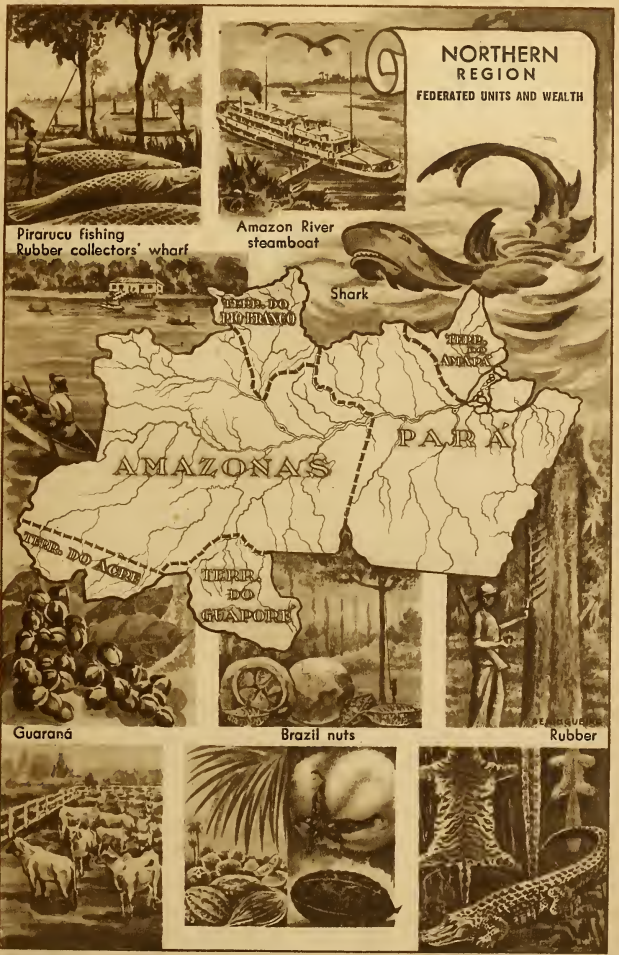
REGIONAL DIVISION

The survey of a country of large expanse like Brazil reveals innumerable variations in its geographical layout and presupposes the existence of regions widely differing one from another. It would be Utopian to expect such regions to coincide with Political Units, for these have grown up with the evolution of history and boundaries have been arbitrarily drawn by man to meet the requirements of political administration. The traveller who crosses a state line, for instance, will note no difference in the scenery on the other side but as he journeys farther into the state he may suddenly be brought face to face with an entirely different landscape.

Modern geographic methodology demands that the study of a country be carried out, not according to administrative divisions, but by "natural regions", and defines the term as signifying a determinate part of the earth's surface exhibiting, in regard to its characteristic features, a certain general homogeneity that differentiates it from the neighbouring regions.

The notion of a natural region comes naturally even to an uneducated man living in close contact with nature. The countryman clearly perceives the differences between the various regions and often gives an expressive name to each region. Thus a peasant farming the coastal region has no difficulty in distinguishing where the mountains begin, just as a beekeeper marks in his eye the limit between cultivated land and wild country.

In Brazil none of the Regions officially delineated corresponds exactly to a group of Political Units and even the diagrammatic


NORTHERN
REGION
FEDERATED UNITS AND WEALTH
Pirarucu fishing
Rubber collectors' wharf
Amazon River
steamboat
Shark
TERR. DO
RIO BRANCO
TERR.
DO
AMAPÁ
PARÁ
AMAZONAS
TERR. DO ACRE
TERR.
DO
GUAPORÉ
Guaraná
Brazil nuts
Rubber
Cattle
Oil-bearing
fruits
Cotton
Cacao
Skins

boundaries seldom coincide with a state line. However, with the sole object of complying with administrative and statistical demands, a practical device has been resorted to whereby whole Political Units are grouped into Regions. Thus when, strictly speaking, a State comprises parts belonging to different Regions, the whole State is included within the Region to which its most important section belongs.

This is the form of practical regional division now adopted in Brazilian tables of statistics and arises out of a compromise between geographers and statisticians.

BRAZILIAN REGIONS

The arrangement, in geographical order, of the Brazilian Federal Units is as follows: Territories of Guaporé and Acre, Amazonas, Territory of Rio Branco, Pará, Territory of Amapá, Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Territory of Fernando de Noronha, Sergipe, Bahia, Minas Gerais, Espírito Santo, Rio de Janeiro, Federal District, São Paulo, Paraná, Santa Catarina, Rio Grande do Sul, Mato Grosso and Goiás.

The Federal Units are assigned to the five regions into which the country is divided, as follows:

NORTHERN REGION — Territories of Guaporé, Acre, Rio Branco and Amapá; States of Amazonas and Pará.

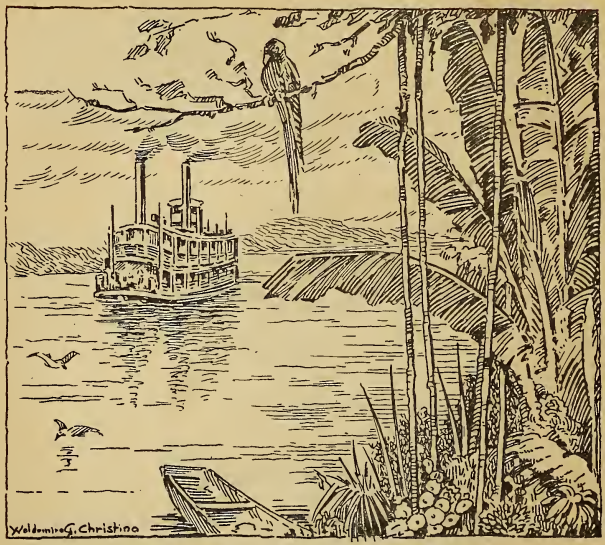
NORTHEASTERN REGION — States of Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco and Alagoas; Territory of Fernando de Noronha.

EASTERN REGION — States of Sergipe, Bahia, Minas Gerais, Espírito Santo, Rio de Janeiro and the Federal District.

SOUTHERN REGION — States of São Paulo, Paraná, Santa Catarina and Rio Grande do Sul.

WEST CENTRAL REGION — States of Goiás and Mato Grosso.

All the studies and surveys carried out by the Brazilian government are based on the regional division indicated above.



River steamboat on the placid waters of the Amazon

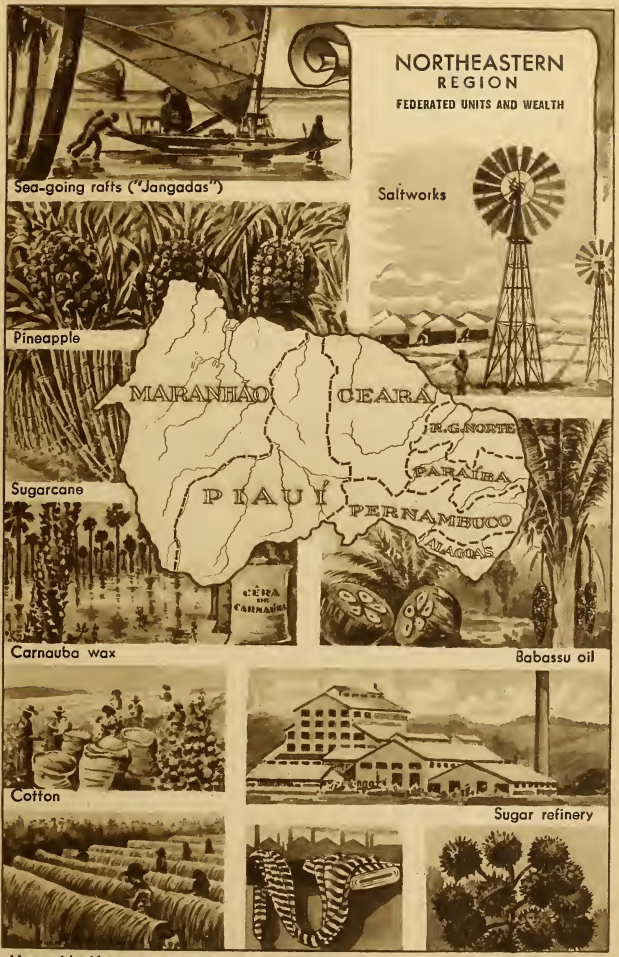
NORTHERN REGION

The great Northern Region is situated athwart the equator, but the larger part of its area is confined to the southern hemisphere.

The principal characteristic of this Region is the vast plain of the Amazon Valley with its dense equatorial forest, known as the "hyleia".

Although it is a fairly homogeneous region, it may be subdivided into three natural regions: the **Guianan Slopes** to the north, which rise to the second highest point in Brazilian territory, Mount Roraimã, 2,875 metres (9,433 feet) above sea level; the **Amazon Plain,** subjugated by the world's most luxuriant vegetation, rising in serried columns to a thick canopy of foliage at an immense height; and the **Brazilian Upland Slopes,** to the south, still covered by tropical forest with a large proportion of Brazil-nut and rubber trees.

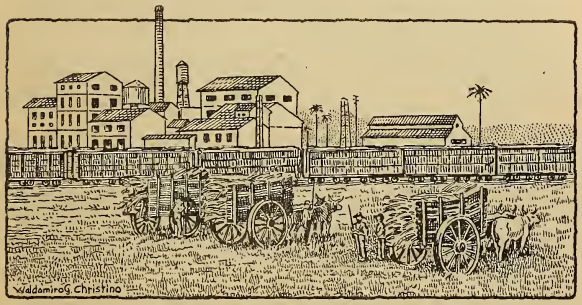
The Northern Region thrives in its hot damp climate, which accounts for the exotic nature of its natural products; rubber, oil-bearing fruits, precious woods, guaraná seedcake, rosewood, cacau, timbó vine insecticide, jute and medicinal plants. The development of agriculture is relative. The clearings are suitable for stockraising and the potential mineral resources, especially gold, diamonds and


NORTHEASTERN
REGION
FEDERATED UNITS AND WEALTH
Sea-going rafts ("Jangadas")
Saltworks
Pineapple
MARANHÃO
CEARÁ
R.G.NORTE
PARAIBA
PIAUI
PERNAMBUCO
ALAGOAS
Sugarcane
CÉRA DE CARNAÚBA
Carnauba wax
Babassu oil
Cotton
Sugar refinery
Vegetable fibre
Textiles
Castor oil

iron, are common knowledge. The rivers of the Region are well stocked with fish, the huge "pirarucu" being widely appreciated and forming the object of a local industry.

MOST DENSELY POPULATED MUNICIPALITIES IN THE REGION

MUNICIPALITY	STATE	INHABITANTS
Belém	Pará	208,000
Manaus	Amazonas	109,000
Bragança	Pará	48,800
Santarém	Pará	48,800



A Pernambuco sugar plant

NORTHEASTERN REGION

The States of Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco and Alagoas, form the Northeastern Region, which may be subdivided into three zones: the Seaboard, the Backwoods and the Lowland Peneplain.

The **Seaboard** may be subdivided into a northern section, with sandy beaches and dunes covered with coconut palms, supporting a fishing population, and an eastern section, which includes the slopes leading up to the backwoods; reefs built up of hardened sand or coral deposits are typical of this section and the State of Rio Grande do Norte, at the apex of the coastline, is noted for its saltworks, the salt marshes being the most important in Brazil.

On the seacoast lives the raftsman or "jangadeiro", typical of the region, a deep sea fisherman who braves the Atlantic rollers in a raft of lightwood treetrunks, lashed and pinned together, with decks awash and a lone triangular sail bellying from the mast.

Farther inland, in the so-called "zona da mata" or wooded zone, the economy is based on sugar plantations which supply the busy sugar mills of the region.

The **Backwoods** are edged by a belt known as the "agreste", where the undergrowth is still fairly exuberant and surmounted by a few hardy species of forest trees. This is the agricultural zone which gives place to the spiny stunted vegetation of the "caatinga" or open scrub forest that covers the uplands and dominates the region of the backwoods.

It is not so much the lack of rain that causes the droughts of the northeast, but rather the unbalanced distribution of the rainfall, which occurs in summer and autumn and evaporates quickly, or runs off the impermeable ground in roaring torrents that dry up in winter leaving sandy, pebble-strewn gulleys behind them; a few rivers which reach the sea keep up a sluggish flow of water for some distance inland.

The adverse climatic conditions determine the way of living in the backwoods. The majority of the population is engaged in stock-raising, especially goats; crop-farming is restricted, only cotton being of some economic importance.

The **Lowland Peneplain** has been eroded down to flat "baixadas" with monadnock tablelands called "chapadas" left over from an earlier age. The rivers are permanent and lined with palm groves of babassu in Maranhão and carnauba in Piauí, spreading inland over large areas.

The great Northeastern Region is rich in strategic minerals, but gold mining has been carried on traditionally especially in the sands of the River Gurupi.

The government has made special provision for this Region, building dams with the dual purpose of retaining water for irrigation in times of drought and ensuring flood control, and drilling artesian wells to tap water-bearing strata. The lakes behind the dams are scientifically stocked with fish, particularly species of rapid growth from other regions.

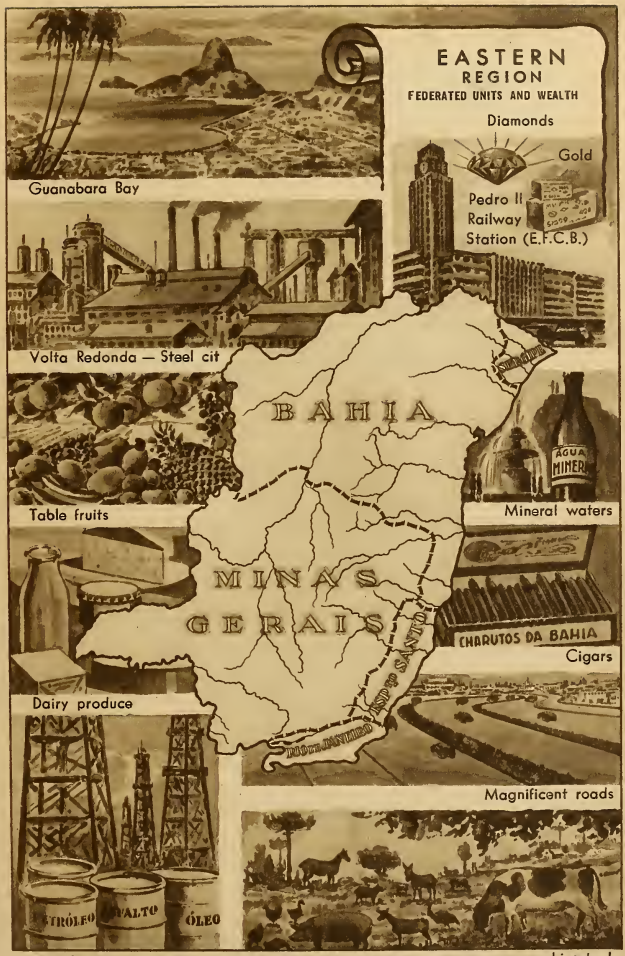
MOST DENSELY POPULATED MUNICIPALITIES IN THE REGION

MUNICIPALITY	STATE	INHABITANTS
Fortaleza	Ceará	506,000
Recife	Pernambuco	352,000
Juazeiro	Ceará	222,000
Campina Grande	Paraíba	126,000

EASTERN REGION

The chief feature of this Region is the long mountainous belt extending down from the north of Bahia to the south of Minas Gerais and including the highest points in the country. Apart from this general characteristic, there is not a great deal in common between the four natural regions into which the main Region should properly be divided.

Of these, the **Lowlands** or "baixada" stretch out in a long narrow plain between the Serra do Mar and the coast, occasionally widening considerably to form the "Campos de Goitacases" on the banks of the lower reaches of the Paraíba do Sul, the "Baixada Fluminense" surrounding Rio de Janeiro, and others of less importance.


EASTERN
REGION
FEDERATED UNITS AND WEALTH
Diamonds
Gold
Pedro II
Railway
Station (E.F.C.B.)
Guanabara Bay
Volta Redonda — Steel cit
BAHIA
MINAS
GERAIS
ESPIRITO SANTO
RIO DE JANEIRO
Table fruits
Mineral waters
ÁGUA
MINERAL
CHARUTOS DA BAHIA
Cigars
Dairy produce
Magnificent roads
PETRÓLEO
ÁLCOOL
ÓLEO
Petroleum products
Livestock

Purebred Dutch cattle in Minas Gerais

The lowlands enjoy a warm, damp climate and are watered by strong-flowing rivers that make their way down from the highlands. Conditions are highly suitable for agriculture.

To the north of the Rio Doce, cacau is the characteristic product, while to the south sugarcane is cultivated and processed in the most modern refineries of the country; fruitgrowing, principally oranges and bananas, is also of paramount importance. The salt industry thrives along the coast in the neighbourhood of Cabo Frio.

The **Eastern Mountainslopes,** rising from the lowlands to the high serras of Diamantina, Espinhaço and Mantiqueira, are clad in equatorial forests. It was here that coffee was first grown in Brazil, but the impoverishment of the soil drove the planters to emigrate to São Paulo and the economic basis of the Paraíba Valley shifted to stockraising and industry. However, there remain some important coffee plantations in the south of Espírito Santo and in Minas Gerais. The existing reserves of timber in the Rio Doce Valley are now a valuable source of supply of charcoal for the local iron-smelting industry.

The **Highlands,** the most typical part of the Eastern Region, present a general aspect of plateaux cut with serrated ridges and terminating to the south in an abrupt scarp, the Mantiqueira Range, dominated at the summit of Itatiaia by the peak of the Black Needles (Agulhas Negras). In the eastern ramification known as the Serra do Caparaó, rises the Pontão da Bandeira, Flag Peak, the highest in Brazil. From the top of this scarp, the eroded plateaux of southeastern Minas Gerais slope gently downward and inland with their rounded hills. Here the contrast between the dry winters and rainy summers is extremely marked.

Farther to the north lies the Serra do Espinhaço, prolonged towards Bahia by the Chapada Diamantina, where the poor fertility of the soil is offset by the richest mineral deposits in Brazil — iron,

manganese, gold, diamonds and other precious stones. Stockraising is profitable on the savannas and there are prosperous tea plantations at Ouro Preto.

The **São Francisco Valley,** in mid-course, has the form of a long narrow trench carved out between the mountains to the east and the plateaux to the west. The climate is dry and the rains become scarcer as the river flows northwards. Cotton-planting and stockraising are the principal local industries.

The great Eastern Region taken as a whole is one of the most prosperous in Brazil and includes within its limits the States of Bahia (cacau, tobacco, sugar, cotton, minerals and various industries); Espírito Santo (coffee and timber); Rio de Janeiro (fruit, cassava or manioc, coffee, rice, livestock, salt and principally industries); and Minas Gerais, with its numerous possibilities for the development of agriculture, stockraising and mining.

Oil has been found in Bahia and wells are already in production, initiating the petroleum industry in Brazil.

Rio de Janeiro, the great industrial and touristic centre, is also situated in this region.

MOST DENSELY POPULATED MUNICIPALITIES IN THE REGION

MUNICIPALITY	STATE	INHABITANTS
Rio de Janeiro	Federal District	1,576,000
Salvador (Bahia)	Bahia	294,000
Belo Horizonte	Minas Gerais	211,000
Campos	Rio de Janeiro	225,000

Diamond placer miners in Minas Gerais


SOUTHERN
REGION
FEDERATED UNITS AND WEALTH
Industries
Well-built modern cities
Coffee plantations
SÃO PAULO
PARANÁ
Table fruit
Cotton
ST. CATARINA
RIO GDE
DO SUL
Hydroelectric energy
Coal
Pine forests
Agriculture
Stock-raising

Bird's-eye view of the city of São Paulo

SOUTHERN REGION

The south of Brazil is the most highly developed and prosperous part of the country. The basic crops of coffee, cotton, wheat and various other cereals, constitute a great advance in the way of balanced agricultural economy.

The scenery contrasts with the mountainous landscapes of Eastern Brazil, and rolling plains predominate, with the following distinctive regions:

Along the **Seaboard** runs a level belt.

The **Alto da Serra** takes the form of a broad ledge sloping seaward.

The **Sedimentary Plateau** has the most enterprising and progressive population.

The **Western Plateau,** the largest of the three uplands, is covered with dense forests interspersed with savannas.

The **Region of the Southern Campinas,** or prairies, consists of rolling grasslands used for stockraising; it is the home of the Brazilian "Gaúcho".

The temperate climate of the southern plateaux makes this region admirably suited for living and working in, and its possibilities

are demonstrated by successful settlements created by the flow of immigrants.

The vegetation of pinewoods and open savannas, typical of the plateau region, is the most characteristic of the south of Brazil.

It is, indeed, one of the richest sections of the country and immigrants find health and a fertile soil there, enabling them to lay the foundations of a prosperous future.

Along the southern shores the sea is well stocked with fish. Shipping throngs the ports, among which Santos is outstanding as being the greatest coffee exporting centre in the world.

It is the region of the great plantations of coffee, cotton, rice, mint, tea, castor oil plants, tung, Indian corn (maize), etc.

The Brazilian wheat fields are also situated there, principally in the States of Rio Grande do Sul, Santa Catarina and Paraná.

Vines grow well and the wine industry is prosperous. Southern-grown fruit supplies a large section of the home market, São Paulo oranges and bananas being the most actively exported. Mattee tea comes from Paraná and Santa Catarina. The standing timber includes more than 200 million natural pine trees and provides for a number of thriving industries. All the coal of Brazil is mined in the south.

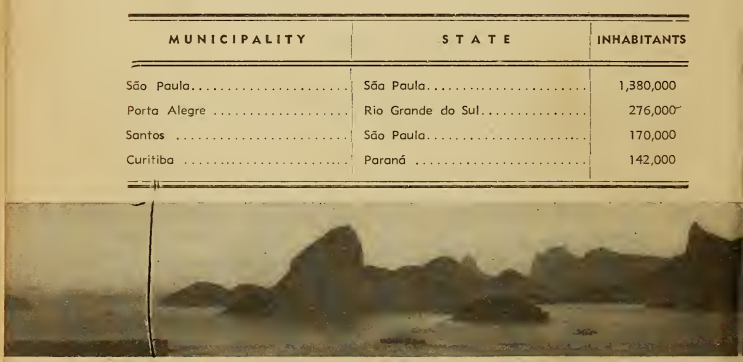
The packing-houses of São Paulo, Paraná and Rio Grande do Sul are another proof of the possibilities of stockraising on the grasslands.

Industry, principally in the State of São Paulo, is highly developed.

The greatest waterfalls in Brazil, the "Sete Quedas" ("Seven Falls") and the falls of Iguaçú, are situated on the western and southern borders of the State of Paraná.

MOST DENSELY POPULATED MUNICIPALITIES IN THE REGION

MUNICIPALITY	STATE	INHABITANTS
São Paula	São Paula	1,380,000
Porta Alegre	Rio Grande do Sul	276,000
Santos	São Paula	170,000
Curitiba	Paraná	142,000



Guanabara Bay, along whose shores stretch the Federal Capital, Ria de Janeira, and the State Capital, Niterói. In mid-distance, the Sugar Loaf and, jutting out on the right, Carcovada Hill


WEST CENTRAL
REGION
FEDERATED UNITS AND WEALTH
Sugar and alcohol industry
Hunting - Fishing - Skins
Ponning for gold
and precious stones
Ornamental birds
MATO
GROSSO
GOIAS
Rubber collector
Oil-beoring fruits
Rock crystal
Coffee
Tobacco
Rice and wheat
Navigoble rivers
Stock-raising

A picturesque meander of the River Paraguay in Mato Grosso

WEST CENTRAL REGION

The great West Central Region is characterized by vast tablelands covered with scrub savanna.

The climate is tropical with a rainy season and a dry season clearly marked.

There are three distinct subdivisions: the **Floodlands** or Pantanal, lowlands of the Paraguay Valley, flooded regularly every summer when the rains fall, but excellent grazing in winter; **Uplands rising from the west bank of the River Paraná,** comprising the southwest of Mato Grosso, southern Goiás and the Minas Gerais Panhandle; and the **Central Tablelands,** covering the north of Goiás and Mato Grosso.

Generally speking, the Region is very suitable for stockraising. In Goiás are to be found the largest deposits of rock crystal and nickel. The rivers are rich in diamonds and attract thousands of miners.

The coffee plantations of Goiás are prosperous and the results of experiments in wheat-growing on the tableland known as the "Chapada dos Veadores" are encouraging.

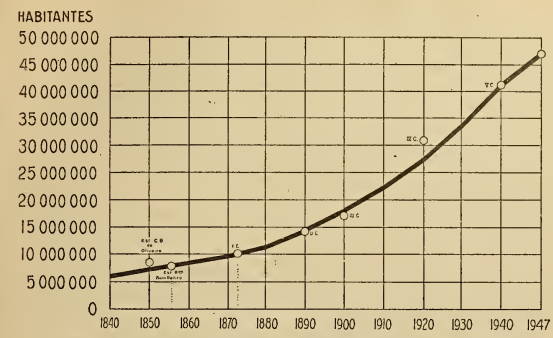
Rubber and ipecacuanha are collected in the north of Mato Grosso and in the south the hardwood quebracho is an extremely important source of tannin.

The West Central Regions bathed by the Upper Xingú and by the rapids and waterfalls of the Tapajós are almost deserted. It is here that the geometrical centre of Brazilian territory is situated.

MOST DENSELY POPULATED MUNICIPALITIES IN THE REGION

MUNICIPALITY	STATE	INHABITANTS
Cuiabá	Mato Grosso	54,000
Goiânia	Goiás	49,000
Goiás	Goiás	45,000
Anápolis	Goiás	40,000

The regional trading centre and river port of Cuiabá, Capital of Mato Grosso, date from colonial times



Growth of the Brazilian population during the past hundred years

DEMOGRAPHIC SITUATION

DEVELOPMENT OF THE POPULATION OF BRAZIL

In order to obtain a clear general view of demographic evolution in Brazil, it is necessary to bear in mind the following basic facts:

1. In the course of the last hundred years, the population of Brazil has risen from 7 to 47 million, which amounts to an increase of 40 million inhabitants.

2. More than nine tenths of this increase must be attributed to an excess of births over deaths, less than one tenth being due to an excess of immigrations over emigrations.

3. This high excess of births was obtained despite the high death rate, and owing to the much higher birth rate, which has dropped but little, even of recent years.

4. By reason of these characteristics of the growth of the population of Brazil, the composition of the latter is characterized by an approximate numerical balance between the two sexes, with a high proportion of children and young people and a low proportion of old people.

5. In consequence of the discontinuance of forced immigration and the development of spontaneous immigration, for the most part coming from Europe, the migratory increment during the period under consideration was chiefly to the advantage of the white race groups, whereas the black and brown race groups developed solely by natural increment, part of which, indeed, was attributed to the former, by the progressive extension of the term "white" to the products of interbreeding which were lighter in colour.

6. Immigration having fallen off during the last decade or so, the proportion of foreigners has dropped sharply and is now quite low for an immigration country.

RESULTS OF THE DEMOGRAPHIC CENSUS

According to the first Brazilian census, taken on 1st August, 1872, the number of inhabitants was reckoned at about 10,110,000.

Knowing the situation in 1872 and being able to determine, by approximate reckoning and with the aid of former estimates of the population, the variations of the latter in the course of the more recent of the previous ten-year periods, it is possible to fix the number of inhabitants at the end of 1846 at a tentative 6,800,000.

On 31st December, 1890, the second demographic census recorded 14,330,000 inhabitants. The general results of this census, like that of the preceding one, seem to be reliable.

On the contrary the results of the third census, taken on December 31, 1900, were quite a bit too low with a total of 17,320,000 inhabitants.

But owing perhaps to massive if wellmeaning corrections, the results of the fourth census, that of 1st September 1920, were an exaggeration in the other direction indicating that the population had risen to about 30,640,000.

Although it is very difficult to rectify, on a purely conjectural basis, data relating to past epochs, the real population by the date of the 1900 census may be estimated at about 18.2 million and that by the date of the 1920 census at 27.5 million.

The fifth census, taken on 1st September, 1940, recorded about 41,250,000 inhabitants; this may be considered accurate, except for the relatively unimportant omissions inevitable in this kind of survey.

Deficiencies in the statistics of civil register make it impossible to arrive at a close approximation of the development of the population of Brazil since the last census. Supposing this development to have continued at the average annual rate of increase calculated for the period 1890 to 1940, the number of inhabitants on 1st January, 1947, should be around 47,200,000. Employing a different method, the Technical Bureau of the National Census Service has arrived at very much the same result, estimating the number of inhabitants at this date at 47,100,000.

The present birth rate should be close on 43 per 1.000 inhabitants and the death rate 22 per 1,000. These rates are quite high compared with those in the majority of other countries.

Icarai Beach on the shores of Guanabara Bay, in the State of Rio de Janeiro

AREA AND POPULATION OF BRAZIL

(Area approved by Resolution No. 262 of 3rd February, 1947, of the Central Directorate of the National Council of Geography)

FEDERATED UNITS & REGIONS	AREA		POPULATION (3) (1st Sept., 1940)		DENSITY
	In sq. km. (0.3861 sq. miles)	Percentage of Brazil	Inhabitants	Percentage of Brazil	Per square km.
1. Guoparé	254,163	2.98	21,297	0.05	0.08
2. Acre	153,170	1.80	79,768	0.20	0.52
3. Amazonos	1,592,626	18.70	416,011	1.01	0.26
Amazonos-Pará (state line to be settled) (4)	3,192	0.04	—	—	—
4. Rio Branco	214,316	2.52	12,130	0.03	0.06
5. Pará	1,216,726	14.29	923,453	2.24	0.76
6. Amapá	137,419	1.61	21,191	0.05	0.15
Northern Region	**3,571,612**	**41.94**	**1,473,850**	**3.58**	**0.41**
7. Maranhãa	334,809	3.93	1,235,169	3.00	3.69
8. Piauí	249,317	2.93	817,601	1.98	3.28
9. Ceará	153,245	1.80	2,091,032	5.07	13.65
10. Rio Grande do Norte	53,048	0.62	768,018	1.86	14.48
11. Poroíba	56,282	0.66	1,422,282	3.45	25.27
12. Pernambuca	97,016	1.14	2,687,175	6.52	27.70
13. Alagaas	28,531	0.34	951,300	2.31	33.34
14. Fernanda de Noronha (1)	27	0.00	1,065	0.00	39.44
Northeastern Region	**972,275**	**11.42**	**9,973,642**	**24.19**	**10.26**
15. Sergipe	21,057	0.25	542,326	1.31	25.76
16. Bahio	563,762	6.62	3,918,112	9.50	6.95
17. Minas Gerais	581,975	6.83	6,736,416	16.34	11.58
Minas-E. Santo (state line to be settled)	10,137	0.12	66,994	0.16	6.61
18. Espírito Santa (2)	40,882	0.48	750,107	1.82	18.35
19. Ria de Janeira	42,588	0.50	1,847,857	4.48	43.39
20. Federal District	1,356	0.02	1,764,141	4.28	1,300.99
Eastern Region	**1,261,757**	**14.82**	**15,625,953**	**37.89**	**12.38**
21. São Paulo	247,223	2.90	7,180,316	17.41	29.04
22. Paraná	201,288	2.36	1,236,276	3.00	6.14
23. Santa Catorina	94,367	1.11	1,178,340	2.86	12.49
24. Ria Gronde do Sul	282,480	3.32	3,320,689	8.05	11.76
Southern Region	**825,358**	**9.69**	**12,915,621**	**31.32**	**15.65**
25. Mato Grosso	1,262,572	14.82	420,835	1.02	0.33
26. Gaiás	622,463	7.31	826,414	2.00	1.33
West Central Region	**1,885,035**	**22.13**	**1,247,249**	**3.02**	**0.66**
BRAZIL	**8,516,037**	**100.00**	**41,236,315**	**100.00**	**4.84**

AREAS:

(1) Includes the Racks of Sãa Pedra and Sãa Paulo and the Atol das Rocas.
(2) Includes the areas of the Islands af Trindade and Martim Vaz.
N.B. The areas mentianed in footnotes (1) and (2) are only included so as to simplify their insertion in the table.

POPULATION:

(3) General Census af Brazil (1st September, 1940). Synapsis af the Demographic Census af the I.B.G.E. National Census Commission, with the alterations in the States in which the new Territories originated.
(4) The population af this area was attributed, by the Census af 1st September, 1940, to the State af Amazonas.

ESTIMATES OF THE POPULATION OF THE PHYSIOGRAPHICAL REGIONS AND UNITS OF THE FEDERATION ACCORDING TO THE TERRITORIAL DIVISION OF 1947

FEDERATED UNITS & REGIONS	ESTIMATED POPULATION on 31st September			
	1940	1944	1947	1950
Northern Region	**1,497,354**	**1,626,621**	**1,723,572**	**1,820,523**
Guaporé	21,455	23,307	24,696	26,085
Acre	80,633	87,593	92,814	98,035
Amazonas	428,214	465,182	492,908	520,635
Rio Branco	12,171	13,222	14,010	14,798
Pará	933,091	1,013,645	1,074,062	1,134,477
Amapá	21,790	23,672	25,082	26,493
Northeastern Region	**10,081,726**	**10,952,091**	**11,604,864**	**12,257,638**
Maranhão	1,248,555	1,356,343	1,437,185	1,518,027
Piauí	826,461	897,811	951,322	1,004,834
Ceará	2,113,693	2,296,169	2,433,027	2,569,885
Rio Grande do Norte	776,341	843,363	893,630	943,897
Paraíba	1,437,695	1,561,813	1,654,901	1,747,989
Pernambuco	2,716,285	2,950,785	3,126,660	3,302,533
Alagoas	961,609	1,044,626	1,106,888	1,169,151
Fernando de Noronha	1,087	1,181	1,251	1,322
Eastern Region	**15,795,291**	**17,158,913**	**18,181,630**	**19,204,346**
Sergipe	548,203	595,530	631,025	666,520
Bahia	3,960,573	4,302,492	4,558,933	4,815,372
Minas Gerais	6,809,418	7,397,282	7,838,179	8,279,077
(Serra dos Aimorés) *	67,720	73,567	77,951	82,336
Espírito Santo	758,236	823,695	872,790	921,884
Rio de Janeiro	1,867,882	2,029,138	2,150,080	2,271,022
Federal District	1,783,259	1,937,209	2,052,672	2,168,135
Southern Region	**13,064,863**	**14,192,765**	**15,038,692**	**15,884,618**
São Paulo	7,267,405	7,894,807	8,365,359	8,835,910
Paraná	1,249,673	1,357,559	1,438,473	1,519,387
Santa Catarina	1,191,110	1,293,939	1,371,061	1,448,184
Rio Grande do Sul	3,356,675	3,646,460	3,863,799	4,081,137
West Central Region	**1,260,766**	**1,369,610**	**1,451,242**	**1,532,875**
Mato Grosso	425,396	462,122	489,665	517,209
Goiás	835,370	907,488	961,577	1,015,666
BRAZIL	**41,700,000**	**45,300,000**	**48,000,000**	**50,700,000**

* Territory disputed by the States of Minas Gerais and Espírito Santo.

N.B. The calculation of the above table was based on the hypothesis of a constant annual population increase of 900,000 inhabitants, starting from the estimated figures: 41,400,000 (rather more than that obtained in the Census of 1st September, 1940, to take care of possible omissions in the demographic census) and, then, 41,700,000 on 31st December of the same year.

CITIES WITH A POPULATION OF OVER 10,000 INHABITANTS
(General Census of 1940)

In Geographical Order of States and Alphabetical Order of Names

CITIES	Actual population
AMAZONAS	
Manaus	66,854
PARÁ	
Belém	164,673
MARANHÃO	
São Luiz	58,735
PIAUI	
Parnaíba	22,176
Teresina	34,695
CEARÁ	
Crato	11,233
Fortaleza	140,901
Juázeiro (Juázeiro do Norte)	23,490
Sobral	13,533
RIO GRANDE DO NORTE	
Mossoró	13,374
Natal	51,479
PARAÍBA	
Campina Grande	33,818
João Pessoa	71,158
Santa Rita	10,805
PERNAMBUCO	
Caruarú	24,264
Garanhuns	16,279
Jaboatão	13,060
Limoeiro	12,493
Olinda	31,666
Paulista	12,843
Recife	323,177
Vitória (Vitória de Santo Antão)	12,435
ALAGOAS	
Maceió	80,045
Penedo	12,651
SERGIPE	
Aracajú	50,306
Estância	10,324
Propriá	10,314
BAHIA	
Alagoinhas	13,317
Cachoeira	10,374
Feira de Santana	14,131
Ilhéus	15,566
Itabuna	15,712
Jiquié	13,268
Juázeiro	10,831
Nazaré	13,382
Salvador	290,443
Santo Amaro	10,929
MINAS GERAIS	
Araguari	15,974
Araxá	10,040
Barbacena	19,238
Belo Horizonte	177,004
Conselheiro Lafaiete	14,352
Itajubá	14,704
Juiz de Fora	70,849
Lavras	11,075
Montes Claros	13,768
Nova Lima	16,321
Passos	11,336
Poços de Caldas	13,751
Ponte Nova	11,707
Pouso Alegre	11,582
São João del Rei	22,551
Sete Lagoas	10,537
Teófilo Otoni	11,968
Ubá	10,911
Uberaba	31,259
Uberlândia	21,530
Varginha	10,954
ESPIRITO SANTO	
Cachoeiro de Itapemirim	18,812
Vitória	42,098
RIO DE JANEIRO	
Barra do Piraí	14,846
Campos	51,663
Entre Rios (Três Rios)	10,285
Niterói	124,507
Nova Friburgo	16,041
Nova Iguaçú	20,598
Petrópolis	46,361
Valença (Marquês de Valença)	10,614

CITIES WITH A POPULATION OF OVER 10,000 INHABITANTS

(General Census of 1940)

In Geographical Order of States and Alphabetical Order of Names

CITIES	Actual population
FEDERAL DISTRICT	
Ria de Janeira	1,519,010
SÃO PÁULO	
Araçatuba	16,903
Araraquara	27,724
Avaré	10,382
Barretos	16,960
Bauru	32,796
Bebedouro	11,632
Botucatu	19,301
Bragança (Bragança Paulista)	12,757
Campinas	77,779
Catanduva	17,028
Cruzeira	11,618
Franca	20,568
Guaratinguetá	15,395
Itapetininga	12,786
Itu	13,729
Jabaticabal	11,592
Jacareí	11,797
Jaú	18,201
Jundiaí	29,532
Limeira	17,241
Lins	16,897
Lorena	10,040
Marília	24,473
Magi das Cruzes	14,359
Piracicaba	31,923
Pirassununga	10,050
Presidente Prudente	12,637
Ribeirão Preto	46,946
Rio Clara	23,322
Rio Preta (São José da Rio Preto)	23,972
Santo André	62,440
Santos	155,894
São Carlos	24,366
São Joãa c'a Boa Vista	12,071
São José dos Campos	13,491
São Paulo	1,258,482
São Vicente	12,983
Soracaba	48,111
Tatuí	10,347
Taubaté	27,548
PARANÁ	
Curitiba	99,440
Londrina	10,531
Paranaguá	12,930
Ponta Grassa	29,360
SANTA CATARINA	
Blumenau	13,652
Florianópalis	25,014
Itajaí	13,239
Joinvile	16,724
São Francisca (São Francisco do Sul)	10,192
RIO GRANDE DO SUL	
Alegrete	16,227
Bagé	31,349
Cachaeira (Cachoeira do Sul)	17,565
Canôas	11,463
Caxias (Caxias do Sul)	17,180
Cruz Alta	16,028
Dam Pedrito	10,030
Jaguarão	10,660
Livramenta	26,623
Nava Hamburga	12,954
Passa Fundo	17,207
Pelotas	61,985
Pôrta Alegre	259,246
Rio Grande	49,337
Santa Maria	39,074
São Gabriel	12,288
São Leopaldo	13,876
Uruguaiana	21,365
MATO GROSSO	
Campo Grande	23,054
Corumbá	13,319
Cuiabá	18,861
GOIÁS	
Goiânia	14,943

NOTES: 1. The cities are arranged in alphabetical order according to their nomenclature in 1940; where the name of a city has been changed since then, the present name is given in brackets.

2. The data af the table include the papulatian figuring in the urban and suburban lists of the districts of municipal seats (see page 26).

CITIES WITH A POPULATION OF OVER 10,000 INHABITANTS

Distribution in order of Size

CATEGORIES	Number of cities	Actual population
From 10,000 to 12,499 inhabitants	35	385,440
" 12,500 " 14,999 "	28	378,635
" 15,000 " 19,999 "	23	391,661
" 20,000 " 29,999 "	19	461,530
" 30,000 " 49,999 "	13	499,433
" 50,000 " 99,999 "	12	802,733
" 100,000 " 199,999 "	5	762,979
" 200,000 " 999,999 "	3	872,866
1,000,000 inhabitants and more	2	2,777,492
10,000 " " "	140	7,332,769

AGE AND NATIONALITY

The composition by age is determined principally by the natural factors of the movement of population, the migratory factor exerting a purely secondary influence.

The percentage composition in large age groups is as follows: 52.79% up to and including 19 years of age, 30.42% from 20 to 39, 13.44% from 40 to 59, and only 3.35% over 60.

As regards nationality the population breaks down into 96.59% Brazilians born, 0.30% naturalized Brazilians and 3.11% foreigners.

In 1940, the predominant foreign nationalities were: Portuguese: 27.59%, Italian: 22.20%, Spanish: 11.53%, Japanese: 10.98%, German: 5.50%, followed by others in smaller proportions, **e.g.** Syrian and Lebanese, Polish, Soviet Russian, etc.

European settlers in Santa Catarina

Martinelli Building, São Paulo

FOREIGNERS IN BRAZIL

Numbers, nationality and sex, according to the 1940 census

NATIONALITIES	FOREIGNERS		
	Male	Female	Male & Female
NORTH AND CENTRAL AMERICA	**3,022**	**2,584**	**5,606**
Canadian	112	106	218
Cuban	117	118	235
Dominican	21	11	32
Haitian	8	8	16
Mexican	93	116	209
Nicaraguan, Costa Rican, Guatemalan, Honduran and Salvadoran	45	33	78
North American	2,486	2,056	4,542
Panamanian	17	7	24
Nationalities corresponding to countries under British sovereignty	94	94	188
Nationalities corresponding to countries under Danish, French and Dutch sovereignties	16	9	25
Nationalities corresponding to countries under North American sovereignty	13	26	39
SOUTH AMERICA	**31,222**	**29,675**	**60,897**
Argentine	7,856	8,478	16,334
Bolivian	2,156	2,271	4,427
Chilean	258	231	489
Colombian	221	115	336
Equadorian	32	17	49
Paraguayan	7,970	6,149	14,119
Peruvian	1,299	1,207	2,506
Uruguayan	10,924	10,820	21,744
Venezuelan	342	266	608
Nationalities corresponding to countries under British sovereignty	114	83	197
Nationalities corresponding to countries under French and Dutch sovereignties	50	38	88
EUROPE	**565,824**	**458,160**	**1,023,984**
Albanian	19	23	42
Belgian and Luxemburg	651	800	1,451
British	3,141	2,499	5,640
Bulgarian	266	285	551
Czechoslovakian	1,043	848	1,891
Danish	391	244	635
Dutch	1,247	644	1,891
Estonian and Lettish	1,926	2,112	4,038
Finnish	110	78	188
French	2,703	4,527	7,230
German and Danzig	47,829	41,209	89,038
Greek	539	312	851
Hungarian	6,545	6,296	12,841
Icelandic	6	9	15
Irish	53	69	122
Italian	146,907	138,217	285,124
Lithuanian	8,097	7,290	15,387
Norwegian	184	93	277
Polish	20,981	20,058	41,039
Portuguese	218,901	135,441	354,342
Rumanian	6,865	6,860	13,725
Russian	13,002	12,604	25,606
Spanish and Andorran	76,950	70,964	147,914
Swedish	368	338	706
Swiss and Liechtenstein	2,241	1,645	3,886
Yugoslavian, Montenegrin and Serbian	4,859	4,695	9,554

FOREIGNERS IN BRAZIL

Numbers, nationality and sex, according to the 1940 census

NATIONALITIES	FOREIGNERS		
	Male	Female	Male & Female
ASIA	**108,076**	**83,526**	**191,602**
Chinese	587	59	646
Japanese	77,200	63,493	140,693
Persian	38	12	50
Russian	738	657	1,395
Syrion, Lebanese, Palestine, Iraqi and Arabian	27,689	18,104	45,793
Turkish	1,670	1,138	2,808
Indion and nationalities corresponding to countries under British sovereignty	65	15	80
Nationalities corresponding to countries under French sovereignty	19	6	25
Nationalities corresponding to countries under Dutch sovereignty	7	13	20
Nationalities corresponding to countries under Portuguese sovereignty	13	6	19
Other nationalities	50	23	73
AFRICA	**628**	**544**	**1,172**
Egyptian	183	186	369
South Africon and nationalities corresponding to countries under British sovereignty	18	22	40
Nationalities corresponding to countries under Belgian sovereignty	9	7	16
Nationalities corresponding to countries under Spanish sovereignty	37	30	67
Nationalities corresponding to countries under French sovereignty	113	70	183
Nationalities corresponding to countries under Italian sovereignty	61	31	92
Nationalities corresponding to countries under Portuguese sovereignty	37	28	65
Other nationalities	170	170	340
OCEANIA	**55**	**44**	**99**
Australian	49	35	84
New Zealand	4	6	10
Other nationalities	2	3	5
UNDECLARED NATIONALITIES	**249**	**224**	**473**
TOTAL	**709,076**	**574,757**	**1,283,833**

Typical landscape along the southern seaboard of Brazil

RELIGION

The Brazilian population is largely Roman Catholic (95.01%), with a minority of Orthodox (0.09%) and Protestants (2.61%).

Altogether the Christian religions cover 97.71% of the inhabitants of Brazil.

The largest non-Christian congregations are the Buddhists (0.30%) and the Jewish Church (0.13%). All the rest, grouped together, amount to a bare 0.28% of the population.

ECONOMIC ACTIVITIES OF THE POPULATION

The branch employing the majority of the Brazilian male population over 10 years of age comprises crop-growing and stockraising activities (56.69%), with the result that agricultural production, with the packing and processing of food products, plays an important role in the economy of the country.

The development of the natural resources of the soil and subsoil included in the vegetable, animal and mineral extractive industries accounts for 2.39%.

Manufacturing industries employ 7.67% of the population, while business and trade, including banking, provide a livelihood for 5.17%.

Social services, among which the statistics classify activities of a mixed commercial, industrial and personal nature, such as innkeeping and catering, dressmaking and tailoring, upkeep and repairs, personal hygiene, etc., occupy 3.20% of the male population 10 years of age and over.

Transportation and communication is a branch that stands at 3.19% of the population under consideration.

Public administration and activities in connection with justice and public education provide for 1.58%, as compared with 1.18% coming under the general heading of home defense and police.

A bare 0.55% are engaged in the liberal professions, private teaching, private administration and religious duties.

In all, 81.62% of the male Brazilian population 10 years of age and over are occupied in activities outside the scope of domesticity, while 73.45% of the same female age groups devote their energies to domestic and scholastic activities.

DISTRIBUTION OF MANPOWER

(10 years of age and over)

According to Branches and Classes of Principal Activity

BRANCHES AND CLASSES OF ACTIVITY	NUMBERS OF PERSONS ENGAGED IN THE ACTIVITIES SPECIFIED		
	Male	Female	Male & Female
I. Agriculture, Stockraising, Forestry	**8,183,313**	**1,270,199**	**9,453,512**
1. Administration of agricultural establishments	35,098	8,019	43,117
2. Agriculture in general	7,784,674	1,231,180	9,015,854
3. Market gardening and flowers	64,742	7,598	72,340
4. Fruit-growing	16,086	832	16,918
5. Forestry	855	569	1,424
6. Stockraising	233,422	11,376	244,798
7. Breeding of small animals and poultry farming	1,345	215	1,560
8. Beekeeping	1,102	354	1,456
9. Processing of crop products	18,058	7,023	35,081
10. Processing of livestock products	798	97	895
11. Other agricultural activities (crops and livestock)	19,569	2,336	21,905
12. Miscellaneous agricultural activities (crops and livestock)	7,564	600	8,164
II. Extractive industries	**345,202**	**45,358**	**390,560**
1. Mining and processing of metallic and non-metallic ores	41,645	2,102	43,747
2. Working of saltmarshes and mineral water springs	7,068	984	8,052
3. Quarrying and cutting of stone and other building materials	14,485	408	14,893
4. Prospection, panning and placer mining	50,249	1,438	51,687
5. Lumbering	32,284	516	32,800
6. Charcoal-burning	14,230	680	14,910
7. Gathering and separation of vegetable fibres	3,415	1,300	4,715
8. Gathering of oil-bearing seeds	10,547	25,400	35,947
9. Collection of rubber, gums, resins, waxes and cognate raw materials	75,438	9,539	84,977
10. Gathering of forest products: foodstuffs, medicines and toxics	6,821	1,613	8,434
11. Hunting	2,253	96	2,339
12. Fishing	86,769	1,282	88,049
III. Manufacturing industries	**1,107,371**	**292,685**	**1,400,056**
1. Metallurgical and mechanical industries (smelting, rolling, casting, tooling, fitting, etc.)	150,506	3,044	153,550
2. Manufacturing from non-metallic mineral raw materials	68,963	9,203	78,166
3. Manufacturing from vegetable raw materials	177,538	18,164	195,702
4. Manufacturing from animal raw materials	24,681	1,343	26,024
5. Chemical and pharmaceutical industries	23,701	8,526	32,227
6. Textile industries	101,218	189,080	290,298
7. Garments, boots and shoes, cosmetics and toilet articles (manufacturing)	43,002	19,670	62,672
8. Food products, beverages & stimulants (manufacturing)	156,891	31,329	188,220

DISTRIBUTION OF MANPOWER

(10 years of age and over)

According to Branches and Classes of Principal Activity

BRANCHES AND CLASSES OF ACTIVITY	NUMBERS OF PERSONS ENGAGED IN THE ACTIVITIES SPECIFIED		
	Male	Female	Male & Female
9. Building trades	261,056	1,624	262,700
10. Production and distribution of gas, light and power, and refrigeration (cold storage)	37,050	797	37,847
11. Printing	27,099	2,679	29,778
12. Miscellaneous industrial activities not included in the foregoing classes or unspecified	35,666	7,206	42,872
	698,202	**50,941**	**749,143**
IV. Wholesale and retail trades			
1. Agricultural products (crops and livestock). Raw materials. Fuels and lubricants	29,879	1,209	31,088
2. Food products, beverages & stimulants	165,294	8,405	173,699
3. Textiles and cognate products. Garments, boots and shoes, cosmetics and toilet articles	50,802	6,225	57,027
4. Furniture and upholstery	4,904	801	5,705
5. Crockery and hardware. Building materials. Metallurgical products	11,424	501	11,925
6. Chemicals, pharmaceuticals and cognate products	23,829	2,932	26,761
7. Paper, stationery and office supplies	6,305	849	7,154
8. Machinery, apparatus and instruments. Electric equipment. Vehicles and accessories	14,096	672	14,768
9. Miscellaneous trading activities not included in the foregoing activities or unspecified	240,590	15,980	256,570
10. Hawking, peddling and local marketing	70,880	3,350	74,230
11. Auxiliary activities in connection with the wholesale and resale trades	53,482	6,223	59,705
12. Warehousing and central marketing	26,717	3,794	30,511
V. Real estate and stockbroking. Banking. Insurance and capitalization	**48,229**	**3,548**	**51,777**
1. Real estate business	1,772	95	1,867
2. Stockbroking and money exchange	2,857	281	3,138
3. Banks and banking houses	21,661	1,429	23,090
4. Savings banks, popular banks, loan offices and friendly societies	2,113	418	2,531
5. Private insurance	5,226	654	5,880
6. Capitalization	762	112	874
7. Auxiliary activities in connection with real estate and stockbroking	1,320	75	1,395
8. Miscellaneous activities not included in the foregoing classes or unspecified	12,518	484	13,002

DISTRIBUTION OF MANPOWER

(10 years of age and over)

According to Branches and Classes of Principal Activity

BRANCHES AND CLASSES OF ACTIVITY	NUMBERS OF PERSONS ENGAGED IN THE ACTIVITIES SPECIFIED		
	Male	Female	Male & Female
VI. Transportation and communication	**459,758**	**13,918**	**473,676**
1. Animal transport	69,126	428	69,554
2. Motor (automobile) transport	88,359	527	88,886
3. Tramcar (streetcar) services	19,320	339	19,659
4. Railway (railroad) services	154,745	2,295	157,040
5. Miscellaneous activities connected with land transport	7,343	137	7,580
6. Ocean, river and lake shipping	55,096	444	55,540
7. Port, harbour and dock services	33,731	227	33,958
8. Air transport, ground crews and airport services	4,045	101	4,146
9. Postal and telegraph services	19,240	4,493	23,723
10. Telephone service	5,648	4,724	10,372
11. Radio (wireless) communications	983	147	1,130
12. Unspecified activities in connection with transportation and communication	2,132	56	2,188
VII. Public administration. Justice. Public education	**227,341**	**83,385**	**310,726**
1. Federal public administration	56,754	6,458	63,212
2. State public administration	46,072	7,070	53,142
3. Municipal public administration	78,307	4,927	83,234
4. Administration of state-owned undertakings and autarchies	4,729	888	5,617
5. Ill-defined or unspecified activities in connection with public administration	8,092	1,150	9,243
6. Offices of notaries public and clerks	9,936	1,131	11,057
7. The Judiciary (including Supreme Court Justices, Justices of Appeal, special judges and magistrates, officers of the "Public Ministry" equivalent to the French "parquet", etc.)	6,080	315	6,395
8. Other activities in connection with the administration of justice	1,283	224	1,507
9. Diplomatic and consular representation abroad	1,104	340	1,444
10. Public education: management and teaching staff	10,616	57,656	68,272
11. Other activities in connection with public education	4,368	3,226	7,594
VIII. Home defense. Police and public safety	**170,827**	**1,385**	**172,212**
1. Army	78,622	481	79,103
2. Military air force	2,349	123	2,482
3. Navy	19,346	107	19,453
4. Naval air force	1,955	16	1,971
5. Military police	40,713	119	40,832
6. Civil police	16,591	284	16,875
7. Other organizations for public safety maintained by the government	4,765	45	4,810

DISTRIBUTION OF MANPOWER

(10 years of age and over)

According to Branches and Classes of Principal Activity

BRANCHES AND CLASSES OF ACTIVITY	NUMBERS OF PERSONS ENGAGED IN THE ACTIVITIES SPECIFIED		
	Male	Female	Male & Female
8. Organizations of watchmen or guards maintained by private undertakings	1,346	34	1,380
9. Fire brigades (fire companies)	3,730	8	3,738
10. Other activities in connection with home defense, police and public safety not included in the foregoing classes or unspecified	1,410	158	1,568
IX. **Clergy. Private education. Liberal professions. Private administration**	**78,731**	**39,956**	**118,687**
1. Clergy and regular religious organizations belonging to the various cults	7,076	2,010	9,086
2. Other activities in connection with religious cults	2,216	1,317	3,533
3. Private education: management and teaching staff	10,124	22,078	32,202
4. Other activities in connection with private education	3,942	5,550	9,492
5. Bar (legal profession) and auxiliary activities	9,086	220	9,306
6. Engineering, architecture, agronomy, industrial chemistry and corresponding auxiliary activities	4,040	149	4,189
7. Medicine, veterinary medicine, dentistry and corresponding auxiliary activities	27,417	6,771	34,188
8. Science and auxiliary activities	279	78	357
9. Art and auxiliary activities	3,317	678	3,995
10. Writing, journalism and auxiliary activities	5,887	460	6,347
11. Economics, finance and auxiliary activities	3,184	344	3,528
12. Estate administration. Other activities in connection with private administration	2,163	301	2,464
X. **Social services and activities**	**461,620**	**438,153**	**899,774**
1. Board, lodging and catering services	65,918	15,214	81,132
2. Personal hygiene services	47,556	4,278	51,834
3. Services of upkeep and repair of lodgings and articles of private use	105,338	2,379	107,717
4. Services of making, upkeep and repair of articles of personal use	131,548	386,057	517,605
5. Human transport, carriage and delivery services	26,024	484	26,508
6. Public amusements and shows. Radio broadcasting	17,064	3,590	20,654
7. Sports and athletics	2,920	220	3,140
8. Other activities in connection with the foregoing services	15,642	1,329	16,971
9. Urban supplies and improvements	16,080	670	16,750
10. Medical and sanitary assistance	25,438	18,308	43,746
11. Relief, welfare and charity. Social security. Trade guilds or unions ("sindicatos profissionais")	7,092	5,345	12,437

DISTRIBUTION OF MANPOWER

(10 years of age and over)

According to Branches and Classes of Principal Activity

BRANCHES AND CLASSES OF ACTIVITY	NUMBERS OF PERSONS ENGAGED IN THE ACTIVITIES SPECIFIED		
	Male	Female	Male & Female
12. Sociol ond culturol octivities. Other activities of a collective or sociol noture	1,001	279	1,280
XI. **Domestic activities. Schalastic activities**	**1,184,239**	**10,725,275**	**11,909,514**
1. Unremuneroted domestic octivities in the home	70,995	9,232,500	9,303,495
2. Remuneroted domestic services	37,494	520,100	557,294
3. Porter (jonitor) ond lift (elevotor) services	3,058	340	3,388
4. Domestic services in connection with gordening ond the like	11,200	974	12,174
5. Domestic services in connection with the upkeep ond driving of meons of tronsport	12,814	546	13,360
6. Nursing ond teoching octivities in the home	3,100	9,285	12,385
7. Other remuneroted domestic activities	20,389	17,872	38,261
8. Scholostic octivities (schoolchildren and students)	1,025,489	943,658	1,969,147
XII. **Activities not included in the other branches. Conditians of inactivity. Activities or conditions ill-defined or undeclared**	**1,469,777**	**1,638,435**	**3,108,212**
1. Activities not included in the other bronches	31,004	6,060	37,064
2. Holders of pensions of vorious kinds (civil, military, retirement, disobility, etc.)	34,266	5,141	39,407
3. Involids	11,937	10,026	21,963
4. Persons inoctive owing to physico[1] defects	3,915	2,229	6,144
5. Lunotics	13,029	9,783	22,812
6. Prisoners (serving time or owoiting judgment)	11,767	309	12,076
7. Inoctive from lock of occupotion	30,708	6,932	37,604
8. Copitolists or property-owners	9,416	1,861	11,277
9. Other conditions not included in the foregoing classes	10,756	22,750	33,506
10. Ill-defined octivities or conditions	59,614	4,925	64,539
11. Undeclored octivity or condition of members of noturol fomilies	1,135,468	1,410,986	2,546,454
12. Undeclored octivity or condition of other persons	117,897	157,433	275,330
TOTAL	**14,434,611**	**14,603,238**	**29,037,849**

PROPORTIONAL DISTRIBUTION OF MANPOWER

Number of persons, 10 years of age and over, occupied in the various branches of principal activity, per 1,000,000 inhabitants of all ages

BRANCHES OF ACTIVITY	NUMBERS OF PERSONS PER 1,000,000 INHABITANTS OCCUPIED IN THE BRANCHES OF ACTIVITY SPECIFIED		
	Male	Female	Male & Female
I. Agriculture. Stackraising. Forestry	198,449	30,803	229,252
II. Extractive industries	8,371	1,100	9,471
III. Manufacturing industries	26,854	7,098	33,952
IV. Whalesale and retail trades	16,932	1,235	18,167
V. Real estate and stackbraking. Banking. Insurance and capitalization	1,170	86	1,256
VI. Transpartatian and communicatian	11,149	338	11,487
VII. Public administratian. Justice. Public educatian	5,513	2,022	7,535
VIII. Hame defense. Palice and public safety	4,143	33	4,176
IX. Clergy. Private educatian. Liberal prafessians. Private administratian	1,909	969	2,878
X. Social services and activities	11,195	10,625	21,820
XI. Damestic activities. Schalastic activities	28,718	260,093	280,811
XII. Activities nat included in the ather branches and canditians af inactivity. Activities ar canditians ill-defined or undeclared	35,643	39,723	75,376
TOTAL	**350,046**	**354,135**	**704,181**

UNEMPLOYMENT

Unemployment of either men or women is scarcely a problem for the Brazilian government, for there is a lack of manpower in nearly all the branches of economic activity in the country.

IMMIGRATION

HISTORICAL SURVEY OF IMMIGRATION INTO BRAZIL

Discovered in 1500, Brazil was colonized almost exclusively by the Portuguese up to 1808, for during these three centuries Portugal kept the ports of her new colony all but closed to foreign shipping. Although it is true that at certain points a foreign inflow, contributed by the Dutch, the French and the Spanish, helped to people the new land, from a historical point of view these movements cannot be considered migratory for they were little more than sporadic incursions bearing all the marks of an invasion and as such instable and without much influence on the breeding of new strains from the native population.

The Dutch alone, settling on the northeast for about thirty years in the role of conquerors, may be credited with some achievements in this direction, but here again the drift was cultural rather than racial, and failed to establish any closer contact or more continuous interbreeding with the inhabitants of the colony. This is apparent from the slight hereditary increment left to the race by their passage, for a study of the population of this region shows that only a negligible proportion can presumably be considered to be of Dutch stock. Even so, it must be assumed that the elements born in Brazil from this stock, for the most part belonging to families whose Dutch names have become deformed, e.g. Lintz to Lins, Van der Ley to Vanderlei, etc., descend from Dutch couples that had definitively taken up their abode in the country, interbreeding with the natives only arising in subsequent generations.

Historically, it is only in 1808 that immigration to Brazil was initiated with the opening of the ports to foreign shipping, consequent to the advance in status from colony to kingdom, ordained by Dom John VI as his first act when the Portuguese court was transferred to Rio de Janeiro in view of the menacing invasion of Portugal by the troops of Napoleon. It is estimated that this transplantation of the Portuguese court brought about the shift, in 1808 alone, of some 50,000 souls to the new capital, most of them privileged members of the aristocracy, governing and upper middle classes of Portugal, who made haste to carry off to Brazil all their possessions and in fact everything of value endangered by the advancing tide of Junot's French troops. Since this contingent was of purely Portuguese origin and Brazil remained under Portuguese rule, the shift operated like an internal transcontinental migration, for the mass merely travelled from the seat of a kingdom to one of its oversea dominions.

Thus the records of 1818 are the first to reveal the interest of Dom John VI in paving the way for European agricultural workers, other than those of Portuguese origin, to swell the population of the colony, now a kingdom in its own right, for several royal charters dating from this year deal with the settlement of 100 Swiss families on the land of the municipality of Cantagalo in what is now the State of Rio de Janeiro.

The data available to the student of Brazilian immigration, since they must be compiled from a number of scattered documents such as official reports to the imperial Crown and to various governments of the Republic, cannot be considered as exact statistics, but at least the coming of these 100 Swiss families is officially recognized to be the starting-point of European immigration into the country. Though

Swiss immigration began under the best of auspices with the arrival of 1,682 colonists in 1820, this movement failed to develop as might have been expected and was indeed arrested for fifteen years, only getting sluggishly under weigh again with the landing of 17 new settlers in 1846. Another sporadic increase is to be noted in 1854 when the entry of 604 more immigrants is recorded, but to this day the initial rhythm has never been resumed.

Almost at the same time as the arrival of the Swiss came the onset of German immigration, which progressed until it weighed heaviest in the balance during the first years of Brazil's political emancipation. Though the first levy only landed in 1828, by 1850 about 7,000 Germans had entered the country, forming a majority among the foreign settlers since the acquisition of political independence. Considering that the Portuguese influx, traditionally the source of manpower, failed to exceed 930 souls during this period, the volume of German immigration may seem surprising, but it should be remembered that a natural atmosphere of hostility surrounded the former rulers of a country that had but recently thrown off the yoke of three centuries.

However, by 1850 these deep-rooted susceptibilities had died down enabling Portuguese immigration to be resumed on a large scale with a total of 68,918 entries recorded for the ten-year period from 1851 to 1860; this proved to be the start of a progressive movement that reached its zenith in 1911-1920 with 321,507 entries. For the hundred and twenty years covered by official statistics (1820-1940), the number of Portuguese immigrants into Brazil totalled 1,437,667 and this is the most significant contribution to the peopling of Brazil, barely surpassed by the influx of Italians which amounted to 1,508,692. It should be pointed out that, despite the impressive preponderance of German immigrants at the beginning of this period, the proportions were not sustained and the German total of 231,476 has been exceeded by that of the Spaniards who figure fourth place with 459,851 entries.

In the course of the ten-year period 1881-1890, the progressive increase of immigration into Brazil gathered force from the fact that the abolition of slave labour (1888) brought about the necessity of attracting foreign manpower to meet the requirements of agriculture and the nascent development of industry. During this period 525,086 immigrants entered Brazil, surpassing the total of all the ten-year periods since 1820. Thenceforth the rate of increase in each ten-year period was above 100% as may be seen from the following series: 1881-1890: 525,086; 1891-1900: 1,129,315; 1901-1910: 1,790,059, reaching its apogee in the peak period of 1901-1910, though the highest annual total was recorded during the previous period, 215,239 being the figure for 1891.

Not only did the abolition of slavery coincide historically with the sharp upward trend of immigration, but it also determined the nature of the activities available and hence the type and nationality of the prospective immigrant. Up till then the inflow had been directed almost exclusively toward the towns and incorporated in the urban population of the Atlantic seaboard, with the sporadic exception of the Swiss and German small farmers who settled on the land in the State of Rio de Janeiro and in the three southern States. When slavery was done away with, the necessity immediately arose of recruiting agricultural wage-earners, particularly for coffee-growing, and this work offered few attractions for the German and Swiss immigrants, accustomed to a very high standard of living and unadaptable to the condition of hired labourer on the coffee plantations.

These circumstances explain why, despite every effort made by the Union and State governments in the way of granting free passages

to immigrants and distributing a wealth of propaganda in Europe, the opportunities offered only appealed strongly to Italian, Portuguese, Spanish and later Japanese labourers, better fitted to adapt themselves not only to climatic conditions but also to wage levels.

When the policy of free ocean transportation was finally abandoned, the rate of immigration fell off considerably and in the following decade, 1911-1920, only 302,986 entries were recorded, though this decline must also be attributed to some extent to the war in Europe and to the difficulties opposed to any movement of population.

From 1930 on, immigration restrictions began to appear in Brazilian legislation but at first they were confined to third class passengers, only acquiring a general character with the adoption of the Constitution of 1934, which provided for a quota system based on 2% of the total entries corresponding to each nationality in the course of the fifty years from 1883 to 1934.

The change in policy was motivated especially by the alarming increase in the Japanese influx which started in the 1901-1910 period with 1,809 immigrants, rapidly rising in the following decades to 27,497 and 71,347 and, though checked, still standing at 86,414 in 1931-1940. This indicated an unprecedented rate of growth as compared with the traditional currents of immigration and brought a new problem to the country, in view of the difficulty of assimilating the newcomers who showed a marked preference for settling in the State of São Paulo.

The criterium adopted in instituting the quota system of 1934 had the advantage of sparing the susceptibilities of every interested country, since, applied indiscriminately, the regulations affected each nationality alike. Though the nature of the restrictions was quantitative and expressly designed to limit the inflow of unqualified workers, the system worked desirably in favour of a continuance of the European tradition, with a major Latin bias, that had been a feature of Brazilian ethnic formation, since, while Japanese immigration was held down definitively to a very small annual limit, a reasonable margin was allowed to long-established immigration from other sources, owing to the fact that the 2% acted over a period during which the latter operated on a far larger scale than the former.

The new policy brought about a considerable reduction in the flow of immigrants to Brazil and the figures for the ten-year period from 1931 to 1940 dropped to 288,607, as compared with 840.209 for the previous period; indeed immigration had never been so slack since the 1871-1880 decade.

During the recent world war, a decree-law (No. 3,175 of 1941) came into force superimposing a qualitative check on the quantitative restrictions of the quota system by granting facilities of entry into the country only to industrial technicians and capitalists willing to bring about Cr$ 400,000.00 into Brazil, thus to all practical purposes debarring war refugees and avoiding the incursion of poverty-stricken unemployables liable to become a burden on the public funds.

At the close of the world war that determined these restrictions, the barriers to the flow of immigration were withdrawn, not only to provide a solution to the problem of a shortage of manpower, but also to fill the gaps existing in the demographic set-up and at the same time to share in the international philanthropic movement designed to rehabilitate displaced persons. It is thus intended to reinject the stimulus of foreign labour into the sources of production of the country, where immigration has so often been instrumental in fomenting progress, and to promote the development of wide tracts of virgin territory. In this connection, it is remarkable to recall that

in 1820, when immigrants were first invited to Brazil, the population was estimated at 4,000,000 inhabitants, representing the accumulated increment of more than three centuries of colonization since the discovery. In comparison, during the hundred and twenty years that have passed since then, immigration alone would have more than doubled this population, for a total of 5,341,896 has entered the country, ranging it among the three nations that have profited by the greatest movement of immigrants.

The legislation now in force, though abiding by the constitutional criterium of immigrant quotas, has embarked upon a new stage in Brazilian immigration policy characterized by the adoption of the principle of selection which distinguishes between spontaneous and planned immigration. In accordance with this new principle, all the immigrants desiring to come to Brazil spontaneously, i.e. of their own accord, can only do so within the limits of their allotted quotas, it being hoped that this restriction will discourage to some extent the displacement of the masses of unskilled labour which have hitherto proved to be the deadweight of Brazilian immigration. On the other hand, planned immigration, by which is meant the introduction of immigrants according to organized methods of selection, involving the provision of housing facilities and a contract of employment to be concluded with government agencies or private undertakings, will be exempt from quota restrictions so as to allow, not only for the maintenance of an adequate supply of agricultural manpower, but also for the admission of technicians and skilled workers on a scale commensurate with the prospects of development of the industrial centres of the country.

In compliance with this new policy, a programme of planned immigration has been applied since 1947 to the problem of displaced persons, selection being operated by a Special Commission in Germany and Austria, whereby situations have been found in Brazil for about 15,000 immigrants, and it is hoped that the movement will be accelerated in the course of 1949. Parallel to this programme, it is intended shortly to put into practice similar plans for the absorption of Italian, Dutch and Portuguese immigrants and to this end agreements are being negotiated with the corresponding Governments.

Immigrants' hostel on the Ilha das Flores, not far from Rio de Janeiro

Typical snapshots of immigrants on their arrival in Brazil in 1948

Italian settlers and their waggon in Paraná

COLONIZATION

The Government has always regarded the problem of colonization as one of the highest interest in view of the fact that the future of the country depends largely on its successful solution.

The allotment of immigrants to agricultural estates has never ceased to be the object of careful studies which take into account the advantages offered by the healthiest regions, without neglecting such important factors as soil fertility and facilities of transport and communication.

On his arrival in Brazil, the immigrant is housed in special lodgings, mostly on the Ilha das Flores, an island near Rio de Janeiro, where he awaits an assignment in accordance with his professional capacities. Many technicians are contracted at once by private undertakings, while the others, principally farm workers, are either distributed among various agricultural estates, after terms have been settled, or sent to the government farming communities known as "núcleos coloniais".

"NÚCLEOS * COLONIAIS" — These settlements consist of a number of lots duly surveyed and marked out, forming a group of small rural holdings.

The "núcleos" are established in country zones which enjoy the following desiderata:

a) Conditions of climate and soil suitable for raising the crops for which a demand exists in the region.

b) Contour and geological formation comprising the principal types of land similarly suitable.

c) Situation near a population centre which is served by a railway, highway or shipping company.

d) Healthy position.

* The term "núcleo" is defined by the "Instituto Brasileiro de Geografia e Estatística" as a "locality which is not the seat of an administrative division", i.e. neither a "vila" nor a "cidade", but a settlement "where inhabitants are grouped together under a special regime".

e) Existence of a watercourse or dam system for irrigation and other agricultural purposes.

f) An area never less than 1,000 hectares (2,471 acres) of land under crops or where crops can be grown, except in special cases where it may be convenient for land belonging to the Union to be developed.

Lots may be obtained in these settlements by Brazilians willing to devote their energies to farming or by foreign agricultural workers, more than 18 years of age, who, not being owners of rural, industrial or commercial property, undertake to reside with their families on the lots granted to them and not to hold public office. The areas of such lots vary from 10 to 30 hectares. or roughly 25 to 75 acres, and the price debited to the grantee is divided into ten equal yearly installments, the first of which only falls due on the last day of his third year of occupation.

Advantages given to settlers in Brazil:

a) Exemption during the first three years of settlement in the "núcleo" from all federal, state and municipal rates and taxes, to which their holdings, crops, vehicles for their transportation and equipment for processing their produce, are or may become liable, including duties on conveyancing **inter vivos** and **causa mortis** (i.e. the transfer of property between living persons or by inheritance), in respect of rural lots fully paid up.

b) Free board during the first three days after arrival in the "núcleo".

c) Employment on a wage or contract basis in work or services in connection with the "núcleo" during the first year from the date of arrival.

d) Free medical assistance until the "núcleo" can support itself (is "emancipado").

e) Diet and medicine, plants, seeds, fertilizer, insecticides, fungicides and farm implements, distributed free of charge during the first year starting form the date of the settler's arrival at the "núcleo".

f) Loan, during the first year after his arrival, of farm machinery, equipment and work animals.

g) Transportation from the railway station, sea or river port to the "núcleo".

NATIONAL AGRICULTURAL COLONIES

Table comparing numbers of present settlers with settlement capacity

COLONIES	AREAS IN HECTARES (= 2,471 acres)		SETTLEMENT CAPACITY		PRESENT SETTLERS	
	Colonies	Lots	Families	Persons	Families	Persons
Amazonas	300,000	30	10,000	70,000	150	750
Pará	250,000	25	10,000	70,000	701	3,505
Maranhão	300,000	30	10,000	70,000	578	2,890
Piauí	300,000	30	10,000	70,000	300	1,500
Goiás	250,000	25	10,000	70,000	2,500	12,000
Ponta Porã.....	250,000	25	20,000	140,000	318	1,590
Iguaçú	300,000	30	10,000	70,000	600	3,000
TOTALS	2,200,000	25-30	80,000	560,000	5,147	25,735

COLONIZATION

A plat an the "Duque de Caxias" madel farm belonging ta the Ministry af Agriculture in the Serra da Estrela, State of Ria de Janeira.

COLONIAL SETTLEMENTS ("NÚCLEOS") AND NATIONAL AGRICULTURAL COLONIES

Created since 1926

Designation	States	Municípios	Stations or ports	Distances from stations or ports	Approximate total area in acres	Altitude in feet	Yearly average temperature in °F.
Colonial Settlements:							
ınta Cruz...	{ Fed. District { Rio Janeiro	Santa Cruz Itaguaí	Santa Cruz Itaguaí	Santa Cruz } Itaguaí 1h.30 }	280	20	83
ıarquês de Abrantes ..	Paraná	Imbuial (former Bocaiuva)	Curitiba	3 hours	1,980	3,281	61
ío Bento....	Rio Janeiro	Nova Iguaçá Duque Caxias	Parada (Halt) } de São Bento }	10 minutes	224	10	86
ınguá	Rio Janeiro	Nova Iguaçá	Tinguá	3 minutes	99	109	—
uque de Caxias	Rio Janeiro	Duque Caxias	Joaquim Tavorá	5½ miles	13	131	68
gro-Industrial io Francisco..	Pernambuco	Petrolândia	Itaparica	72 miles	99	917	81
National Agricultural Colonies:							
ıiás	Goiás	Goiás	Anápolis	3 hours	6,170	2,140	77
mazonas ...	Amazonas	Manacapurú-Codajaz	Manaus	6 hours	7,420	269	81
ırá	Pará	Monte Alegre	Monte Alegre	45 minutes	8,770	197	77
ıranhão	Maranhão	Barra Corda	Barra Corda	12 days	10,400	344	64
eneral Osório	Paraná	Clevelândia	União da Vitória (S. Catarina)	13 hours	7,500	1,970	68
ourados	Mato Grosso	Dourados	Maracajú	5 hours	7,420	1,310	68
ıauí	Piauí	Oeiras	São Luís-Teresina	2 days	7,420	—	68

BIOGRAPHICAL SURVEY OF FAMILIES AND INDIVIDUALS OF FOREIGN ORIGIN WHO HAVE CARVED OUT AN EMINENT POSITION FOR THEMSELVES IN THE SOCIAL STRUCTURE OF BRAZIL

Foreign immigration has contributed extensively in the past and is still conducing effectively to the progress of Brazil, a country which offers the widest and most encouraging opportunities to men of other lands and to whoever aims to begin life and activities anew in an untried yet welcoming atmosphere of freedom, where personal effort is recognized at its true value and there are outlets for entreprise that can but seldom be found in the serried ranks of other, and older, peoples.

The scope of this chance to mould his own destiny that Brazil offers to the immigrant may well be gauged by the way in which he and his fellows have already advanced the development of the country, for it is in the measure that he becomes part and parcel of his adopted land and unites his efforts to the productive urge and resources of the nation with whom he lives, that the foreigner creates his own well-being and consolidates his future.

Often enough, the prosperity of such as have elected to settle in Brazil has been seen to be bound up with the sharp increase in development of the regions where they work and to which they lend the impetus of their creative enterprise. Among them, some have thrust ahead to become outstanding personalities in their new **milieu,** wielding their qualities with so manifest a skill, energy and perseverance that they have gained widespread appreciation in the various fields of human activity and grown to figures of national importance. In other cases, the range of success, though meritorious, has been confined to the State, city or township of their choice. Some, more able or more fortunate, reached their enviable position as a result of their own efforts not many years after first setting foot on Brazilian soil. Others, though achieving comfort and relative wealth for them and theirs, only saw their true aspirations fulfilled in the signal attainments of their children who have lead the family on to its high destiny.

Even those whose varying fortunes have brought them to consider themselves less favoured, will nevertheless admit, as a general rule, that they have earned a position, however modest, superior to what they could have expected in their own country, in view of the common run of opportunities. This is shown by the small proportion repatriated out of the masses of immigrants that have entered the country in the various phases of more recent history.

The greater part of those who returned to their former homes, took their savings with them and were drawn either by unsevered moral ties or felt that they had earned enough and sought repose in the land of their birth. Of these, however, many sailed back to Brazil, swayed by memories of the past or realizing by contrast how closely they had become attached to the life they had led for so long abroad. For, indeed, even those who elect to live out their declining years in the mother country are seen to have become so changed and influenced that they are commonly called "Brazilians" by their compatriots in Portugal, Italy and many regions of Germany. There any Brazilian traveller is welcomed with open arms and in various countries of the Levant such is the gratitude of those who have

laboured in Brazil, that they have named the principal thoroughfares of towns and villages after cities and States of this country.

The variety of climates and economic conditions, the abundance of natural resources, the absence of excessive rigidity or marked prejudice in the social organization, less firmly crystallized than in the older countries, the multiple opportunites arising from the progressive emergence of new forms of farming and industry, new fields to conquer, accompanying the general development of the country and its various regions, and, in view of the constantly increasing diversification of available crafts and professions, the assurance that skill and experience in any branch — manual, artistic, scientific — will fill a need and yield a profit unparalleled elsewhere — all this weight of advantages tilts the balance of Fortune unwaveringly in favour of the immigrant who comes to Brazil determined to work and make good.

The welcome extended to all such immigrants and the prosperity achieved by their families are well illustrated by the diversity in name and origin of the prominent figures in Brazilian society, culture and politics. Portuguese surnames stand side by side with others which hail from distant lands with widely differing social conditions, whether in Europe or farther afield: Arab, Syrian, Armenian, Israelite, Turkish, Chinese, Japanese. All are used with freedom, sincerity and pride, nor need they be camouflaged or adapted to accepted forms as is often the case in other countries, for no opprobium attaches to a man's appellation, whatever its consonance.

The variety of environments to be found in Brazil is also a factor which improves the immigrant's chances of success. In the characteristics of certain regions, many encounter features that are singularly favourable to their adaptation; thus, the Mecklenbergers feel at home in the deserted settlements once peopled by the Jesuit Missions in Rio Grande do Sul, while the small farmers from North Germany, Venice and Liguria have opted for the colonial mountain zone of the "Serra" in the same State; industrial workers and small artisans from Northern and Central Italy, and from Central Europe in general, find the capital of São Paulo conducive to their enterprise, and Japanese market-gardeners tend to settle on the seacoast and uplands of this State and in the region of Bragança, in Pará. Likewise, the peddling of hardware and the wholesale and retail cloth trade offer an opening in the backwoods or in the city to many a travelling vendor or trader of Arab, Syrian or Armenian origin, and in the course of their assimilation these immigrants have contributed in no small measure to the progress of various far-flung regions.

Many are the instances where prosperity and success attend the efforts of the newcomer who identifies himself with some phase of the economic and cultural development of Brazil. Thus, the birth of industry in the State of São Paulo as a result of coffee valorization by the Government, laid the basis of great fortunes for former German and Italian immigrants to São Paulo or other States, who became leading figures in economic circles.

In the intellectual and artistic spheres, there are eminent expatriates who will ever remain associated with the inception and organization of a number of important cultural institutions in this country. As examples, we may mention: the Italian physician of renown, De Simoni, who reformed the original system of hospitals in Brazil and founded the National Academy of Medicine, of which he was the first president, and furthermore exerted a great influence on the

cultural development of the Capital of the Empire; the gifted painter, Eliseu Visconti, representative **par excellence** of a whole phase in the history of fine arts; the notable executant and composer, José Faini, whose life and work so closely accompanied the upsurge of music in Rio Grande do Sul that centred about the Conservatories of Pelotas and Rio Grande, and whose children remain paladins of their parents' campaign pro arte; the great German scientist Riedel, to whom the National Museum owes so much; and the Swiss naturalist Emilio Goeldi, organizer of the Pará national science museum that bears his name.

Some idea of the way in which opportunity came to meet these immigrants at the end of their journey from such different lands, satisfying their ambitions of progress and social advancement, may be gleaned from a survey, necessarily succinct, of the interesting circumstances encompassing the road to success in certain typical cases. Such is the wealth of material however, that no little difficulty has been experienced in selecting suitable examples of nationally or regionally important figures and the choice made is by no means exclusive nor detracts from the merits of the many other immigrants who have attained to renown, but seeks to define the most representative personalities by outlining the major events of their careers and tracing their connection with some clear-cut phase of the economic or cultural development of Brazil.

The industrialization of São Paulo has provided a field of endeavour for a whole class of immigrants, who, in devoting their energies and material resources to the realization of this vast project, stand out among their fellows by their achievements in the economic sphere. Of this group, which includes the founders of many of the great fortunes of São Paulo, Francisco Matarazzo, later awarded the title of Count by the Pope, is almost a symbol and may be said to head the phalanx of men of value and daring enterprise, who honour such names as Crespi, Gamba and Lunardelli.

Leaders, indeed, they were of a multitude of compatriots who settled in São Paulo about the time of the proclamation of the Republic and whose prosperity became ever more firmly rooted with the increasing economic progress of this State.

Matarazzo first worked in Sorocaba, in the interior of São Paulo, but in 1889 he moved to the Capital, where little by little he built up the colossal fortune that he left to his sons, who have not ceased therewith to pursue the ends that their father set out to accomplish. In the initial decades of this century, the first Count Matarazzo founded, one after the other, the undertakings now grouped together as the Matarazzo United Industries, as well as a number of others in the most varied lines of business such as farm produce, shipping, sugar refining, grain mills, cotton, silk and wollen goods, oil and vegetable fat refining, soap-making, grain importing and exporting. In all, these works and factories undoubtedly amount to the largest industrial group in Brazil and even in South America as a whole.

By the vigour and firmness of his multiple initiatives during his rise to a dominant position, Count Matarazzo recalls those famous compatriots of his that contributed vastly to the first wave of Brazilian economic prosperity in the XVIth century, shortly after the discovery — the three Adorno brothers. Exiled Genovese noblemen of ancient lineage, they were among the first colonists in the new land and seized the opportunity of introducing sugarcane and the production of sugar at São Vicente and Bahia, thereby reaping an enormous fortune..

Another Italian immigrant closely connected with the progress of São Paulo during the last fifty years is Comendador José Martinelli, who set out from the picturesque walled city of Lucca in 1892 at the age of 21. Working at first as custom's-house clerk in the port of Santos, he decided to set up a shipping agency of his own in the State Capital with branch offices, first in Santos and then in Rio. His next step was a banking-house that became the Sociedade Martinelli. In 1915, he founded a great shipping enterprise, the National Lloyd, which rendered outstanding services to Brazil and the Allies during the first World War. To support his activities in this branch, he organized a shipyard known as the "Estaleiro Guanabara".

In 1922, Martinelli sold the two latter undertakings in order to fulfill his dream of initiating the building of skyscrapers in São Paulo, the first of which, the 30-storey "Edificio Martinelli" is a monument to his creative energy. In Rio, at another stage of his existence, he was to erect ten other high buildings.

Shifting his gaze seawards again, he gained control of the "Companhia Comércio e Navegação" which owned a fleet of more than thirty vessels and one of the largest docks in Brazilian waters, the "Dique Lahmeier", on the other side of the bay from Rio de Janeiro at the State Capital of Niterói, besides extensive salt marshes in Rio Grande do Norte.

Martinelli was a pioneer in yet another direction. At the outset of coal-mining in Brazil, he purchased the coal fields of Butiá, in Rio Grande do Sul, sinking a heavy sum of money in their development. When the new undertaking began to yield abundant profits, he sold it to acquire mines of even greater importance in Santa Catarina.

Associated as he was in such diverse ways with the new trends of domestic economy, Comendador Martinelli could not fail to become one of the leading personalities in Brazilian financial circles and he left an immense fortune when he died.

In many points his career is analogous to that of another immigrant, the Spaniard Serrador. Like Martinelli, this 17-year-old youth landed at Santos in 1892, but elected to settle in Curitiba, where he worked for twelve years in the restaurant and show business. Having seen a cinematograph film, his imagination was stimulated and he saw a great future for the budding industry. Such was his enthusiasm, that he proceeded to import the flickering reels and primitive projectors of those days and put on free performances to attract the public. From 1907 to 1912 he organized a far-reaching network of cinemas in the Capital, in Santos and throughout the interior of the State of São Paulo. His undertakings prospered with the rapid development of the movie industry in the United States and Europe. He opened various cinemas in Rio and the Companhia Cinematográfica Brasileira that he founded became increasingly powerful.

His success roused in him the ambition, long dormant, of endowing Rio with a monumental district of skyscrapers intended as an amusement centre for the city. Five years he spent in campaigning for this idea with rolls outspread of plans for buildings in grand style, until in 1925 he succeeding in producing the first great cinema theatre housed in an edifice towering to twenty storeys; the following year saw the emergence of the "Bairro Serrador" or "Cinelândia", a quarter which may be said to have transformed the aspect of the centre of town and to have encouraged the subsequent erection of an ever-increasing number of tall buildings, twenty stories and more, in the

principal districts of Rio. In the "bairro" of his dreams, Serrador put up two more splendid edifices, the Serrador Theatre and the Alhambra, which has since been rebuilt as the ultra-modern Hotel Serrador.

In São Paulo, during the period in which coffee was being officially valorized, several immigrants piled up huge fortunes in plantations or dealing in the commodity, and in this connection the names of Schmidt and Lunardelli should be mentioned for they were looked up to as "coffee barons" in their day.

Later on, the development of cotton and the opening up of North-eastern and Upper São Paulo brought riches to numbers of foreign settlers and the fortunes they made added impetus to the expansion of industry in São Paulo, where the factories provided well-paid work for many other immigrants to this country.

Achievement and opportunity were not restricted to Rio and São Paulo, but extended throughout Brazil to a wide variety of crops and crafts, allowing for the progress of immigrants of as many different nationalities and not only those of Portuguese, German and Spanish origin.

Thus in the same State of São Paulo, Syrians and Armenians thrived in the cloth trade, subsequently becoming large-scale manufacturers, and today there are several sections of luxurious residental quarters (Avenida Paulista, Jardim America, etc.) which are inhabited by the families of successful businessmen and industrials of Levantine origin. Among these, it is only fair to cite the names of Nami Jafet and João Abdala, merchants and planters, and manufacturers such as Calfat, Alkimini-Chamma and others.

In the north of the country, many are the undertakings founded by Syrian, Arab, Turkish and Armenian immigrants, the most outstanding being that genius of commerce, Chamié, who has built up one of the greatest, if not the greatest fortune in the Amazon region.

The fabric industry furnishes other examples, such as that of the Lunderen brothers, sprung from a Danish family settled in Recife, with their huge mills in Paulista, in the interior of São Paulo State; it is they that subsequently organized throughout Brazil a group of successful chain stores specializing in textiles and known as the "Lojas Pernambucanas".

Another branch of industry, tobacco, was the field of action of foreign settlers such as the Dannemanns, of Danish origin, in Bahia, the Pooks of Rio Grande do Sul, and the Souza Cruz family, of Portuguese origin, in Rio.

Great entreprises founded by immigrants who achieved prosperity in this country are to be found in many other branches, e.g. the Morgantis, in sugar-refining, in São Paulo; the Fratelli Vitas, in rock crystal, in Bahia; the Ginettis, in smelting and other manufacturing, in Minas Gerais; the Blocks, in printing, and the Klabins, in São Paulo and Rio and Paraná, who, among other business activities, created the newsprint industry; the families of Olderich, in canning foods, and Termignoni, in tanning leather, both from Rio Grande do Sul, are well known throughout the country, the latter being the most important manufacturer in this line in all South America.

There is practically no city in Brazil, whatever its size, whatever its State, from the depths of the backwoods to the level plains of the

seacoast, where among the larger firms or fortunes of the locality, one cannot find the names of at least two or three former immigrants, whose progress in general has gone hand in hand with that of the community.

Two typical examples of this association between the development of a small Brazilian locality and the fortune of an enterprising immigrant deserve mention in view of the national scope reached by the undertakings that they founded. From the humble beginnings of two tinsmiths who settled in Rio Grande do Sul arose two great industries: one represented by the metal works of Abramo Eberle in Caxias do Sul, and the other by Renner's cloth and garment factory. A short outline of how this came about will show the results that may be expected from an honest application of intelligence and hard work.

Abramo Eberle came to Rio Grande at four years of age with his parents, labourers from Veneto, who settled in 1885 or thereabouts in the little "colony" of Campo dos Bugres, formed in the Serra region by two thousand families and destined to become first the township ("vila") and later the city of Caxias. The father worked in the fields specializing in fruit-growing, while his mother enlisted the aid of a few apprentices to run a small tinker's shop installed in their home and fitted out with the primitive equipment they had brought with them from Europe.

The family soon earned the respect of the neighbourhood and when he was sixteen their son took over the workshop where he had grown up in the craft with his young companions. For seven years he plied his trade in the rough wooden shed, except for a short period when he rendered his fellow townsmen the valuable service of popularizing their wines and farm products on the national market by presenting them in São Paulo. In 1904, he organized a small metal-working shop in partnership with three technicians, gradually extending his activities to the goldsmith's trade, hardware and chinaware, so that by the end of the first decade of the century, the prestige of his undertaking was definitely assured.

Development proceeded apace, first by transferring a metallurgical establishment from Porto Alegre and then by importing new machinery from abroad, until it became one of the most important, if not the most important factory of its kind in the country, turning out some 15,000 products renowned for their excellent workmanship. The labour force which had started with the two fellow craftsmen of the tinsmith swelled to more than six hundred skilled workers and the factory grew with the city, the population of which had already increased from 3 thousand inhabitants in 1875 to 30 thousand at the beginning of the century and doubled in the course of the next twenty years.

The other young fellow to build up an industry in Rio Grande do Sul began life as a tinker travelling through the interior of the State. When Renner was called upon to repair a certain broken mechanical loom, not only did he leave it in perfect working order but took an interest in the household industry in which it was used and joined up with the owner. Within a short time he had a number of other looms and women weavers working for him. Such were the humble beginnings of the great Renner works which now turn out garments, fabrics and ready-made clothing for the whole nation and have gained for their founder a well-merited reputation in business and financial circles. Like Abramo Eberle, Renner began with a lowly calling and ended up by creating a great industry in Porto

Alegre, thriving with the general progress of the State's economy and vouchsafing to him, as to the Italian immigrant in the Serra, riches and social prestige.

Indeed, throughout Brazil the immigrant owes his success to initiative in taking advantage of the resources and opportunities offered by the gradual development of the land which has welcomed him and where he has taken root.

Numerous regions have thus been opened up by settlers of European origin, starting from the first "núcleos" or government-aided settlements in the early days of the last century, and culminating in daring and far-flung schemes of colonization such as those of the middle of the century, among which there stands out the pioneer development of the region of Itajaí, in Santa Catarina, under the leadership of the famous Dr. Blumenau, whose name was later given to a prosperous city that grew out of the first "núcleos" he founded and directed with such skill.

Similar fortune awaited the dense waves of immigrants that reached the shores of Brazil in the last decades of the nineteenth century when such a wealth of opportunities was offering in Rio Grande, Santa Catarina, Paraná, Minas Gerais and Espírito Santo. For instance, a batch of Polish immigrants was sent to Paraná by President Prudente de Morais and founded the small settlement of Prudentópolis, now a thriving city surrounded by spreading grain fields, many being the rural fortunes that have been amassed by former immigrants or their children. And what has been averred of the strictly colonial zones, i.e. those that have been settled by large-scale immigration, is equally true in relation to the individual immigrant, unaided by a collective organization and hailing from foreign countries other than those of Italy, Germany, Central and Eastern Europe and Japan.

Of such immigrants the Portuguese are the most important, sprung from the rootstock of our population and constituting the core of the nation. It might almost seem superflous to expand upon the success that normally accompanies these immigrants. so widespread is the prosperity of the "Portuguese" Brazilians, i.e. those who have worked and lived in Brazil. Great branches of commerce and industry and even certain fields of agriculture such as truck-farming, up till not very long ago were the chosen, if not exclusive sphere of the Portuguese that settled in Brazil. Indeed, it would be unfair not to mention at least three names linked to large fortunes built up by Portuguese immigrants whose exceptional enterprise has exerted an influence that can be felt to these days. One of them is Viscount Morais, the far-sighted businessman, banker and industrial, who left one of the most impressive estates of his day. The others are Comendador Seabra, a figure in textile manufacturing and merchandising, and Sr. Vitor Fernandes, likewise businessman and banker, now two of the wealthiest men in the country.

Another point that should be emphasized when considering the value of the opportunities open to foreigners, is the facility with which they can rise to a prominent position in the cultural and political life of Brazil and many have taken an active part in politics or occupied high official posts. Three may be mentioned **en passant**, all of them still living in Rio Grande do Sul, but Italian born: Mansueto Bernardi, director of the Mint; Lorenzo da Monaco, the eminent oenologist who revolutionized wine-growing in the State; and Alberto Albertini, who came from Cairo to Porto Alegre to be the director of the Bromato-

logic Laboratory and ended up as a great industrial, manufacturing confectionery which is famous throughout the south of the country.

Even the seemingly more modest occupations offer wide opportunities for the foreign immigrant to achieve fortune and social standing. Thus, for instance, the profession of photographer, pursued by a poor immigrant from Eastern Europe in a great city like Rio de Janeiro, may enable him to make a name for himself in the topmost intellectual and artistic circles, with no detriment to his financial success. This was the case of Nicolas, who was born in Rumania and intended to settle in Buenos Aires, but was captivated by the beauties of the scenery rimming the Bay of Guanabara. It is true that he was an artist in every sense of the word and his studio soon gained renown, eventually becoming the favourite haunt of artists and intellectuals. For nearly twenty years, the Studio Nicolas played the role of a salon that had no little influence on life in the metropolis, and the artist and his Brazilian wife earned affection and esteem for the stimulus they gave to arts and letters by befriending, advising and encouraging young talent.

It should be reiterated that very often when the constructive action of the immigrant fails to go beyond the purely private or exclusively local sphere, it is the reputation of his sons that extends to State or Union, in the field of politics, letters or science. In such cases, it is as though the efforts of the head of the family find their full expression in the distinguished careers of his offspring.

In the majority of the cases referred to above, the sons and heirs of successful immigrants carry on his work, maintaining and often expanding it. But the keenest interest attaches to those in which the son it is that covers the family with renown or raises it to an outstanding position in the social, cultural or economic order.

Brazil is, indeed, a new country with ample resources, a generous, hospitable people, wide areas to settle in and develop, new products or raw materials to contribute to domestic industrialization or export — opportunities that are brilliant, many-sided and almost unlimited for the foreign immigrant. Possibilities there are of comfort and prosperity, independence, a free and profitable life, and the chance to take his place in a complex social life, unmarred and unobstructed by barriers of class or caste, or prejudice against races or nationalities, a country in fact where he can live happy and active, conscious of shaping his own destiny.

In an epoch of convulsions and social difficulties of all kinds, for the innumerable displaced persons of so many countries of Europe and the East, for enterprising young people from any land, for older men, heads of families, skilled in a trade, cultural or professional activity, whether decided to toil upwards to success or seeking a new environment in which to reassemble their homes, Brazil is a true Mecca, dispensing to all: peace, prosperity and the zest of living.

ECONOMIC SITUATION

For centuries the products coming from Asia reached Europe by two routes across Asia Minor to the shores of the Mediterranean, whence they were redistributed by the seafaring peoples.

The increase in the demand for these goods, chiefly spices, precious stones and costly fabrics, spurred Portugal and Spain on to an "Era of Discoveries" in their anxiety to open up a new sea passage to Asia around the dark continent of Africa.

In their search the navigators crossed the Atlantic and thus Brazil, whether by chance or by foresight, was discovered.

But for thirty years after its existence was revealed to the world, the country remained practically unexplored. The only visible wealth consisted in brazil-wood, which was cut down and exported for dye-making by foreign traders.

In 1530 the first cattle and the first cuttings of sugarcane were introduced, Indian labour being utilized from 1530 to 1700. Negro manpower was first applied in 1550 and for more than three centuries it proved to be the mainstay of the Brazilian economy.

Sugarcane attached man to the soil more than any other crop and encouraged the formation of great estates, whence there arose a landed nobility to be the kingpost of the Brazilian social structure.

Stockraising, however, played a remarkable part in the development of Colonial Brazil, for it provided industry with transport, food, power and leather supplies. An almost invisible current of inland communications was maintained, chiefly in the centre of the country, with the aid of horses, mules and oxen.

For more than two centuries, along with sugar and livestock, other products were being exploited such as raw materials for vegetable dyes, lumber, tobacco, cotton and rice, in addition to spices and medicinal herbs.

And so nearly two hundred years slipped away and still the gold and gems for which Portugal was clamouring failed to appear.

Then, in 1690, the precious metal was at last discovered.

By 1803 the South American continent had sent Spain and Portugal 1,300 million pounds worth of gold and silver and, moreover, 9/10ths of the precious metals which poured into Europe during this period. Brazil's share in the total value of gold shipments, estimated at 300 million pounds, amounted to 194 million or 64%.

Brazilian gold has contributed effectively to world progress, strengthening the English economy and presenting Portugal with a century of abundance, despite the ruinous effects of the Anglo-Portuguese commercial treaty arranged by John Methuen, British ambassador to Lisbon, and signed in 1703. Gold it was that fixed

the population of the colony, stimulated the building of the first roads and cities, and provided increased momentum for a number of other industries.

Diamonds were found in 1729 and a new era was ushered in, with a total production, up to 1880, of some 3 million carats.

With very minor exceptions, Brazil's inland trade was monopolized by Portugal up to 1808, the goods being shipped to Lisbon where they were put up for sale to other countries, since the colony was denied any right to industrial activity.

When Dom João, Prince Regent and afterwards King of Portugal, fled before the invading army of Napoleon to take refuge in Brazil, new prospects dawned for the colony whose home economy profited by the following decisions: opening of the ports to international trade; industrial freedom; creation of boards of Commerce, Agriculture and Shipping; foundation of the Bank of Brazil; duty-free importation of Brazilian fabrics by the mother-country; creation of a chemical laboratory; diamond-cutting; raising of Brazil to the status of a kingdom; smelting at Ipanema in Minas Gerais; reservation of coastal shipping to Brazilian vessels; organization of immigrant settlements, etc.

1850 marks the true beginning of the manufacturing phase which has proceeded apace until our days.

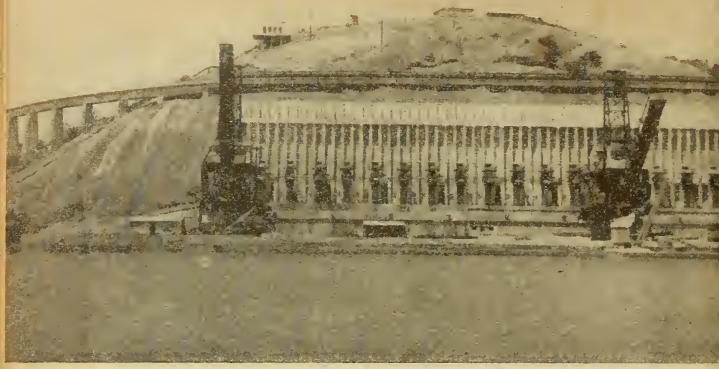
From 1860 to 1865, the American Civil War deprived the international markets of cotton from North America and provided an opportunity for Brazilian producers.

During the period 1860-1910, Brazil held control of the world rubber market.

Generally speaking, therefore, it may be said that home economy has been based almost exclusively on rural activities, crop and livestock farming, with the progressive development of the tobacco, cotton, cacao, sugar, rubber, vegetable oil and other extractive and genetic industries, together with the coffee plantations which, from 1830 until the present day, have supplied Brazil's principal export product.

In the course of the last 15 years Brazil has passed through a period of appreciable economic modification with the cultivation of new crops such as tung, tea, mint, etc. which have gone far towards stabilizing agriculture. The promotion of wheat-growing is a major problem in economics which is now being successfully attacked by the government.

The meat-packing industry has been of great assistance to stock-raisers throughout the country and the rationalization of the iron and steel industry, with the blast furnaces smelting Brazilian ore with Brazilian fuel, has materially contributed to the consolidation of the national economy.



This up-to-date 47,000-ton silo at the Port of Vitória has a loading capacity of 1,200 tons of ore per hour

MINERALS

The study of Brazilian geology began in the first quarter of the nineteenth century with the work of the German scientist, Baron von Eschwege. The first official geological service was founded in 1875 under the name of "Geological Commission of the Empire" and directed by the American geologist Charles Frederick Hartt. The year 1907 saw the creation of the "Mineralogical and Geological Service" under the able leadership of a scientist of universal renown, Adalbert Orville Derby, who held office for twelve years. This organization has been considerably extended and is now entitled the "National Department of Mineral Production (Departamento Nacional de Produção Mineral)".

Present-day geological knowledge of the country is therefore the result of more than a century of research.

Land of various geological periods makes up the surface area of Brazil, ten out of the generally recognized fourteen being represented approximately in the following proportions:

Quaternary	9%	Carboniferous and Devonian	1%
Tertiary	16%	Silurian	4%
Cretaceous	8%	Algonkian	4%
Triassic	9%	Archean	33%
Peruvian	6%	Unexplored area	10%

The terranes most widely represented in Brazil are, therefore, the Cryptozoic (Algonkian and Archean) which total 37.0% of the area of the country.

The most important mineral deposits lie in Cryptozoic formations, e.g. gold, tantalum, beryl, titanium, tungsten, nickel, chromium, iron, manganese, magnesium, aluminium, tin, lead, limestone, phosphates, fluorite, precious and semi-precious stones, etc.

Not only have these regions been and still are the lodestone of the greatest mining activity in the country, but they have also been the scene of outstanding events in Brazilian history.

The Permian and Carboniferous terranes of the Southern Region are the seat of the coal beds.

The Triassic is responsible for the best soils in the country, in particular the "terra roxa" or purple-red earth preferred by the coffee planter.

Petroleum, gypsum and rock salt have been found in Cretaceous formations.

The Tertiary crops up in the Amazon Valley and is marked by the appearance of Brazil-nut trees.

The great "Pantanal" of the River Paraguay and in general the major valleys of the principal watercourses in the country belong to the Quaternary. On land of this period cattle are raised in Marajó, jute in Amazonas and rice and cotton on the banks of the São Francisco.

However, the Cryptozoic scenery of the Serra do Mar and the Bay of Guanabara carved from majestic mountains etch an indelible impression on the foreigner's imagination.

BRAZILIAN EXTRACTIVE MINERAL PRODUCTION — 1939/1948

PRODUCTS	QUANTITIES PRODUCED (In metric tons)			
	1939	1946	1947	1948 Jan.-June
Arsenic	713	829	1,001	542
Coal	1,046,975	1,896,883	1,998,896	955,871
Gold (in kilogrammes)	2,614	4,370	4,216	2,004
Iron ore	533,282	582,516	—	—
Manganese ore	257,752	172,264	—	—
Marble	13,687	26,738	—	—
Mica	1,038,768	1,639,851	—	—
Salt	508,936	609,198	562,570	—
Silver (in kilogrammes)	858	683	631	408

SOURCE — Service of Production Statistics (**Serviço de Estatística da Produção**).

MINERALS OF BRAZIL

The Brazilian subsoil, besides yielding gold and gemstones, contributes the fuels essential to the production of heat and steam. Iron ore and limestone are used for smelting; limestone, clay and gypsum in the manufacture of cement; manganese, chrome and nickel for blending ferroalloys; sand, clay, lime and stone in the building trades; while salt, apart from its food value, enters into various industrial processes.

In short, Brazilian mineral production may be outlined as follows:

1. There is little production of non-ferrous minerals and those used in industrial chemistry.
2. Brazilian industry stresses the production of minerals for radio and allied industries, articles of personal adornment, fuel, precious metals and ferro-alloys.
3. The mining industry concentrates on the production of fuels, building materials, precious metals and gemstones. Methods dating from colonial times are still typical of gold and gem mining.
4. Brazil produces raw materials for alloying iron with manganese, titanium, tungsten, chromium, etc. to form metals which are indispensable to the modern standard of living.
5. While 35% of Brazil's mineral production is absorbed by the home market, 65% is exported with a corresponding gain in foreign currency, so that it may be said that each Brazilian contributes a dollar's worth of minerals to export.

METALLIC MINERALS

I. **Precious metals** — Both primary and secondary gold deposits are to be found in Brazilian territory. They were and still are the object of considerable activity on the part of thousands of independent miners occupied in prospecting and panning by primitive methods in various parts of the country.

Gold lodes began to be worked in 1819 in the mine of Passagem in Minas Gerais. Since the middle of the last century, the Morro Velho mine, also in Minas Gerais, has shared to the extent of 80% in the total Brazilian production of this metal. The recovery of primary gold from tailings has been carried on since 1941 in Piancó in the State of Paraíba.

Saltworks on the northeast coast of Brazil

A certain amount of silver is obtained as a by-product of gold and lead refining and there are platinum-bearing rocks in the State of Minas Gerais.

II. **Lesser metals** — One of the rare deposits of primary zirconium in the world is to be found at Poços de Caldas in the State of Minas Gerais. The monazitic sands on the sea-coast of Espírito Santo are rich in zirconium silicate.

Several hundred kilogrammes of bismuth are produced yearly in Brazil.

Tantalum, columbium and beryllium appear together in the same gangue rock distributed throughout three pegmatite zones. During the second World War, Brazil supplied one third of the beryl and half the tantalite needed by the United Nations.

A new pegmatite mineral has recently been discovered and named **brasilianite.**

III. **Ferroalloy metals** — The reserves of manganese in Brazil are the greatest in the hemisphere.

Titanium is found in two forms: rutile and ilmenite.

The beach sands between parallels 15° and 20° comprise numerous small deposits of monazite, ilmenite and zircon.

There are numerous outcrops of the tungsten ores, scheelite and wolframite.

The nickel deposit of São José do Tocantins, now called Niquelândia, is of worldwide renown.

Two chromium deposits suffice to supply the home industry and leave a surplus for export.

IV. **Non-ferrous metals** — Brazil is rich in the ores of the light metals, aluminium and magnesium. The most important reserve of bauxite is situated on the Poços de Caldas plateau and supplies the aluminium sulphate industry in São Paulo and Buenos Aires. In Ouro Preto an aluminium factory working with local bauxite produces 2,500 metric tons of the metal per year.

There are two deposits of high-grade magnesite in the States of Ceará and Bahia and both are being worked.

Copper ore occurs in various parts of Brazil, the largest deposit, that of Caraíbas, in Bahia, being estimated at 11 million tons.

A district of lead- and zinc-bearing ores in the Serra de Paranápiacaba, in the States of São Paulo and Paraná, is of some importance; small mines have been opened up, resulting in the production of galena, the export of concentrates and the manufacture of lead ingots.

Brazilian tin deposits, both primary and secondary, are of relative importance compared with the volume of home consumption.

V. **Iron** — The huge reserves of iron in this country are world-renowned; the ore is high grade, with a low phosphorus content and insignificant percentages of sulphur and titanium.

Among the various ferriferous provinces in Brazil, that of Minas Gerais is remarkable for its 13 thousand million tons of compact micaceous hematite.

The hill of Urucum in Mato Grosso comprises a deposit of 1,300 million tons of ferro-silicate ore with 50% iron. In Santa Maria, in Amapá Territory, there are several tens of millions of tons of iron ore similar to that in Minas Gerais.

Coal mine in Santa Catarina

FUELS

Coal — The Permo-Carboniferous formations of Southern Brazil (States of Rio Grande do Sul, Santa Catarina, Paraná and São Paulo) are interstratified with beds of coal. The reserves in this region are reckoned at rather more than 500 million tons.

Present production in Brazil varies from 1½ to 2 million tons, which is not yet enough to meet the requirements of the country.

A central washing plant with a capacity of 400 tons per hour is operated in the State of Santa Catarina and the output comprises smelting, gas and steam coal.

Petroleum — The sedimentary area liable to yield petroleum is as large as that in the United States.

By 1934, the following oil provinces had been marked out: Southern Brazil, the sedimentary coastal belt in the Northeast, the Middle North, Acre and the Amazon Valley.

The National Petroleum Council **(Conselho Nacional do Petróleo)** was created in 1939 and drilling operations were entrusted to American firms. Recently it has been decided to set up oil refineries in Brazil.

Well C26, drilled at Candeias in the State of Bahia, has ranged Brazil among the oil-producing countries, for tests show a daily output of 1,800 barrels from a three-quarter-inch bore at a pressure of 30 atmospheres.

No less than 26 wells have already been drilled in the Candeias field and work is proceeding at the most likely sites indicated by the mineralogists who have surveyed the region. The first well dates from five years back and, though small, is still producing thirty barrels a day.

Natural gas has also been found at Aratu, in the State of Bahia, and the deposit, estimated at 3,500 million cubic feet, is now being worked.

Oil derrick in the northeast

NON-METALLIC MINERALS

Minerals for the chemical industries: Limestone is abundant in Brazil: **Sulphur** is for the most part imported, though there is a small production of pyrites in Ouro Preto. It is hoped, however, to make use of the **marcassite** obtained as a by-product of coal-mining, for the manufacture of sulphuric acid. **Salt** domes have been found in the States of Sergipe and Alagoas, when drilling for oil, and two companies are now studying the possibilities of utilizing the product for making caustic soda.

Economic deposits of **fertilizer** salts have not yet been discovered in Brazil, with the result that the fixation of atmospheric nitrogen

on an industrial scale is an important national problem which is linked to that of hydroelectric power facilities. Three deposits of **apatite**, a raw material for making phosphate fertilizer, are known and there is a large deposit of **aluminium phosphate** in Maranhão which is worth mentioning.

Sea-salt is produced by evaporation along the Atlantic seaboard, principally in the northeast.

On the island of Camamu, in the State of Bahia, there is large deposit of **barytes**, estimated at 2 million tons.

Building materials — Limestone is also used in the manufacture of lime and cement. The **clays** and **kaolins** are particularly suitable for the ceramic industry and there are a number of factories producing high grade pottery and chinaware.

In general, tile and bricks are baked in small kilns in the neighbourhood of urban centres, but certain classes of these materials, manufactured in São Paulo, are exported.

In the States of Rio Grande do Norte, Ceará and Maranhão there are extensive beds of **gypsum** suitable for cement manufacture.

The reserves of the **asbestos** mine of Poções, in the south of Bahia, are estimated to exceed 100,000 tons.

Pools of **asphalt** have not been found in Brazil, but there are several arenite deposits with 10% bitumen which are now being worked for road-surfacing materials.

Brazil is rich in ornamental stone; **marbles** of the most varied hues and veining, **granites** and **gabbros**, are sawn into slabs and polished for facings.

RADIO AND ELECTRIC MATERIALS

Piezoelectric quartz is a strategic material in universal demand, but Brazil is the sole producer. During the recent war, Brazilian materials supplied more than 100 oscillator factories with a total output of 250 million dollars' worth of quartz.

The reserves of piezoelectric quartz in this country are inexhaustible. After grading, it is shipped abroad from the ports of Rio and Bahia. It would, however, be advantageous to put up plants for the manufacture of **slabs**, **blanks** and **oscillators** on the spot, thus adding this industry to the national economy.

Brazil now rivals India for the position of chief producer of **mica**.

Before the war, much sheet mica was exported to India for processing, but it is now shipped direct to the American market.

Domestic mica will be of major importance in the electric materials industry when the local hydroelectric potential is developed.

GEMSTONES

Placer **diamonds** are widely distributed over the area of Brazil and are to be found in the States of Amazonas, Pará, Maranhão, Bahia, Minas Gerais, Mato Grosso, Goiás and Paraná. Nowhere, however, have the gems been found in the matrix rock.

Diamonds have been mined in Brazil since 1720, the work now being carried on by about 30,000 searchers who maintain an annual output of from 200,000 to 400,000 carats. Brazilian stones are small but of fine water, possessing good brilliancy and fire.

The production, exclusively Brazilian, of the **carbonado** or black diamond, an extremely hard stone, stands out among that of industrial diamonds as a whole and attains 15 to 20 thousand carats per year.

World War II brought about an exodus of the Dutch and Belgian lapidaries which revived the Brazilian industry; soon as many as 3,000 skilled workers were being employed on an industrial scale by the refugees.

Brazil is renowned for its **semi-precious stones:** aquamarines, tourmalines, imperial topazes, citrines, amethysts, emeralds, chrysoberyls and the new gem **brasilianite,** first found at Teófilo Otoni, in Minas Gerais.

MISCELLANEOUS MINERALS

There are innumerable minerals in Brazil which may be used as **refractories, sound** and **heat insulators, abrasives,** etc.

Apart from magnesite and chromite refractories, zircon is also being employed in the manufacture of heat-resisting materials.

Brazilian diatomite is exported for use as a filler and in industrial filtration.

A great many deposits of **talc** are known, in addition to those of **steatite** and **agalmatolite** in Minas Gerais, which are suitable for use as facing materials.

Brazilian **graphite** supplies the domestic pencil factories and enters into the composition of certain paints and lubricants.

Of the many mineral springs, thermal and subthermal, the waters in some cases are juvenile, of magmatic origin, and meteoric in others. The spas are confortable and often luxurious, and fitted out with the most modern equipment.

Coal being unloaded at the docks of Rio de Janeiro

VEGETABLE EXTRACTIVE INDUSTRIES

Owing to its privileged geographical situation, Brazilian territory can boast of the most exuberant vegetation with a high production yield.

It is estimated that one fourth of the known species of flora thrive in the forests which cover an area of about 865 million acres and are rich in timber, cellulose, oils, gums, resins, balsams, waxes and tannins.

So valuable a heritage provides a magnificent source of high grade raw materials, in some cases irreplaceable, for the numerous industries based on vegetable products.

The advance of chemical research has contributed increasingly to a knowledge of the appreciable and often exceptional properties of Brazilian plants and the ways in which full advantage may be taken of them.

Many useful species are to be found only in this country, as, for instance, carnauba, guaraná and oiticica, but others are being cultivated methodically, particularly such oil-bearing plants as cotton, castor, tung, mint, linseed, sunflower and peanut. The following pages will give some idea of the scope of this domain.

BRAZILIAN EXTRACTIVE VEGETABLE PRODUCTION — 1946/1947

PRODUCTS	QUANTITIES PRODUCED In kilogrammes (= 2.2 lbs.)		PRODUCTION VALUES (In cruzeiros)	
	1946	1947 *	1946	1947 *
Agave	9,409,152	9,625,041	38,566,562	39,940,438
Babassú	51,545,379	64,333,493	102,219,847	180,307,017
Brazil nuts	23,988,976	28,081,500	125,439,261	107,202,173
Carnaúba wax	11,633,170	9,082,654	487,311,588	337,035,890
Caroá fibre	9,392,024	9,251,305	22,203,349	23,379,810
Guaraná	134,080	130,000	2,858,714	2,800,000
Guaxima fibre	3,256,639	4,071,386	10,523,217	16,846,930
Jarina (vegetable ivory)	6,000	6,000	10,000	10,000
Jute	8,123,574	6,316,981	30,786,151	25,022,482
Licuri (uricuri) nuts	3,730,883	2,745,529	7,778,755	7,661,057
Licuri (uricuri) wax	1,778,032	1,576,621	58,914,469	38,222,803
Mattee tea	62,581,592	72,541,000	68,120,798	91,875,500
Oiticica	32,349,327	23,663,786	39,498,443	25,720,307
Piassava fibre	6,048,840	5,321,634	23,974,140	22,636,410
Rubber	31,687,069	32,739,160	392,855,749	402,134,896
Timbó powder	80,110	—	1,251,261	—
Timbó root	166,618	129,473	370,388	388,861
TOTAL	**225,911,475**	**269,615,563**	**1,412,682,692**	**1,321,184,574**

* Data subject to rectification.

BRAZILIAN PRODUCTION OF TIMBER, FIREWOOD, CHARCOAL AND RAILWAY SLEEPERS — 1946

FEDERATED UNITS	Timber	Firewood	Charcoal	Railway sleepers
	Cubic metres (1)	Cubic metres (1)	Kilogrammes (2)	Units
Guaporé Territory	96	40,510	25,200	16,980
Acre Territory	42,249	168,055	148,600	850
Amazonas	14,564	312,418	8,866,917	5,093
Rio Branco Territory	20	4,572	—	—
Pará	105,594	210,738	147,516	17,127
Amapá Territory	301	43,050	200,000	—
Maranhão	30,642	1,337,070	1,725,620	12,000
Piauí	43,070	1,495,282	190,030	24,050
Ceará	23,476	260,873	863,070	115,127
Rio Grande do Norte	17,130	705,820	3,637,330	35,250
Paraíba	35,861	2,101,739	31,782,215	2,163
Pernambuco	42,460	1,658,091	26,632,624	153,995
Alagôas	40,620	2,773,900	22,117,410	140,900
Sergipe	8,554	346,209	789,650	45,650
Bahia	148,210	10,278,554	35,702,533	282,873
Minas Gerais	951,530	28,066,500	236,030,950	1,072,200
Espírito Santo	92,922	1,201,079	2,238,366	563,508
Rio de Janeiro	47,207	2,249,762	42,848,655	43,395
São Paulo	434,813	7,330,125	82,790,550	106,853
Paraná	1,168,354	4,154,101	5,899,062	99,224
Iguaçú Territory (3)	82,744	5,947,598	2,182,545	212,308
Santa Catarina	924,923	5,914,034	2,137,545	212,308
Rio Grande do Sul	1,079,521	4,535,111	21,343,883	444,472
Ponta Porã Territory (4)	1,434	48,868	15,079	7,230
Mato Grosso	11,099	370,733	329,780	33,274
Goiás	63,338	920,360	141,570	37,910
TOTAL	**5,410,732**	**83,475,152**	**528,789,600**	**3,684,740**

(1) 1 cubic metre = 423.6 board feet = 35.31 cubic feet.
(2) 1 kilogramme = 2.2 lbs.
(3) Now reincorporated in the State of Paraná.
(4) Now reincorporated in the Stote of Mato Grosso.

PROPERTIES OF SOME BRAZILIAN VEGETABLE OILS

LOCAL NAME	BOTANICAL IDENTITY	Specific gravity at 15°C.	Melting point in °C.	Freezing point in °C.	Saponification number	Iodine value	Acidity	Refraction index	INDUSTRIAL APPLICATION
PALMS:									
Açai (assaí)	Euterpe oleracea	0.988	—	—	193.7	7.017	10.2	—	Food produc
Anajá (inajá)	Maximiliana regia	—	26-29	—	241	17	—	—	Food produc Soap.
Babassu	Orbignia oleifera	0.914	22.2-26	22.7-23	248-264	12-17	2.8-4.3	1.4608	See page 8
Bacaba	Oenocarpus bacaba	0.988	—	0	192	78	—	1.4686	Soap. Stear
Batauá (patauá)	Oenocarpus bataua	—	—	-10	196	75	13	—	Soap. Stear Salad oil.
Curuá	Attalea manosperma	0.920	—	—	255	8	—	0.920	Margarine.
Dendê	Eleais guineensis	—	22-30	21	199	80	30	—	See Oil-palr page 9.
Jatá (pirirama)	Syagrus cocoides	—	25-29	8-26	252	13-14	—	—	Food produc
Jauari	Astrocaryum jauary	—	30.5	—	242	13.7	5.4	—	Food produc
Jupati	Raphia taedigera	0.917	—	—	194	77	19.2	—	Food produc
Mucajá (macauba)	Acrocomia sclerocarpa	—	—	25	190	77	—	1.4598	See page 8
Murumuru	Astrocaryum murumuru	0.918	33-36	32.5	240	5.42-124	3-18	1.425	Margarine.
Tucumã	Astracaryum vulgare	0.957	27-35	—	220	46	32-44	—	Food produc Margarine.
Urucuri	Attalea excelsa	—	—	—	242	12.6	—	—	Food produc (calourless)
OTHERS:									
Ameixa	Ximenia americana	—	—	—	175	80	1-12	—	Medicine. Dryer. Soap
Anda-açu	Johannesia princeps	0.927	—	—	—	—	—	—	Medicine. Dryer. Light
Andiroba	Carapa guyanensis	0.949	10	5	196	62	18-37	—	Soap. Light
Arara bean (fava)	Hippocratea ararae	0.942	—	—	205.3	85.6	7.85	—	Food produc (red).
Arara nut (castanha)	Johannesia heveoides	0.924	—	—	195	101	2.18	1.4788	Dryer. Emet
Bacuri (pakooru)	Platonia insignes	—	310	—	199	78	46	—	Soap.
Baratinha	Caraipa lacerdaei	0.928	—	—	181	78	15.3	—	Soap.

PROPERTIES OF SOME BRAZILIAN VEGETABLE OILS

LOCAL NAME	BOTANICAL IDENTITY	Specific gravity at 15°C.	Melting point in °C.	Freezing point in °C.	Saponification number	Iodine value	Acidity	Refraction index	INDUSTRIAL APPLICATIONS
Batiputa	Gomphia parviflora	0.910	—	—	—	70	12.4	1.4615	Medicine.
Brazil nut	Betholletia excelsa	0.918	28-30	4	170-198	80-106	1.43	1.4738	Fine soaps. Food products.
Cacao	Theobroma cacao	0.961	32-35	37	200	28-42	—	1.4600	Cocoa butter.
Cashew nut	Anacardium occidentale	0.918	—	—	170-195	60-89	2.2-8	—	Medicine.
Castar	Ricinus communis	0.963	13	—	185	84	—	—	Lubricant. Medicine.
Camadre de azeite	Omphalea diandra	0.919	—	—	192	116	—	1.4738	Perfume. Lubricant. Lighting. Food.
Campadre de azeite	Elaeophora abutaefolia	0.920	—	-17	177	178	—	1.474	Soap. Lubricant.
Cottanseed	Gossypium spp.	0.921 -0.930	—	—	193	146-196	—	1.4746	Margarine. Lighting. Soap.
Cupuaçu	Theobroma grandiflora	—	32	—	188	45	—	—	Same grease as cocoa butter.
Jabati	Erisma calcaratum	0.915	45	36	233.5	23.1	8.78	—	Medicine.
Mamorana	Pachira spp.	—	18.3	—	206.7	41.7	3.57	—	Food products. Industry.
Marfinzeira	Agonandra brasiliensis	—	—	-20	192.6	83.2	9.5	—	Soap.
Mauba	Acrodiclidium mahuba	—	40-44	—	252	18	20	—	45% trilaurin.
Munguba	Bombax munguba	—	—	—	185	64.4	—	—	Food products (light yellow).
Pajurá	Parinarium montanum	—	—	—	200	77	—	—	Soap.
Peanut	Arachis hypogaea	0.917 -0.925	37	0-3	190	95	0.3-2.6	—	Food products. Peanut butter.
Piquiá-eté	Caryocar villosum	—	30.5	28.5	199-200	26.4	5.3	—	Food products.
Pracachi	Pentaclethra filamentosa	0.910	—	—	170-177	69	19	1.4713	Food. Soap. Lubricant.
Quaruba	Erisma uncinatum	0.917	43.5	—	230	7	—	1.4500	Soap.
Quinquió	Aptandra spruceana	0.987	—	-20	190.7	91.2	10.9	—	Soap.
Rubber	Hevea brasiliensis	0.924	—	—	190	117-140	9-23	—	Dryer. Paints and varnishes.
Sapucaia	Lecythis paraensis	—	4	4	174	72	—	—	Soap. Lighting.
Silk cattan	Ceiba pentandra	0.924	—	28	196	75-76	5.2	—	Food products.

PROPERTIES OF SOME BRAZILIAN VEGETABLE OILS

LOCAL NAME	BOTANICAL IDENTITY	Specific gravity at 15°C.	Melting point in °C.	Freezing point in °C.	Saponification number	Iodine value	Acidity	Refraction index	INDUSTRIAL APPLICATION
Soapberry	Sapindus saponaria	—	—	15	190	55.5	9.7	—	Soap. Rich saponine.
Tacacazeira	Sterculia prurlens	0.912	—	5	192	66	—	1.4712	Yellow odou less oil. So
Tamaquaré	Caraipa psidiifolia	0.938	—	—	183	92	22.12	—	Soap.
Tonka bean	Dipteryx odorata	—	—	—	189	66.2	—	—	Perfume.
Uchi-pucu	Saccaglottis uchi	0.908	—	23	187	70.2	35	1.4665	Edible oil.
Ucuuba	Virola spp.	—	45	40	219	9.14	17.5	—	Soap. Light Stearine.
Umari	Poraqueiba paraensis	0.913	—	1	196	7.18	21	1.4685	Food produc
Yellow oleander	Thevetia neriifolia	0.914	—	13	—	—	—	—	Soap.

NOTE — Brazilian names: Brazil nut, **castanha de Pará;** cashew nut, **castanha de cajú;** castor oil plant, **ricina** or **mamana;** cotton, **algadão;** peanut, **amendoim;** silk cotton tree, **sumaumeira;** soapberry, **saboneteira;** yellow oleander, **jarra-jarro.**

Oiticica silos in Ceará

BABASSU

The babassu palm generally grows in extremely dense groves often numbering more than 200 trees per acre, 100 of which are always in production. The productive vigour of each tree is remarkable, for it bears fruit for as long as ten years, the annual harvest ranging from 450 to 1,800 nuts per tree with a minimum total yield of 15 lbs. of kernels.

When the babassu nuts are ripe, they fall to the ground and all the collectors have to do is to pick them up.

In order to form an idea of the abundance of this natural wealth, it need only be realized that in the State of Maranhão alone the babassu palms cover one fourth of the land area, which amounts to 334,809 square kilometres or about 130,000 square miles.

The kernels provide a valuable foodstuff and yield an oil employed in medicine and industry. It is an excellent substitute for olive oil, butter and lard. A cattle feed in the form of a cake is made from the residue and the shell can be used for fuel.

ESTIMATED CAPACITY OF BABASSU PRODUCTION IN VARIOUS STATES OF BRAZIL

STATES	AREA In hectares (=2.471 acres)	NUMBER OF TREES In thousands	PRODUCTION OF NUTS In millions	PRODUCTION OF KERNELS In metric tons
Amazonas	200,000	50,000	40,000	520,000
Bahia	50,000	12,500	10,000	130,000
Ceará	30,000	7,500	6,000	78,000
Goiás	1,000,000	250,000	200,000	2,600,000
Maranhão	8,655,400	2,163,850	1,731,080	22,504,040
Mata Grassa	2,000,000	500,000	400,000	5,200,000
Minas Gerais	1,000,000	250,000	200,000	2,600,000
Pará	200,000	50,000	40,000	520,000
Piauí	300,000	75,000	60,000	780,000
TOTAL	**13,435,400**	**3,358,850**	**2,687,080**	**34,932,040**

DATA — 1 hectare = 250 palm trees; 1 palm tree = 800 nuts;
1 nut = 13 grammes of kernels (7 to 9% of the total weight of the nut).

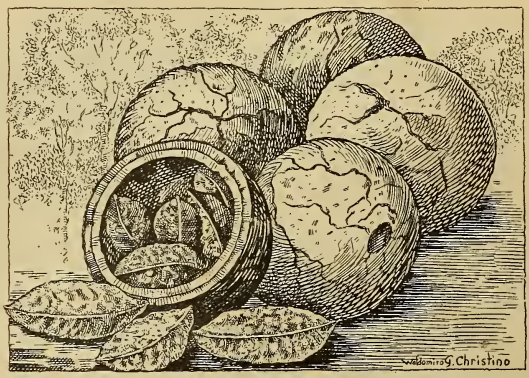
BRAZIL NUTS

The Brazil-nut tree, **Bethollетia excelsa**, grows wild in the Amazon region.

The hard woody outer shell of the fruit encloses 15 to 20 seeds or "nuts", the kernels of which have a high food value and are rich in oil. Each worker can collect from three to five bushels per day; some trees, however, yield as much as 14 bushels, the equivalent of four barrels.

The trees begin to bear fruit at eight years of age, reaching full production four years later.

In view of the height of the canopy, the fruit is harvested on the ground and split open on the spot, the work being of a seasonal character, but whereas the rubber collector works only in the low-water season, the activities of the Brazil-nut gatherer are confined to the period when the river is in spate.



This extractive industry has considerable possibilities. After drying and shelling, the nuts yield 50 to 60% of oil, pleasant-tasting as a salad oil, industrially applicable in soap-making and pharmacy, and useful as a lighting fuel and lubricant for delicate mechanisms.

The United States, Canada and England have always been heavy consumers of Brazil nuts, for the high calorific value of the kernels makes them eminently suitable as a winter food.

A supply of 100 calories requires 104 grammes of walnuts, 150 of apples, 205 of oranges, 232 of pineapples or 94 of bananas, as compared with only 14 grammes of Brazil nuts.

One hundred grammes of carbohydrate can be replaced by 190 grammes of white bread or a mere 57 grammes of Brazil nuts.

OITICICA

Northeastern Brazil and particularly the States of Piauí, Ceará, Rio Grande do Norte and Paraíba are the natural habitat of a lofty tree known as oiticica (**Licania rigida,** Benth.), which produces a valuable oleaginous fruit.

The oil obtained from the seeds is a dryer closely ressembling Chinese tung oil and is the most recent export product contributed by Brazil to the world's markets.

Production is most active in Ceará and this is the State chosen by the principal industrial organizations engaged in this flourishing industry. In less than five years, 20 oil refineries have been established in the northeast with a processing capacity of 80 thousand tons of the raw material. This has greatly enhanced the value of land where the tree is growing which has now become so valuable, whereas it used to be a nuisance because of the shade it cast over other plantings.

Almost all the oiticica exported from Brazil goes to the United States, where its resistance to corrosion and blistering cause it to be used chiefly in the oil and varnish industries.

GATHERING CARNAUBA

The valuable carnauba wax, of world-wide renown and demand, sticks like dust to the leaves of the carnauba palm.

CASHEW NUTS

The cashew-nut tree, **Anacardium occidentale,** is native to Brazil. Great interest is being shown in methods of processing the fruit, owing to the wide variety of uses for which the product is in keen demand on the international markets.

Thus the nut itself is used in confectionery, while the oil extracted from the double rind that encloses the kernel and called "cardoil" by the English and Americans, is a by-product that finds an application in the preparation of plastics and many other industrial products, such as: insulating compounds for electric wiring, coils, motors, dynamos and magnetos; brake shoe and clutch linings; oiled paper; anti-corrosives for chemical tanks; paint and varnish resins; compounds for heat- and oil-proofing natural and synthetic rubber; flooring materials; insecticides.

The possibilities of development are so promising that an American firm, holding about a hundred patents for inventions based on the cashew nut, has sent experts to Brazil to study ways and means of production and industrialization.

A ton of cashew nuts yields an average of 1 cwt. of cardoil and 6 cwt. of kernels.

WAXES

CARNAUBA — The carnauba or wax palm, **Copernicia cerifera,** Mart., is typical of certain regions of Brazil, where it ranks as an outstanding source of wealth.

Graceful and imposing, it spreads its fan-shaped leaves over wide areas along the banks of the rivers in the northeast, giving a distinctive aspect to the local scenery.

Although the carnauba provides an excellent fibre, its great economic value resides in the wax which adheres in the form of a dust or powder to the underside of the leaves. Each plant yields an preparation of paints and varnishes, film and gramophone record 80 million palms in production throughout Brazil.

The uses of carnauba wax are numerous, varied and important. Apart from serving to raise the melting point of paraffin wax and stearine, it enters on a large scale into the manufacture of floor, furniture, leather and automobile polishes, and is widely used in the preparation of paints and varnishes, film and gramophone record manufacture, and the waterproofing of paper, cardboard and fabrics. Likewise the varied industries of explosives, carbon paper and electric insulating materials make an extensive use of the Brazilian wax.

LICURI (Uricuri) — This feather palm is also native to Brazil and possesses valuable economic properties, in the form of fibre, cellulose, wax and an oil considered as good as babassu oil.

Its principal habitat is the State of Bahia, where it is to be found covering about 30% of the State area with an average density of 80 trees per acre.

The wax is stripped from the licuri leaves as from those of the carnauba. The plant is potentially of the utmost value to the Brazilian economy, for it yields a local product which is unique in the world.

The carnauba or Brazilian wax palm

GUMS, RESINS AND ESSENTIAL OILS

ANANI RESIN — Anani or anambi resin comes from **Symphonia globulifera**, L. (Guttiferae), known as "mani" or "moronobo" in French Guiana. This tree is readily distinguishable by the elbow-shaped buttress roots which enable it to get a purchase on the soft, marshy ground. Every part of the tree yields a yellow, resinous sap which thickens on drying. This gum is used by the Indians to glue on their arrowheads. It is also melted, purified and mixed with a small amount of powdered imbauba charcoal to form a kind of black bitumen which is run into cylindrical moulds and sold in Amazonia for cobbler's wax under the name of "cerol".

ANGICO gum is extensively employed in various Brazilian industries. It is an excellent substitute for gum arabic and comparative tests have shown that the gluing strengths of the two products are equivalent.

The angico tree also produces an excellent resin which exudes from the branches so abundantly as to fall to the ground in heavy drops.

The plant, of which there exist various species, is well known throughout Brazil, often lining the river banks with its gay flowers which attract swarms of honey bees.

BREU RESIN — Called Brazilian elemi to distinguish it from that obtained from the Philippine islands (Manilla elemi) and elsewhere in the Far East, this oleo-resin is produced by various trees of the genus **Protium** (Burseraceae). The species known as breu branco (**Protium heptaphyllum**) yields "jauara icica" resin employed in France under the name of "résine d'élémi bâtard" or "résine de Tacamaaca". The name of "breu", literally pitch, comes from its use as a ship-calking material, after being mixed over a flame with oil or tallow. When burnt, it gives off an aromatic odour which enables it to be sometimes used as a substitute for incense.

CAMPHOR LAUREL OIL — Obtained by distillation from **Ocotea costulata**, Nees Mez, a member of the laurel family found in the rosewood zone in the region of Juruti-Maués, along the banks of the River Trombetas near the Porteira Falls and on the Amazon delta at Breves. The smell recalls a mixture of camphor and turpentine and indeed 45% of pure turpentine can be extracted by rectification. Density at 28° C.: 0.8712; distillation point: between 194° and 200° C.

CHEWING-GUM — Formerly, sweet pine gum was used exclusively in the manufacture of this product, but its increased popularity encouraged the use of other raw materials mostly coming from forests in the tropical zone; indeed, the name "chicle" is derived from that given locally to the latex oozing from the bark of a Central American tree.

Brazil could share to an appreciable extent in supplying vegetable gums, for thirteen genera and probably more than a hundred species of the Sapotaceae family are known to thrive in this country.

Many of these species have not yet been properly tried out. Experiments and research should be applied to the development of this profitable field, so as to promote the discovery of valuable properties and the introduction of methods of cultivation calculated to obtain the most favourable results.

COPAIBA OIL — This balsam is exuded from the trunk of the copaiba tree (Leguminaceae, **Copaifera reticulata**, Ducke; **Copaifera**

multijuga, Hayne), which generally yields from 7 to 9 Imperial pints of oil, though as much as 26 and even 32 pints may be collected in exceptional cases. The oil is a syrupy, transparent liquid, pale or reddish yellow in colour and strongly scented. It is astringent and extensively used in medicine. Density at 15° C.: 0.983; saponification number: 77.8; iodine value: 174; acidity: 136.

JUTAÍ RESIN — As opposed to the fossil resin known as true or ripe copal, jutaí resin obtained from various live trees ("jutaí-açu" or "jutaúba", **Hymenaea courbaril,** L., or "jutaí-pororoca", **Hymenaea parvifolia**, Hub., both belonging to the pea family) goes by the names of raw, recent or "jackass" copal in English-speaking countries. Running from wounds made in the trunk bark, it solidifies into a hard mass, opaque on the surface but transparent underneath, having a vitreous, conchoidal fracture and a slightly resinous smell. The yield from each tree varies from 6 to 9 lbs. It is used by the inhabitants of the interior to varnish the rough pottery made locally, but may also enter into the composition of finer varnishes.

LACRE RESIN — Lacre wood (Guttiferae, **Vismia guyanensis,** Choisy) or caopia is a small tree growing in cut-over land. An orange-yellow resinous sap exudes from incisions made in its bark and subsequently hardens; the resin so formed takes the place of shellac or gamboge in America.

MINT — Before the Second World War, the United States imported menthol almost exclusively from the Far East, the normal consumption being estimated at 400 to 600 lbs. per year, absorbed chiefly by the pharmaceutical, food product, toothpaste, cream, liqueur and similar industries. American industry had relied on this source of supply and when it was cut off, the increasing scarcity of the raw material was responsable for attempts to develop peppermint-growing in that country, but the results obtained were unsatisfactory.

This state of affairs benefitted Brazil, cultivation being particularly active in the States of São Paulo, Paraná and Minas Gerais with predominance of the species **Mentha arvensis.**

The crop proved highly lucrative, giving three cuts per year with a yield of 70 to 90%, on the basis of 21.4 lbs. of menthol per acre.

The development of such remarkable possibilities brought Brazil in a few years' time to the position of being able to supply almost all the world's requirements of menthol.

In the State of São Paulo alone, the 1943 crop was processed by no less than 61 distilleries with a total production of 50,000 lbs. of crystallized menthol of American standard type.

By the beginning of 1944, mint-growing had entered upon a new stage of development, published statistics revealing that the area under peppermint in that State was then seven times greater than in the preceding year and amounted to more than 60,000 acres, while the number of stills had risen to 1,500.

The production curve took on an even steeper slope in 1945 and Brazilian exports exceeded 1 million lbs. Expansion would indeed have got quite out of hand, had not official measures been taken to safeguard production, e.g.: restriction of the areas under cultivation; pegging of export prices; compulsory registration of all transactions in oil of peppermint and crystallized menthol; and regulations forbidding any new crystallization or oil-distilling plants to be set up.

Brazilian menthol is strictly controlled and thoroughly stands up to industrial and pharmaceutical requirements in the United States.

MUCUGÉ is another useful plant which abounds in the State of Bahia and yields a fine latex. The "milk" of this tree is sweet and may be added to coffee as a substitute for cow's milk.

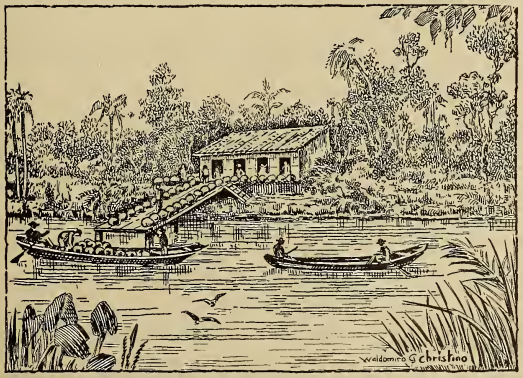
MUIRATINGA LATEX — The muiratinga or cauchorana (Moraceae, **Perebea mollis,** Poepp) may be tapped by in incision in the bark to yield an abundant flow of resinous latex, light chestnut yellow in colour, which is a true natural varnish. The yellow tinge may be removed by the addition of a small quantity of a solution of alum. It may be applied directly to a wooden surface like a paint.

NHAMUÍ OIL — Extracted from **Nectandra eleophora,** Barb. Rodr., a tall tree of the laurel family, often found in the sandy soil forests of the lower Rio Negro and elsewhere in the Amazon Basin. The oil is a colourless, fluid liquid smelling like turpentine; readily inflammable, it burns with a high flame, giving off dense black smoke. It is actually almost pure turpentine. Density at 28° C.: 0.859; boiling point: 154°-169° C.

ROSEWOOD OIL — Extracted by distillation from the wood of a tree found in the basin of the River Oyapoc (Lauraceae, **Aniba rosoedora,** Ducke). Rosewood essence is a colourless, highly fluid liquid, tasting pleasantly of a mixture of roses, lemon and bergamot. It is composed largely of linalol and used in perfumery. Several distilleries operating in the States of Pará and Amazonas are engaged in processing rosewood. Density: 0.863-0.867; distillation point between 194° and 200° C.

SORVEIRA RESIN — The sorveira tree (Apocynaceae or dogbane family, **Couma utilis,** Muell.) yields an abundant milky juice which, after coagulating and drying, is used to prepare a white resin, hard and brittle when cold but softening in warm water. It is not sticky, but is an excellent calking material for ships.

TAMANQUEIRA RESIN — The "tamanqueira de leite" of the Upper Amazon and Acre rivers (**Zschokkea lactescens,** Kuhlmann) is another member of the dogbane family which produces large quantities of a white latex that is particularly suitable, after coagulation, for the preparation of chewing-gum, owing to its pleasant vanilla taste.



Unloading balls of raw rubber at a collectors' wharf on the banks of the River Amazon

Curing rubber in the smoke fo burning urucuri nuts

RUBBER

Brazil used to be the largest supplier of natural rubber for industrial consumption all over the world. Various circumstances brought about the loss of Brazilian supremacy on the international markets, chief among these being the transplantation of **Hevea brasiliensis** to the East Indies and the subsequent advantage of organized intensive cultivation over the primitive methods of collection from wild trees scattered throughout the forest.

At present the rubber supplied by Latin American countries nearly all comes from the Amazon basin, a vast extent of which lies within the frontiers of Brazil.

The Brazilian government has embarked upon a programme designed to raise the level of the natural rubber production which already suffices to meet the requirements of home industry and leave a surplus for export.

The new Brazilian policy may be summed up in the following points: land reclamation and hygiene in the Amazon region; organization of transportation; loans to the rubber collector; fixing of basic prices; and principally the establishment of technically organized plantations.

The Agronomical Institute of the North ("Instituto Agronómico do Norte") and the Rubber Bank ("Banco da Borracha") have been created in support of Brazilian rubber producers.

In addition to the extractive production, promising plantations are being developed, an outstanding example being those of Fordlândia, where grafting has been adopted so as to ally high-yielding qualities with those of resistance and immunity to pests.

In various regions of Brazil there exist other rubber-producing plants, such as the **maniçoba** and **mangabeira** trees. Even in the habitat of the rubber tree itself, such species as the **caucho**, **balata**, **coquirana**, **sorva** and **maçaranduba**, contribute special types of latex to production statistics.

Though supplies from Brazil are as yet insufficient to meet the demands of world industry, the prospects are encouraging. Occupying the position of largest producer in the hemisphere, it has a very fair chance of recovering a share of the lost markets.

Floating logs down-river in a raft or "balsa"

TIMBER

Lumbering is one of the major industries of Brazil. The secular forests comprise the most varied species of hardwood, suitable for a great number of purposes, and comparative tests have shown the high value of their physical and chemical properties.

The southern pine is unquestionably the most valuable timber in the country and covers an area of more than 22 million acres in the States of Paraná, Santa Catarina and Rio Grande do Sul.

Interspersed with the pinewoods there are mixed stands of various other important species, particularly imbuia which is highly appreciated for its density, strength and attractive graining.

Bearing in mind the fact that 48% of Brazilian territory is forest country, it is not difficult to imagine the immense potental wealth that reserves of this magnitude represent in a major economic domain.

Official control in this field extends from felling operations, and subsequent sawing into lumber, right up to the most highly industrialized stage which is the manufacture of plywood, an industry that, though one of the most recent, has developed apace because of wartime conditions which deprived the South American countries of Finnish and Swedish plywood and opened up new markets where Brazil has secured an enviable position and succeeded in maintaining it.

The Brazilian woods best known to foreign trade are: pine, imbuia, aguana and jacaranda, often known as Brazilian rosewood. These five account for about 98.5% by value of the timber exported, the lion's share being assigned to pine with 89% of the total.

However, no less than thirty-two different varieties of Brazilian wood are in demand on foreign markets, some meeting with greater success than others.

CHARACTERISTICS OF BRAZILIAN WOODS

ACAPU — Also known as Brazilian teak, this heavy fibrous wood is very strong and proof against insect pests. Its black lustre gives a fine effect to parquet flooring.

AGUANO — This excellent wood, which grows in the south of the Amazon region, is employed in quality cabinet-making and in the building trades.

CEDAR — A very light wood ranging in colour from red to grayish brown, with an aromatic odour. Much used for furniture, cigar-boxes, backs of wardrobes, plywood, door and window frames, etc.

FREIJÓ — A strong lightwood used in aircraft and propellor manufacture.

GONÇALO-ALVES — One of the finest woods used in furniture-making. It wears well out of doors and does not rot underground.

IMBUIA — Deep in colour or almost black, with thick fibres and brilliant light-brown patches. this wood is extremely beautiful when polished and varnished. Though eminently suitable for high class cabinet work, it is also used for railway sleepers and in house and ship building and carpentry in general.

JACARANDA — The most beautiful wood in Brazil. There are a number of varieties; the rose variety is very resistant to damp; then there is one of a deeper hue with dark veins; and a purple or violet jacaranda is the hardest of all, besides other intermediate types. The trees abound in the forests of Rio State and Minas Gerais and indeed in nearly all the States from Maranhão to São Paulo.

MAÇARANDUBA — The weather-resisting qualities of this sturdy timber recommend it for outdoor construction work, housebuilding, sleepers, bridges, etc.

PAU-MULATO — Used in ship-building, outdoor construction work and cabinet-making.

PAU-ROXO — This violet-hued wood is very strong and is used in combination with satinwood and other pale woods to compose attractive patterns in flooring.

PAU-AMARELO OR SATINWOOD — This satiny, light yellow wood is employed in the making of high grade furniture.

PEROBA — One of the commonest woods in Brazil, used for furniture, posts, sleepers, flooring, etc.

PINE — A white wood with pale, purple, or deep red veins, used in the building trades and furniture manufacture, and for packing-cases for every purpose, broom handles, sheets for plywood, paper pulp and cellulose.

CELLULOSE

The cellulose industry ranks among the six most important in the world. Cellulose is a highly strategic material, essential to the manufacture of a wide range of products indispensable to human comfort.

Paper, vegetable silk, celluloid, varnishes, cinematographic films and plastics, to mention but a few uses to which cellulose is put, all help to increase the damand year by year.

Cutting the leaves for fibre on a plantation of piteira, a species of agave

The privileged position of Brazil as supplier of so important a raw material may readily be deduced from the fact that thousands of Brazilian plant species are rich in cellulose and characterized by a high yield in comparison with the pulpwoods of the Old World: ash (26%), Vosges pine (37%), beech (35%), birch (29%) and poplar (33%).

The following analytical results have been obtained for some of these Brazilian plants:

TREES OR SHRUBS	BOTANICAL IDENTITY	Density of Dry Wood	Humidity	Cellulose Yield (Dry)	Length of Fibre (mm.)	Width of Fibre (mm.)
Elemi (Breu branco)	Protium heptaphyllum	0.51	35%	38%	1.003	0.021
Guiana chesnut (Mamorana)	Pachira aquatica	0.46	60%	36%	1.880	0.020
mbaúba	Cecropia robusta	0.33	35%	48%	1.050	0.025
mbaúba, Black	Cecropia	0.37	42%	45%	1.110	0.021
mbaúba, Red	C. bifurcata	0.35	50%	22%	1.450	0.040
mbaúba, White	C. paraensis	0.35	58%	42%	1.110	0.021
mbaubão	C. distachya	0.32	47%	45%	1.280	0.039
Lac	Vismia guianensis	0.58	50%	33%	0.830	0.017
Munguba	Bombax munguba	0.18	70%	19%	1.600	0.022
Dente de macaco	Apeiba tibourbou	0.15	50%	29%	1.430	0.018
Quaruba, Red	Vochisia vismiaefolia	0.62	—	41%	1.130	0.015

The fibre characteristics of the following species have also been determined:

TREES OR SHRUBS	BOTANICAL IDENTITY	LENGTH OF FIBRE (mm.)	WIDTH OF FIBRE (mm.)
Beefwood (Australian pine)	Casuarina glauca	1.02	0.013
Cypress	Cupressus spp.	1.53	0.030
Eucalyptus	Eucalyptus spp.	0.85	0.012
Japan cedar (Sugi)	Cryptomeria japanica	2.34	0.031
Mutamba	Guazuma ulmifalia	1.10	0.023
Paraná pine	Araucaria brasiliensis	4.50	0.050
Poplar (Eurapean aspen)	Papulus tremulus	0.88	0.025
Tamanqueira	Fagara rhaifalia	1.03	0.031
Tamaquaré	Caraipa grandifalia	1.18	0.022
Tamboril	Enteralabium maximum	1.00	0.028
Teuta azul (Blue teuto)	Pithecalabium trapezifalium	1.19	0.019
Ucuuba	Virala surinamensis	1.02	0.027

Brazilian pine is exceptionally long-fibred and supplies several pulp mills.

The marsh plant **lirio do brejo** or garland flower **(Hedychium coronarium),** which grows rapidly and abounds along the sea-coast, is excellent for paper-making, while the **bracatinga** tree **(Mimosa escabrella)** is another quick-growing species yielding a soft cellulose particularly suitable for the manufacture of celluloid.

The leaves of the carnauba palm yield an excellent fibre for a wide variety of purposes

Harvesting home-grown fibre

TEXTILE FIBRES

Brazilian crops (coffee, rice, maize, castor, cacau and haricot beans, and other products) require several million sacks for shipping them from the agricultural zones to the consuming centres and export ports.

Three textile plants are exciting particular interest among Brazilian farmers: **sisal hemp, New Zealand flax** and **ramie,** the two former being suitable for sacks and ropemaking, while the latter is an excellent substitute for European linen flax.

Brazil has always been a heavy importer of Indian jute, but large plantations are now being developed in the Amazon Valley where the hot damp climate ensures a good harvest with fibres as long as 10 to 14 feet. The efforts made to acclimatize jute in this country have been coordinated along more rational lines as a result of the work being carried out by the Northern Agronomical Institute ("Instituto Agronómico do Norte"). It is estimated that about 5,000 families are engaged in the cultivation of Indian jute in the Amazon region.

It is not to be thought, however, that imported species of textile plants are necessarily superior to the native varieties, many of which have been used locally for generations and have valuable, often preeminent, properties, depending on the uses to which the fibre is to be put. More than 60% of native fibre now enters into the raw material being worked in the country.

The importation and construction of decorticating and degumming equipment, along with recent improvements in the methods employed, are contributing materially to the development of fibre crop farming.

CHIEF BRAZILIAN TEXTILE PLANTS

ARAMINA (**Urena lobata**, L.) — This member of the mallow family, also known as **guaxima, carrapicho** and **purple mallow**, is very common throughout Brazil.

Comparative studies of aramina, St. Francis' Poppy and Indian jute have brought to light the following advantages: aramina plantations do not require hoeing whereas jute only does well on soil free from weeds; moreover, the plant is not readily attacked by ants or the coruquerê caterpillar, pests which do a lot of damage to jute; finally, aramina grows from a rootstock and can be cut for several years running, whereas jute must be sown anew every year.

CARAUÁ (**Bromelia sagenaria**; see also Caroá) — This pineapple-like plant is a damp-loving species native to the Amazon Valley, where there are two varieties, one **white** with tough, light-coloured fibres and the other **purple**, the rarer of the two.

It must not be confused with its fellow Bromeliacea, "caroá" (also called "crauá" and "cruá") from which it differs in the fact that, in the wild state, it grows by itself and not in dense masses like the natural caroá plantations in the northeast. It is, however, frequently planted in brakes as a firestop, for it spreads rapidly and does not require transplanting from the seed-bed. By 8 months, the leaves are already five feet long and in 14 months' time each individual clump bears 50 to 60 leaves, about 8 feet in length; when it is considered that every acre under carauá produces a minimum of 3,000 lbs., with a 5% to 8% yield in fibre, it will be seen that the crop is of considerable interest to planters and industrials, for the fibre is not only widely used in rope-making, but, mixed with cotton, can also be woven into an excellent fabric.

CAROÁ (**Neoglaziovia variegata**, Mez.; see also Carauá) — This stemless Bromeliacea spreads its sword-like leaves, 16 feet in length, over vast areas of the northeastern caatingas, furnishing this arid country with an extractive industry, for the long tough fibres are used in ropemaking and as a substitute for jute in its various applications. Recently a fabric woven from this fibre has achieved some success.

MACAMBIRA (**Bromelia laciniosa**, Arr. Cam.) — The tough fibres are used for rope and hammock making.

MALVA BRANCA (White mallow; **Sida cordifolia**, L.) — Common in Pará. Yields good fibre for rope, burlap, fabrics and paper.

MALVA PRETA (Black mallow; **Sida rhombifolia**, L.) — Used for brooms. The stem bark yields a good fibre, stronger and more lasting than jute.

MALVA VELUDO (Velvet mallow; **Pavonia malacophylla**) is found in Pará and as far south as Minas Gerais, but is more abundant and utilized more extensively in the former State. The toughness of its fibres makes it an excellent substitute for jute.

NEW ZEALAND FLAX (**Phormium tenax**, Forst.) is called **canhamo** (hemp) in Brazil where it was introduced many years ago and is now cultivated systematically in the State of São Paulo for the rope and string industry.

OKRA or GUMBO (**Hibiscus esculentus**, L.) — Though originating in Africa, it is cultivated in Brazil under the name of **quiabeiro** as a vegetable. The stems yield a very strong fibre.

PAPOULA DE SÃO FRANCISCO (St. Francis' Poppy) or Brazilian hemp (**Hibiscus cannabinus,** L.) is a shrub, 7 to 13 feet in height, yielding a fibre that can be put to the same uses as jute. There are plantations in the States of São Paulo, Rio de Janeiro and Minas Gerais.

PIASSAVA or PIASSABA — The leaves of this palm are 13 to 16 feet long and the stalks emerge from a dense network of thick matted fibres forming a sheath around the trunk. These fibres are used for making brooms, brushes and ship's hawsers for they last well in sea-water and are light enough to float.

Bahia piassava (**Attalea funifera,** Mart.) has really exceptional qualities and is a source of wealth for this State.

There are as yet no organized plantations of piassava, which remains the basis of a flourishing extractive industry. The leaves are cut at the base and the fibre stripped from the end of the stalks, each palm-tree yielding an average of 19 lbs. of fibre. A skilled labourer can gather about 100 lbs. of rough fibre in a day's work, yielding 66 lbs. of clean material.

In the Amazon region, particularly in the valley of the Rio Negro, another species is to be found: **Leopoldina piassaba,** Wallace. The fibre ressembles Bahia piassaba, but is not so strong.

PINEAPPLE (**Ananas sativus,** Schult.) — Widely cultivated in Brazil for the fruit and leaf fibre, one of the varieties being known as **abacaxi.** The fine silky fibres are very strong and suitable for making quality fabrics and lace.

PITEIRA (**Fourcroya gigantea,** Vent.) — The tall flower stalk of this species of agave is dried and used instead of cork by insect collectors; it also makes a good razor-hone. The leaves, 4 to 8 feet long, supply strong fibres for ropes, paint and scrubbing brushes which stand up to sea water.

RAMIE (**Boehmeria nivea,** L.), also called Rhea or China-grass, belongs to the nettle family and grows up every year to a height of 4 to 8 feet from a perennial rootstock. It is being cultivated actively in the States of São Paulo and Paraná for the excellent fibre it produces, leaving a wide margin of profit to the farmer.

Ramie is a high grade product suitable for delicate fabrics and cannot be grown by every foreign competitor. In São Paulo there are enough spinning mills to absorb all the output of the region. Apart from substituting linen thread advantageously both in quality and price, the material may be mixed with wool and silk lending added strength to the finished fabrics.

The São Paulo Government is encouraging ramie growing by standardizing commercial types, guaranteeing profitable prices, advocating improved decortication and degumming processes and cheapening the necessary machinery.

ROSELLE, RED or JAMAICA SORREL (**Hibiscus sabdariffa,** L.) is known as **vinagreira** (vinegar plant) or **caruru azedo** in Brazil. Roselle fibre is superior to hemp.

TUCUM (**Bactris spp.** and **Astrocaryum spp.**) — The name applies to various species of palmtree growing wild in the eastern region of Brazil, where the fibre is greatly appreciated in the manufacture of fishing lines and nets.

TANNIN

Brazilian forests are rich in tannin-bearing plants and several factories are engaged in preparing this valuable raw material, which is indispensable to various industries and particularly to tanning.

The most important woods utilized industrially fall into three groups: the **barbatimões,** 25 to 48% tannin; the **angicos,** 30 to 45% and the **mangroves,** 20 to 30%.

More than 10 million saplings of **black acacia** or lightwood **(Acacia melanoxylon)** have been planted in the State of Rio Grande do Sul, while the **quebracho** or axe-breaker tree, renowned as much for its high tannin content as for the dyeing extract, grows wild in the south of Mato Grosso.

TANNIN CONTENT OF BRAZILIAN WOODS

TREES OR SHRUBS	BOTANICAL IDENTITY	PERCENTAGE OF TANNIN (Maximum)
Angica branca (White a.)	Piptadenia calubrina	45%
Angica da campa (Field a.)	Piptadenia macracarpa	45%
Barbatimão branca (White b.)	Stryphnadendran barbatimão	35%
Angica verdadeira (True a.)	Piptadenia rigida	35%
Duranhem	Chrysaphyllum duranhem	30%
Caparrasa	Ludwigia caparasa	25%
Mangue vermelha (Red mangrave)	Rhizaphara mangle	25%
Angica Raxa (Purple a.)	Piptadenia cebil	20%
Murici	Byrsanima spp.	20%
Red quebracha	Schinopsis Larentzii	20%
Paricá	Piptadenia peregrina	16%
Inga brava (Wild i.)	Calliandra peckalti	15%
Inga caixão (Box i.)	Inga heteraphylla	15%
Inga doce (Sweet i.)	Inga affinis	15%
Jurema preta (Black j.)	Mimasa nigra	14%
White quebracha	Aspidasperma quebracha	12%
Aroeira da Sertão (Backwaads a.)	Astranamium camune	12%

INSECTICIDES

Cases of poisoning are often traced to the use of mineral insecticides and it is clear that the ideal product for use in pest control is one that destroys the insects attacking the plants but is harmless to man.

At the present time, **rotenone, pidetine** and **nicotine** are the three alkaloids of vegetable extraction which are most commonly employed in the preparation of insecticides.

These active principles are to be found in Brazilian plants, the most important being timbó vines and chrysanthemums.

Of these the former are wild tree-climbers of the Amazon valley, the roots of which are rich in rotenone and exported after careful packing in strong brown paper bags. On the other hand pyrethrum or "Persian" powder is extracted from a small chrysanthemum cultivated in various parts of Rio Grande do Sul and yielding from 550 to 700 lbs. of the dry product per acre.

MEDICINAL PLANTS

Brazilian plant life furnishes ample resources for herbal medicine and the flora is well known to provide valuable pharmaceutical material. Many active principles of imported products are present in plants of common occurrence, thus enlarging the possibilities of the chemical and pharmaceutical industries.

IPECACUANHA — The ipeca or poaia is a rather small shrubby plant of the family Rubiaceae, native to Brazil and of considerable commercial value, for various alkaloids are extracted from its roots and particularly **emetine,** which is widely used in medicine. Brazil is indeed the only producer of true ipecac; in the State of Mato Grosso alone, the plant is found in an area 37 miles wide by 110 miles long and is the basis of a profitable, if primitive, extractive industry.

Emetine salts are prepared by Brazilian laboratories, thus retaining the monopoly of production in the country.

DRUGS DERIVED FROM BRAZILIAN PLANTS

DRUGS	ORIGIN
Atropine	Extracted principally from jimsonweed (**Datura stramonium**) and belladonna. Together with two other well known narcotics, hyoscíamine and hyoscine (scopalamine), it is also present in henbane (**Hyoscyamus niger**), which is easily cultivated in Brazil.
Brucine	See Strychnine.
Cafeine	Alkaloid extracted from coffee, mattee, kolanut and guaraná.
Cocaine	The coca plant thrives in the Amazon Valley, where the leaves are used for the extraction of cocaine.
Cumarine	Found in numerous Brazilian plants, particularly the tonka bean (**Dipteryx odorata**).
Curare	Present in various lianas of the genus **Strychnos.**
Curcumin	The ginger-like herb, turmeric (**Curcuma longa**) is found in all the States of Brazil.
Digitalin	The active principal of the foxglove, which, under the name of "dedaleira", has become quite acclimatized in Brazil.
Emetine	Alkaloid extracted from ipecacuanha, a plant native to the States of Mato Grosso, Goiás, Espírito Santo and Minas Gerais.
Eucalyptol	Furnished by the various species of eucalyptus or gumtree, which are grown in various regions of the country for timber, present reserves being estimated in millions of trees.
Hyoscine and hyoscyamine	See Atropine.
Opium	Extracted from the opium poppy, which is very common in Brazil, but only as a garden flower.
Pilocarpine	Extracted from the leaves of the jaborandí tree, native to Brazil.
Quinine	The cinchona or quina trees are found chiefly in the south of the country, where climatic conditions are particularly favorable.
Scopalamine	See Atropine.
Senna	Extracted from the pods of the cassia trees, which are a common sight in the forests and gardens of Brazil.
Strychnine	The active principal of nux vomica, which also contains brucine.
Theobromine	Alkaloid akin to caffeine, but milder. Chiefly found in cacao.

CATTLEYER WALKERIANA, GARDNER 1843

The forests of Brazil are rich in archids. The illustration repraduces a species ariginating fram the Central Massif, thaugh this particular plant came fram Cardisburga in the State of Minas Gerais.

USEFUL PLANTS

The word plant is taken in its widest scientific meaning and includes trees, shrubs, grasses, etc. Since many are unknown to English-speaking peoples, they have been listed alphabetically by their Brazilian names, followed by the latin designation, the family in Roman type, the genus and species in bold face. Wherever possible, the English equivalent has been added.

ABRICÓ DO PARÁ (Guttiferae, **Mammea americana,** L.) — The **mamey** or **mammee-apple** is cultivated in the West Indies and parts of Florida for its edible fruits, which, in Brazil, often weigh as much as 9 lbs. apiece and are made up into preserves, jellies and syrups selling for high prices because they retain the delicate aroma and taste of the fruit indefinitely. An essence distilled from the blossoms is used for flavouring the so-called "água dos creoulos" and a delicious liquor. The young shoots are allowed to ferment and produce a wine-like heady drink called "toddy" or "momim", which is highly appreciated. Finally, the resin exuding from the bark provides an insecticide and is also used for healing wounds.

ABRUNHEIRO (Rosaceae, **Prunus spinosa,** L.) — The berries of the **sloe** or **blackthorn** were used to prepare the once popular medicine "acacia nostras"; they are edible and various fermented liquours somewhat similar to sloe gin are made from them, as well as a dyestuff. An infusion can be prepared from the leaves, which have even been used to adulterate tea.

ACARIUBA (Olacaceae, **Minquartia guianensis,** Aubl.) — The tree grows in the Lower Amazon Valley and provides a very hard, rot-prooof timber, density 0.890, known as **manwood** in England and especially suitable for posts and railway sleepers. The chips are boiled in water to produce a black dye used for dyeing cotton.

AÇAFRÃO (Iridaceae, **Crocus sativus,** L.) — The **saffron crocus,** also called **vegetable gold,** is often grown as a garden flower. However, the economic value of the plant resides in the dried stigmas which contains 42% colouring matter consisting chiefly of safranine, polychroite, carotene and crocein, 40,000 flowers being required to produce 500 grammes of stigmas. Very little of the dye is needed to colour a large quantity of water and it is widely used in the wood stain, varnish, cosmetic, liquor and other industries. It is also employed in cooking and for making drinks, and as a harmless flavouring and colouring matter for food pastes, cheeses and confectionery.

AÇAFROA (Compositae, **Carthamus tinctorius,** L.) — This is the **saff-flower** or **false saffron,** cultivated for ornament in North America and the Old World. It yields a drug and a dye called carthamin which imparts delicate shades of pink and red to cotton and silk fabrics. It is, however, chiefly used in cooking and confectionery and in perfumery for the manufacture of lipstick and rouge.

ALCAÇUZ DA TERRA (Leguminosae, **Periandra dulcis,** L.) — The bitter-sweet pulpy black roots of this **wild liquorice** are used as a sweetening agent and provide a recognized substitute for true liquorice, **Glycyrrhiza glabra.** They contain starch, dextrin, miscellaneous salts and a substance called glycyrrhizine.

ALMECEGUEIRA (Burseraceae, **Hedwigia balsamifera**, Sw.) — The bark of the stalk and roots is antipyretic and yields an alkaloid producing convulsions like strychnine and a resin which forces the body temperature down abnormally and induces paralysis; together, they form a poison acting on the nervous system like **curare**.

ANANI (Guttiferae, **Symphonia globulifera**, L.) — This tree is frequently met with in the floodwater swamps and cut-outs of the Amazon Valley and is easily identified by its elbow-shaped buttress roots and abundance of scarlet flowers. The soft yellow wood is suitable for making casks and barrels, for it is thoroughly watertight, even along the grain. Every part of the tree yields a resinous latex turning black when dry, with which a kind of pitch called cerol is made for use in calking ships' seams and as a substitute for cobbler's wax.

ANILEIRA (Leguminosae, **Indigofera anil**, L.) — Brazilian **indigo** paste is greenish white in colour. Though interest in this plant has picked up of recent years, its cultivation on an economic basis is restricted to the States of Ceará, Rio Grande do Norte, Paraíba, Minas Gerais and Rio Grande do Sul. The yield averages 450 lbs. per acre, or 1½ oz. of indigo from 25 lbs. of leaves.

ARARUTA (Myrtaceae, **Maranta arundinacea**, L.) — Though naturalized in Florida, this plant originally came from Brazil. The starchy root yields the nourishing flour, snow white and odourless, known as **arrowroot**; combining in any form with water and milk, it makes delicious biscuits, cakes, sweets and custards. Its excellent restorative qualities recommend it above all for children and convalescents.

ARVORE DO DRAGÃO (Liliaceae, **Dracaena draco**, L.) — This is the famous **dragon tree** of the Canary Islands, known to the Greeks before the Christian era. At times, natural cracks appear on the trunk of this peculiar tree and a dull red gummy resin oozes out of them; the same resin, which is called "dragon's blood", may be obtained from artificial incisions at any time of the year. It has a brilliant fracture when dry and is used in the manufacture of dentifrices and varnishes for artists' colours, besides having certain medicinal qualities.

BABOSA (Liliaceae, **Aloes spp.**) — The oily juice of the leaves may be used with advantage as a substitute for hair oil or grease, for it is a natural product that does not injure the hair. When dry, it forms the common purgative called aloes which has a black rather shiny appearance, is hard and brittle and tastes extremely bitter; it is soluble in hot water and alcohol.

BÁLSAMO DE TOLÚ (Leguminosae, **Myroxylon toluiferum**, H.B.K.) — This tree yields a fluid aromatic sap; colourless and almost transparent when fresh, it gradually acquires a yellow or reddish hue (seldom, however, opaque) as it hardens into a solid friable oleoresin known as **balsam of Tolu**, a stimulating and desinfecting expectorant containing esters of benzoic and cinnamic acids. The active principle, **cumarurin**, is present in the beans.

BARBATIMÃO VERDADEIRO (Leguminosae, **Stryphnodendron barbatiman**, M.) — The bark of this tree contains a red pigment which is precipitated for use in the ink industry where there is a fairly high demand for the product. It is strongly astringent and contains up to 50% of tannin.

BARRIGUDA (Bombacaceae, **Chorisia insignis**, H.B.K.) — Like its near relative, the **silk-cotton tree (Ceiba pentandra)**, the **floss-silk**

tree is a commercial source of kapok, a cotton-like fibre contained in a leathery capsule which constitutes the fruit. Kapok is considered the most suitable material for stuffing cushions and pillows.

BAUNILHA (Orquidaceae, **Vanilla aromatica,** Sw.) — The pods or beans of the **vanilla** vine are widely used in the chocolate and tobacco industries, as well as in confectionary and ice cream manufacture, on account of the active principle, **vanillin,** which imparts the well-known aromatic flavour to vanilla essence. The vine is cultivated in the States of Rio de Janeiro, Espírito Santo, Bahia and Pará.

BENJOIM (Styracaceae, **Styrax officinalis,** L.) — This handsome ornamental tree is a native of the Brazilian backwoods. When the bark is tapped, the balsamic resin known as **benzoin** or **gum benjamin** exudes from the incision and hardens in a few weeks, after which it is collected and sold to perfume manufacturers. The yield is as much as 9 lbs. per tree. Other Brazilian species, **Styrax reticulata, S. ferrugineum** and **S. camporum,** produce **storax,** a somewhat weaker type of benzoin.

BOMBONASSA (Cyclanthaceae, **Carludovica palmata,** R. & Pav.) — The **jipi-japa** or **Panama-hat plant,** is indeed the palm-like plant from the more tender leaves of which Panama hats are made, not only in Panama, but also in Brazil, in the region of the Upper Amazon.

BUCHA (Cucurbitaceae, **Luffa cilindrica,** L.) — The fibrous skeletons, obtained by macerating the fruit of this vine in water and drying, are sold like sponges under the names of **dishcloth gourd, vegetable sponge, rag-gourd,** or **loofah.** The strong elastic reticular tissue thus formed is made up into washing gloves, bathing sandles, hats, etc. Cultivation of the plant is highly developed in the Baixada Fluminense, the low-lying country surrounding Rio de Janeiro.

BURITÍ DO BREJO (Palmaceae, **Mauritia flexuosa,** L.) — This marsh palm often grows to a height of 130 feet, with a bole 2 feet in diametre. The local inhabitants hew it into dugouts and saw or split it into wide planks and laths, the leaves being used as a thatch and the fibres for making mats, ropes and hammocks, while an edible, sago-like starch is prepared from the pith. Several American firms have shown an interest in its possibilities as a cork substitute (see **Corticeira).**

CAIXETA (Euphorbiaceae, **Croton spp.)** — Yields a white porous lightwood (density, 0.459 to 0.502) with a tough straight grain, suitable for boardings, packing-cases, crates, paper pulp, clog soles and brush stocks, rough-made guitars and household articles. The roots are spongy and float; hence their use in the manufacture of buoys and life-preservers, in addition to shoe soles and razor strops.

CANAFISTULA (Leguminosae, **Cassia fistula,** L.) — The albuminous pulp surrounding the seeds of the **pudding-pipe, golden shower** or **drumstick tree** provides a delicate flavouring matter for blending with certain oriental tobaccos. Aside from its medicinal uses, the pulp is sold commercially for flavouring puddings and ice cream.

CARAJURU (Bignoniaceae, **Arrabidaea chica,** H.B.K.) — By maceration of the leaves of this plant, a powdery red dye may be obtained which is insoluble in water but soluble in alcohol, ether and oil. The warpaint used by the Indians is made by dissolving this powder in andiroba oil. The plant is also an aphrodisiac.

COAGERUCU (Annonaceae, **Xilopia frutescens,** Aubl.) — This tree belonging to the custard-apple family has a peppery aromatic bark, under which the bast tissue supplies fibres used in rope and tow making. The seeds are also aromatic, having carminative and digestive qualities; they form a good substitute for pepper and indeed the acrid aromatic volatile oil they contain gives them a pleasanter and more delicate taste than Asiatic peppercorns.

COENTRO (Umbelliferae, **Coriandrum sativum,** L.) — The leaves and flowers of the common **coriander** are highly appreciated as an ingredient in sauces and for seasoning stews and salads. They enter into the composition of the so-called "melissa water" and are used as a corrective in "black medicine". The seeds are aromatic, stimulating and stomachic; they are crushed to make the well-known condiment, which is an ingredient in curry powder, mixed spices and liqueurs, and an oil distilled from them is employed in the preparation of toilet waters.

COLEIRA (Sterculiaceae, **Cola acuminata,** Schoot) — The seeds contained in the fruit pods of this tree are the famous **kolanuts** or **Goora-nuts** chewed by the Indians to relieve the pangs of hunger and fatigue and widely used as a stimulant in soft drinks. They contain proteins, caffein, tannin, theobromin and cola red. The plant is grown systematically in Bahia State and in Rio Doce Valley, in Espírito Santo.

CORTICEIRA (Leguminosae, **Erythrina crista-galli,** L.) — The Brazilian name means cork-tree, but the trees and shrubs of this genus are commonly called **coral trees** in North America, where they are planted for ornament. The wood is yellowish white in colour, very light and soft, and is sometimes lashed to logs of heavy timber to keep them afloat. Having a specific gravity of 0.317, it is suitable for rowing-boats, rafts, troughs, bowls, wooden sandals, net floats and bee-hives. The powdered charcoal is an active ingredient in the making of cartridge powder and the pulp is excellent for paper manufacture. The bark is used in tanning and yields a red dye; it also contains the alkaloid erythrin, a drug which is said to induce hypnosis. The glands at the base of the leaflets are "eminently melliferous".

This coral tree is found in several regions of Brazil, but economic development is still relatively unimportant, and the greater part of the cork consumed in the country is imported from Spain and Portugal. However shipping difficulties during the last war created a keen demand for substitutes, cork being considered a strategic material in the United States. Brazilian plants suitable for this purpose include **buriti do brejo, imbaré** and **pau-santo,** which are described under their names in alphabetical order.

CRAVO DO MATO (Lauraceae, **Dicypellium caryophyllatum,** Nees) — Distillation of the seeds and bark of this laurel yields an essential oil used in perfumery and medicine. Strongly aromatic like **oil of cloves,** it has a reddish colour and a hot bitter taste.

GENIPAPO or JENIPAPO (Rubiaceae, **Genipa americano,** L.) — The white, fine-grained wood of the **genip** or **genipap,** sometimes called **marmalade box,** carves well and is suitable for gun butts and other small parts. The bark and fruit contain a blue or violet pigment, used by the Indians for preparing warpaint and dyeing fabrics. The leaves are rich in **mannite.**

IARÁ (Palmaceae, **Leopoldinia pulchra,** Mart.) — A good fibre for rope-making is obtained from the leaves of this palm-tree and

the trunk and leaf-stalks are split into narrow strips for basketwork. An edible tapioca is made from the fruit.

IMBARÉ — This lightwood has great strength; to make it even lighter, incisions are made in the trunk, so as to allow the sap to run out. Besides being a cork substitute, it is used in the manufacture of furniture for airplanes, etc., and incorporated as a plywood, wherever lightness is essential. (See **Corticeira**).

IPADU (Erythroxylaceae, **Erythroxylon coca**, Lamk.) — The leaves of the **coca** plant provide a nervous stimulant due to the presence of the alkaloid **cocaine** as active principle. The Indians chew them to allay hunger and obtain a pleasant sensation of intoxication. They also burn the fruit sheath or spathe of the motacu palm (**Attalea princeps**, Mart.) and mix the ashes with coca leaves and chips of a bitter vine, cipó amargo (**Abuta concolor**, Poepp.), to enhance the effects.

IPECACUANHA (Rubiaceae, **Cephaelis ipecacuanha**, Rich.) — This shrub, also known as ipeca or poaia, grows wild in the forests of Mato Grosso, Minas Gerais and Espírito Santo.

The root contains the valuable alkaloid emetine and Brazil being the only country in the world where the plant is found in its natural state, it is in an excellent position for manufacturing emetine hydrochlorate, a drug widely used in medicine.

The present production of ipeca in the State of Mato Grosso is estimated at 35 metric tons and 25 in the two other producer States.

The name is often applied to other, inferior, plants and care must be taken not to confuse these with true ipeca, which yields 3% alkaloids including 1.8% emetine.

Development of the hydrochlorate industry in Brazil has already passed the experimental stage with a yearly production of 132 lbs., but an effort is being made to raise this figure to 55 lbs. a month or 660 lbs. a year, which amounts to 50% of the world consumption of this product.

JARINA (Palmaceae, **Phytelephas macrocarpa**, R.) — The **ivory palm**, which covers vast expanses of forest land in the southeast of Amazonas State and almost half the area of Acre Territory, bears a fruit containing several seeds which exude a milky juice, acquiring the appearance of ivory on hardening; hence the name **vegetable ivory**. Small ornaments are already being made from this substance and in the absence of any other substitute for the animal product, the supply of which is steadily diminishing, a promising future lies ahead of vegetable ivory.

A high value attaches to the raw material in Europe and exports are carefully graded by the Brazilian authorities into two classes: seeds in the natural state, enclosed in the endocarp, and peeled seeds, without the endocarp. Each of these classes is divided into five types according to the number of seeds per kilogramme; thus type 1 runs to 36 per kilo and type 4 to 62 per kilo, type 5 consisting of seeds of all sizes.

NHANDI (Piperaceae, **Piper caudatum**, Vahl.) — The aromatic, stimulating berries may be used as a pepper substitute, while the root is carminative and sometimes enters into the composition of the Indian poison, **curare**.

PARACUUBA CHEIROSA (Leguminosae, **Le Cointea amazonica**, Ducke) — The heartwood is compact and fine-grained, splitting with difficulty and taking a fine polish with a reddish hue; it is thus an excellent and attractive cabinet wood, all the more so because it

exhales a delicate odour of roses. It yields a charcoal of high calorific power. Tool handles are made from the sapwood, while the Indians use the core to make heavy arrowheads capable of piercing the tough shell of the turtle. Density: 1.25.

PARICAZINHO (Leguminaceae, **Aeschynomene sensitiva,** Sw.) — Beneath a thin peel, the stems show a pithy structure similar to that of elder branches, but more rigid and closely knit, incorporating cellulosic matter of pure white. It is used for entomological preparations and in the manufacture of buoys, life-belts and heat insulants, serving as an excellent substitute for cork in hat-making and the toy industry, etc. A rice paper substitute is also made from the pith.

PARTASANA (Typhaceae, **Typha domingensis,** Pers.) — Known as **tabua** in Southern Brazil, the common **cat-tail** or **bullrush** supplies the raw material for matting and various plaited objects, and cellulose for paper manufacturing. The pollen is a substitute for **lycopodium** spores.

PAU-SANTO (Guttiferae, **Kielmeyera spp.**) — A lightwood often used as a cork substitute (see **Corticeira**).

PIMENTEIRAS (Piperaceae, **Capsicum spp. et al.**) — The **pepper** family is very widely represented in Brazil and the aromatic berries are used as condiments which have a stimulating action on the digestion. The varieties olho de peixe, pimenta de cheiro, pimenta Josepha, murupi, matta-frade, camapu, cajurana, caçari, murici, olho de pombo, pacova and comeri are among the bast known.

SUMAÚMA (Bombacaceae, **Ceiba pentandra,** L.) — The **silk-cotton** is a gigantic tree rising from enormous buttress roots. The wood is white and, having a density of only 0.500, is often used for making rafts and buoys, while the cellulosic yield amounts to 26% with 54% of humidity and fibres 2.9 mm. long by 0.018 in diametre. Like the **floss-silk tree** (**Chorisia insignis**), the seeds are surrounded by **kapok,** a light, elastic, snow-white material, the hydrofugal properties of which enable it to be used for making life-belts capable of floating 30 to 35 times their own weight, besides being particularly suitable for stuffing cushions and pillows. The seeds themselves are edible and yield 18 to 30% of a light yellow, sweet-smelling oil employed in soap-making.

TAMANQUEIRA DE LEITE (Apocynaceae, **Zschokkea lactescens,** Kuhlmann) — Yields a white latex suitable for the preparation of **chicle-gum,** with the additional advantage of having a natural vanilla flavour.

TAMAQUARÉ GRANDE (Guttiferae, **Caraipa grandifolia,** M.) — The fruit kernels contain 65% of a chestnut-red tallow-like substance. When tapped, the trunk yields a dark red balsamic resin.

URARI (Loganiaceae, **Strychnos spp.**) — The dread "curare", one of the deadliest poisons known, in which the Indians dip their arrowheads, is prepared from juice expressed from the bark of **Strychnos castelnaci,** Weed. and mixed with various other vegetable extracts obtained from: imene bark (**Abuta imene**); pahni root (**Piper geniculatum**); malagueta berries (**Capsicum pendulum**); taemag bark (**Ficus atrox**); euphorbia sap (**Euphorbia cotinifolia**); pindaiba berries (**Guatteria veneficiorum**); nhandi root (**Ottonia waracabacoura**); tamaquaré bark (**Caraipa augustifolia**); and cipó amargo root (**Abuta candicans**). The drug **curare,** an extract of Strychnos containing **curarine,** is used to combat tetanus in non-lethal doses and has sprung into prominence in connection with its possible curative effects in cases of infantile paralysis.

URUCU (Bixaceae, **Bixa orellana**, L.) — Though grown as an ornamental tree in Florida, the **annatto** or **achiote** bears a fruit, from the pulp of which an orange red dye is extracted for colouring butter and cheese, the two principle colouring agents being **bixine** (bright red) **andorelline** (yellow). Medicinally, the dye is held to be an antidote to prussic acid, the virulent poison present in improperly treated manioc (cassava).

VETIVER (Gramineae, **Andropogon squarrosus**, L.) — This grass, which grows wild nearly all over Brazil under the names of "capim cheiroso" or "Patcholi", would seem to be the same as, or similar to, **Vetiveria zizanoides**, a native of the East Indies, where its roots have been used for centuries in perfumery and medicine. The latter, the most important part of the plant, are from 2 inches to a foot in length, strong and flexible, and covered with a lustrous yellow skin, enclosing a fibrous woody core that has a pleasant distinctive odour ressembling that of sandalwood and myrrh and from which the essential oil is extracted by distillation, with a yield of 11 to 13 lbs. per metric ton of roots. Vetiver oil is used in preparing mixed perfumes and acts as a valuable fixative for volatile essences.

Cultivation, in Brazil, of the cinchona or quina tree from which quinine is obtained

The development of wheat-farming is one of the major problems of Brazil on the way to being solved by colonization

AGRICULTURE

The tilling of the land lies at the root of the Brazilian economy. A mere knowledge of the geology of the country justifies the most auspicious conclusions as regards the production of the soil.

The basaltic lava flows originating at the end of the Triassic period — the most extensive in the world, — that cover an area of about 386,000 square miles in the south of Brazil, gave rise to fertile soils that have played a decisive role in the present agricultural development of the Southern Region, which comprises the largest estates dedicated to the growing of coffee, cotton and other products indispensable to the life of man.

Brazil continues to be essentially a farming country despite the evolution and increasing importance of the fields of extractive and industrial production.

The marked progress to be noted in the methods of farming applied in the various agricultural regions and the intervention of the government in the solution of the chief problems connected with agriculture, show clearly the new trends of crop-raising in Brazil.

The Brazilian farmer is intelligent and quick to adopt more up-to-date processes, thus cooperating in the improvement in quality and yield of crops in general.

The requirements of the international markets have also influenced Brazilian agricultural production. Thus, the entry of Japan into the war brought about a scarcity of menthol, an indispensable raw material. Advised to grow mint, planters forced the production up to so high a level that it was necessary to restrict the area under cultivation, which was more than enough to meet the demands of world consumption.

Industry was also short of tung oil. The extension of the tung plantations in the southern States now brings within reach the possibility of dispensing entirely with the Chinese oil as far as home consumption is concerned and there may even remain over a surplus for export.

These two examples serve to show the capacity of labour, initiative and adaptation of the Brazilian peasant, which ensures a firm foundation to the country and enables it to stand up to crises on the international markets.

Brazil is the largest coffee producer. The cotton-fields of Brazil range it among the principal producers of the commodity.

Brazilian cacau production is only surpassed in volume by that of the Gold Coast.

Brazil comes second to the United States as principal producer of maize (Indian corn), though nearly the whole of the crop is absorbed by the home consumption.

Mattee tea, the stimulant guaraná, carnaúba wax, coconuts and many other commodities are the produce of species growing wild on Brazilian soil.

The Brazilian Government keeps in touch with the needs of agriculture, providing active assistance by creating agricultural demonstration fields known as "Campos de Cooperação", distributing selected seed grown on its Experimental Stations, retailing agricultural machinery and other implements at low prices, controlling pests which damage the crops, examining land and analysing soil to determine the advisable fertilizers, properly classifying the yield from the harvests and affording financial protection to the farmer by means of a well-organized network of cooperatives.

This amounts to efficient and indispensable aid in a country that already disposes of more than 35 million acres of land under cultivation.

The classification, according to activities, of the population recorded in Brazil by the census authorities on 1st September, 1940, provides one of the most trustworthy guides to the agrarian set-up of the country.

This classification assigns a total of 9,453,512 workers to agriculture, stockraising and sericulture, a group which is only exceeded in number by persons engaged in "domestic and scholastic activities" and amounting to 11,909,514.

AGRICULTURAL DEMONSTRATION FIELDS

The Brazilian Government renders outstanding service to the farmer by organizing and maintaining agricultural demonstration fields which are known as "Campos de Cooperação".

The system adopted by the Ministry of Agriculture comprises five types of field: **cooperação anual,** where the land is tilled on the farmer's own property, the Ministry supplying the necessary machinery, seeds, a plough, and the technical advice of an agronomist, for the period of one year; **cooperação permanente,** similar services performed according to a five-year contract with collective institutions, such as cooperatives, agricultural associations, etc.; **culturas fiscalizadas,** where the Ministry contributes selected seed, technical guidance and control, and sometimes harvesting, threshing or processing machinery; **rápida execução,** which means that a given operation in the cycle of crop-raising is carried out free of charge on the farmer's own land; **cooperação educacional,** or the organization of farm work in collaboration with rural schools, intended to foster in the children a love for the soil, inculcate an up-to-date farming mentality and prepare them to lead useful country lives.

CONTROL OF PLANT DISEASES

It would be pointless to promote and develop the raising of crops were there to be no organization properly implemented to wage effective warfare on the pests that attack them, for it is impossible to obtain economic yields without the systematic control of insects, fungi, etc.

The government department known as "Divisão de Defesa Sanitária Vegetal" exercises this control in the four domains of **exclusion** (embargo or restriction of imports), **quarantine, eradication** and **protection.**

Ant extermination is carried on according to definite programmes, and in the struggle against grasshoppers, which chiefly plague the southern farmer, the most modern methods are employed, reinforced by agreements concluded with the neighbouring countries interested in the subject.

LEGAL WEIGHTS AND MEASURES

Brazil has legally adopted the units based on the metric decimal system and the resolutions of the General Conferences of Weights and Measures, meeting in accordance with the International Convention of the Metre, of 1875, and all those that are derived from these units, including: length: the metre (3.281 feet); mass: the kilogramme (2.205 lbs. averdupois); time: the second; intensity of electric current: the ampere; resistance of electric current: the ohm; luminous intensity: the candle; temperature: the degree centigrade (1 4/5 degrees fahrenheit; to convert centigrade to fahrenheit, multiply by 9, divide by 5, and add 32).

OX-CART

This primitive means of transportation, derived from the ancient Roman **plaustrum** in use in Latium, is one of the factars most instrumental in furthering rural progress in Brazil. The ox-cart and its driver have enriched Brazilian folklore, providing the subject for many a moving chant of the backwoods. The cart shown is of the type common to Galás.

AGRARIAN WEIGHTS AND MEASURES

Despite the official adoption of the metric system and although all contracts and other legal documents must conform thereto (even to the extent of the necessary alterations being made when they were drawn up prior to the agreement), a number of old-fashioned measurements are still in common use in the country districts. Moreover, certain exceptions are tolerated, e.g. in the export and import trade, but must be authorized by the National Institute of Technology ("Instituto Nacional de Tecnologia").

Thus the farmer's square measure for calculating land areas is generally based on the "braça", which may be defined as follows:

BRAÇA — Still used practically all over Brazil, it is equivalent to 2·2 metres or 7 foot 3 inches and is the basic unit for the following units of area, which are all the more confusing in that they change in value according to the region. The word braça means arm's length and was divided into 10 palms (palmos); there were 8 Brazilian inches (polegadas) to the palm and 12 inches to the foot (pé). It will be seen that the Brazilian inch was only slightly larger than its English equivalent (1·1:1). There are 3,000 braças to the league (legua — 4·1 miles).

UNITS OF AREA USED IN COUNTRY DISTRICTS

(By order of magnitude)

NAME	BRAÇAS	Sq. Metres	ACRES	STATES
Quadra de sesmaria (league square)	60 x 3,000	871,200	214	Rio Grande da Sul (used by cattle ranchers).
Alqueire * mineiro..	100 x 100	48,400	11.96	Minas Gerais, Espírito Santo, Rio de Janeiro, Goiás; called "quadra" in Maranhão and Piauí.
Alqueire paulista....	100 x 50	24,200	5.98	São Paulo, Paraná, Santa Catarina, Rio Grande do Sul (north), Mata Grasso (sauth).
Quadra gaúcha.....	60 x 60	17,424	4.30	Rio Grande do Sul.
Quadra paraibana...	50 x 50	12,100	2.99	Paraíba.
Tarefa * baiana.... (task)	30 x 30	4,356	1.10	Bahia, Goiás, Minas Gerais, Ceará and Pernambuca.
Tarefa cearense.....	30 x 25	3,630	0.90	Ceará.
Tarefa nordestina...	25 x 25	3,025	0.75	Sergipe, Alagoas; less used in Paraíba and Ceará; called "mil covas" (1,000 hales or plantings) in Rio Grande do Sul.
Tarefc gaúcha.....	10 x 20	968	0.24	Still used a little in Rio Grande da Sul.

* The alqueire and the tarefa are alsa measures respectively of capacity and weight (see tables of non-decimal units).

It is interesting to note how closely these measures approximate to multiples or fractions of an acre. Thus the two alqueires, each of which has a semi-official character in the corresponding regions, are very nearly six and twelve acres respectively; the quadra gaúcha is rather more than four and a quarter acres; the quadra paraibana one acre, a little less and a little more than the tarefa baiana and the tarefa cearense; and the tarefas nordestina and gaúcha, three-quarters and one-quarter of an acre respectively.

These units are supplemented by others, of an even more local character, warmly defended, like their counterparts in England and America, by the farmer and artisan, who find them easier to divide and more convenient for farming and handiwork.

OTHER NON-DECIMAL WEIGHTS AND MEASURES

The use of non-decimal systems extends to the units of weight and capacity which vary widely according to the different regions of Brazil, though the definitive adoption of decimal standards is slowly spreading from village to village throughout the national territory.

Thus the multiplicity of systems is beginning to be simplified and reduced in the more populous centres, with a corresponding evolution in the habits of the people, evidenced by the gradual disuse of former conventions and the failure of new ones to appear sporadically, as they used to from one region or another.

Brazil was one of the first countries to accept the decimal system unreservedly and to apply it officially; the problem is primarily one of education and a sustained effort has been made by the government to bring home to the people the practical value of a unified system of the weights and measures in commercial use.

Nevertheless, obselete forms persist, above all in the crop- and stockraising localities of the interior, and it is absolutely essential for whoever needs to come into close contact with life in such regions, to bear in mind the equivalents of the weights and measures used locally; to this end the following reference tables have been appended.

Harvesting the cotton crop

CHIEF NON-DECIMAL UNITS OF WEIGHT AND CAPACITY IN USE IN BRAZIL

LOCAL SYSTEM	METRIC SYSTEM	BRITISH (IMPERIAL) SYSTEM	OBSERVATIONS
Acha	1 to 3 kg.	2.2 to 6.6 lbs.	Used for measuring firewood.
Alguidar	10 l.	2.2 gals.	Earthenware or metallic vessel.
Almude	16 or 25 l.	3.52 or 5.5 gals.	Wine and spirit trade (E).
Alqueire	—	—	See details.
Ancora	40 l.	8.8 gals.	Barrel for transporting rum (N, NE & E).
Arranca	560 kg.	11 cwt.	For measuring manioc (cassava) in Paraíba.
Arratel	500 gm.	17.6 oz.	For measuring liquids.
Arroba	—	—	See details.
Atilho	400-600 gm.	14.1-21.2 oz.	Two heads of maize (Indian corn) tied together.
Atura	40 l.	1.1 bushels	Straw basket (Pará and Amazonas).
Balaio	—	—	See details.
Balsa	1,000 l.	220 gals.	Large barrel.
Banca	1,200 kg.	2,646 lbs.	Firewood — 2.916 cu. m. (3.814 cu. yds.) (Santa Catarina).
Banda	20-30 kg.	44-66 lbs.	For measuring raw pork.
Barrica	2 to 180 kg.	4.4 lbs. to 3½ cwt.	Kind of cask or barrel.
Barril	40 to 400 l.	8.8 to 88 ga's.	Barrel for liquids.
Biguncho	100 kg.	220.5 lbs.	For measuring grapes in Rio Grande do Sul.
Bloco	30 to 45 kg.	66 to 99 lbs.	Ball of rubber.
Bola	—	—	See details.
Borracha	40 l.	8.8 gals.	Leather container for molasses (N, NE & E).
Braça	1 to 8 kg.	2.2 to 17.7 lbs.	2.20 m. (7 ft. 3 ins.) of roll tobacco (NE & E).
Bruaça	30 to 50 kg.	66 to 110 lbs.	Raw leather bag.
Cabeça	20 gm.	0.7 oz.	Head (bulb) of garlic.
Cacho	—	—	See details.
Caçua	—	—	Split bamboo or fibre basket.
Caixa	20 to 60 kg.	44 to 132 lbs.	Wooden packing-case.
Caldeira	16 kg.	35 lbs.	Boiler for purifying molasses (NE).
Canada	—	—	8 bottles. Liquid measure (N, NE & E).

ABBREVIATIONS: gm.: grammes; kg.: kilogrammes; cu. m.: cubic metres; l.: litres; m.: metres; cm.: centimetres; N. north; NE: northeast; E: east.

CHIEF NON-DECIMAL UNITS OF WEIGHT AND CAPACITY IN USE IN BRAZIL

LOCAL SYSTEM	METRIC SYSTEM	BRITISH (IMPERIAL) SYSTEM	OBSERVATIONS
Caneca	0.5 l.	0.88 pint	For measuring grain in Maranhão.
Caneca	18 and 24 l.	4 and 5¼ gals.	Ceará and Sergipe.
Capaeira	—	—	Shipment of 20 hens.
Carga	—	—	See details.
Carneirinha ...	5 l.	1.1 gals	Beverages. Acre.
Carreta	1.5 cu. m.	53 cu. ft.	Cartload of 600 kg. (1,320 lbs.) of sugarcane or firewood.
Carro	—	—	See details.
Celamine	10 to 20 l.	2.2 to 4.4 gals.	Northern States and Goiás.
Centa	—	—	100 pieces.
Cesta	—	—	See details.
Cipó	24 kg.	53 lbs.	Bundle of 100 heads of maize.
Clafter	4 cu. m.	141 cu. ft.	Firewood — 1,200 kg. (2,514 lbs.).
Côcha	220 kg.	485 lbs.	200 litres (44 gals.) of molasses (Minas Gerais).
Carda	—	—	See details.
Cuia	2 to 10 l.	3.5 pints to 2.2 gals.	Cylindrical vessel for measuring grain.
Décima	40-50 l.	8.8-11 gals.	Barrel — one tenth of a pipe (pipa).
Dorna	800-1,000 l.	176-220 gals.	Vat for fermenting grapes.
Espiga	240 gm.	8½ oz.	Head of maize (Indian corn).
Fanga	145 l.	4 bushels	For measuring grain, salt and lime (S).
Farda	—	—	See details.
Gaúcha	80 l.	2.2 bushels	Fish basket.
Garajáú	40 to 60 kg.	88 to 132 lbs.	Poultry basket.
Garrafão	20-24 l.	4.4-5.3 gals.	Demijahn.
Jacá	—	—	Taquara (split cane) or timbó (liana) basket.
Jôga	1 kg.	2.2 lbs.	For weighing fibre (NE).
Lençal	60-64 kg	132-141 lbs.	Bale of raw cotton (Sergipe).
Maça	0.100 to 15 kg.	3.5 oz. to 33 lbs.	Bunch of fibre or garlic.
Manta	20 kg.	44 lbs.	Side of bacon.
Mão	12 kg.	26.5 lbs.	50 heads of maize (N, NE & E).
Medida	—	—	Any standard measurement.

ABBREVIATIONS: gm.: grammes; kg.: kilagrammes; cu. m.: cubic metres; l.: litres; m.: metres; cm.: centimetres; N. north; NE: northeast; E: east.

CHIEF NON-DECIMAL UNITS OF WEIGHT AND CAPACITY IN USE IN BRAZIL

LOCAL SYSTEM	METRIC SYSTEM	BRITISH (IMPERIAL) SYSTEM	OBSERVATIONS
Molho	100 to 1,500 gm.	3.5 oz. to 3.3 lbs.	Small bunch.
Moqueca	20 kg.	44 lbs.	Cake of brown grating sugar or manioc (cassava) wrapped in straw.
Oitavo	400 l.	88 gals.	Beverages (Rio Grande do Sul).
Palmo	0.22 cm.	8.65 inches	Tobacco industry (N & NE).
Paneiro	40 l.	1.1 bushels	Wickerwork basket.
Pão	90 kg.	200 lbs.	Sugarloaf.
Peça	0.350 gm.	12.4 oz.	Bundle of caroá fibre (NE).
Pêla	25 to 60 kg.	55 to 132 lbs.	Block of rubber.
Prato	1 to 5 l.	1.76 pints to 1.1 gals.	For measuring grain.
Quarta	—	—	A quarter of an alqueire. See details.
Quartilho	—	—	For liquids. From half a bottle to 2 litres (3½ pints).
Quarto	100 l.	22 gals.	Wine measure (Rio Grande do Sul).
	15 kg.	33 lbs.	Half a side of bacon.
Quartola	200 l.	44 gals.	Barrel — half a pipe (pipa).
Quiçamba	60 l.	1.65 bushels	Taquara (split cane) basket for coffee-picking.
Quinto	40 l.	8.8 gals.	Barrel — one tenth of a pipe (pipa).
Resquarto	5 l.	1.1 gals.	Grain measure (Sergipe).
Réstea	10 kg.	22 lbs.	String of onions.
Rôlo	10 to 90 kg.	22 to 100 lbs.	Roll tobacco.
Saco	—	—	See details.
Surrão	30 to 45 kg.	66 to 99 lbs.	Leather bag.
Talha	—	—	For measuring firewood (100 achas) or bananas (10 cachos).
Tarefa	—	—	Unit of area or weight for sugarcane or manioc (cassava).
Tarro	20-30-50 l.	2.2-4.4-11 gals.	Milking-pail (Rio Grande do Sul).
Tonel	200 to 1,000 l.	44 to 220 gals.	Wooden cask or pipe (pipa).
Trança	0,500 gm.	7.72 grains	Domestic fibre trade (NE).
Urú	50-60 kg.	110-132 lbs.	Basket for carrying cottonseed and coconut.
Vara	1.10 m.	3.65 feet	For measuring roll tobacco — 1,500 kg. (3.3 lbs.) in the north and 1 kg. (2.2 lbs.) elsewhere.

ABBREVIATIONS: gm.: grammes; kg.: kilogrammes; cu. m.: cubic metres; l.: litres; m.: metres; cm.: centimetres; N. north; NE: northeast; E: east.

ALQUEIRE — From the very earliest times of the colony, the alqueire has been used by the farming population and is now common throughout all the Units of the Federation from Acre Territory to the State of Rio Grande do Sul.

The term is applied to two distinct units, one of capacity and the other of area, closely related in origin, since by definition an alqueire of land is the area that can be sown with an alqueire of seed, which in turn is the amount of seed required for an alqueire of land. So empirical a system varies naturally with the kind of seed, the composition of the soil and other local conditions, as may be seen from the following table.

TYPES OF ALQUEIRE USED IN BRAZIL

(Values arranged by order of common occurrence)

FEDERATED UNITS	VALUES MOST FREQUENTLY ADOPTED	
	Litres	British Imperial Gallons
Acre Territary	40, 30	8.8, 6.6
Amazanas	40	8.8
Pará	40, 35, 45, 48, 46	8.8, 7.7, 9.9, 10.56, 10.12
Maranhãa	50, 48, 100, 40, 60, 200, 32	11, 10.56, 22, 8.8, 13.2, 44, 7.04
Piauí	100, 48, 32, 60, 50, 200, 40, 160	22, 10.56, 7.04, 13.2, 11, 44, 8.8, 35.2
Ceará	160, 128	35.2, 28.16
Ria Grande da Narte	320, 160	70.4, 28.16
Paraíba	320	70.4
Pernambuca	320	70.4
Alagaas	320	70.4
Sergipe	640, 160, 320, 80, 120	140.8, 35.2, 70.4, 17.6, 26.4
Bahia	80, 160, 320, 200, 40, 36, 640, 60, 600, 144, 128	17.6, 35.2, 70.4, 44, 8.8, 7.92, 140.8, 13.2, 132, 31.68, 28.16
Minas Gerais	40, 50, 48, 80, 60, 100, 160, 120, 144, 44, 20	8.8, 11, 10.56, 17.6, 13.2, 22, 35.2, 26.4, 31.68, 4.4
Espírita Santa	40	8 8
Rio de Janeira	40, 60	8.8, 13.2
São Paula	50, 40, 60, 48, 110, 100, 55, 36	11, 8.8, 13.2, 10.56, 24.2, 22
Paraná	40, 50	8.8, 11
Santa Catarina	40, 36, 28, 37, 50	8.8, 7.92, 6.16, 8.14, 11
Ria Grande do Sul	40, 36, 27, 80, 30	8.8, 7.92, 5.94, 17.6, 6.6
Mata Grasso	50, 40, 80	11, 8.8, 17.6
Gaiás	80, 160, 40	17.6, 35.2, 8.8

As a general rule, special recipients are not made for measuring out alqueires, old cans or boxes generally being used for this purpose. The alqueire is divided into fourths or "quartas" (see page 121).

ARROBA — A unit of weight almost all over the country and generally equivalent to 15 kg. (33 lbs.), though in some municipios of Paraíba, Rio Grande do Norte and Alagoas, it is as much as 16 kg. (35.2 lbs.). Seed cotton and coffee-berries are habitually weighed at 16, 18, 20 or 22 kg. (35.2, 39.7, 44.1 or 48.5 lbs.) to the arroba to allow for the waste.

BALAIO — Such baskets are made of split cane (taquara) or fibre, and may be divided into two classes: the large or common type of balaio, with a capacity varying from 40 to 100 litres (1.1 to 2.75 bushels) and the small balaio varying from 5 to 20 litres (1.1 to 4.4 gallons). Both are widely used in the States of Espírito Santo, Rio de Janeiro and Minas Gerais. The capacity of the former stands at 80 litres (2.2 bushels), the term "balaio de 20 litros" coming from the fact that the volume of heads of maize (Indian corn) that will fill the basket yields about 20 litres of grain, when husked. That of the latter amounts to 60 litres (1.65 bushels) and is known as a "balaio de arroba", because its contents in coffee-berries produce an average of one arroba of clean dried beans; it is indeed commonly used by the coffee-picker.

BOLA — A lump of crude rubber built up by dipping a wooden paddle into the latex and drying over a smudge fire (see Bloco). In many municipios of the northern, northeastern and central States, the term is applied synonymously with "rolo" to spun or roll tobacco, while in the South "pacote" is used.

The long rope-like coil thus prepared usually has the following weights, according to the regions:

Ceará, Sergipe, Alagoas and Bahia.....	45 kg. (99 lbs.)
Maranhão and Mato Grosso.....	30 kg. (66 lbs.)
Paraíba, São Paulo and Goiás.....	15 kg. (33 lbs.)

CACHO — Bananas, grapes and a species of coconut, "côco da Praia" (**Diplothemium maritimum,** Mart.) are among the fruit most commonly sold in "cachos" or bunches, the weight of which vary considerably owing to the diversity of types of each product, as may be seen from the following table:

PRODUCTS	NUMBER AND WEIGHT OF FRUIT PER BUNCH								
	Maximum			Minimum			Average		
	no.	kg.	lbs.	no.	kg.	lbs.	no.	kg.	lbs.
Bunch of bananas.....	90	12	25.4	30	4	8.8	60	8	17.6
Bunch of "Praia" coconuts	30	40	88.2	3	4	8.8	15	20	44.1
Bunch of grapes (Rio Grande do Sul type)..	—	1	2.2	—	0.3	0.7	—	0.5	1.1

CARGA — The term "carga", meaning load, is applied in general to the volume of a product that can be carried on the back of a man or beast of burden, or in a cart or waggon.

However in the case of such materials as sugarcane and firewood, the load is generally divided into two and slung over the back of a pack animal where it is secured on either side by a wooden armature called a "cambita" or "cangalho", the load of which, corresponding to half the total load, is considered to be the "carga", the weight varying as follows according to the materials transported:

PRODUCTS	WEIGHT OF THE "CARGA" OR PACK LOAD (= half the total load)					
	Maximum		Minimum		Average	
	kg.	lbs.	kg.	lbs.	kg.	lbs.
Brown grating sugar in cakes	60	132	30	66	40	88
Caroá and other fibres	50	110	30	66	40	88
Charcoal	60	132	20	44	30	66
Firewood	60	132	40	88	50	110
Sugarcane	75	165	50	110	60	132

CARRO — Generally speaking, when the term "carro" is used as a unit of measure by farmers or produce merchants, reference is being made to the capacity of an ox-cart, a vehicle which is widely employed in the inland rural districts.

Thus in some parts of the country the harvest is reckoned in "carros" and one may even hear tell of planting so many "carros" of maize or beans, whereby it is meant that the crop to be grown is expected to yield that number of cartloads when harvested.

The usual weight of each of the various kinds of load of an average type of cart with a capacity of 2.3 cubic metres (about 70 cubic feet) is as follows:

PRODUCE	USUAL WEIGHT OF CARTLOAD ("CARRO")	
	kg.	lbs.
Arrowroot roots	600	1,323
Babassú in the shell	1,000	2,205
Charcoal	400	882
Coconuts ("Côco da Praia") in the shell	750	1,654
Firewood	800	1,764
Manioc (cassava) roots	800	1,764
Maize (Indian corn) in the shuck	1,200	2,646
Oranges	800	1,764
Potatoes	750	1,654
Potatoes, Sweet	600	1,323
Seed cotton	600	1,323
Sugarcane	1,000	2,205
Timber	1,200	2,646

CESTO — The most common types of basket ("cêsto") used in Brazil are the "caçuá" and the "jacá" which are found in practically every part of the country. The "paneiro" is very often used in Amazonas and Pará and generally holds an alqueire, i.e. 40 litres (8.8 gallons), while the "cofo" and the "panicum" are met with to a great extent, especially in Bahia. The "garajau", the "gigo" and the "seirão" are less common; the two former occur in Pernambuco, though there the "garajau" is sometimes called a "grade", and the latter belongs in Santa Catarina. The use of the "balaio" tends to be confined to the south, whereas the "atura", which is generally much the same as the "paneiro", is to be seen in the States of Amazonas and Pará. The "uru", made of fibre, is much used in Rio Grande do Norte. The countryman of the State of Rio de Janeiro shows a preference for the "quiçamba" particularly for carrying manioc. Finally, the "canastra" is found in the Territory of Acre and the States of Amazonas and Pará.

CORDA — This term is employed, but rarely, in certain States of the north, northeast and east to designate a "feixe" or bundle of firewood, fibre, etc. Care must be taken not to confuse it with the American standard cord for timber which is rather more than twice as large (144 as compared with 70.6 cubic feet or 2 cubic metres). The term is also applied to the coils of roll tobacco, which vary considerably in weight. The values most frequently given to the "corda" in its various applications are as follows:

Caroá fibre (Paraíba and Sergipe) ..	0.350	kg. (12.3	oz.)
Local fibres (Maranhão)	15	kg. (33	lbs.)
Roll tobacco (Maranhão)	25	kg. (55	lbs.)
Firewood (Espírito Santo)	800	kg. (176	lbs.)

FARDO — The "fardo" or bale is a closely pressed package of merchandise with an outer wrapping of tow or paper, bound with rope, wire or steel band. The products most commonly packed in bales are: leaf tobacco, seed cotton and lint, alfalfa, fibres, bacon, jerked meat, etc. The size and density of cotton bales intended for export are regulated by the Textile Plant Service ("Serviço das Plantas Têxteis") of the Ministry of Agriculture according to the following standards: length: 1.10 to 1.15 metres (43¼ to 45 inches); height: 0.50 metres (19½ inches); width: 0.45 to 0.50 metres (17¾ to 19½ inches); density: 400 kg. per cubic metre (25 lbs. per cubic foot). In the home trade, the bales vary widely in weight, volume and density. In the States of Alagoas and Sergipe, for instance, they never weigh more than 75 kg. (165 lbs.) and are often confused with bags, the term "fardo" being used there interchangeably with "saco". See tables on pages 122-125 for further details.

QUARTA — It has been seen that this measure amounts to a quarter of an alqueire, but the latter being a unit both of area and capacity and furthermore varying widely from State to State, a similar variation may be expected in the quarta. The confusion is increased when, in the same region, the two units of capacity are based on different systems of square measure, as in parts of Bahia where an 80-litre alqueire and a 10-litre quarta are used, corresponding respectively to sown areas of 100 x 100 braças (alqueire mineiro) and a quarter of 50 x 100 (alqueire paulista).

The term also applies to 25 cm. (10 ins.) of roll tobacco, weighing about 7½ lbs.

AVERAGE WEIGHTS, DENSITIES AND VOLUMES OF THE BALE OR "FARDO"

A = very often, B = fairly often, C = seldom and D = very seldom used

PRODUCTS		WEIGHT		VOLUME		DENSITY	
		kg.	lbs.	cubic metres	cubic feet	kg. per cu. m.	lbs. pe' cu. ft.
Alfafa	A	45	99	0.275	97.1	165	10.3
	C	60	132	0.375	132.4	160	10.0
	D	90	198	0.560	197.8	160	10.0
Bacon		50	110	—	—	—	—
Caroá fibre	B	60	132	0.300	105.9	200	12.5
	C	70	154	0.350	123.6	200	12.5
	C	100	221	0.460	162.4	220	13.7
	C	120	264	0.600	211.9	200	12.5
Cod, Foreign dried		60	132	—	—	—	—
Cotton, Seed	B	60	132	0.300	105.9	200	12.5
	B	75	165	0.400	141.3	200	12.5
Cotton lint	A	75	165	0.400	141.3	200	12.5
	B	100	221	0.450	158.9	220	13.7
	B	120	264	0.500	176.6	240	15.0
	A	150	331	0.600	211.9	250	15.6
	C	200	441	0.800	282.5	250	15.6
Fibres	A	50	110	0.250	88.3	200	12.5
	B	75	165	0.400	141.3	190	11.9
	B	100	221	0.500	176.6	200	12.5
	C	150	331	0.750	264.9	200	12.5
Jute	C	200	441	0.650	229.5	300	18.7
Meat, Dried or jerked		90	198	—	—	—	—
Tobacco, Leaf	B	60	132	0.240	84.8	250	15.6
	A	75	165	0.320	113.0	230	14.4

Transporting the ripe fruit on a pineapple plantation

WEIGHTS GIVEN TO THE BAG OR SACK ("SACO")

A = very often, B = fairly often, C = seldom, and D = very seldom.
Regions: Cen = Centre, E = East, N = North, NE = Northeast, and S = South.

PRODUCTS	FREQUENCY OF USE	REGION WHERE USED	WEIGHT kg.	WEIGHT lbs.
Arrowroot flour	A	—	60	132
	B	—	50	110
Arrowroot root	C	—	50	110
Bacon	C	—	50	110
Barley	B	S	60	132
	B	S	50	110
Babassú nuts in the shell	B	N, NE	60	132
Bananas	D	—	60	132
Beans, Dried	A	—	60	132
Cacau	B	—	60	132
Carnauba wax	B	N, NE	60	132
Cashew nuts	A	—	60	132
	B	—	50	110
	D	—	45	99
	D	—	40	88
	D	—	35	77
Castor beans	B	Cen, S	50	110
	B	N, NE, E	60	132
	C	—	45	99
Charcoal	A	—	20	44
	B	—	30	66
	B	—	25	55
	D	—	40	88
	D	—	50	110
	D	—	60	132
Coconuts ("Côco da Praia"), 100 Shelled	B	—	70	154
Coffee berries	B	Cen, S	36	79
	B	N, NE, E	40	88
	C	—	30	66
Coffee beans, Processed	A	—	60	132
Cotton, Seed	A	—	60	132
	B	—	30	66
	C	—	80	176
Cotton lint	A	—	60	132
	C	—	80	176
Cottonseed	A	—	60	132
	B	—	50	110
	C	—	45	99
	D	—	30	66

WEIGHTS GIVEN TO THE BAG OR SACK ("SACO")

A = very often, B = fairly often, C = seldom, and D = very seldom. Regions: Cen = Centre, E = East, N = North, NE = Northeast, and S = South.

PRODUCTS	FREQUENCY OF USE	REGION USED WHERE	WEIGHT kg.	WEIGHT lbs.
Leman	C	—	50	110
	D	—	30	66
Lime, Sweet	C	—	50	110
	D	—	30	66
Maize flour (Indian corn)	B	Cen, S	45	99
	B	—	50	110
	B	N, NE, E	60	132
Maize in the shuck (corn on the cob)	A	—	60	132
Manioc (cassovo) flour	B	Cen, S	45	99
	B	—	50	110
	B	N, NE, E	60	132
Manioc roots	B	—	50	110
	B	—	60	132
Oots	D	—	50	110
Oronges	C	—	50	110
	D	—	30	66
Oiticica seeds	C	—	50	110
	C	—	60	132
Ouricuri (licuri) wox	C	—	50	110
	C	—	60	132
Peonuts (mankey or ground nuts) in the pod	A	—	25	55
	B	N, NE, E	30	66
	B	N, NE, E	40	88
Peonuts (monkey or ground nuts), Hulled	A	—	50	110
	B	N, NE, E	60	132
	C	—	40	88
	C	—	30	66
Pototoes	B	Cen, S	50	110
	B	N, NE, E	60	132
Pototoes, Sweet	B	Cen, S	50	110
	B	N, NE, E	60	132
Rice, Polished	A	—	60	132
Rice, Rough	A	N, NE, E	60	132
	A	Cen, S	50	110
	C	—	45	99

WEIGHTS GIVEN TO THE BAG OR SACK ("SACO")

A = very often, B = fairly often, C = seldom, and D = very seldom.
Regions: Cen = Centre, E = East, N = North, NE = Northeast, and S = South.

PRODUCTS	FREQUENCY OF USE	REGION WHERE USED	WEIGHT kg.	WEIGHT lbs.
Rye	B	S	60	132
	B	S	50	110
Sapucaia nuts	B	—	60	132
Sugar	A	—	60	132
Sugar (fram primitive mills)	C	—	45	99
Tapiaca, Ground	B	Cen, S	50	110
	B	N, NE, E	60	132
	C	—	45	99
Wheat flaur	A	—	50	110
	A	—	45	99
	B	N, NE, E	60	132
	C	—	25	55
	D	—	5	11
Wheat grain	A	—	60	132
	C	—	50	110

Fazenda in the interior of São Paulo State

NUMBER AND AREA OF FARMS AND RANCHES IN BRAZIL
As of 1st September, 1940

SIZE OR ESTATES				NUMBER OF ESTATES REGISTERED	AREAS In hectares (= 2.471 acres)		
Hectares		Acres			Total [1]	Crops	Grazing [2]
From	To	From	To				
—	1	—	2.47	39,305	22,911	18,264	1,480
1	2	2.47	5.49	103,077	145,072	119,849	9,448
2	5	5.49	12.36	272,086	924,768	624,453	124,084
5	10	12.36	24.71	240,089	1,800,688	875,575	393,484
10	20	24.71	49.42	315,676	4,557,586	1,710,481	1,134,411
20	50	49.42	123.55	455,057	14,298,481	3,782,990	3,915,839
50	100	124	247	204,705	14,256,093	2,587,781	4,933,158
100	200	247	549	123,008	17,178,729	2,256,352	7,077,472
200	500	549	1,236	89,332	27,430,468	2,634,711	12,686,717
500	1,000	1,236	2,471	31,478	21,575,802	1,572,896	10,747,652
1,000	2,500	2,471	6,178	18,932	28,544,426	1,327,036	15,099,034
2,500	5,000	6,178	12,356	5,390	18,411,939	597,194	9,864,356
5,000	10,000	12,356	24,711	2,217	15,068,452	365,526	8,272,384
10,000	100,000	24,711	247,110	1,236	26,300,597	331,892	11,407,963
100,000+	—	247,110+	—	37	7,204,235	30,430	2,474,251
Undeclared area.....				2,964	—	—	—
BRAZIL				**1,904,589**	**197,720,247**	**18,835,430**	**88,141,733**

SOURCE — National Census Service ("Serviça Nacianal de Recenseamenta").

[1] Including the following areas distributed amang the various sized estates: Timber and scrub: 49,085,464 hectares; Undevelaped land: 29,296,493 hectares; Submarginal land: 12,361,127 hectares; Artificial pastures: 5,072,919.

[2] Including artificial pastures.

A typical scene off the northeast coast of Brazil

AGRICULTURAL MACHINERY AND IMPLEMENTS
On the estates enumerated in the Census of 1st September, 1940

TYPES OF EQUIPMENT	QUANTITIES
Tractors	3,380
10 H.P. ar mare	2,759
Less thon 10 H.P.	621
Ploughs	500,853
Mauld .baard	408,101
Disc	39,455
Single-shore	53,297
Horrows	127,728
Tine	113,236
Disc	14,492
Rollers	11,718
Seed drills	156,383
Single	148,129
Dauble and multiple	5,731
Patato	2,523
Cultivators	227,648
Horvesters	5,805
Animal troction	5,174
Mechanical tractian	631
Ant exterminotors	188,050

SOURCE — Notionol Census Service ("Serviço Nacianol de Recenseamento").

Rocks eroded to the shape of a giant blacksmith and his anvil in the Serrinha Hills, near Ponta Grossa (Paraná)

AREAS UNDER CERTAIN SPECIFIED CROPS IN BRAZIL AND PRODUCTION FIGURES FOR 1934/38 AND 1947

PRODUCTS	AREA CULTIVATED In hectares (= 2.471 acres)		PRODUCTION In metric tons (= 2.205 lbs.)	
	Average 1934/38	1947	Average 1934/38	1947
Barley	9,297	12,134	11,944	12,211
Castor	110,475	184,990*	126,106	144,671*
Caffee	3,486,368	2,437,029	1,446,112	903,168
Cattan	1,981,463	2,384,377	1,183,403	1,392,546
Cattan lint	—	—	355,021	345,143
Cattanseed	—	—	828,382	1,047,403
Maize (Indian corn)	4,013,346	4,323,052	5,656,383	5,502,548
Oats	10,788	12,197	12,490	10,421
Rice	901,974	1,650,989	1,305,234	2,596,374
Rye	13,518	15,138	14,808	10,527
Sugarcane	459,858	784,794	16,968,408	28,444,290
Wheat	160,713	381,125	144,171	345,301

* Data subject ta rectification.

SOURCE — Service af Production Statistics ("Serviça de Estatistica da Produção").

VALUES OF BRAZILIAN AGRICULTURAL PRODUCTION 1934/38 and 1947

PRODUCTS	VALUES In Cr$ 1,000	
	Average 1934/38	1947
Alfalfa	36,538	92,871
Bananas	111,010	628,129
Barley	4,255	15,739
Beans, Dried	318,003	1,760,126
Cacaa	128,514	697,966
Castar beans	57,772	303,808*
Cocanuts	30,139	151,923
Caffee	1,955,743	5,431,479
Cattan lint	1,171,111	3,023,754
Cattanseed	283,825	2,919,173
Grapes	81,720	204,527
Maize (Indian corn)	1,189,864	4,390,117
Maniac (cassava)	488,129	1,911,247
Oats	4,021	15,445
Oranges	341,329	415,563
Pineapples	22,577	77,275
Patatoes	135,390	1,016,573
Rice	621,299	3,474,860
Rye	4,698	23,018
Sugarcane	404,342	2,226,385
Tabacca	179,207	597,901
Wheat	58,619	947,668

* Data subject ta rectification.

SOURCE — Service af Production Statistics ("Serviça de Estatistica da Produção").

AGRICULTURAL PRODUCTION OF BRAZIL — 1944/1947

1. Area under crops

PRODUCTS	CULTIVATED AREAS (in hectares = 2.471 acres)			
	1944	1945	1946	1947
Alfalfa	27,681	26,564	24,081	26,354
Bananas	75,709	84,205	90,538	93,104
Barley	12,042	13,757	13,067	12,134
Beans, Braad	51,057	59,208	58,767	60,669
Beans (Black, Haricat, Lima, etc.)	1,349,505	1,432,190	1,534,110	1,583,723
Cacao	241,520	267,920	243,772	270,014
Castar beans	207,563	200,073	176,351	184,990
Cacanuts	35,212	37,148	37,874	43,432
Caffee	2,326,141	2,381,561	2,406,369	2,437,029
Cattan	2,807,758	2,721,584	2,479,580	2,384,377
Garlic	5,271	5,561	6,894	7,714
Grapes	41,297	32,002	32,943	33,504
Maize (Indian corn)	4,101,315	4,092,054	4,326,864	4,323,052
Maniac (cassava)	807,009	897,988	931,205	828,482
Oats	10,935	12,677	11,660	12,197
Onians	19,770	21,895	21,916	20,947
Oranges	70,662	73,183	75,918	78,069
Peanuts (mankey nuts)	31,334	40,617	33,823	45,940
Pineapples	8,995	11,422	12,863	12,482
Patatoes	84,017	115,855	110,122	116,521
Patatoes, Sweet	86,650	107,916	113,691	123,719
Rice	1,427,515	1,498,117	1,646,029	1,650,989
Rye	14,439	13,800	11,945	11,411
Sugarcane	675,606	656,921	762,201	784,794
Tea	1,263	1,210	1,290	1,413
Tabacca	114,759	143,565	145,498	150,237
Tamatoes	3,346	6,591	8,930	10,459
Tung	3,804	4,456	5,161	7,563
Wheat	328,487	315,548	300,842	381,125
TOTAL	**14,960,628**	**15,275,888**	**15,624,304**	**15,696,480**

Lighthouse at the old sea-port of Olinda, former capital of Pernambuco State

AGRICULTURAL PRODUCTION OF BRAZIL — 1944/1947

2. Quantities

PRODUCTS	UNITS	QUANTITIES PRODUCED 1944	1945	1946	1947
Alfalfa	kg.	129,322,850	148,405,578	162,322,446	145,126,020
Bananas	bunch	92,716,672	107,310,636	117,207,410	123,691,466
Barley	kg.	8,778,120	14,892,050	11,510,270	12,211,255
Beans, Brood	60-kg. bag	651,877	575,333	530,174	586,100
Beans (Black, Haricot, Lima, etc.)	60-kg. bag	17,375,339	16,707,439	17,932,582	17,437,234
Cacao	60-kg. bag	1,942,104	1,994,263	2,027,649	1,984,927
Castor beans	kg.	185,095,841	160,435,612	143,002,848	144,670,580
Coconuts	nut	135,666,300	137,712,100	155,740,400	154,068,800
Coffee beans, Processed	60-kg. bag	11,444,767	13,915,265	15,288,638	15,052,803
Cotton lint	metric ton	592,381	378,495	377,767	345,643
Cottonseed	metric ton	1,166,810	745,520	744,086	680,812
Garlic	kg.	14,301,990	12,702,990	13,713,705	15,671,370
Grapes	kg.	190,355,900	209,028,421	220,461,291	163,634,880
Maize (Indian corn)	60-kg. bag	92,912,355	80,775,944	95,356,202	91,709,141
Manioc (cassavo)	metric ton	10,333,356	11,414,680	11,556,331	10,946,769
Oats	kg.	6,877,018	11,084,500	8,694,315	10,421,327
Onions	kg.	69,522,780	78,095,580	72,303,225	67,266,405
Oranges	box	27,804,157	28,621,051	29,955,137	30,084,781
Peanuts (monkey nuts) in the pod	kg.	31,931,613	28,583,961	31,303,706	40,987,360
Pineapples	fruit	73,892,264	74,906,480	68,523,539	73,957,620
Potatoes	metric ton	462,660	595,670	541,743	575,387
Potatoes, Sweet	metric ton	659,125	967,921	924,074	1,051,454
Rice, Rough	60-kg. bag	35,174,449	35,782,745	45,983,767	43,272,901
Rye	kg.	9,670,591	10,160,350	8,450,030	8,357,738
Sugarcone	metric ton	25,148,948	25,178,584	28,300,356	28,434,290
Tea	kg.	380,686	409,205	743,990	971,500
Tobacco, Leaf	kg.	104,363,340	113,448,780	118,557,450	101,771,100
Tomatoes	kg.	41,486,521	58,903,025	86,818,851	107,586,500
Tung	kg.	2,878,370	3,597,880	4,538,920	6,089,870
Wheat	kg.	170,586,423	233,298,040	212,513,594	345,300,670
TOTAL (approximative)	metric ton	**51,906,032**	**52,678,143**	**57,826,882**	**57,211,886**

UNITS — kg. = kilogromme = 2.205 lbs.; 60 kg. = 60 kilogrammes = 132 lbs.; metric ton = 2,205 lbs.

AGRICULTURAL PRODUCTION OF BRAZIL — 1944/1947

3. Yield

PRODUCTS	UNITS (1 kg. = 2,205 lbs.)	AVERAGE YIELD PER HECTARE (1 hectare = 2,471 acres)			
		1944	1945	1946	1947
Alfolfo	kg.	4,672	5,587	6,741	5,507
Bananas	bunches	1,225	1,274	1,295	1,328
Barley	kg.	729	1,083	881	1,006
Beans, Broad	kg.	766	583	541	580
Beans (Black, Haricot, Lima, etc.)	kg.	773	700	701	661
Cacao	kg.	482	447	499	444
Castor beans	kg.	892	802	811	782
Coconuts	nuts	3,853	3,707	4,112	3,547
Coffee beans (hulled and cleaned)	kg.	295	351	381	371
Cotton, Seed	kg.	639	421	462	439
Garlic	kg.	2,741	2,284	1,989	2,032
Grapes	kg.	6,114	6,532	6,692	4,884
Maize (Indian corn)	kg.	1,359	1,184	1,322	1,273
Manioc (cassava)	kg.	12,805	12,711	12,410	13,213
Oats	kg.	629	874	746	854
Onions	kg.	3,517	3,567	3,299	3,211
Oranges	boxes	393	391	395	385
Peanuts (monkey nuts) in the pod	kg.	1,018	704	926	892
Pineapple	fruits	8,215	6,558	5,327	5,925
Potatoes	kg.	5,507	5,142	4,919	4,938
Potatoes, Sweet	kg.	7,607	8,969	8,128	8,499
Rice, Rough	kg.	1,478	1,433	1,676	1,573
Rye	kg.	670	736	707	695
Sugorcane	kg.	37,000	38,000	37,000	36,000
Tea	kg.	302	271	577	688
Tobacco, Leaf	kg.	909	790	815	677
Tomatoes	kg.	12,399	8,937	9,722	10,286
Tung	kg.	757	807	879	805
Wheat	kg.	519	739	706	906

Orange-pickers at work

PRINCIPAL BRAZILIAN CROPS

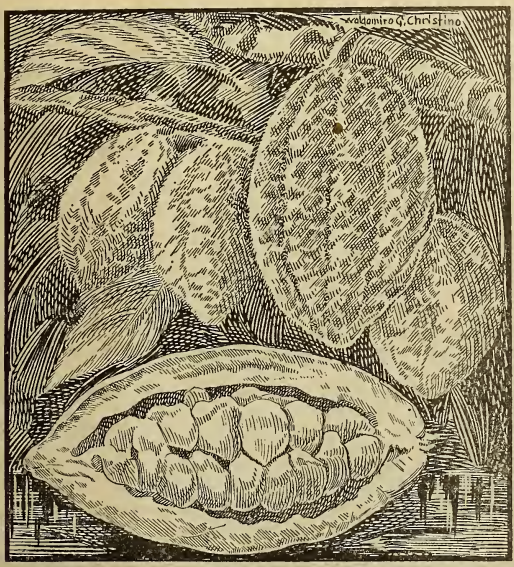
BARLEY — Production is still small, though certain regions are well suited to growing this cereal and Brazilian breweries make every effort to encourage the southern farmer to extend the land under barley so as to increase the supply of malt, a raw material essential to the industry, the greater part of which is at present imported.

BEANS — Together with maize and manioc, dried beans constitute the staple food of the Brazilian rural population.

Indeed, beans and rice ("feijão e arroz") with meat may well be considered the national dish. Eaten by rich and poor, it is scarcely ever absent from the menu, whether it be in one of the State Capitals or in the smallest village of the interior. Nor is the popular taste for this vegetable condemned by the dietitian, for its high nitrogen content enables it to be used with advantage along with the more common carbohydrates in the make-up of a whole series of balanced nutrition formulas.

Countless varieties are grown in the country, from the common black bean to the lima and butter beans, and the total area under cultivation exceeds 10,000,000 acres, with a production of about 17,000,000 132-lb. bags.

Organized cultivation of manioc or cassava



The cacau fruit grows on the trunk and main branches of the tree

CACAO — The cacao or chocolate tree is a native of tropical America, but it has travelled far afield, crossing the Atlantic to the Portuguese island of Fernando Pó, where a few pods were pocketed by a native of Accra to plant in his garden when he returned home to the Gold Coast, now Brazil's chief rival on the international cocoa market. Similarly in this country, the plant emigrated from the Amazon Valley to the south of Bahia State, which has become the great centre of production, with plantations amounting to 97% of the area under cacao in the whole of Brazil, the other States contributing a mere 3%.

Since 1931, cacao planters have profited by the efficient assistance given by the Bahia Cacao Institute ("Instituto de Cacao da Bahia"), an administrative autarchy founded at a time when they were labouring under the pressure of financial difficulties.

The Institute has been particularly successful in organizing credit and carrying out experimental work in connection with methods of

cultivation and processing, and also in promoting the control of insect pests and diseases.

Transportation difficulties have been smoothed out by a comprehensive programme of road-building, particularly in the municipios of Ilhéus, Itabuna, Canavieiras, Belmonte, Itacará, Rio Novo, Jequié, Santarém, Una and Maraú.

The constant vigilance of the Cacao Institute has helped to keep domestic prices at a reasonable level relative to the situation on the consumer markets of this commodity.

CASTOR OIL PLANT — It is estimated that 435,000 acres are planted with this valuable tree-like herb of the spurge family. It thrives all over the country and remains immune to pests and disease.

Castor oil is remarkable for its high density. Thus, setting aside its medicinal value, it is chiefly important as an irreplaceable lubricant for high-speed engines, where its adhesive power is essential to the smooth running of bearings, transforming metallic friction into liquid friction. It is the heaviest of the vegetable oils (0.960 at 15° C.) and is also extremely suitable for the manufacture of fine transparent toilet soaps.

The Brazilian production of castor beans is well over 330 million lbs.

COCONUTS — Long stretches of the low-lying Brazilian coastline are silhouetted with coconut palms that grow right down to the beach. The total number of these trees is estimated at 3 million, with a production capacity of more than 100 million nuts per year. The industrial purposes to which the product can be put are well known, particularly those connected with copra and fibre.

The common coconut tree which lines the shores of Brazil is remarkoble for the variety of services it renders to mon

COFFEE — Coffee is the mainstay of the Brazilian agrarian economy. Having been cultivated for centuries in the country, it has yielded heavy profits, as may be deduced from the advanced conditions in the regions where the coffee tree is grown. The share of the commodity in the total value of exports amounts to 40%.

There are at present about 2,150 million coffee trees in full production and they cover an area of more than 6 million acres.

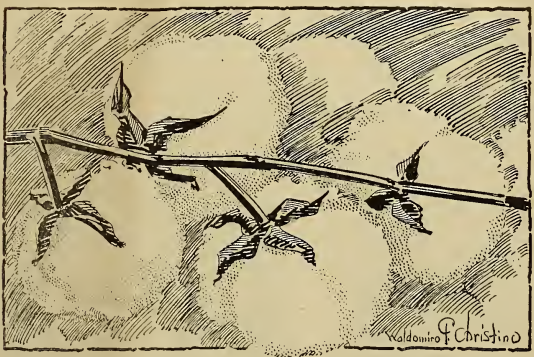
The plantations that are being developed in the new producing regions of the States of Paraná and Goiás are doing surprisingly well.

New methods of cultivation are being introduced into the old zones of the States of Rio, São Paulo and Minas Gerais, with the object of improving the quality of the product and the average yield by careful shading and fertilizing.

Giant drying silo on a São Paulo coffee plantation

COFFEE-PICKING

Working on the coffee plantation in Brazil, the settler quickly makes headway protected by highly favourable economic guarantees.



Ripe cotton bolls ready for picking

COTTON — Brazilian cotton fields spread over an area of about 6 million acres. In less than 20 years, Brazil has become one of the world's major producers of the precious fibre, gaining a strong foothold on the consumer markets owing to the exceptional properties of the product.

The practical research work of selection and improvement of the strains carried on in the technical Institutes has completely changed the cotton situation in the south of the counry, which has taken but a short space of time to develop into the most important centre of cultivation.

The home production is large enough to meet the requirements of all the mills in the country and to supply a regular export trade.

GUARANÁ — This interesting vine from the Amazon region was classified in 1821 by the botanist Kunth under the name of **Paulinia cupana**, but despite the well-known tonic and stimulating properties of the seeds, production is still relatively little developed, 210 tons being the peak figure of recent years.

Analysis reveals a higher caffein content than that of any other plant. Modern chemistry has widely enlarged the scope of its applications, particularly in the manufacture of soft cooling drinks, syrups, lozenges, etc.

MAIZE (Indian corn) — Among the great world producers of maize, Brazil holds the second place with a cultivated area of over 10 million acres and an annual production of 95 million 132-lb. bags.

It is no exaggeration to state that every farmer in the country has his maize fields. Studies are being pursued to improve the quality and

Cultivation of maize (Indian corn) on an Experimental Farm

yield of this cereal, and to this end some 500 hybrids have already been selected on the various government experimental stations.

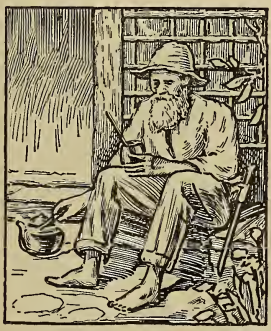
MANIOC (Cassava) — This is the most genuinely national of Brazilian crops. Originally growing wild, it has been cultivated since the discovery of the country and, after treatment, the immense starchy roots yield a flour which is the staple diet of the rural population. The area under manioc exceeds 2,200,000 acres, while production runs as high as 12 million tons.

MATTEE TEA — This evergreen tree, which belongs to the same genus as the common holly, is a native of the Paraná, Paraguay and Uruguay Valleys. The infusion prepared from the leaves is pleasant to the taste and has valuable nourishing and medicinal properties, so that it is a true Brazilian tea, the drinking of which has spread, however, principally throughout the Argentine, Uruguay, Chile and Paraguay. In traditional style, the mattee is prepared by pouring boiling water on the dried leaves in a small calabash and sucked up through a metal or reed tube with a strainer at one end, called a bombilla: the calabash or cuia is often shared by several persons like a pipe of peace, each one filling it up from the kettle in turn. Mattee, however, may also be brewed like tea in a teapot and served in cups, or else iced to make a deliciously refreshing drink.

The mattee industry is typically Brazilian. The leaves are gathered from the wild trees, but there are modern processing plants operating in the States of Paraná and Santa Catarina.

The product is chiefly packed in pinewood kegs, which have proved the source of a flourishing new industry using the local timber as a raw material; neat wooden boxes or packets are, however, preferred for the foreign markets.

The National Mattee Institute ("Instituto Nacional do Mate") is an autarchical body whose aim it is to defend the interests of the production, industry and commerce of Brazilian mattee.



A countryman savouring his mattee

RICE — Practically all the land in Brazil can be used for growing rice, and yet it is curious to note that in 1917 Brazil was still importing this commodity; now it is one of the chief suppliers of the international markets.

The Rice Institute ("Instituto do Arroz") of Rio Grande do Sul is developing a farseeing programme of expansion, with the parallel intention of improving and cheapening the product, while increasing its popularity in the consuming centres.

In the south, Japanese varieties of the smooth, bearded type, particularly appreciated on the Argentine market, account for half the crop. Blue Rose, a medium-grain variety preferred in Central America and Europe, is also grown.

In the States of Minas Gerais and the Northeast, the predominating types are Agulha ("Needle"), Honduras, Matão, Branco (White), Dourado (Golden) and varieties of the Catete type.

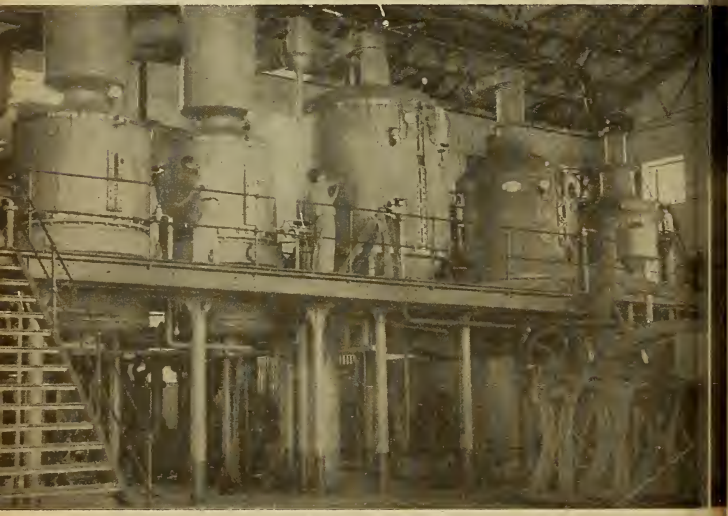
In the course of the last few years, about 400 strains of rice have been imported for selection and hybridation purposes from the United States, India, Ceylon, Australia, Italy and other countries.

RYE — Rye-farming is prosperous, principally in the State of Paraná, where each settler produces at least enough for consumption in the homestead.

Black bread made from rye flour is an essential part of the diet of the German and Polish agricultural worker.

SOYBEAN — This annual legume, with its great variety of uses, has gained far-reaching popularity as a seed and fodder crop in the Cotton and Corn Belts of the United States and does well in Brazil, where the area under cultivation is increasing steadily.

The soybean is admirably suited to the northeastern region, for its capacity to resist drought enables it to withstand the unpredictable severity of local conditions.



Pernambuco sugar refinery

SUGARCANE — The growing of sugar-cane dates back almost to the discovery of Brazil and the plantations now cover close on 1.5 million acres of land and produce 22 million metric tons of cane to feed more than 65,000 mills and refineries with a high output of sugar and alcohol, which are basic sources of wealth for various important regions.

Experimental tobacco growing in Bahia

Several important measures have been adopted by the government harmonizing the interests of industry with those of the cane producers. The innovations are typically Brazilian and consist, not in dividing up or redistributing land, but in regulating the use to which it is put and stabilizing production on the basis of a fair profit to the planter.

The seasonal sugar output is now rated at about 24 million bags.

TEA — Tea has been grown in Brazil for more than a century, but in 1920 the expansion of Japanese immigration increased the area under cultivation, until there are now some 30 million tea plants (25 million of Chinese and 5 million of Indian variety) in the State of São Paulo, which has become the most important centre of tea production in South America.

This development is also due in no small measure to the repercussions of the last war. Home consumption is now up to 800 metric tons, while exports for 1948 have reached 1,219,757 lbs., furnishing proof positive that the product is well received on the international market.

TOBACCO — The consumption of tobacco rose steeply during the last war and Brazil, being a major producing country, could not fail to be influenced favourably by the increasing scarcity of the product.

Tobacco-growing supplies an important element in the economy of the country, for more than 400,000 acres are under cultivation, chiefly in the States of Rio Grande do Sul, Bahia and Minas Gerais, and the total production is reckoned at 265 million lbs. of leaf tobacco. Blends are made up to suit every taste and Brazilian cigars have achieved a world-wide reputation.

TUNG — The cultivation of this plant was only begun in Brazil in the year 1930, but for centuries the production of China wood oil has been one of the major sources of wealth in the Orient.

The first seeds introduced into the country came, however, from the United States and were distributed to farming communities in São Paulo, Paraná, Santa Catarina, Rio Grande do Sul and Minas Gerais. Development was rapid and soon the foreign tree became as familiar to Brazilian planters as if it had been grown regularly for generations.

Brazil now leads the South American countries in this field and everything points to its becoming the second largest producer of tung, surpassed only by China.

It is worth noting that the expansion is being promoted on methodical lines with a sound technical background.

Many firms are interested in the raw material and some of them are already operating modern equipment for extracting of the oil.

WHEAT — Wheat farming is traditional in Brazil and there is no doubt that the upland country is suitable for raising this valuable crop.

The fact that the wheat fields already cover an area of about 1,250,000 acres and that the 1948 harvest yielded some 500,000 metric tons of grain clearly shows the possibilities of development which have aroused considerable interest in government circles in view of the favourable results that an increase in production may be expected to have on the economy in general and on the standards of popular nourishment throughout the country.

It is estimated that in less than five years Brazil will be producing all the wheat needed for home consumption.

The official assistance which is being granted to wheat-growers is indeed considerable, and it would seem that the achievement of a solution to the great problem has taken on the aspect of a question of honour.

Experiments in progress and genetic studies already carried out in official establishments have been most encouraging, particularly as regards resistance to rust, which has long been the major obstacle to the successful growing of this cereal in Brazil.

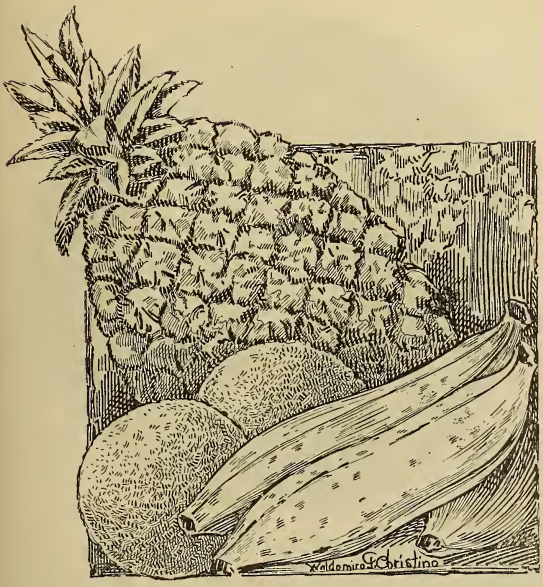


TABLE FRUITS

Prospective fruit-growers have found climatic and altitude possibilities in Brazil suitable to the widest seasonal range of production, with the result that economic success attends the planting of all kinds of fruit tree, whether they depend on temperate conditions or the rigours of tropical heat.

The so-called European fruits, such as apples, pears, grapes, plums, peaches and chestnuts, yield abundantly in the higher regions of the States of Minas Gerais, São Paulo, Santa Catarina and Rio Grande do Sul, while the countless native species are highly appreciated, not only for their handsome appearance and aroma, but also for their delicate taste, full advantage of which is taken in the preparation of jams, jellies and juices already industrialized on a large scale in the more important centres.

Among the great variety of fruits entering into home consumption, some play an important role in the export trade, especially pineapples, oranges and bananas.

BANANAS — The great banana plantations are situated chiefly along the seacoast in the States of Rio de Janeiro, São Paulo and Paraná, the fruit being mainly exported from Santos.

Brazilian production amounts to more than 90 million bunches, 6,580,000 of which were shipped abroad in 1947.

Like all other fruit intended for export, Brazilian bananas are carefully selected, graded and properly packed so as to run no risk of deterioration while awaiting shipment in vessels specially equipped for this kind of cargo.

ORANGES — The strain of orange-tree from which the groves of California sprang was originally brought to Brazil and this illustrates the possibilities of the country in the way of growing citrus fruits. However, Brazilian growers only turned their attention to the export trade in 1920, when they lost no time in securing a dominant position on the more important markets, particularly England.

SALVADOR

Often known to the foreigner under the name of Bahia, this State capital is one of the principal export centres of Brazil, shipping overseas the greater part of the cacao crop and a large percentage of tobacco, cotton, fibres and various other products.

In the ten years from 1911 to 1920, 206,934 boxes were exported, followed from 1921 to 1930 by 4,262,754 boxes and increasing to 34,425,292 in the period from 1931 to 1940.

These statistics are eloquent in view of the high standards exacted for citrus fruits on the markets which Brazilian producers have conquered in less than three decades by dint of considerable initiative and hard work.

Packing pineapples for export

WINE AND GRAPES

The south of Brazil is eminently suitable for cultivation of the vine, and wine is made there that is well appreciated and provides the best evidence of the possibilities of local production.

Restriction of planting to the finest strains and the taking of the utmost care in developing the vineyards, together with the application of up-to-date processes to wine-making, have brought about a distinct improvement in the quality of the product.

The chief problem of the Brazilian wine-grower resides in the replacement of the old stocks by varieties capable of producing better wines.

Certain strains of **Vitis vinifera** and hybrids of acknowledged value are gradually being substituted for the old American strains that still comprise 80% of the vines grown in the country. The encouraging behaviour of the new varieties in certain regions, principally in the

mountains of the State of Minas Gerais, bears witness to the results that are being obtained. European varieties such as Rhine Riesling, Italian Gros Moscatello and others, have progressed very satisfactorily. This particular region is volcanic and situated at 3,300 feet above sea level; it is destined to produce the finest wines in Brazil.

The State of São Paulo is successfully developing stocks of Pinot blanc Chardonay, Maddersfield Court, Hamburg Muscatel, Black Diamond and selected strains of Pirovano.

In Paraná and Santa Catarina, experiments are being made with varieties of Trebbiano, Frankenthal and some Muscatels.

Eighty per cent of the vineyards are, however, situated in Rio Grande do Sul.

The making of "wine" from typically Brazilian fruits has been the object of interesting research, and the production of cashew wine is fairly large in the north where the cashew nut tree grows wild.

The Fermentation Institute ("Instituto de Fermentação") of the Ministry of Agriculture received several collections of fine-wine strains in 1948, intended for cultivation in the vineyards of the official Oenological Stations, a network of which covers the wine-growing regions. The shipments consisted in 18,000 grafts comprising 170 varieties.

Brazilian grape production now exceeds 353 million lbs.

Bringing in the grape harvest in Rio Grande do Sul

VINEYARDS

Wine-growing in prosperous in Brazil and certain regions are suitable for cultivating the finest and best appreciated varieties of grape.

Romney Marsh sheep bred on the southern prairies

LIVESTOCK

Stockraising, apart from being one of the principal factors in the growth and settlement of the population, is a cornerstone of the economy of Brazil.

The Brazilian government has the interests of the stockbreeder at heart and much work has been done in raising the standard of the herds and eliminating the causes of disease. Every year pure-bred reproducers are imported for acclimatization purposes and renewing the strains.

Artificial insemination has made great strides, particularly as regards the fecundation of ewes, 24,700 controlled inseminations having been practiced in 1945, resulting in the birth of 13,000 lambs which is equivalent to a percentage of 52.2%. The system has been extended recently to dairy cattle in central Brazil, with the object of improving the breed.

The natural pastures of Brazil are fairly rich. There are prairies or savannas in the Amazon Valley, as there are in the northeastern, central and southern regions. The most important are those of Rio Branco (Amazonas), Marajó (Pará), the São Francisco basin (Bahia and Minas Gerais), Vacaria and the Pantanal (Mato Grosso), Mantiqueira (Minas Gerais) and finally the most famous of all, the prairies of Rio Grande do Sul.

The dairy cattle supplying the principal centres of population are kept partly in the cowshed, and the use of hay and silage is spreading considerably.

Cattle shows are held regularly in various grazing regions, to the great advantage of breeders.

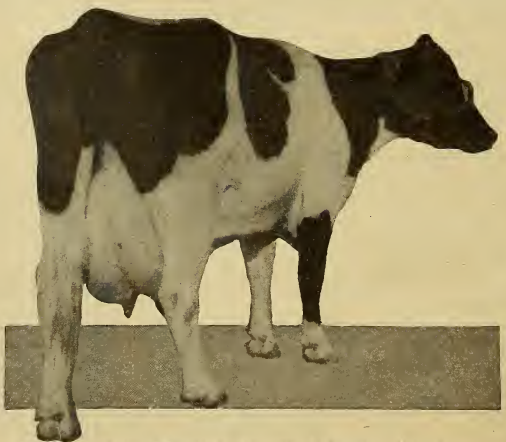
Since the herds represent a valuable national heritage, it is only natural that the Government should take care to safeguard the health of the animals. This work is entrusted to an Animal Health Service ("Divisão de Defesa Sanitária Animal"), staffed by veterinaries and sanitarians who see to the application of measures and practices designed to fight disease and ensure protection.

Active supervision and control at the Frontier Posts aims at preventing the invasion of epidemics.

In the role of legitimate defender of stockraising in Brazil, the Animal Health Service is faced with immense difficulties in the way of carrying out the task assigned to it, as will be realized if a moment's thought is given to the vastness of the territory and the complexity of the problems awaiting solution.

LIVESTOCK POPULATION OF BRAZIL — 1940 & 1946

DIVISIONS	HEAD OF LIVESTOCK	
	1940 (Enumerated)	1946 (Estimated)
Cattle	34,392,419	46,357,640
Horses	4,677,094	6,768,000
Asses and mules	2,129,395	4,325,330
Swine	16,839,192	23,814,650
Sheep	9,285,118	15,542,260
Goats	6,520,353	7,363,090
Poultry	62,659,892	—



Champion Dutch cow exhibited at the Minas Gerais Cattle Show in 1948

CATTLE

With about 46 million head of cattle, Brazil is one of the major meat-producing countries. The basic stock is being improved by cross-breeding according to the ends in view: beef, dairy produce or work.

The southern prairies are noted for the fine descendants of early maturing breeds such as the Hereford and Polled Angus.

In the regions where the dairy industry flourishes, Dutch, Guernsey, Jersey and Swiss do well. The Zebu or Brahman humped cattle native to India have gone far to improve the Brazilian herd, owing to their great resistance. It should be pointed out that the humped cattle raised in Brazil are not be confused with the original Indian breeds; the present Zebu herds, in which Nelore, Gir and Guzerath predominate, have undergone appreciable improvement and must now be considered distinct regional types.

RATIO OF POPULATION TO CATTLE

Situation in 1940 in the four regions

REGIONS	FEDERATED UNITS	POPULATIONS	CATTLE	CATTLE PER INHABITANT
1st	Acre Territary	79,768	23,337	0.28
	Amazanas	438,008	270,180	0.59
	Pará	944,644	705,524	0.74
	Maranhão	1,235,169	803,252	0.65
	Sub-total	**2,697,589**	**1,802,293**	**0.65**
2nd	Piauí	817,601	993,987	1.20
	Ceará	2,091,032	991,904	0.47
	Rio Grande da Norte	768,018	431,688	0.55
	Paraíba	1,422,282	608,044	0.42
	Pernambuca	2,688,240	606,296	0.22
	Alagoas	951,300	217,813	0.23
	Sergipe	542,326	262,944	0.48
	Bahia	3,918,112	2,740,278	0.69
	Sub-total	**13,198,911**	**6,852,954**	**0.51**
3rd	Espírita Santa	750,107	287,557	0.36
	Ria de Janeira	1,847,857	721,515	0.38
	Federal District	1,764,141	5,496	0.31
	São Paulo	7,180,316	3,174,453	0.44
	Paraná	1,236,276	469,055	0.37
	Goiás	826,414	2,975,305	0.36
	Minas Gerais	6,736,416	7,768,245	1.13
	Mato Grassa	432,265	2,136,278	0.49
	Sub-total	**20,773,792**	**17,537,904**	**0.83**
4th	Santa Catarina	1,178,340	734,389	0.63
	Rio Grande da Sul	3,320,689	7,464,705	2.30
	Sub-total	**4,499,029**	**8,199,094**	**1.80**
BRAZIL	**TOTAL**	**41,236,315**	**34,392,245**	**0.82**

HORSES

Brazilian horses are being improved by selection and crossing. Among the best breeds are the **Crioula**, from Rio Grande do Sul, suitable for heavy farm work; the **Mangalarga** and the **Campolina**, which make good saddle horses in central Brazil; finally, the **Nordestino**, a small horse, but strong and agile, used chiefly by the cowboys of the northeast for rounding up the cattle which are raised on the wide expanse of scrubby uplands.

The English **Thoroughbred** is popular in the centre and south of the country and breeding is stimulated by the incentive of horseracing, a sport that gathers its enthusiasts chiefly from the large capitals where there are fine race-courses and luxurious up-to-date "Jockey Clubs".

The **Breton** has been adopted for obtaining heavier draft animals.

ASSES AND MULES

The spread of motor vehicles has slowed up the breeding of mules in Brazil.

Even so, these animals render valuable services in remote regions where the roads are mere tracks, the crops being brought in by pack and draft mules and carried to the more important centres where they are picked up by faster means of transport. The large agricultural estates also use mules extensively for general purpose work and they are still found to be highly profitable for drawing light farm machinery.

DISTRIBUTION OF CATTLE IN THE VARIOUS REGIONS OF BRAZIL

Horse-breeding in Rio Grande do Sul

Of recent years, Brazil has exported a fair number of mules, chiefly to the Mediterranean countries.

Reproducers of Italian and Catalan breed have improved the Brazilian stock.

SWINE

Swine form the second division of domestic animals from the point of view of economic importance, for they number 23 million head. Some of the home breeds are worthy of interest, **e.g.** the **Canastrão**, the **Piau**, the **Pirapitinga**, the **Caruncho**, and others.

Even so, the herds have been improved by crossing with English and American reproducers.

Brazil being one of the largest maize-producing countries in the world and hog-raising being closely bound up with this feed crop, development has proceeded apace and the production of pork has risen as high as 265 million lbs.

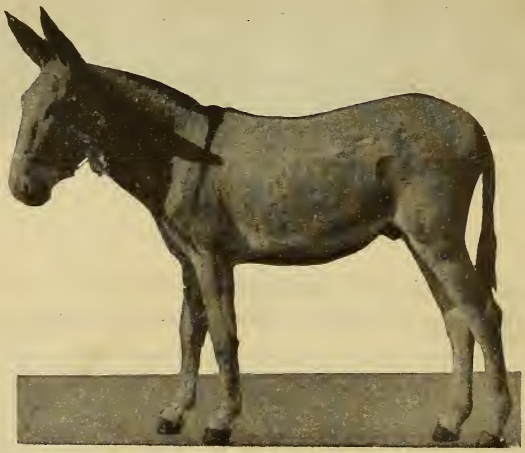
SHEEP

The most important flocks of sheep are those raised in Rio Grande do Sul, where **Romney Marshes, Merinos, Lincolns** and **Southdowns** are particularly prized.

Crossing with **Bergamascas** is being tried out in the northeast to increase the size of the local breeds, among which the **Deslanada** or woolless sheep is particularly well adapted to the hot dry climate and there is a good demand for its skin on the international markets.

Interesting work is being done in the field of artificial insemination and a start has been made with about 10,000 ewes. Experiments are also in progress to ascertain the possibilities of obtaining good meat lambs by crossing native ewes with Southdown rams.

The present production of Brazilian wool is estimated at over 40 million lbs.



"Pego" — a sturdy Brazilian breed

GOATS

Improvement has lagged behind in this division, though all the necessary elements are there for promoting active development of the breeds.

The principal herds are kept in the northeast, where goatskin is an important export commodity.

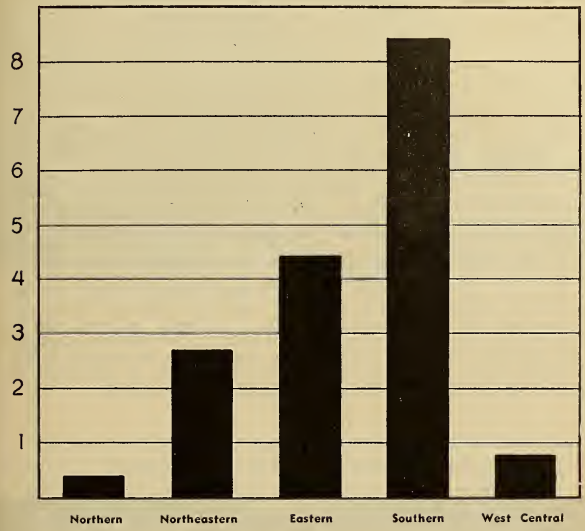
POULTRY

Poultry farming has a great future ahead of it in Brazil, as may be shown from the profitable nature of the industry which has sprung up around the great centres of population. The prices charged for meat and eggs have roused considerable interest in breeding, every year bringing an increase in the small farms organized by city-dwellers to swell the family income by poultry-raising and market gardening on a reduced scale.

Early-maturing chicken breeds have been imported extensively, in particular **White Leghorn, Rhode Island Red, Light Sussex, Plymouth Rock,** etc.

Pigeons are also commonly kept and a Confederation has been created by government decree to promote systematic development of pigeon-breeding. Statistics assign a total of 100,000 carrier pigeons to Brazil.

HOG-RAISING IN THE VARIOUS REGIONS OF BRAZIL



BEE-KEEPING

The climate of certain regions of Brazil is eminently suitable for bee-keeping and dozens of honey-bearing botanical species have already been identified among the local native flora.

More and more bees are being kept at the present time, particularly in the southern States where the yellow Italian bee gives excellent results.

SERICULTURE

It is interesting to note that, whereas in the chief silk-producing countries like Japan, China and India, only two annual crops are obtained, one in spring and the other in autumn, four crops a year are readily grown in Brazil, and even six crops are obtainable in the Amazon region. These exceptional conditions are further supported by the fact that the mulberry produces abundant foliage all the year round in this country. The best breeds of **Bombyx mori** have been scientifically acclimatized and careful selection has stabilized the

production at a high level, silk thread and fabrics now being turned out to rival the finest on the market.

Up to 1939, Brazil was still buying 93% of the silk required to meet the requirements of the home mills.

During the period from 1941 to 1942, silk seed (egg) production rose from 400 to 880 lbs. at the Campinas "Serviço de Sericicultura" alone, in the State of São Paulo, each lb. comprising 590,000 eggs. In 1943, production figures were up to 2,351 lbs.

The production of raw coccoons amounted to 413 metric tons in 1935; ten years later the annual output had reached 6,000 tons corresponding to 1.1 million lbs. of raw silk.

In Brazil, the mulberry tree begins to yield foliage at the end of 2 years, 6.000 trees being required to feed the product of 1,000 grammes (35 oz.) of seed. In 1905, 5,886,000 mulberry trees were being grown, while in 1945, statistics rated the number of trees at 50,000,000.

The home industry engaged in manufacturing equipment for unwinding the coccoons and preparing the raw silk is comparatively advanced, and the output includes reeling basins, reelers, dryers, strippers, throwing frames, weighting apparatus and other equipment connected with the processing of natural silk thread. In 1948 a change in methods was brought about by the introduction of machines designed to distribute the leaves automatically and replace the screens in the rearing-house. This innovation of Brazilian origin is calculated to speed up the development of the local silkworm industry.

Coccoons and skeins of raw silk in a São Paulo spinnery

Unloading the catch at a modern cold storage warehouse

FISHERIES

The waters of the Atlantic seaboard and the inland rivers of Brazil are abundantly stocked with fish; nevertheless the fishing industry has not not developed as actively as desirable owing to a lack of the capital and initiative necessary to large-scale undertakings of this nature.

All the activities connected with fishing in Brazil are under the control of the Ministry of Agriculture, through its Hunting and Fishing Division ("Divisão de Caça e Pesca"), the following being the more important assignments coming within the scope of its duties: the systematic study of ichthyological species found in Brazilian waters, 10,000 different seawater specimens already having been examined; the building and equipment of fish warehouses; the installation of Biological and Fish Culture Experimental Stations, where the methodical breeding of native species of economic interest is carried out; the installation of plant for the manufacture of products and by-products, the chief end in view being the training of skilled technicians, in addition to the preparation of shark liver oils rich in vitamins; research in connection with the training of fishermen; protection of aquatic and semi-aquatic fauna through the application of special legislation; financial assistance for setting up freezing and packing plants and purchasing fishing boats.

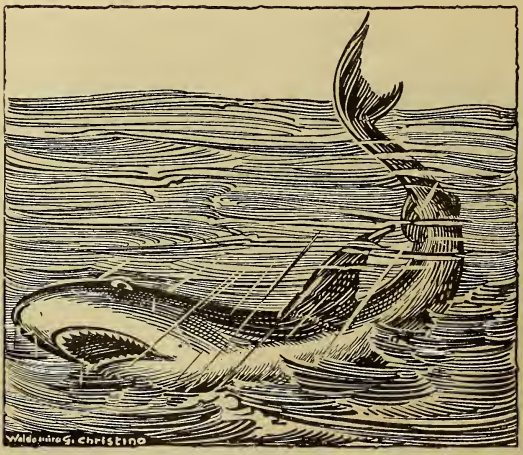
The sea-coast of Rio Grande do Sul is considered to be the most important fishing centre in Brazil. Tainha de corrida (**Mugil brasiliensis**) is netted in the months of April and June when shoals of this fish swim out to sea. Corvina (**Micropogon spp.**) provides one of the most abundant catches from September to December. Shrimps and prawns leave the creeks and bayous of Rio Grande in the months of June to April to spawn in the ocean. Bagre, linguado, peixe-rei, pescadinha and prejereba are species extensively consumed in the southern region.

In the northeast and north, fishermen generally set out in light sea-going craft, the most astonishing of which is the "jangada", an open raft made of rough-hewn tree-trunks, pinned and lashed together, with decks awash under a typical triangular sail, that bears the hardy crew far out to sea in search of the best kinds of fish, garoupa, seringado, dentão and bicuda. One of the most thriving fisheries in the northeast is that of the flying fish **(Cephacantus volitans)**, which is salted and smoked.

Langouste **(Palinurus guttatus echinatus)** is plentiful in the waters of Pernambuco.

Cação, a species of shark **(Euselachii plenrotremata)** abounds off the coast of Maranhão and a factory is operated in the State capital, São Luís, for the extraction of a number of valuable products.

Among the freshwater fishes of the Amazon region, the pirarucu **(Arapaima gigas)** stands out; it is dried and exported in the form of "mantas" or sides. The growth of this species is remarkable; the larvae are about 10 inches in length and weigh about 9 oz., increasing to 3 feet and 17½ lbs. at the end of the first year. At the age of 18 months some specimens have been found to weigh as much as 28½ lbs., with a length of more than 40 inches. A full-grown pirarucu may be more than 8 feet long and tip the scales at 230 lbs. This being so, it is safe to maintain that there is no other food-producing animal in the world that yields so much meat in so short a time.



The "cação", from which shark liver oil and by-products are extracted industrially in northern Brazil

SÃO PAULO

The State capital of São Paulo is a modern city of 1,500,000 inhabitants situatet 2,600 feet above sea level. It is considered to be the greatest industrial city in South America.

The Bridal Veil ("Véo da noiva"), a beautiful waterfall on the Upper São Francisco

INDUSTRY

The natural resources of Brazil are particularly favourable for the development of the country's raw materials, for they are situated for the most part in regions endowed with a very high hydroelectric potential.

The principal industries are represented by textile mills (27.0%), food products (18.0%), metal manufacture and engineering (11.4%), skins, hides and leather (8.2%), building trades (7.1%), furniture (5.0%), chemicals (4.7%), pottery, chinaware and ceramics (4.4%). These percentages are based on the manpower employed.

The manufacturing industries occupy rather more than 3% of the population, or about 1,500,000 workers in 85,000 factories (1947).

More than 80% of Brazilian manufacturing industries are engaged in supplying the elementary household needs of the inhabitants, **i.e.** food, clothing and shelter.

The food industries comprise the processing of the products of the field to suit the economy of man and his domestic animals; preparing them for trade; milling grain and turning out flour, sugar, meat, preserves, juices and pastes; baking dough; manufacturing sweets and confectionery; brewing beer and making wine and soft drinks.

The textile industry began by producing inferior cotton goods for clothing the poorer classes; under the mantle of protectionist tariffs, it gained stature and quality, ending up by catering to the entire

population of the country. During the war, production rose to 1,420 million yards of cotton cloth per year in response to the demand on the South African and South American markets.

About 15,000 new plants of all kinds were improvised in Brazil, from 1939 to 1948, in an effort to lessen the scarcity of products previously imported from the great industrial centres overseas. This massive development is now in critical need of up-to-date machinery and above all of technicians to transform and consolidate the industrial structure in the face of international competition.

About 67% of the industrial production of Brazil and 55% of the workers are concentrated in the State of São Paulo and the Federal District of Rio de Janeiro.

It is indiscutable that the industrialization of the country will have to be built up on a well-laid foundation of capital and skilled labour.

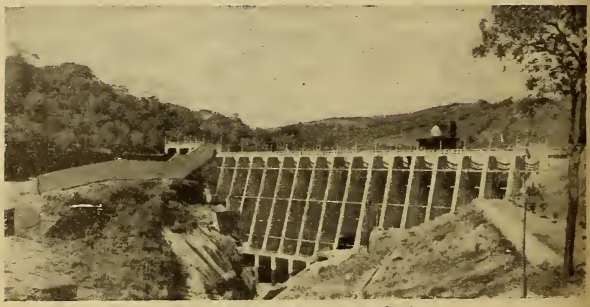
The leading industrial nations are now seeking to encourage the immigration of skilled workmen and Brazil is following their example.

But in addition to this appeal to immigrant technicians, a serious attempt has been made to find a partial solution to the problem by training Brazilian technicians, to which end the National Service for Apprenticeship of Industrial Workers ("Serviço Nacional de Aprendizagem dos Industriários") has been created and amounts to one of the most important innovations in the field of vocational training in this country.

This service consists in grafting industrial schools on the factories themselves so as to take full advantage of the practical experience that the apprentice acquires in paid work, without interrupting the rhythm of production.

The employer and factory-owner is obliged to grant time off for attending classes during a minimum of 8 hours a week without any reduction in wages.

Plans were begun in 1942 for providing vacancies for the training of 30,000 Brazilian trade apprentices.



Rio das Pedras Dam in Minas Gerais

In 1943 specifications were outlined for the building of 64 large professional training schools, 17 of which are already completed and 47 under construction. Furthermore, 20 units are being operated at the cost of private industrial undertakings.

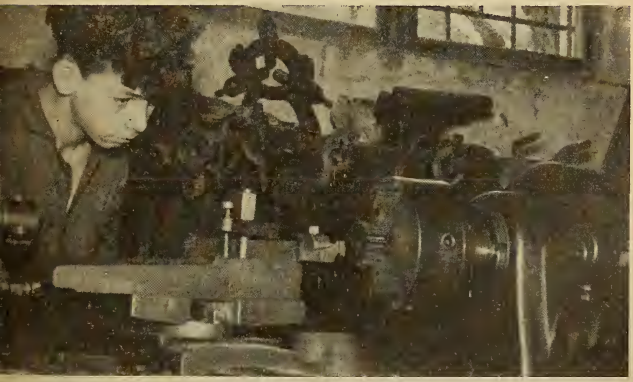
In 1948, there were 16,715 students attending vocational courses in: mechanical and electrical engineering (e.g. fitter, locksmith, tinsmith, boilerman, blacksmith, motor mechanic, machine tool worker, foundryman, toolmaker, welder, draftsman, electrician, etc.); building trades and furniture (e.g. contractor, carpenter, mason, electrician, draftsman, etc.); spinning, weaving and design; railway work (metal- and woodworker, mechanic, electrician, etc.); ship-building; leather trades; chemistry and pharmacy; printing and book-binding; ceramics.

The industrial possibilities of Brazil are enormous and varied, depending entirely on initiative. The materials now exported raw or semi-finished provide ample scope for activities useful to the country and highly remunerative to private individuals.

A typical example is to hand in the case of rock crystal exports. Brazil has exported as much as 15 million dollars' worth of rough quartz per year, supplying 160 oscillator factories all over the world. The value of the finished crystals, cut to size and polished, amounted to more than 350 million dollars.

If Brazil had been in a position to semi-manufacture the quartz into slabs and blanks, leaving only the finishing to the foreign factories, about 90 million dollars would have remained in the country.

The case of this mineral may well be repeated with numerous other products capable of supporting a wide range of thriving local industries.



Apprentice facing a gear wheel on a power lathe in one of the industrial schools of Brazil

INDUSTRIAL PRODUCTION OF BRAZIL

Factories subject to taxation

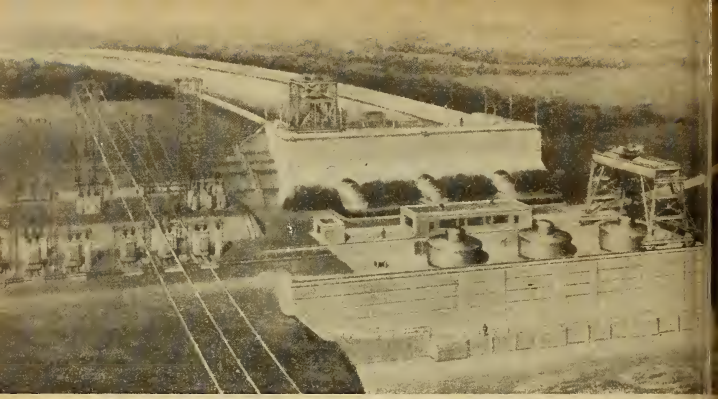
CLASSES OF UNDERTAKING	Up to and including 5 workers	More than 5 and up to 6 workers	More than 12 workers or equivalent H.P.	TOTAL
Alcohol	56	99	158	313
Beverages	7,350	2,695	1,803	11,848
Boots and shoes	7,816	937	425	9,178
Candles	97	11	9	117
Cement	6	—	8	14
Cheeses and cream cheeses	5,023	94	18	5,135
China and glassware	107	100	91	298
Coffee, roasted or ground, and tea	2,502	679	223	3,404
Combs, brushes, feather dusters and brooms	398	78	45	521
Cutlery and shaving brushes	38	25	14	77
Electric lamps, dry batteries and equipment	374	146	47	567
Fabric and fur goods	2,863	889	452	4,204
Fabrics	132	442	500	1,074
Fans (manual)	9	1	1	11
Firearms, ammunition and fireworks	379	15	19	413
Furniture	3,863	1,453	911	6,227
Hardware and ironmongery	1,537	904	542	2,983
Jewelry, costume jewelry and personal ornaments	1,262	343	180	1,785
Kitchen ranges, portable stoves and geysers	174	61	29	264
Lard, butter and substitutes	2,981	429	145	3,555
Leather goods and goods of similar materials	3,790	277	110	4,177
Matches and cigarette lighters	15	6	20	41
Musical instruments	48	16	15	79
Optical, photographic and cinematographic equipment	29	18	5	52
Paints and varnishes	643	125	119	887
Paper and paper goods	471	209	156	936
Perfumery and toilet articles	897	123	80	1,100
Petrol (gasoline), oils and calcium carbide	11	3	6	20
Pharmaceutical specialities	968	198	146	1,312
Playing cards	5	3	2	10
Preserves	1,041	365	293	1,699
Rubber goods	97	37	38	172
Salt	668	247	68	983
Sugar	6,108	685	690	7,483
Thread, haberdashery and buttons	168	114	90	372
Tile and other materials	680	258	138	1,076
Tobacco	198	61	76	335
Toys	535	121	40	696
Umbrellas and sticks	788	70	40	898
Vinegar and edible oils	1,116	68	22	1,200
TOTAL	**55,243**	**12,405**	**7,774**	**75,422**

INDUSTRIAL PRODUCTION OF BRAZIL

According to the results of the 1940 general census

INDUSTRIES	FIRMS	PLANTS	TOTAL	CAPITAL In Cr$ 1,000	
				Brazilian	Foreign
Beverages & stimulants	1,461	1,701	308,454	177,986	130,468
Building trades	1,191	1,243	174,229	145,355	28,874
Chemicals & pharmaceuticals	1,343	1,610	472,040	370,581	101,459
Clothing, boots & shoes, & toilet articles	2,808	3,218	162,982	91,435	71,547
Electric light & power, gas, refrigeration & water supply; sewers	1,224	3,218	1,720,588	357,578	1,363,010
Food products	12,147	14,905	1,375,980	1,030,979	345,001
Fur, feathers, etc.	13	18	1,298	1,051	247
Leather and skins	1,149	1,297	83,263	62,810	20,453
Mechonicol industries	595	694	133,521	56,045	77,476
Metallurgy	1,299	1,460	368,156	270,739	97,407
Mineral extroctive industries	1,621	2,267	162,056	146,712	15.844
Non-metallic mining products	4,348	4,861	316,339	160,489	155,850
Paper & cardboord	192	228	128,135	103,375	24,760
Publishing & printing	1,838	2,207	183,534	157,419	26,115
Rubber	52	65	41,445	31,178	10,267
Oils & greases, Vegetable	114	174	46,938	40,826	6,112
Textiles	1,613	2,212	1,209,202	898,200	311,002
Vegetable extractive industries	1,421	1,791	87,616	82,808	4,808
Wood & similor products	4,949	5,614	257,104	184,818	72,286
Miscellaneous	569	635	40,155	19,190	20,965
TOTAL	**39,937**	**49,418**	**7,273,025**	**4,389,074**	**2,883,951**

Ceramics industry



Power plant at Avanhandava in the State of São Paulo

SOURCES OF POWER

Heat, light and power, according to origin, is utilized in cooking, industry and transportation in Brazil in the following proportions:

Alcohol	0.1%
Charcoal	0.8%
Coal, Domestic	3.7%
Coal, Foreign	5.0%
Firewood	83.2%
Fuel oil, Foreign	3.8%
Hydroelectric power	1.3%
Petrol (gasoline), Foreign	2.1%
	100.0%

There are 1,813 electric power plants operating in Brazil with an installed capacity of 1,298,925 kw., 1,064,318 kw. of which forms part of the hydraulic potential of the country, amounting in all, at low water and without altering the position of valleys, to 15 million kw.

Skilled engineering could raise this potential to 30 million kw., approximately, with 70% situated in the temperate region, i.e. in 9% of the total area of Brazil.

It is interesting to note that the consumption of firewood stood at close on 3,000 million cubic feet, while in the same year the output of charcoal rose to about 1,170 million lbs.

IGUAÇU

The falls of Iguaçu, situated on the frontier between Brazil and Argentina, with an estimated potential of 600,000 H. P., are one of the greatest sources of hydroelectric power in the country.

GENERAL SURVEY OF THE ELECTRIC POWER INDUSTRY IN BRAZIL — 1938 and 1943

PLANTS, CAPACITY & DISTRIBUTION	1938	1943
Number of undertakings	1,150	1,603
Generating plants	1,346	1,882
Public utilities:		
Thermo-electric plants	623	874
Hydro-electric plants	659	911
Mixed	—	28
Private entreprise:		
Hydro-electric plants	64	69
Capacity in kilowatts	1,040,445	1,298,925
Thermo-electric plants:		
Public utilities	157,764	234,607
Hydro-electric plants:		
Public utilities	858,355	1,033,992
Private enterprise	24,326	30,326
Localities supplied	2,140	2,849

SOURCE — National Department of Mineral Production ("Departamento Nacional de Produção Mineral").

TEXTILES

There are 423 cotton mills in Brazil, providing employment for more than 220,000 workers; the plant comprises 92,400 looms and 2,911,000 spindles.

The production of quality goods with out-of-date equipment has been one of the great achievements of Brazilian industry; furthermore, spinning jennies and looms have been built in the country with no little difficulty and improvements have been made in bleaching, dyeing and finishing processes.

However, in order to keep up with the march of progress and to meet international competition in this field, Brazilian industrialists are seeking to modernize their plants and to this end orders for more than 1,600 millions cruzeiros' worth of textile machinery have been placed with American, English and Swiss manufacturers.

Production is concentrated chiefly in the States of São Paulo (34.5%), Minas Gerais (16.6%), Pernambuco (12.8%), the Federal District (10.5%) and Rio de Janeiro State (9.2%), but the industry is carried on to some extent all over the country.

The success which Brazilian fabrics have met with on foreign markets and the increase in exports have proved highly beneficial to the economy of the country, apart from furnishing incontrovertible evidence of its capacity for industrial organization.

So solid has become Brazil's position as a major textile exporter, that it was invited by the Combined Production and Resources Board to participate in the understandings with regard to the world supply of this commodity.

Brazilian cotton cloth production is now estimated at 1,300 million yards, while the domestic consumption averages 1,100 million yards.

Blast furnace at Volta Redonda

Barbed wire manufactured in Minas Gerais

IRON AND STEEL INDUSTRY

Possessing one third of the known iron ore deposits in the world, it is natural that Brazil should have given thought to the development of an iron and steel industry.

Nor has this field failed to be of absorbing interest to leading European scientists such as Baron von Eschwege and the great French engineer Monlevade, to whom Brazil owes the sound foundation on which the progress of the industry has been built.

Private initiative has, indeed, never ceased to take an active part in the expansion of this important economic division.

Thus fifty-five different plants are in operation and the output is constantly increasing in scope and quality, covering at the present time: cast iron and steel; alloy steels (nickel, silica, titanium and chromium); ingots and blooms; small flats and sections; concrete reinforcement, column struts and guy rods; water piping; smooth and barbed wire; nails, screws and rivets; crushing machinery; axles, couplings and brake levers for rolling stock; vises and anvils; ploughs; saws, axes, picks, mattocks and hoes; sanitary equipment, valves and stopcocks; stove sheeting and kitchen utensils; and a wide range of other products of primary utility.

In 1945, steel rails were turned out by the rolling mills of the Companhia Belgo-Mineira for the first time in South America.

PIG IRON — The output of Brazilian blast furnaces, in 1947, amounted to 480,929 metric tons of pig iron **(ferro gusa).**

ROLLED IRON — Also known as mild or hammered iron, rolled iron **(ferro laminado, doce** or **batido)** is characterized in Brazil by a maximum carbon content of 0.15%. The 1947 production for this type stood at 296,686 metric tons.

Partial view of the Volta Redonda Steelworks

STEEL — The 24 plants in operation in 1947 yielded 386,971 metric tons of steel (**aço**), of varying degrees of hardness and carbon content, equipment consisting of open hearth (Siemens-Martin) furnaces, and small acid converters; mild steel scrap is also welded into the so-called faggot or bundle iron in heating ovens, and spongy iron is obtained directly from the ore in kilns.

FERRO-ALLOYS — Brazil produces ferro-manganese, ferro-silicon and ferro-nickel, as well as a certain amount of special alloy steels such as manganese and nickel-chromium.

VOLTA REDONDA WORKS — The domestic production of iron and steel was far from sufficient to meet the requirements of the country. In 1947, Brazil was still importing 172,300 tons of bars, angles, sheets, plates, strips and miscellaneous sections.

The production of heavy plates and sections for shipbuilding and structural steelwork, heavy rails and accessories, large rounds and squares, cold-rolled strip, black and galvanized sheet, tinplate, etc. was beyond the scope of the home mills, for such manufactures involve a massive outlay of capital and the solution of many other problems with which private industry can scarcely be expected to cope. These problems included the construction of ports, the laying of new railway track, coal mine development and the building of coal freighters.

Facing the issue which is so intimately bound up with the economy and defense of the country, the Government, in direct collaboration with the National Treasury, has organized a plan well calculated successfully to promote the heavy iron and steel industry.

To this end, the "Companhia Siderúrgica Nacional" was formed and after six years of work, cast iron and steel began to flow from the furnaces of Volta Redonda on 22nd of June, 1946, marking a new stage in the industrialization of Brazil.

Volta Redonda is supplied by the Central Brazil Railway ("Estrada de Ferro Central do Brazil") with iron and manganese ore from the Lafaiete region mined at João Ribeiro, about 250 miles away. The same railway brings limestone 220 miles from the Pedra do Sino and probably nearer sources of supply will become available. Coal is shipped from the south of Santa Catarina State to the port of Rio de Janeiro and thence by rail to Volta Redonda.

The following production schedule has been planned for the new works:

OUTPUT	1st YEAR IN OPERATION (Metric tons)	2nd & SUBSEQUENT YEARS (Metric tons)
Rails, fishplates and bearing plates	70,000	80,000
Comercial sections, bars, etc.	20,000	42,000
Billets	—	12,000
Heavy plates	25,000	33,000
Black sheets and plates	15,000	20,000
Galvanized sheets	15,000	15,000
Tinplate	40,000	40,000
TOTAL	**185,000**	**842,000**

The normal type, heavy-duty **blast furnace** has a capacity of 1,000 tons per 24 hours and is fitted with an up-to-date system of control. Production in 1947 reached 175,673 metric tons of pig iron.

The **cokery** comprises 55 Koppers-Becker ovens and a plant yielding the following by-products:

Ammonium sulphate	5,200	metric tons
Tar	3,340,000	Imperial gallons
Pure benzene	853,000	" "
Pure toluol	197,000	" "
Pure xylene	45,700	" "
Solvent naphtha	20,500	" "

The steel works has a capacity of 256,000 tons of ingots, with three 150-ton open hearth furnaces, two stationery and one tipping. Two more of the latter type are to be provided. The tipping furnaces will add flexibility to the Volta Redonda plant, enabling a start to be made with the production of special steels for mechanical engineering and plates for specific purposes.

The results observed since the Volta Redonda Works have been in operation are by no means lacking in interest, particularly as regards the behaviour of Brazilian coal.

Owing to the nature of this fuel and to the efficiency of the Coal Washing Plant at Tubarão (Santa Catarina), it has been possible, with remarkable technical success, to reduce the final sulphur content in the coke. The high percentage of ash was offset in the blast furnace by the exceptional quality of Brazilian iron ore, with the result that the pig-iron produced was up to specification and even better than had been anticipated.

Another detail worthy of note was the faultless operation of the open hearth furnaces. It was feared that the coke oven gas used would be too rich in sulphur and the atmospheric air of Brazil too damp, leaving an excess of impureties in the steel and reducing the luminosity of the flame. The results obtained, however, dispelled these apprehensions, for when the product left the rolling mill it was seen from the very first run that success was assured to Volta Redonda, which had profited by experience gained in India, Canada, Australia and South Africa.

In 1947, the production of the Volta Redonda Works reached a total value of Cr$ 183,596,243.20. A project for doubling the capacity of the plant is now under consideration.

Plant for recovering ammonia, benzene and other by-products from coke-oven gas at Volta Redonda

SHIPBUILDING

The shipbuilding industry is still incipient in Brazil. The shipyards in operation are small and strung out in the ports along the seabord in accordance with shipping requirements.

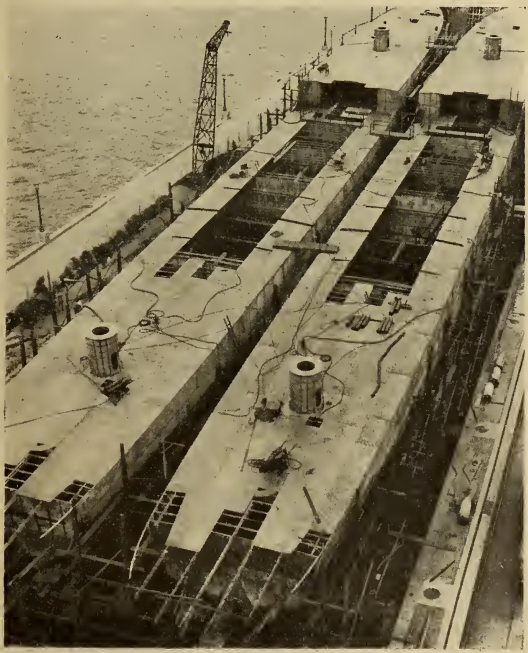
The largest and best equipped shipyards are situated in the bay of Rio de Janeiro and include the Naval Arsenal ("Arsenal da Ma-

rinha") and those of the Lloyd Brasileiro and a number of private undertakings.

Many of the vessels of small and medium tonnage engaged in coastal shipping in Brazilian waters were built in the domestic shipyards, which are also fitted out to execute maintenance and repair work on ships of large tonnage.

The shipbuilding policy of Brazil is directed by the naval authorities who have promoted an era of accrued activity in this important industrial division.

At the same time, the output of Volta Redonda is designed to set the shipbuilding industry on a new basis involving the use of iron and steel plates and sections of home manufacture.



Ship-building at the Arsenal of Rio de Janeiro

RUBBER

The history of rubber has yet to be written. Nor will it be an easy task to follow step by step the tumultuous existence of this product which has risen from the lowly position of a tropical curiosity to that of key material for the manufacture of some 35,000 different commodities.

When the conquering adventurers first laid hands on America, rubber was already known to the natives; yet for two centuries nobody realized the value of the milky sap that oozed from certain trees.

La Condamine was the first explorer to have a clear notion of what rubber might be worth and he carried samples of it to Europe in 1743.

As a result of the scientific experiments of a Scottish surgeon, James Syme, who discovered at the university of Edinburgh that rubber could be dissolved in benzene, patents were taken out in 1823 by Charles Mackintosh for the waterproofing of silk and other fabrics which he made into the first raincoats, still often called mackintoshes in England.

In Europe, the firm of James Lyne Hancock, Ltd., established in London in 1820, claims to be the oldest rubber factory in the world, while in the New World the manufacture of sheet rubber products was begun by Charles Hoskins in 1932, and the prosperous American industry stems from this initative, though it only gained impetus after Charles Goodyear had learnt how to vulcanize rubber by the sulphur reaction in 1939.

The first shipment of Brazilian rubber went forward in 1827 and from then until the turn of the century, Brazil held the monopoly of the raw material. Subsequently, in the face of competition from the scientifically grown plantations in the Far East, the extractive industry lost ground progressively until 1932, when production began to increase again, culminating in the relative prosperity of the war years. After the war, a collapse might have been expected, but fortunately the rapid development of the manufacturing industry in Brazil forestalled this danger.

The present rubber production of Brazil is sufficient to meet the requirements of its heavy industry, comprising 6 large factories, and 139 firms engaged in light rubber manufactures.

The domestic rubber goods industry may be divided up along the following general lines:

1. Tyres and inner tubes;
2. Manufactures for industry in general;
3. Surgical and pharmaceutical rubber goods;
4. Boots and shoes, and waterproof fabric;
5. Miscellaneous articles.

From 1940 to 1947, the Brazilian production of tyres and inner tubes increased 742% in output by volume. The estimated figures for 1948 amount to 1,100,000 tyres, absorbing 15,000 metric tons of raw material.

Rubber for export is being efficiently washed in the States of Amazonas and Pará, where 11 plants are in operation with a processing capacity of 176,000 lbs. per day.

MEAT INDUSTRY

PACKING PLANTS — The meat packing plants operating in Brazil, apart from municipal slaughterhouses producing fresh meat to feed the local population, are resumed in the following table:

STATES	No. of Plants	FIRMS*	LOCALITIES	Established
Rio de Janeiro	1	C. F. Iguaçú	Nilópolis	1930
" "	1	F. Anglo	Mendes	1917
	2			
Minas Gerais	1	F. Três Corações	Três Corações	1932
" "	1	F. Barbacena	Barbacena	1940
	2			
São Paula	1	F. Armaur	Capital	1920
" "	1	F. Wilson	Pres. Altina	1911
" "	1	F. Anglo	Barretas	1911
" "	1	C. F. Santas	Santos	1911
" "	1	F. Dimar	Santo André	—
" "	1	F. Cruzeiros	Cruzeira	1925
	6			
Paraná	1	F. Matarazzo	Jaguariaíva	1923
Santa Catarina	1	F. Sul Brasileiro	—	—
Rio Grande do Sul	1	F. Armour	Livramento	1917
" " "	1	F. Swift	Rio Grande	1920
" " "	1	F. Anglo	Pelotas	1915
" " "	1	F. Bageense	Bagé	1940
" " "	1	F. Rener	M. Negro	1926
" " "	1	F. Nacionais S. Brasileira	Gravataí	1938
" " "	1	" "	Caràzinho	—
" " "	1	" "	Santa Ángelo	—
" " "	1	" "	Cotiporã	—
" " "	1	Mat. Frig. Oderich	Caí	—
" " "	1	" " "	Lageada	—
	11			

* F. = Frigarífico(s) — Packing-hause(s); C. F. = Campanhia Frigarífica; S = Sociedade; Mat. Frig. = Matadoura Frigarífica — Slaughter- and Packing-house.

It will be seen that there are two packing plants in the State of Rio de Janeiro, one in Nilópolis, a town situated in the Fluminense lowlands which is in reality a suburb of the Federal District, and the other farther inland at Mendes. Two small slaughterhouses have recently been set up in Minas Gerais.

São Paulo State has six packing plants, that of Barretos being the most favourably situated.

The Matarazzo plant in Paraná specializes in pork products inasmuch as it is situated near the maize (Indian corn) zone of Tomasina, with easy transport facilities linking it to the best maize lands which lie in the northern section of the State.

The only packing-house in Santa Catarina is situated at Tubarão and also deals in pork products.

Rio Grande do Sul, as is only natural in the main stock-raising State in the Union, possesses eleven packing plants, four of them of considerable size. Thus, out of the twenty-three packing plants in Brazil, almost 50% are concentrated in the southernmost State, the land of the "Gaúcho", where the best herds graze on the richest pasture and the industry is the most highly developed.

The head of livestock slaughtered in 1946 was as follows:

Oxen	3,416,664	Hogs	5,421,493
Cows	1,192,003	Sheep	1,467,683
Calves	263,016	Goats	1,182,747

The worldwide shortage of meat shows no signs of abating, and it would be of the greatest financial advantage to Brazil for the raising of livestock to be extended to suitable parts of the country as yet quite undeveloped pastorally, particularly in the central zones which should offer a strong appeal to capital.

The government is now going into the possibilities of replacing the small municipal slaughterhouses by up-to-date refrigerated packing-plants, better equipped to deal with both products and by-products, particularly hides and pressure vat residues.

BRAZILIAN PRODUCTION OF ANIMAL ORIGIN — 1940/47

1. Quantity

PRODUCTS	PRODUCTION IN KILOGRAMMES (= 2.2 lbs.)		
	1945	1946	1947
Beef	636,907,094	735,862,680	779,870,976
Pork	120,846,643	123,395,475	114,988,889
Mutton	21,065,614	22,265,033	19,566,314
Gootflesh	11,155,322	11,706,399	12,002,450
Oxhides	94,159,861	110,120,214	118,139,907
Pigskins	4,272,205	4,452,502	3,957,082
Sheepskins	1,929,597	2,498,605	2,255,773
Goatskins	988,767	999,234	1,076,879
Lard	61,930,368	57,300,072	62,559,097
Compounds	5,566,930	3,934,184	6,206,616
Bacon	111,279,471	118,618,350	106,439,851
Tollow	33,947,286	43,108,497	39,878,287
Doiry produce *	183,486,344	166,240,129	191,614,890
Miscellaneous	106,902,571	122,409,288	137,619,137
TOTAL	**1,394,438,073**	**1,522,910,662**	**1,616,176,148**

* Statistics are confined to establishments inspected by the Federal Government.

Prize Indubrasil bull

BRAZILIAN PRODUCTION OF ANIMAL ORIGIN — 1940/47

2. Value

PRODUCTS	PRODUCTION IN CRUZEIROS (Cr$)		
	1945	1946	1947
Beef	3,078,538,286	3,872,267,633	4,507,165,765
Pork	720,365,505	890,848,515	1,074,662,782
Mutton	76,606,315	104,070,936	96,300 328
Gootflesh	42,958,864	53,100,403	60,529,074
Oxhides	373,155,588	508,455,276	675,795,282
Pigskins	33,514,002	41,033,802	19,046,248
Sheepskins	14,850,142	20,278,236	21,326.257
Gootskins	9,389,326	10,528,951	12,098,330
Lord	414,733,166	516,409,589	965,295,858
Compounds	28,769,318	22,172,696	80,506,589
Bocon	731,951,916	979,182,665	1,242,678,725
Tollow	156,570,030	248,499,403	290,099,852
Dairy produce *	760,866,027	878,177,810	1,200,990,341
Miscellaneous	464,190,785	635,556,561	881,267,857
TOTAL	**6,906,459,270**	**8,780,582,476**	**11,127,763,288**

* Statistics are confined to establishments inspected by the Federal Government.

Stretch of lines on the masterly engineered Santos - São Paulo Railway

TRANSPORTATION AND COMMUNICATION

RAILWAYS

For more than three centuries Brazil remained a colony of one of the world's most seafaring peoples. Tradition, therefore, worked in favour of maintaining shipping as the main links in its system of transportation.

This tendency is responsible for the series of isolated railways striking inland from the ports.

Realizing the necessity of, as it were, tying up these loose ends, the Brazilian Government has organized a General Plan of the Home Railway System ("Plano Geral de Viação Nacional") designed to fill the gaps between the various lines, holding up the expansion of land transportation, and so to complete what may be truly called the Brazilian Railway Network.

Mention should also be made of the Brazil-Bolivia Railway now under construction which will be one of the sections of the future **Santos-Arica Transcontinental Line** (Brazil-Bolivia-Chile) whereby unbroken communication will be established by rail between the Atlantic and Pacific seaboards.

BRAZILIAN RAILWAYS

GENERAL INFORMATION

1946

HEADINGS	DATA	HEADINGS	DATA
TRAFFIC CONDITIONS:		CONSUMPTION:	
Length of line, in miles...	**21,851**	Electric power for traction purposes, in 1,000 kw..	154,675
Norraw gouge (1ft. 11½in., 2ft. 2in. ond 3ft.)	687	Wood, in 1,000 cubic yords	1,324,633
Standord metre gauge..	19,780	Cool, in long-tons.....	996,548
Wide gouge (5ft. 3in.) .	1,384	Domestic	721,164
Stations and halts:		Foreign	275,384
Stotions	2,946		
Halts	720	FINANCIAL RESULTS (Cr$ 1,000):	
		Revenue	**2,785,041**
TRANSPORTATION:		From tronsportation.....	2,657,724
Passengers:		Of passengers.....	631,712
Thousonds of possengers	270,080	Of livestock.....	63,777
Thousonds of possenger-miles	5,397,840	Of luggoge and parcels	189,964
		Of goods	1,664,346
Livestock:		Miscelloneous receipts ..	127,317
Thousonds of heod of livestock	3,911	**Expenditure**	**2,424,385**
Thousonds of heod-miles	564,928	**Balance**	**360,656**
Luggage and parcels:			
Thousonds of long tons..	5,128	ACCIDENTS:	
Thousonds of ton-miles..	158,028	**Total of accidents**.....	**16,078**
Goods:		Collisions	708
Thousonds of lang tons..	40,531	Overturns or falls.....	289
Thousands of ton-miles..	4,437,675	Deroilments	11,283
Rolling stock:		Miscellaneous	3,798
Motor railwoy coaches..	103	**Victims**	**2,094**
Locomotives	5,672	Dead	287
Passenger carriages.....	4,605	Injured	1,807
Goods wagons.....	50,811		

Map of the Brazilian Railway System

Transcontinental trains will run over 1,165 miles of track in Brazilian territory (Sorocabana Railway, 317; Noroeste do Brasil, 848 miles), all of which is open to traffic except the short stretch from Porto Esperança to Corumbá. From then on about one third of the Brazil-Bolivia Railway (411 miles) is already completed and the remainder under construction, but the greater part of the next section, Ferrocarril Cochabamba-Santa Cruz (395 miles), as far as Vila Vila, is still being planned. The last 514 miles (making a total of 2,485 miles) are covered by the Boliviano and Arica-La Paz railways, the latter scaling the Andes between the Bolivian capital and the Pacific coast at an altitude of close on 14,000 feet.

ELECTRIFICATION OF THE RAILWAYS — Steam traction predominates on Brazilian lines, the locomotives burning coal or wood. There are, however, a few Diesel engine railway coaches in service, and some stretches of line have been electrified, to the total extent, in 1947, of 643 miles.

In carrying out the General Plan, the National Railway Department ("Departamento Nacional de Estradas de Ferro") seeks to adapt the means of traction to the sources of power available in the country, the ultimate end in view being the general electrification of the whole system.

CENTRAL BRAZIL RAILWAY STATION
(Estrada de ferro Central do Brasil)

The tower clock is nearly 33 feet in diametrs, and luminous. The minute hand is 21 feet 6 inches longs and weighs 560 lbs.

Electrified section of the Paulista Railway

PROGRESS OF BRAZILIAN RAILWAYS

1938 to 1945

HEADINGS	DATA	
	1938	1945
Length of line open to traffic, in miles*	21,255	21,922
Narrow gauge (1ft. 11½in., 2ft. 2in. and 3ft.)	861	687
Standard metre gauge	19,109	19,845
Wide gauge (5ft. 3in.)	1,285	1,390
Stations and halts:		
Stations	1,825	2,535
Halts	445	591
Rolling stock:		
Motor railway coaches	—	178
Locomotives	2,995	3,698
Passenger carriages	3,770	4,064
Goods wagons	38,685	54,294

SOURCE — National Railway Department ("Departamento Nacional de Estradas de Ferro").

* Including the electrified line, which rose from 373 miles in 1938 to 576 miles in 1945.

LENGTH OF LINE OPEN TO TRAFFIC ACCORDING TO RAILWAYS AND TO GAUGE — 31 Dec. 1946

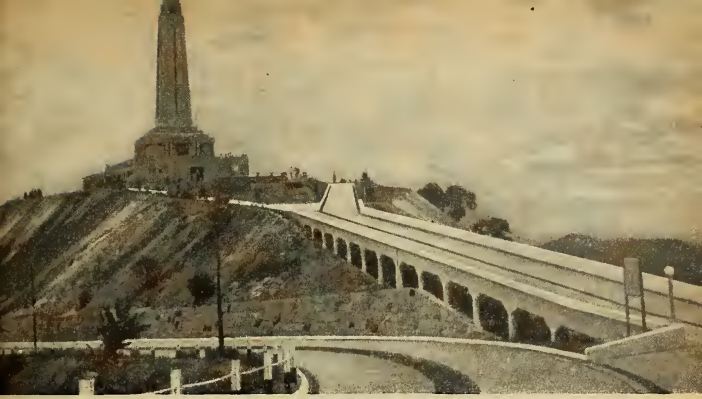
No.	RAILWAYS	LENGTH OF LINE IN KILOMETRES (= 0.6214 miles)					
		TOTAL	ACCORDING TO GAUGE				
			5ft. 3in.	metre	3ft.	2ft. 2in.	1ft. 11½in.
1	E. F. Madeiro-Momoré	366	—	366	—	—	—
2	E. F. Tocantins	119	—	119	—	—	—
3	E. F. Bragança	294	—	247	—	—	47
4	E. F. São Luís-Teresina	454	—	454	—	—	—
5	E. F. Central do Piauí (1)	191	—	191	—	—	—
6	Rêde de Viação Cearense	1,492	—	1,492	—	—	—
7	E. F. Mossoró	186	—	186	—	—	—
8	E. F. Central R. G. do N.	342	—	342	—	—	—
9	The Great Western of B. R.	1,657	—	1,657	—	—	—
10	V. F. F. Leste Brasileiro	2,240	—	2,240	—	—	—
11	E. F. Nozoré	324	—	324	—	—	—
12	E. F. Ilhéus a Conquisto	128	—	128	—	—	—
13	E. F. Bahia-Minos	582	—	582	—	—	—
14	E. F. Vitório-Minos	597	—	597	—	—	—
15	E. F. Itapemirim	54	—	54	—	—	—
16	The Leopoldina Railway	3,082	—	3,082	—	—	—
17	C. F. Itabapoana	33	—	33	—	—	—
18	E. F. Central do Brasil	3,355	1,295	2,060	—	—	—
19	E. F. Corcovado	4	—	4	—	—	—
20	E. F. Maricá (2)	158	—	158	—	—	—
21	Rêde Mineira de Viação	3 985	—	3 256	729	—	—
22	E. F. Morro Velho	8	—	—	—	8	—
23	Comp. Paulista de E. F.	1,536	827	647	—	—	62
24	E. F. do Dourado	317	—	317	—	—	—
25	E. F. Morro Agudo	41	—	41	—	—	—
26	E. F. Monte Alto	32	—	32	—	—	—
27	E. F. Jaboticabal	25	—	25	—	—	—
28	E. F. Barro Bonita	18	—	18	—	—	—
29	Ramal Férreo Campineiro	31	—	31	—	—	—
30	Comp. Itotibense de E. F.	20	—	20	—	—	—
31	E. F. Sorocabano (3)	2,215	—	2,179	—	—	—
32	E. F. Votorontim	14	—	14	—	—	—
33	The S. Poulo R. Company	246	139	107	—	—	—
34	E. F. Perus-Pirapora	16	—	—	—	—	16
35	Comp. Mogiana de E. F.	1.959	—	1,874	—	—	85
36	E. F. Noroeste do Brasil	1,539	—	1,539	—	—	—
37	E. F. Araraquara	379	—	379	—	—	—
38	E. F. Campos do Jordão	47	—	47	—	—	—
39	E. F. São Poulo-Minas	180	—	180	—	—	—
40	Comp. F. São Paulo-Goiás	148	—	148	—	—	—
41	V. F. Paraná-Sto. Catorina	2,457	—	2,457	—	—	—
42	E. F. Dono Tereso Cristino	239	—	239	—	—	—
43	E. F. Santa Catorina	114	—	114	—	—	—
44	E. F. Mote Loronjeiro	68	—	—	—	—	68
45	V. F. Rio Gronde do Sul	3,578	—	3,578	—	—	—
46	E. F. Jocuí	30	—	30	—	—	—
47	E. F. Palmores a Osório	55	—	—	—	—	55
48	E. F. Goiás	393	—	393	—	—	—
	BRAZIL	**35,348**	**2,261**	**31,981**	**729**	**8**	**369**

SOURCES — "Departamento Nocional de Estradas de Ferro" and "Serviço de Estotístico Militar", of the Generol Secretariat of the I.B.G.E.

(1) Incorporated with the E. F. São Luís-Teresina.

(2) Incorporated with the E. F. Central do Brasil.

(3) This roilwoy moy be considered to be standard metre-gauge throughout, since the 36 kilometres of the line from Tamanduatei to Cantareira and the Guarulhos branch are mixed gauge 60 cm. (1ft. 11½in.) and 1 metre.



Monument on the Rio-São Paulo Highway

HIGHWAYS

The work of construction, repair and maintenance of roads in Brazil is organized by the Union, the States and the Municipios.

The National Highway Plan ("Plano Rodoviário Nacional") has been entrusted to the National Highway Department ("Departamento Nacional de Estradas de Rodagem") which is essentially a technical organ whose duty it is to trace the lines of fundamental policy, preparing or approving plans for construction work and determining the technical requirements to which the highway system of the country must conform. Advice and supervision of road-building throughout the country are thus both within its scope, though the actual work of carrying out the programmes is assigned to State Government Departments. In this way, local ramifications are linked up and the whole network welded together by the federal organism.

The year 1948 marked the beginning of a new constructive era for the highways of Brazil, embodied in a five-year plan of a strictly practical nature.

This year, about 20,000 men were at work on the Brazilian highways, which will give some idea of the magnitude of the undertaking intended to free a vast expanse of the national territory from the danger of a blockade by sea, which could still tie up transportation despite the 171,000 miles of roads already in service.

MOTOR VEHICLES IN SERVICE IN BRAZIL — 1938 and 1946

CLASSIFICATION	NUMBER OF MOTOR VEHICLES	
	1938	1946
Possenger tronsport	116,518	129,216
Ord'nary motor cors	104,224	114,388
Omnibuses and light possenger vons	4,762	8,022
Ambulances	173	351
Motorcycles	7,359	6,455
Goods tronsport	59,294	90,169
Lorries	57,553	84,190
Vans ond other motor vehicles for the transport of goods	1,338	4,537
Motorcyc'es	35	93
Motor vehicles for speciol purposes	368	1,349
TOTAL	**175,812**	**219,385**

SOURCES — "Instituto Brosileiro de Geografio e Estotístico" ond "Departamento de Geografio e Estotístico da Prefeituro do Distrito Federol".

Viaduct on the road that links Rio de Janeiro to the fashionable resort of Petrópolis

COPACABANA

The sweeping beach which adds such beauty to the city of Rio de Janeiro. The luxurious hotels and busy, fashionable shops, added to its attractions as an amusement centre and the comfort of its residences, make this suburb the most popular of seaside resorts.

One of the new ships built in Canada for the Lloyd Brasileiro in 1948

SHIPPING

A regular curve rimming the Brazilian seaboard would measure 3,644 miles in length, but capes and inlets bring this figure up to 5,630 miles.

The Brazilian coastline stretches in two directions: NW-SE from Cape Orange to Point Calcanhar, and thence NE-SW down to the southern frontier. The first section is almost a straight line of low, sandy shores, rich in alluvion; the second is more irregular, opening out into numerous natural harbours.

In all there are 138 such harbours dotted along the coast, 47 being sea-ports and 91 river ports open to ocean shipping.

International shipping sails up the Amazon as far as Manaus and up the Paraguay as far as Corumbá, these rivers even being accessible to vessels of heavy draft.

Nineteen Brazilian ports are now adequately equipped, while others are being built or modernized.

Apart from the normal port works, special facilities are being introduced in some cases, e.g. for the loading of Santa Catarina coal at Imbituba, a port which can handle 1 million tons per year. Similarly, to cope with iron ore shipments, a modern silo has been built at the port of Victoria, with a storage capacity of 47,000 metric tons and a loading capacity of 1,200 metric tons per hour. The ports of Santos and Rio de Janeiro are equipped with grain elevators for the export trade, refrigerating plant for warehousing and loading meat and fruit and other mechanical devices for dealing with international shipments.

There are 217,255 men registered in the Brazilian merchant service, 208,985 of them being of Brazilian nationality. The total breaks down into 112,866 seamen, 19,856 longshoremen, 67,583 fishermen, 16,921 stevedores and 29 ship-owners or fitters-out ("armadores").

The shipping entering Brazilian ports in 1946 amounted to 32,941 vessels of all nationalities with a total tonnage of 24,879,000.

The 34 shipping companies in the country operate 284 lines over a total distance of 415,000 sea miles.

Brazil's merchant navy possessed 502,880 tons of shipping in 1946. In 1947 and 1948, the fleet was increased by the incorporation of several vessels built in Canada by the Lloyd Brasileiro to fill the gaps brought about by the loss, during the last war, of 30 ships totalling 131,512 tons.

BRAZILIAN SHIPPING COMPANIES — 1937 and 1945

HEADINGS	DATA	
	1937	1945
Number of shipping companies	18	28
Ocean	1	3
Coastal	7	28
River and lake	12	1
Shipping lines:		
Number of lines	72	312
Mileage [1]	161,303	442,649
Shipping:		
Number of vessels	198	181
Tannage: [2]		
Grass	371,889	440,392
Net	223,794	264,050
Deadweight	337,804	449,115

SOURCE — "Camissão de Marinha Mercante" and "Instituto Brasileiro de Geografia e Estatistico".

[1] Given in French sea miles measuring 1,852 metres, whereas the British Admiralty mile is equal to 1,853.2 metres.

[2] Grass and net tannage is expressed in measurement or capacity tons, each equal to 100 cubic feet, and the former includes all closed-in spaces for whatever purpose, e.g. seamen's quarters, engine-room, coal bunkers, etc. Deadweight tannage, measured in long tons (1,016 kg.), is the difference between the "light" ship, i.e. the empty vessel with its machinery, etc., and the same vessel fully loaded. The long ton is approximately equal to the weight of 1 cubic metre of seawater.

COASTAL AND RIVER SHIPPING

In Brazil, coastal shipping is reserved to Brazilian vassels and is planned to meet the regional economic requirements.

The Merchant Navy Commission ("Comissão de Marinha Mercante") organizes shipping rates, determines points of call, goes into the questions of stevedores' wages and subventions to shipping companies, and settles any matters related to shipping by sea, river or lake. Exceptionally, foreign vessels are allowed to carry cargo between Brazilian ports.

The principal Brazilian rivers are navigable for very long distances, greatly facilitating inland communication.

This applies to the São Francisco, Purus, Araguaia and Tocantins rivers, each navigable for more than 600 miles, the Paraná, for half this distance, and the Amazon which is eminently suitable for navigation the whole of the 1,967 miles from its mouth to where it crosses the Brazilian frontier.

The total navigable length of Brazilian rivers is estimated to exceed 27,400 miles.

River steamer

CHIEF NAVIGABLE RIVERS

RIVERS	DISTANCE NAVIGABLE		BASINS
	Km.	Miles	
Amazon	3,165	1,970	Amazon
Purus	2,853	1,970	Amazon
São Francisco	2,712	1,680	São Francisco
Tocantins	1,372	860	Amazon
Araguaia	1,300	810	Amazon
Guaporé	1,239	770	Amazon
Madeira	1,090	680	Amazon
Itapecurú	826	520	Northeastern
Paraguay	722	540	Paraguay
Parnaiba	668	420	Northeastern
Das Velhas	647	400	São Francisco
Jequitinhonha	614	380	Eastern
Uruguay	580	360	Uruguay
Paraná	550	340	Paraná
Ribeira de Iguapé	300	190	Southeastern
Doce	220	140	Eastern
Jacuí	220	140	Southeastern
Itojaí-Açú	180	110	Southeastern

Commercial air lines operating in Brazil

AVIATION

The development of aviation in Brazil has been really remarkable. The aeronautical policy of the government has been clearly defined and is basically sound, for the geographical layout and vast extent of the country are such that air transport is one of the most efficient ways of ensuring cheap and easy communication.

Thus it is that during the last few years the air lines have forged ahead of any system of surface transportation. Evidence of this lies in the fact that Brazil is the second country in the world, as regards both the total length of the home air routes and the intensity of air traffic, surpassed only by the United States. Furthermore, it leads South America with 75% of the total air traffic in this part of the hemisphere.

The daily movement at the Rio de Janeiro airport now averages 170 planes. This includes 40 round trips between the Federal District and the State capital of São Paulo, more frequent therefore than the service between Paris and London and only slightly less so than the most intense in the United States — that between New York and Chicago.

The operating system followed by Brazilian aviation is moulded on the American, subject to modifications brought about by the geographical situation.

Airport control is radiophonic, the order of landing being determined from the control tower, which issues all the necessary data to ensure conditions of safety.

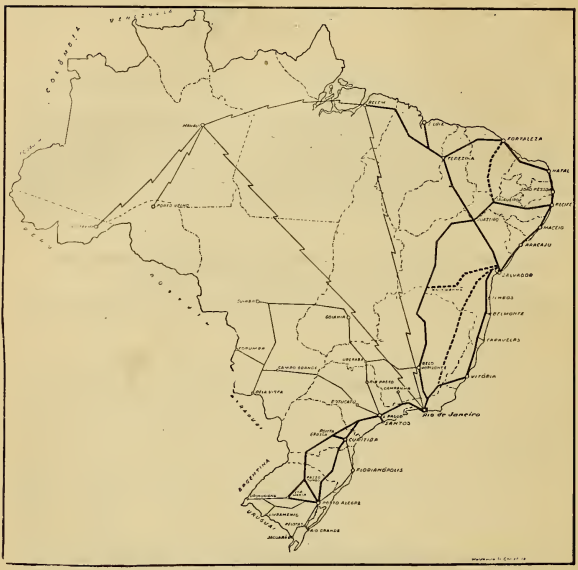
The following Brazilian companies are engaged in international air transportation: Varig, Cruzeiro do Sul, Aerovias Brasil and Panair, while the following foreign companies make regular flights over the country: Panamerican Airways, British South American Airways, Air France, the Swedish Svensk Interkontinental (SIBA), the Dutch KLM, Flota Aérea Mercante Argentina (FAMA), and the Portuguese Companhia Mercantil Ibéria.

COMMERCIAL AIR TRANSPORT IN BRAZIL (DOMESTIC AND FOREIGN COMPANIES) — 1938/47

HEADINGS	DATA			
	1938	1939	1946	1947 [1]
Distance flown, in miles	4,300	4,312	24,844	33,391
Traffic mileage:				
Passenger-miles [2]	25,789	29,384	305,175	414,475
Cargo in ton-miles	728	858	12,472	25,239
Mail, in ton-miles	287	289	822	1,047

SOURCE — "Diretaria de Aeranáutico Civil".
NOTE — The data given applies solely to traffic within Brazilian frontiers.
[1] Data subject to rectification.
[2] Including passengers carried free on cammercial flights.

Transportation on the São Francisco River in the State of Bahia



Radio and telegraph network (for explanations see text)

POSTAL AND TELEGRAPH SERVICES

The postal and telegraph services of Brazil are run by the "Departamento dos Correios e Telégrafos", having a General Directorate in the capital of the country and various Regional Directorates coordinating the post offices of varying importance called "agencies", "stations" and "posts", scattered over the national territory.

A plan is being pursued comprising certain measures for expanding telegraphic facilities, notably the adoption of the carrier system on trunk lines and the development of a radio network. The former system consists in dividing any one metallic circuit into as many as a dozen "channels", along which messages are transmitted by alternating or pulsating currents at a different frequency for each channel, the required frequency being sorted out at the receiving end by an electric filter. On the above map, primary trunk lines of this type are shown by a thick line, secondary and future lines by a thin and a dotted line respectively, and radio trunk circuits in zig-zag.

POSTAL AND TELEGRAPH SERVICES
General Information — 1945

HEADINGS	DATA
Regional Directorates	30
Stations:	
Telegraph	52
Coastal radio	9
Agencies	4,440
Post offices	2,733
Post, telegraph and public call offices	1,603
Radio post offices	104
Personnel	32,880
Postal routes:	
Number	2,920
Distance in miles	120,735
By rail	25,433
On horseback	25,131
On foot	5,480
By boat	11,487
By motor vehicle	43,359
By other means of transport	1,084
Number of drivers	2,437
Number of vehicles in service	855
Motorcars and motorcycles	490
Carts and waggons	135
Bicycles and tricycles	230
Subscribers' post office boxes	49,661
Collection boxes	1,981
Stamping machines	617
Telegraphic network, in miles:	
Length of lines	40,797.996
Length of wiring	86,476.104
Telegraph line breakdowns:	
Number	4,250
Duration in hours	37,849

SOURCE — "Departamento dos Correios e Telégrafos".

BROADCASTING

Radio has influenced communication throughout Brazil to an extraordinary extent. Apart from organized broadcasitng, progress in the amateur field has been illuminating.

BROADCASTING STATIONS IN BRAZIL — 1945

HEADINGS		Number of Stations
GRAND TOTAL		**110**
According to Units of the Federation	Acre Territory	1
	Amazonas	1
	Pará	1
	Maranhão	1
	Piauí	1
	Ceará	1
	Rio Grande do Norte	1
	Paraíba	2
	Pernambuca	1
	Sergipe	1
	Bahia	2
	Minas Gerais	18
	Espírito Santa	1
	Rio de Janeiro	4
	Federal District	13
	São Paulo	41
	Paraná	6
	Santa Catarina	2
	Rio Grande do Sul	8
	Mato Grosso	3
	Goiás	1
According to the year of inauguration	Up to 1925	10
	From 1926 to 1930	6
	From 1931 to 1935	30
	From 1936 to 1940	29
	From 1941 to 1945	34
	Undeclared	1
According to power	100 watts	22
	From 101 to 500 watts	38
	From 501 to 1,000 watts	10
	From 1,001 to 5,000 watts	29
	From 5,001 to 10,000 watts	8
	From 10,001 to 25,000 watts	15
	50,000 watts	5
	Undeclared	1
According to wave-length	Exclusively medium	101
	Exclusively intermediate	1
	Medium and intermediate	2
	Medium and short	6

SOURCE — "Serviço de Estatística da Educação e Saúde".

NOTE — The number of statians classified according to power fails to correspond with the grand total because 8 statons transmit on various wave-lengths using different wattage.

FOREIGN TRADE

Brazil's foreign trade is characterized by a **greater volume** of imports as compared with a **higher value** of exports.

The disruption caused by the last world war has had severe repercussions on Brazilian trade, bringing about the necessity for drastic measures to reestablish the trade balance, and thus importation of more or less unnecessary commodities has had to be restricted in favour of those that are better fitted to promote general well-being and progress.

BALANCE OF TRADE

YEARS	IMPORTS	EXPORTS	BALANCE
	QUANTITIES IN METRIC TONS		
1931	3,476,141	2,236,062	— 1,240.079
1935	4,229,305	2,761.517	— 1,467,788
1940	4,336,133	3,236,916	— 1,099,217
1945	4,291,096	2,987,221	— 1,303,875
1946	5,061,382	3,663,122	— 1,398,260
1947	7,051,382	3,781,453	— 3,372,721
1948	6,799,421	4,658,408	+ 2,141,013
	VALUES IN Cr$ 1,000		
1931	1,880,934	3,398,164	+ 1,517,230
1935	3,855,917	4,104,008	+ 248,091
1940	4,964,149	4,960,538	— 3,611
1945	8,617,320	12,197,510	+ 3,580,190
1946	13,028,716	18,229,532	+ 5,200.798
1947	22,789.291	21,179.413	— 1,609,878
1948	20 984.880	21.698.874	+ 711,999

AVERAGE VALUE PER METRIC TON OF IMPORTS AND EXPORTS

YEARS	VALUE IN CRUZEIROS			
	Actual Figures		Index Figures (1931 = 100)	
	Imports	Exports	Imports	Exports
1931	541	1,520	100	100
1935	912	1,486	169	98
1940	1,145	1,532	212	101
1941	1,362	1,902	252	125
1942	1,558	2,818	288	185
1943	1,866	3,237	345	213
1944	2,082	4,015	385	364
1945	2,008	4,083	371	269
1946	2,574	4,977	375	329
1947	3,185	5,601	579	381
1948	3,086	4,658	570	306
1948				

IMPORTATION

In 1948, Brazil imported goods to the value of Cr$ 20,948,880. The way in which these purchases break down will be better realized by consulting the figures for last year.

YEAR 1948

CLASSES	Metric tons	Value F.O.B. Brazil In Cr$ 1,000
Class I — Livestock	3,660	35,976
Class II — Raw materials	4,922,817	4,891,369
Class III — Foodstuffs	982,987	3.899,737
Class IV — Manufactured products	939,957	12,157,798

Brazil is a heavy buyer of **manufactured goods,** principally motor vehicles, railway carriages and waggons, rails and piping, paper, pharmaceutical products, electric generators and equipment, and machinery.

Purchases of **raw materials** include, primarily, petrol (gasoline), coal, fuel oils, cement, cellulose, iron, steel and copper.

The chief **foodstuffs** imported into Brazil are wheat, beverages, fruits and olive oil.

Raw materials amounted to 26% of the total value of imports in 1947. It may well seem strange that a country so rich in raw materials should still be obliged to rely on importation to such a large extent, but the explanation is to be found in the purchase of wheat for home consumption.

The port of Recife, capital of the State of Pernambuco

BRAZILIAN IMPORTS — 1930/48

According to chief classes of goods

1. Quantities in metric tons

YEARS	Total	Livestock	Raw materials	Foodstuffs	Manufactures
1930	4,733,915	729	3,302,611	997,560	433,015
1931	3,476,141	890	2,270,754	952,057	252,430
1932	3,254,392	604	2,132,269	878,095	243,424
1933	3,837,527	1,422	2,439,547	1,004,553	392,005
1934	3,845,719	1,607	2,388,634	986,523	468,955
1935	4,229,305	10,637	2,696,530	1,002,803	519,335
1936	4,467,630	4,929	2,848,456	1,052,161	562,084
1937	5,099,880	1,180	3,306,493	1,057,333	734,874
1938	4,913,170	23,927	3,157,273	1,163,711	568,259
1939	4,788,718	28,347	3,067,438	1,085,504	607,429
1940	4,336,133	45,935	2,808,726	958,247	523,225
1941	4,053,616	43,545	2,510,435	992,902	506,734
1942	3,012,438	18,289	1,668,175	1,012,769	313,205
1943	3,303,192	2,926	1,706,038	1,121,932	472,296
1944	3,842,683	6,522	1,933,219	1,378,165	524,777
1945	4,291,685	24,208	2,346,159	1,356,730	564,588
1946	5,061,382	12,487	3,566,686	670,169	812,040
1947	7,161,091	6,969	4,935,101	1,030,144	1,188,877
1948	6,799,421	3,660	4,922,817	932,987	939,957

BRAZILIAN IMPORTS — 1930/48

According to chief classes of goods

2. Values in Cr$ 1,000

YEARS	Total	Livestock	Raw materials	Foodstuffs	Manufactures
1930	2,343,705	5,101	759,037	605,667	973,900
1931	1,880,934	2,996	693,823	481,471	702,644
1932	1,518,694	2,132	515,241	400,728	600,593
1933	2,165,254	3,779	710,158	463,517	987,800
1934	2,502,785	3,233	795,876	484,093	1,219,583
1935	3,855,917	12,131	1,179,233	688,518	1,976,035
1936	4,268,667	7,771	1,233,444	896,941	2,130,511
1937	5,314,551	6,081	1,560,323	947,728	2,800,200
1938	5,195,570	21,754	1,496,232	817,663	2,860,421
1939	4,993,992	30,898	1,488,393	626,717	2,847,984
1940	4,964,149	43,905	1,670,676	732,971	2,516,597
1941	5,524,986	41,824	1,845,627	751,828	2,885,707
1942	4,694,873	27,807	1,611,795	791,612	2,263,659
1943	6,229,232	12,391	1,897,628	1,055,999	3,263,014
1944	8,128,471	21,698	2,459,829	1,687,710	3,959,234
1945	8,747,086	71,693	2,428,208	2,157,110	4,090,075
1946	17,028,734	55,194	3,474,071	2,494,052	7,055,417
1947	22,789,291	45,044	4,961,482	4,071,553	13,711,212
1948	20,984,880	35,976	4,891,369	3,899,737	12,157,798

SOURCE — "Serviço de Estatística Econômica e Financeira".

VALUE OF BRAZILIAN IMPORTS — 1938/48

Classified according to chief products and countries of origin

CLASSIFICATION	VALUE OF IMPORTS In Cr$ 1,000			
	1938	1946	1947	1948
TOTAL	**5,195,570**	**13,028,734**	**22,789,291**	**20,984,880**
According to chief products:				
Motor vehicles and accessories	285,149	956,990	2,732,777	3,771,554
Wheat flour	33,632	534,529	1,431,798	1,345,715
Wheat in grain	536,494	406,380	1,057,772	1,146,463
Petrol (gasoline)	172,638	354,783	668,433	889,235
Coal	263,056	364,418	627,248	406,749
Fuel oils	111,892	267,996	454,753	828,008
Radios, pick ups and gramophones	58,466	194,120	430,438	230,128
According to chief countries of origin:				
United States	1,257,926	7,583,485	13,975,157	10,875,787
Great Britain	539,291	1,034,606	1,548,026	2,116,400
Argentina	614,598	1,019,935	1,460,604	1,496,471
Dutch West Indies	165,663	493,354	972,407	1,351,904
Sweden	127,605	381,767	660,332	466,607
Belgium and Luxembourg	208,563	165,620	440,612	555,450
Switzerland	48,205	373,699	532,746	402,958
France	166,985	126,615	492,414	503,555
Germany	1,298,356	—	—	19,564

SOURCE — "Serviço de Estatística Econômica e Financeira".

Tea plantation at Registro in São Paulo State

PRINCIPAL COMMODITIES BOUGHT BY BRAZIL — 1947/48

COMMODITIES	QUANTITIES			VALUE F.O.B. BRAZIL In Cr$ 1,000	
	UNITS	1947	1948	1947	1948
Beverages	Tons	21,100	13,631	297,745	187,828
Coustic sodo	"	40,051	58,312	190,626	235,237
Cement	"	347,152	361,014	239,885	252,701
Chino and glassware	"	23,031	16,647	209,515	145,795
Cool	"	1,531,111	1,061,150	592,429	406,749
Cutlery and tools	"	10,771	8,165	370,995	244,653
Driving machinery	"	6,628	4,490	214,017	154,573
Electric generators and motors	"	7,551	6,755	243,225	236,094
Fruit (apples, peors and grapes)	"	39,898	32,991	276,113	207,780
Iron tubing	"	52,145	31,187	250,983	148,111
Linen fabrics	"	1,350	1,702	215,541	251,113
Locomotives	Number	194	131	239,246	258,229
Motor vehicles	"	66,098	68,306	2,159,878	2,348,554
Motor vehicle accessories	Tons	1,307,799	1,726,961	454,753	828,008
Oils, Fuel	"	17,551	11,020	572,899	362,743
Oils, Refined	"	92,464	97,065	241,188	280,024
Poper	"	85.928	63,913	478,502	361,755
Poper, Cellulose for	"	103,377	45,382	371,587	187,057
Petrol (gosoline)	"	932,916	1,132,408	668,433	889,235
Rodio sets	"	3,506	2,000	430,438	230,128
Refrigerotors	"	6,445	6,168	210,811	221,099
Soltpetre, Chileon	"	70,471	37,372	102,637	54,821
Scientific opporotus	"	2,193	2,003	274,018	255,062
Sewing machines	"	2,544	2,561	112,051	122,887
Steel rolls	"	72,019	27,484	156,770	76,899
Steel sheeting	"	73,941	24,349	236,884	87,270
Tinplate	"	77,874	67,745	272,073	255,853
Typewriters	"	856	545	121,624	82,622
Tyres and inner tubes	"	3,982	769	110,900	21,126
Wheot flour	"	461,157	402,219	1,431,798	1,345,715
Wheot in groin	"	368,520	312,977	1,057,772	1,146,463
Wire	"	40,394	16,643	163,785	68,617

Brazilian oranges packed for export

EXPORTATION

Coffee, cotton, fabrics, pine timber, cacau, tobacco, carnauba wax, rice and tinned (canned) meat are the main Brazilian exports, the chief buyers of these commodities being, according to statistical data for the year 1947: the United States (30.60%), the Argentine (18.22%), Great Britain (6.94%), the Belgo-Luxembourg Union (7.18%), Uruguay (3.68%) and Italy (1.89%).

BRAZILIAN EXPORTS — 1930/48

According to chief classes of goods

YEARS	Total	Livestock	Raw materials	Foodstuffs	Manufactures
			QUANTITIES IN METRIC TONS		
1930	2,273,688	7,185	674,552	1,580,658	11,293
1931	2,236,062	20,305	480,202	1,726,325	9,230
1932	1,632,265	7,792	289,838	1,327,869	6,766
1933	1,910,772	789	348,757	1,555,937	5,289
1934	2,184,782	145	576,304	1,599,992	8,341
1935	2,761,517	59	825,448	1,926,473	9,537
1936	3,108,727	69	1,140,306	1,959,654	8,698
1937	3,296,345	0	1,412,300	1,874,117	9,928
1938	3,933,870	138	1,550,210	2,371,508	12,014
1939	4,183,042	51	1,848,587	2,318,351	16,053
1940	3,236,916	163	1,465,191	1,742,655	28,907
1941	3,535,557	209	2,216,210	1,270,289	48,849
1942	2,660,827	97	1,620,428	975,907	64,395
1943	2,696,089	186	1,546,721	1,083,326	65,856
1944	2,671,405	74	1,207,492	1,412,368	51,471
1945	2,987,221	97	1,529,356	1,394,775	62,993
1946	3,663,122	1,903	1,595,804	2,026,031	39,384
1947	3,781,453	128	1,784,784	1,951,064	45,477
1948	4,658,408	304	2,304,479	2,319,706	33,919
			VALUES IN Cr$ 1,000		
1930	2,907,354	7,241	546,116	2,338,638	15,359
1931	3,398,164	17,982	529,452	2,836,803	13,927
1932	2,536,765	4,740	282,128	2,243,185	6,712
1933	2,820,271	617	356,569	2,458,266	4,819
1934	3,459,006	159	855,541	2,591,116	12,190
1935	4,104,008	186	1,242,060	2,851,765	9,997
1936	4,895,435	223	1,823,519	3,056,564	15,129
1937	5,092,060	167	2,077,026	2,989,661	25,206
1938	5,096,890	271	1,910,589	3,167,990	18,040
1939	5,615,519	173	2,328,444	3,239,348	47,554
1940	4,960,538	372	2,142,557	2,687,807	129,802
1941	6,725,646	255	3,243,981	3,112,319	369,091
1942	7,499,556	272	3,056,733	3,323,937	1,118,614
1943	8,728,569	310	2,993,825	4,016,594	1,717,840
1944	10,726,509	229	3,895,809	5,232,671	1,597,800
1945	12,197,510	1,336	4,540,747	5,434,104	2,221,323
1946	18,229,532	17,916	7,582,957	9,283,817	1,344,842
1947	21,179,411	3,002	8,259,003	11,287,146	1,630,262
1948	21,696,874	6,726	7,985,052	12,992,558	712,538

SOURCE — "Serviço de Estatística Econômica e Financeira".

VALUE OF BRAZILIAN EXPORTS — 1938/48

Classified according to chief products and countries of destination

CLASSIFICATION	VALUE OF EXPORTS In Cr$ 1,000			
	1938	1946	1947	1948 (January to August)
TOTAL	**5,096,890**	**18,229,532**	**21,179,413**	**21,696,874**
According to chief products:				
Coffee	2,296,110	6,441,463	7,755,099	9,018,564
Cotton lint (ginned cotton)	929,856	2,937,584	3,076,205	3,384,997
Cotton fabrics	4,260	703,021	1,252,587	480,069
Cocoa beans	212,996	651,144	1,047,731	1,065,884
Hides, skins and leathers	208,959	650,852	1,002,697	763,023
Pinewood	58,182	706,021	840,589	811,492
According to chief countries of destination:				
United States	1,749,281	7,693,152	8,213,967	9,386,800
Argentina	230,427	1,362,579	2,003,711	2,054,702
Great Britain	446,807	1,596,027	1,651,612	2,048,531
Belgium and Luxembourg	182,202	783,423	995,198	1,031,390
France	325,869	377,678	753,461	546,394
Germany	971,516	—	10,222	229,914
Spain	5,832	510,066	749,565	513,305

Bales of Brazilian cotton ready for shipment

PRINCIPAL COMMODITIES SOLD BY BRAZIL — 1947/48

COMMODITIES	QUANTITIES			VALUES F.O.B. BRAZIL In Cr$ 1,000	
	UNITS	1947	1948	1947	1948
Babassu nuts	Tons	11,778	31,765	33,777	163,017
Bananas	Bunches	6,584,664	8,166,696	83,273	102,935
Beans, Dried	Tons	28,984	15,097	72,704	41,287
Brazil nuts, Shelled	"	3,709	1,856	59,795	27,351
Brazil nuts, Unshelled	"	15,569	11,651	84,446	56,184
Caetetu skins	"	442	404	24,255	20,400
Carnauba wax	"	8,388	9,292	383,779	285,738
Cast iron	"	29,465	65,199	41,929	91,711
Castor oil	"	6,266	5,212	64,738	40,146
Castor seed	"	168,548	163,515	618,902	439,715
Cocoa beans	"	99,041	71,661	1,047,731	1,065,884
Cocoa butter	"	2,615	355	36,355	8,399
Coffee beans	Bags	14,830,064	17,492,324	7,755,099	9,018,564
Cotton, Raw ginned	Tons	285,473	258,703	3,076,205	3,384,997
Cotton linter	"	34,393	18,505	163,706	68,005
Cottonseed oil	"	6,623	10,093	83,040	102,302
Cotton waste	"	10,301	8,023	67,151	43,004
Crystal, Rock	"	369	720	37,186	83,945
Diamonds	Grammes	28,680	12,086	52,407	18,805
Fabrics	Tons	16,678	5,638	1,252,587	480,069
Goatskins	"	2,278	1,493	96,839	71,048
Leather, Tanned	"	1,393	357	40,760	12,805
Maize (Indian corn)	"	166,046	110,961	245,369	183,032
Manioc (cassava) flour	"	100,985	20,845	170,858	33,596
Manganese ore	"	142,092	141,253	32,153	32,334
Mattee tea	"	55,434	46,775	159,535	138,016
Meat, Frozen	"	17,455	20,849	133,458	158,197
Meat, Tinned or canned	"	18,166	23,221	198,368	281,529
Meat extract	"	443	946	29,167	51,912
Menthol	"	310	136	89,322	41,475
Mica	"	857	987	33,112	32,158
Piassava fibre	"	3,242	3,319	23,353	18,873
Oiticica oil	"	5,376	12,126	54,419	87,124
Oranges	Boxes	1,703,015	2,845,202	100,973	171,225
Ouricuri (licuri) wax	Tons	2,166	1,445	52,543	37,298
Oxhides, Dried	"	9,563	9,316	141,400	118,875
Oxhides, Salted	"	56,680	48,315	524,523	404,234
Rice	"	218,423	212,643	682,524	740,811
Rice, Broken	"	22,385	2,950	57,257	8,766
Rosewood essence	"	210	60	26,517	6,085
Rubber	"	13,510	5,446	204,221	47,011
Sisal fibre	"	14,850	19,863	95,687	116,275
Sugar	"	61,556	361,277	220,641	691,574
Tallow or grease	"	3,783	136	38,140	1,339
Tapioca	"	6,516	3,581	29,473	14,239
Timber, Pine	"	500,975	572,031	840,589	811,492
Tobacco	"	39,400	25,344	376,647	268,277
Tucum fibre	"	9,493	5,515	34,550	21,675
Tungsten ore	"	1,227	1,056	29,552	27,370
Wool, Raw	"	4,159	7,090	68,992	104,910

FOREIGN CAPITAL IN BRAZIL

Capital outlay in Brazil is highly remunerative in view of the commercial possibilities and within the scope of current legislation.

The yield from investment in this country is generally double and sometimes as much as five times that which can be obtained in North America or in Europe.

Brazilian laws are among the most liberal in the world with regard to foreign capital. Profits may be withdrawn at the rate of twenty per cent per annum and exports of same may amount to eight per cent of the capital outlay.

Furthermore, the Brazilian Government grants exemption from taxes sometimes for as long as five years from the start of the undertaking.

In this connection, the remarks of President Truman are apt and to the point. In substance, he pointed out that Brazil, whose possibilities and capital requirements had been the object of investigation by the joint Brazilian-United States technical mission, might well lead the way in the elaboration of a programme for the development of economically backward countries. Moreover, such an investment plan would not merely profit Brazil, for indeed new outlets for American products could be created, above all in the case of depression threatening the United States.

An idyllic country house in the South of Brazil

The Ministry of Education and Public Health. The building is a good example of modern functional architecture, affording protection from the sun and ample light and air.

PUBLIC HEALTH

Public health is under the control of the Federal government whose field of action extends all over the country.

The National Health Department ("Departamento Nacional de Saúde"), at the head of the organization, deals with matters of public health in all the "municipios", frames policy and supervises practical work. Thus, it undertakes enquiries, research and studies in connection with conditions of health, both in the domain of medical and social assistance and in that of public health, strictly so termed, paying attention to problems of promoting sanitary conditions, hygiene, fighting epidemics and developing preventive medicine.

Preparatory, postgraduate and specialists' courses are being given in medical and sanitarian subjects.

The chief cities of Brazil are endowed with **Health Centres**, whose many-sided activities, confined to definite areas, include the control of communicable diseases and rural endemics, protection of expectant mothers and children, suppression of unhealthy conditions and sanitary inspection of dwellings, enforcement of labour hygiene and hygienic practices in the food industries, and periodical health examinations. These duties are entrusted to five doctors and one nurse for every 10,000 inhabitants.

The Health Centres serve cities of importance and their jurisdiction extends to subordinate districts.

On 1st January, 1946, there were 948 establishments of medical and sanitarian assistance operating in the various municipios of Brazil. The hospitals in the capital cities numbered 317, with accomodation for 43,748 in-patients.

The **Oswaldo Cruz Institute,** the largest medical research centre in the country, prepares the necessary sera and vaccines, the annual output of anti-typhoid vaccines amounting to more than 500,000 doses. The manufacture of others such as the anti-smallpox vaccine brings the production figures up to more than 3.5 million doses per year.

The department known as the **"Defesa Sanitária do Brasil"** superintends the medical and sanitarian services of the merchant navy, inspecting shipping on arrival and departure. Aircraft inspection has been particularly efficient, and most necessary for the danger of invasion by **Anopheles gambiae** and other insect carriers of African diseases demands that severe, permanent measures of control be applied to airplanes flying over the Atlantic so as to ensure full protection to the American continent.

Like other countries in America, Brazil used to be scourged by **yellow fever,** until the genius of a great Brazilian doctor, Oswaldo Cruz, supported by a brilliant staff of co-workers, definitively rid the country of this terrible disease, which has now been quite stamped out in every corner of the national territory, where the threat of fresh outbursts is warded off by the absence of carriers.

The **National Yellow Fever Service** makes every effort to improve its operating methods, directing a campaign that extends to all the inhabited area of the country, an area greater than that of all Europe with the exception of the U.S.S.R.

Malaria has always been one of the major preoccupations of the public powers in Brazil. In this connection, the Federal Government has a wide range of achievements to its credit, among which the work done in the Fluminense Lowlands and the Federal District is outstanding. From 1938 to 1941, the Government's activities spread to 18 States, with particular emphasis on cleaning up the zones of malaria in the vicinity of State capitals. It should be noted that in Brazil malaria is most prevalent along the coastal belt and in the valleys of the great rivers.

This specialized service employs more than 6,000 functionaries who destroyed 349,000 breeding-places of Anopheline mosquitoes in 1946. In the same year, 22,911,164 searches were made for larvae, 723,137 houses were visited and 164,131 persons received medical attention. In the course of two years, 10,670,464 anti-malaria tablets have been distributed.

Several systems are used to control the carriers, the application of D.D.T. in the home and the use of the medicine "Aralen" being particularly noteworthy.

In January 1949, a plan was begun to spray 113,000 premises with D.D.T.; the properties in question cover an area of 7,600 acres on the southern seaboard, distributed over the territory of 60 municipios in the State of Paraná.

As the result of a resolution voted at the Third Meeting of Foreign Ministers held in Rio de Janeiro, an agreement was signed between the governments of Brazil and the United States dealing with: the reclamation of the Amazon Valley; the preparation of technicians for carrying out public health programmes; and collaboration with the National Leprosy Service.

A leper colony in the interior of Brazil

Various other specialized services operate in Brazil for the purpose of safeguarding the health of the people and repelling the invasion of diseases, the most important being the national services of bubonic plague ("peste"), tuberculosis and cancer.

ASSISTANCE TO THE SICK IN BRAZIL
1946

PHYSICIANS	NUMBER	PERCENTAGE
Registered and practising in Brazil	16,940	100.00
Practising in the Federal and State capitals	10,235	60.42
Practising in the interior	6,705	39.58
Percentage of those registered in the capitals, practising in Rio and São Paulo	—	61.00
Practising, per group of 10,000 inhabitants:		
In the States of Maranhão, Piauí and Paraíba	Less than 1	—
In most of the other States	Less than 4	—
Practising in Brazil, per group of 2,780 inhabitants	1	—

GENERAL HOSPITALS*	IN-PATIENT CAPACITY		
	Necessary	Actual	Shortage
Throughout the country	122,000	64,000	58,000
In the capital of Brazil	12,500	9,500	3,000
In three northeastern States (Maranhão, Piauí and Ceará)	11,300	1,450	9,850

* Not including consumptives, lepers, mental patients, maternity cases, etc.

DEATHS REGISTERED — 1944/48

CAPITALS	MONTHLY AVERAGES				1948			
	1944	1945	1946	1947	July	August	Sept.	Oct.
Pôrto Velho	20	19	16	15	20	17	12	17
Rio Branco	19	29	23	25	17	21	23	...
Manaus	202	178	166	156	128	151	148	191
Bôa Vista	...	...	...	...	...	...	...	...
Belém	404	375	356	350	392	327	329	...
Macapá	3	6	7	7	8	7	8	12
São Luís	117	122	112	135	118	134	105	...
Teresina	92	95	90	86	76	90	73	...
Fortaleza	490	504	495	513	512	512	439	415
Natal	218	213	218	241	293	216	205	195
Jaão Pessoa	193	199	219	214	236	553	221	242
Recife	957	979	999	996	...	...	...	...
Maceió	233	247	245	232	283	274	243	188
Aracajú	128	129	137	116	115	129	151	87
Salvador	743	661	692	555	675	...	...	...
Belo Horizonte	395	374	391	407	...	...	...	118
Vitória	228	138	122	107	86	109	91	91
Niterói	246	220	215	215	...	...	...	172
Rio de Janeiro	3,068	2,793	2,723	2,638	2,748	2,646	2,687	...
São Paulo	1,677	1,666	1,554	1,628	1,738	1,843	...	...
Curitiba	196	182	156	187	167	184	187	175
Florianópolis	119	120	106	110	88	77	82	60
Pôrto Alegre	453	475	447	432	408	502	...	...
Cuiabá *	34	33	29	31	35	33	34	...
Goiânia	52	55	57	59	47	60	60	...

SOURCES — "Serviço Federal de Bio-Estatística" and "Sistema Regional da Secretaria Geral do I.B.G.E.".

* Data referring solely to the "District" of the "seat" (See "Territorial Division", page 26).

SOCIAL SECURITY

Brazilian social security embraces, with few exceptions, all the urban population. The only workers still beyond the scope of its benefits are domestic servants, a certain number of persons working on their own and members of the liberal professions.

Thus, Brazilian social security covers a total of some three million insured, which brings the total of beneficiaries, at the average rate of 3 per insured, up to about 9 million persons enjoying the protection of the Old Age and Disability Pensions Institutes and Funds ("Institutos e Caixas de Aposentadoria e Pensões").

Owing to the difficulties inherent to the immensity of the land and to living conditions in the country, it has not yet been possible to extend social security to the rural classes, though they have already started to organize into "sindicatos" (unions or guilds) and are beginning to take advantage of certain provisions of labour legislation. Thus they also benefit by the law passed in 1949, which provides that workers are to receive normal wages on public holidays.

The cost of social security is borne in equal proportions by the Federal Government, the employers and the employees.

However, the system of benefits has not yet been standardized for all institutions, as would seem desirable. There are four basic types of benefit:

a) Retirement pension on the grounds of permanent ill health;
b) Assistance in case of illness;
c) Death pension;
d) Funeral assistance.

The organization of social security is rounded off by "nutritional assistance" provided by the "Serviço de Alimentação da Previdência Social" whose purpose it is to supply the workers with nourishing food at reasonable prices by means of a series of popular restaurants.

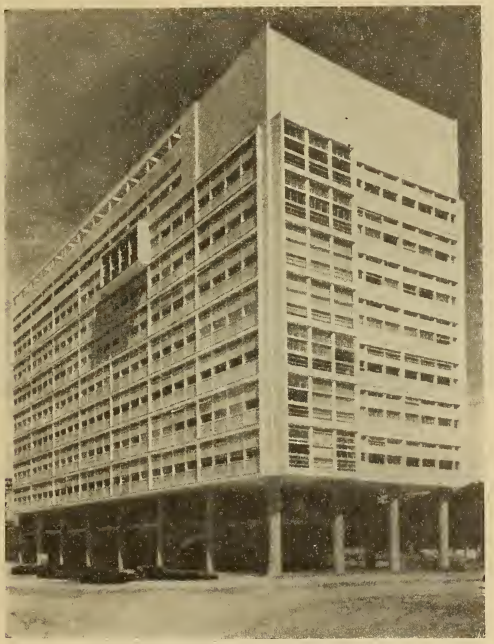
Beginning with railway workers 25 years ago, applied to dockers a few years later and then extended to almost every class of society at a rhythm that has increased prodigiously during the past decade, the whole vast organization is one of the most remarkable institutions in the country. Nor can the importance of social security be too highly stressed, for on the health and activity of the worker and his family — and in no less a degree on freedom from worry — must be based the future prosperity and sound development of the nation.

SOCIAL SECURITY AND ASSISTANCE IN BRAZIL — 1938/47

HEADINGS	DATA	
	1938	1947
Number of institutions	104	35
Underwriting funds, in Cr$ 1,000	1,360,419	11,313,716
Active associates	1,787,386	2,924,538
Beneficiaries:		
Retirement pensioners (workers)	21,758	145,692
Death pensioners (workers' dependents)	37,100	153,138
Benefits, in Cr$ 1,000:		
Retirement pensions	64,931	509,817
Death pensions	25,925	212,416
Medicol assistonce	17,179	193,954
Miscelloneous	1,153	418,649

SOURCE — "Departomento Nocional de Previdência Social".

NOTE — Nat including data reloting to the public servonts' sociol security institute, "Instituto de Previdência e Assistência oos Servidores do Estado".



The Brazilian Reinsurance Institute

LABOUR SAFETY AND HYGIENE

The health of Brazilian workers is safeguarded by a Division of the Ministry of Labour, entitled "Higiêne e Segurança do Trabalho".

As is indicated by the translation of the name which heads this section, the Division is designed to control and avoid illness and accidents consequent and inherent to working conditions; to this end, it is provided with the necessary equipment and staffed with specialists in physiology, physics, biochemistry, microbiology, anatomy, pathology, industrial toxicology, traumatology, orthopedics, hygiene, forensic medicine, sanitary engineering, etc.

The Division is divided into three sections: the Labour Hygiene Section inspects and certifies buildings, determining the necessary modifications, if any, to be made to any premises where labour is to be employed, from the smallest workshop to the largest industrial

Industrial worker's house

plant; the Labour Safety Section aims at the elimination of risk, seeing that proper care and precautions are taken, causing moving parts to be enclosed and devising and enforcing other safety regulations; the Women's and Minors' Assistance Section protects female and under-age workers, the latter from 14 to 18 years of age, against unhealthy and dangerous working conditions, forbidding their employment where lead, arsenic, mercury, etc. are handled, insists on rest periods with pay being accorded to expectant mothers, before and after childbirth, prohibits night work and any that may be deemed injurious to health, and checks abuses of all kinds.

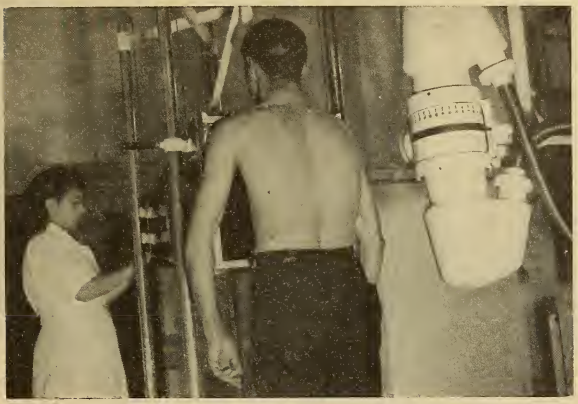
Altogether, the industrial worker's lot is by no means a hard one, as may be seen by some of the illustrations on these pages.

PROTECTION OF THE INDIANS

The Indian Protection Service ("Serviço de Proteção aos Índios") is entrusted with the difficult task of organizing the "self-colonization" of undeveloped sections of Brazilian territory by adapting the primitive native inhabitants.

The problem is very different from those connected with the immigration of civilized populations, on whatever scale, whether domestic or foreign; the humanization of the waste lands of the country is strictly an indigenous issue, consisting in the identification of a native population within its own "habitat", and to this end the civilized man must deliberately endeavour to establish contact with the native so that he may acquire technical skill and grasp the politico-social values of institutions.

The cultural stages reached by the Indian tribes still existing in the Brazilian backwoods differ widely among themselves and from that of civilized society.



Worker undergoing an X-ray examination of the lungs

In the majority of cases, when a tribe comes into touch with civilized people, conflicts arise, varying from the simplest to the most complex.

Where the native character is docile and welcomes innovations, the question is one of occupational organization and the guiding principles of the Service can be applied from the start; when, however, the tribes are hostile and bellicose, the initial problems take on a warlike aspect.

The Indian Protection Service seeks a point of contact, withstands the ensuing attack and only replies by passive resistance, displaying its pacific intentions and offering gifts, among them crops tilled in advance so that the Indians may reap the harvest and profit thereby. The processes adopted are largely original and empirical, blending the arts of war with political and humanitarian strategy. The object is to bring home to the Indian that his civilized fellow creature is powerful, but disdains the use of force; that he is capable, but does not aim to impose himself by violence; that he is different from other civilized men, singly or grouped together, and that his intentions are entirely friendly and well-wishing.

Once the Indians have realized these honest intentions, they pass through a new phase involving a watchful attitude and a cautious approach, and it is now that **pacification** may be attempted, after the initial stage of **attraction.**

As soon as the tribe has been pacified, the Indian Protection Service must set out to interest its members in agricultural and stock-raising activities and little by little it finds its efforts crowned by success.

URBAN IMPROVEMENTS

Conditions in cities and towns * in 1946

HEADINGS	DATA	
	Number	Percentage
I. LIGHTING:		
Total cities and towns	**1,669**	**100.00**
With street and house lighting	1,342	80.41
With street lighting only	84	5.04
With house lighting only	5	0.29
Without lighting	238	14.26
II. WATER SUPPLY:		
Total cities and towns	**1,669**	**100.00**
With water laid on to houses	675	40.44
With water only laid on to public pipe outlets, taps and fountains	68	4.08
With no public water supply	926	55.48
III. SEWERS:		
Total cities and towns	**1,669**	**100.00**
With a comprehensive network of sewers	179	10.73
With only a rudimentary network of sewers	210	12.58
With no network of sewers	1,280	76.69
IV. COMPARATIVE DEVELOPMENT OF PUBLIC UTILITIES IN FEDERAL AND STATE CAPITALS AND THE TWO LARGEST CITIES:		
Total house lighting connections to city mains	**1,676,977**	**100.00**
In the Capitals	792,292	47.25
Rio de Janeiro	275,293	16.42
São Paulo	248,587	14.82
Total premises with water laid on	**1,092,493**	**100.00**
In the Capitals	603,399	55.23
Rio de Janeiro	209,161	19.15
São Paulo	164,128	15.02
Total premises connected up to city sewers	**632,014**	**100.00**
In the Capitals	361,293	57.17
Rio de Janeiro	130,886	20.71
São Paulo	121,662	19.25

* "Sedes municipais" — See "Territoriol Divisian", page 26.

CULTURAL SITUATION

The educational and cultural system of Brazil is based on the provisions of the Constitution which set forth that: "All men have a right to a proper upbringing, which shall be provided at home and in school. It should be inspired by the principles of freedom and the ideals of the solidarity of mankind".

At the present time, the Brazilian school year is divided into two terms: from 1st March to 30th June and from 1st August to 30th November, the month of July and the period from 15th December to 15th February being assigned to vacations.

BRAZILIAN SCHOOL UNITS AND MATRICULATIONS
1943/45

TYPE OF EDUCATION	NUMBER OF SCHOOL UNITS			NUMBER OF MATRICULATIONS		
	1943	1944	1945	1943	1944	1945
Primary	43,433	42,697	44,794	3,313,184	3,359,146	3,548,409
Secondary	1,354	1,235	1,249	210,170	221,199	252,166
Home economics	48	41	69	1,908	1,168	3,015
Industrial	1,051	1,263	1,349	48,040	52,924	56,772
Commercial	792	955	1,004	77,877	81,487	87,101
Artistic	750	817	891	15,042	16,385	20,599
Teachers'	444	444	778	38,554	42,769	41,322
Higher	282	277	282	23,548	25,497	26,323
Miscellaneous	1,453	1,633	1,664	162,444	170,485	168,677
TOTAL	**49,607**	**49,362**	**52,080**	**3,890,767**	**3,971,060**	**4,204,384**

PRIMARY EDUCATION

All education must start with the primary grades, the basic training which enables the coming generation to enter the nuclei of popular culture in the strata to which they belong.

In view of the necessity of teaching the people in general to read and write, the Ministry of Education and Public Health has organized a generous programme of grants in aid to the States, supported by a special stamp tax known as the "Education and (Public) Health Tax". State and municipal governments, for their part, apply 15% of taxes to the development of primary education.

As a result the educational movement may be seen to be gathering force throughout the country, stimulating and strengthened by private initiative which is doing much to bring reading and writing within the reach of the poorest families.

There are now about 50,000 school units operating in Brazil with a teaching staff of 100,000 and attendance rated at more than 3 million children.

The year 1947 saw the birth of a widespread movement of popular education entitled "Adults' Educational Campaign" and aiming at the organization of 10,000 complementary classes for illiterate young people and grown-ups in all the cities, towns and villages of Brazil. In less than 12 months this goal was already surpassed, the 10,185 classes then maintained with federal aid meeting with the most encouraging results. A further 3,000 classes and more were soon being run by various associations and even by individual initiative. In the State of São Paulo alone, such classes numbered more than 700.

In addition it should be noted that about 40.000 persons each teach two or three pupils at home.

It is estimated that more than half a million people profit by this form of education, for among them the Department of Education alone has already distributed 585,000 copies of an elementary reading book specially designed for this purpose.

Physical training

SECONDARY EDUCATION

The object of education in the secondary grades is to pursue the acquisition of general knowledge and the formation of character, instilling and enhancing a sense of patriotism and the elementary humanities, so as to build up an intellectual background for higher studies.

Secondary education in Brazil is divided into two grades; first, the student follows a basic curriculum during a four-year **curso ginasial,** then passing over to the **classic** or **modern** side, for a further three years. On the classic side, he acquires a deeper comprehension of philosophic thought and concentrates on the study of classic authors, while on the modern, his work deals principally with the sciences. This arrangement respects the bent of each individual student, who can thus pursue the studies best suited to his intelligence.

Moral training is not the object of a specific programme but derives from the way in which all the programmes are carried out and, in general, from the organization of school life itself, which sets a high ethical level in accordance with the ideals of human dignity and patriotism.

Brazil possesses 1,004 establishments of secondary education attended by more than 302,000 pupils.

HIGHER EDUCATION

Higher education in Brazil is organized preferably along university lines.

A necessary proviso for the foundation of a University is the incorporation of at least three institutes of higher education. With the adoption of the most up-to-date methods, the educational tendancy is to reduce lectures to a minimum and develop the practical side. It was found that with the system of having only one final examination with subjects to be drawn by lot, led to success in passing being largely a matter of luck and tolerance on the part of the examining board, so that now the student is obliged to take partial examinations, which

ensure a steady level of competence being maintained throughout the course.

The 305 units of higher education in Brazil are attended by 25,000 students and the teaching staff is made up of 4,500 professors; the range of subjects includes engineering, chemistry, architecture, medicine, dentistry, pharmacy, agronomy, veterinary medicine, law, administration and finance, philosophy and music.

POST-GRADUATE AND SPECIALISTS' COURSES

Specialists' courses, their scope and attendance are a clear indication of the renovation of education in Brazil. Among these may be mentioned the course organized by the DASP for raising the level of efficiency in the public services, those of the Getulio Vargas Foundation and finally the training of personnel for the diplomatic and consular career by the Rio Branco Institute attached to the Ministry of Foreign Affairs. Advanced studies in English are pursued at the Brazil-United States Institute and at the various Anglo-Brazilian Cultural Societies in Rio and some of the chief cities.

COMMERCIAL EDUCATION

The Brazilian commercial course is divided into two grades, termed: a) basic course, and b) technical course.

The first grade, designed to impart fundamental notions of commerce, lasts four years, while the second comprises five courses organized as follows: 1) commerce and advertising; 2) administration; 3) accounting; 4) statistics; and 5) secretarial work.

INDUSTRIAL TRAINING

The Brazilian Government designates a certain number of professors every year to go abroad as trainees in the most advanced industrial centres, chiefly those of North America.

Apart from the National Service of Apprenticeship for Industrial Workers ("Serviço Nacional de Aprendizagem dos Industriários"), the Federal Government maintains arts and crafts training schools in the States with the object of standardizing industrial education; the courses are divided into 4 years basic and 3 years technical.

The three-year technical course includes the following specialities: a) machinery and motor construction; b) electrotechnics; c) construction work; d) bridges and roads; e) technical design; f) applied arts; g) interior decoration; h) aircraft building; i) industrial chemistry; j) smelting and metallurgy; k) textile industries.

There are 213 industrial training units operating in Brazil with an attendance of 53,000 apprentices.

EDUCATIONAL FILMS

The purpose of the National Institute of Educational Cinematography ("Instituto Nacional do Cinema Educativo") is to promote the use of films as an auxiliary educational process and a means of general education.

To this end, the Institute keeps a film library, issues films and publishes a magazine. It has introduced 16 mm. sound film, both black-and-white and colour, into Brazil, and there are already about 700 films in its library. Exchange with foreign countries runs to a total of 73,000 feet per year.

In creating this service, Brazil has become perhaps the only country providing its scientists free of charge with the means of documenting their original research work.

MILITARY TRAINING

Military training, though having its own special features, displays points of contact with the general plan of education in Brazil. Thus it begins by teaching illiterate conscripts to read and write and goes as far as post-graduate university courses.

Although the immediate intention of satisfying the organic requirements of the Army predominates in the army system of education, many are the benefits which revert to the national community. Above all the appreciable number of technicians, specialists and skilled workers prepared every year by the Army and subsequently engaging in civil activities justify the classification of military training as an important element in nation-wide education.

In addition to the **General Staff** and **High Command** courses, the Army maintains other technical organs to deal with the problems of Military Education.

a) **Directorate of Army Education** ("Diretoria do Ensino do Exército") — This department covers: **primary education**, administered in the Regimental Schools; **secondary education**, in the military colleges and preparatory schools; **training of cadets and N.C.O.'s** ("ensino de formação"), represented by courses of instruction in the Military School of Rezende, prior to receiving a commission, and courses for training sergeants; **advanced military studies** ("ensino de especialização"), pursued at an Improvement and Specialization Centre ("Centro de Aperfeiçoamento e Especialização") controlling various educational organizations dealing with motorized equipment, signals and radio, paratroops, equitation, and specialized instruction.

Other schools are also subordinated to the Directorate, such as those of Veterinary Medicine, Medical Service ("Saúde"), Physical Training, Coastal Artillery, and the Anti-aircraft Defense Training Centre.

The "Escola de Guerra", Brazil's military academy

b) **Army Ordnance Technical Department** ("Departamento Técnico de Produção do Exército"). — This is the technical organ which deals with military industry and cognate services. It is entrusted with the training of Technical Engineer Officers, specialists and skilled workers.

Navy and Flying Corps Officers, as well as civil engineers, are also allowed to enter the Technical School.

c) **Army Geographical Service** ("Serviço Geográfico do Exército") — This service undertakes the training of Geographical Engineer Officers and also directs the course of topography for sergeants.

Thus Brazilian army training involves educational work which is essential to the military requirements of the country, but has at the same time a scope which is infinitely greater, in that it provides the technicians of which the nation stands in need.

NAVAL TRAINING

The youths who propose to enter upon a naval career receive their training in the **Naval School**, entry to which is subject to a competitive examination in mathematics, physics, chemistry and Portuguese, supplemented by a rigorous medical test.

The whole course lasts five years, consisting of one year of preparatory studies and four years of advanced work.

On passing out, the cadets ("aspirantes") are promoted to the rank of "guarda-marinha".

The guarda-marinha or midshipman pursues his technical and professional preparation on board special training ships.

There is also a **Naval Warfare School** ("Escola de Guerra Naval") for officers of higher rank.

The subaltern personnel of the Navy is trained in the **Seamens' Apprentice Schools** ("Escolas de Aprendizes Marinheiros"), which accept boys from 16 to 19 years of age for a six-months' course.

The Naval School

MERCHANT NAVY SCHOOL

The "Escola de Marinha Mercante do Brasil" in Rio de Janeiro provides training for officers in the following ranks of the merchant service: Master Mariner; Master of a Coasting Vessel; First Mate; Second Mate; First Engineer; Second Engineer; Third Engineer; First Purser; Second Purser.

The regulations conform to the International Convention as regards the minimum capacities of Captains und Officers of the Merchant Service.

AGRICULTURAL RESEARCH AND TRAINING

Brazilian technical and scientific work in connection with the produce of the soil is closely bound up with the **National Centre of Agronomical Training and Research** ("Centro Nacional de Ensino e Pesquisas Agronómicas"). This great central organization coordinating domestic production comprises two specific administrative organs: the **Rural University** and the **National Service of Agronomical Research**, in addition to regional organisms constituted by the Northern and Southern Agronomical Institutes.

The **Rural University** administers higher education in agronomy and veterinary medicine. This model organization also directs regular and extra-curricular post-graduate and extension courses in all the branches of agricultural training, and arranges special lectures.

Post-graduate and extension courses — These courses are of two distinct types: the **regular** courses provide the specialized training necessary for public servants holding technical posts in the Ministry of Agriculture, whereas the **extra-curricular courses** ("Cursos avulsos") are characteristically of a university post-graduate nature and intended to broaden the scope of the theoretical and practical attainments of agronomical biologists, ecologists, fruit-growers, economists, oenologists, agricultural and veterinary inspectors, chemists, zootechnicians, foresters, experts in plant diseases, etc.

Agronomical research — The National Service of Agronomical Research comprises the Agricultural Chemistry, Agricultural Ecology and Experimentation, Fermentation, Northern and Southern Agronomical, and Oil Institutes.

Each of these institutes is equipped with Technical Sections and Experimental Stations where field investigations and experiments are carried out in order to find a solution to the problems which are brought to their notice.

The results of this work have already been felt in the various branches of Brazilian production and much experience has been gleaned in the growing of wheat, cotton, fibres, jute, tung and many other crops which are exerting a most favourable influence on the Brazilian economy.

Agricultural training in Brazil is coordinated and directed by a Superintendancy of the Ministry of Agriculture and comprises various systems within the framework of three grades: Higher, Secondary professional, and Elementary.

The "Higher Training" is carried out by the Federal Government in the National School of Agronomy, near the Federal Capital, and

in the Eliseu Maciel School, at Pelotas, in the State of Rio Grande do Sul. There are also nine other schools officially recognized and situated in various parts of the country.

The "Secondary Professional Training" is undertaken by three agrotechnical schools subordinated to the Federal Government. The courses, which last from two to three years, prepare specialists in agriculture, stockbreeding, dairy farming, etc.

The "Elementary Training" is designed to provide the necessary instruction for persons of more than 16 years of age, who desire to learn a special agricultural trade or acquire a technigue to be put to immediate use; while not going deep into theoretical aspects, the courses are intensive and practical, their duration depending on the nature of the subject selected.

Veterinary Training — Advanced training in veterinary medicine is modelled on the educational system adopted in the National School of Veterinary Medicine ("Escola Nacional de Veterinária"). Every candidate must present a certificate showing that he has concluded the regular secondary school course before being allowed to take the entrance examination, as is indeed the case with all the Higher Schools of Agriculture. There are five other veterinary schools in Brazil, all of which turn out graduate veterinarians, besides a number of Agrotechnical Schools which give secondary courses in this branch.

The Rural University

CULTURAL ACTIVITIES

LIBRARIES

There are a remarkably large number of private libraries in the various cultural centres of Brazil and all of them have fine collections of rare books in Portuguese and other languages.

The organization of both private and public libraries owes a great deal to the influence of former generations of the élite, who were accustomed to complete their studies in France and England, and this heritage has been enlarged by their modern descendents who tend to seek a more highly specialized background in the United States.

In the early days of Brazil's cultural emancipation, European professors of renown predominated in the higher grades of education. Gradually, however, there grew up a class of Brazilian intellectuals who had travelled abroad and, on their return from studying in European and American universities, were appointed university professors or rose to important positions in public administration.

Nowadays their influence has become more decisive, for it is generally government technicians who go to foreign countries to advance their knowledge of some particular speciality, and this has led to a remodelling of the up-to-date Brazilian library along North American lines.

Moreover, substantial changes have operated of late to modify and extend the cultural structure of the country, so that the emphasis has shifted to popular education at the expense of pure erudition, with a marked leaning towards specialization, thus heralding a new phase in the development of Brazilian culture, which has left behind the encyclopaedic and speculative philosophy of a less practical era.

Organization — The collections of Brazilian private and public libraries include official publications of the Empire, many of them written in French, but the largest section in most cases deals with documents dating from Republican times.

These libraries are of two types: the **non-specialized** library, mainly comprising the works of classic authors, is catalogued according to one of the old-fashioned systems, whereas the **specialized** library is organized on the American "active library" plan, embodying Dewey's decimal system of cataloguing, combined with Cutter's tables, with free lending, reference and reading guidance services.

In fact, great strides are being made in the field of library economics in this country, and the appointment of specially trained librarians, added to the installation of up-to-date equipment, has done much to sweep away the cobwebs from the typically obsolete library of ten years back.

Catalogue Exchange Service — The system of printing and issuing standard index cards for library exchange purposes, according to the principle adopted by the Washington Library of Congress, has been put into practise in Brazil with great success.

Collective catalogue — The object of this organization is to enable the whereabouts in Brazil of any particular volume, document, magazine or newspaper, to be localized for consultation with the maximum rapidity and efficiency, and the Brazilian Library Exchange Service will soon be in a position to supply the consultant with accurate

information as to the possessor of any work in which he may be interested.

Noteworthy progress has been made in other directions within the scope of the "Active Library" programme of Brazil, e.g.: children's libraries, popular libraries for the working classes, travelling libraries installed in special motor vehicles, reading equipment for microfilm, the development of modern library techniques and the registration of libraries throughout the country, the two latter activities coming within the province of the National Book Institute ("Instituto Nacional do Livro"), which also edits various publications and distributes reading matter to public libraries. Up to the year 1947, 4,088 libraries had been registered and 700,000 books donated.

MUSEUMS

The numerous museums of Brazil which cover the fields of natural history, Brazilian history, painting and statuary both classic and modern, and other specialities, attract a great number of visitors.

National History Museum ("Museu Histórico Nacional") — Situated facing the international airport of Rio de Janeiro, it consists of three sections: History, Religious Art, and Numismatics. The first section contains a historic collection of more than 15,000 pieces going back to colonial times; the second is remarkable for the fine crucifixes and ivories exhibited, while the third displays coins, medals and decorations of Portugal and Brazil, as well as ancient Greece and Rome, 90,000 in number.

Independence Museum ("Museu da Independência") — Situated in the historic town of Ouro Preto, in the State of Minas Gerais, this museum collects material in connection with the ill-fated conspiracy known as the "Inconfidência Mineira", the first movement towards Brazilian independence, together with works of artistic or historical value illustrating the development of Minas Gerais.

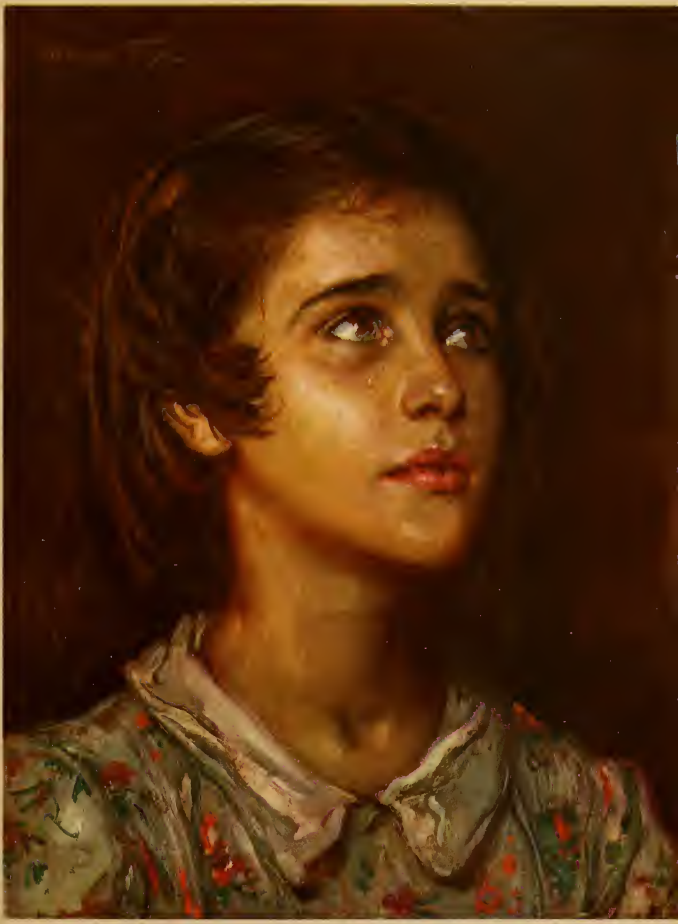
Mission Museum ("Museu das Missões") — Situated in São Miguel, in the State of Rio Grande do Sul, its purpose is to bring together and preserve works of art and objects of historical interest relating to the seven peoples of the Eastern Missions, founded by the Jesuits.

Imperial Museum ("Museu Imperial") — This museum was founded in Petrópolis in 1940, with the end in view of "collecting, arranging and exhibiting objects dating from the reigns of Pedro I and Pedro II".

Gold Museum ("Museu do Ouro") — Housed in the former "Casa da Independência do Ouro" in Sabará (Minas Gerais), this museum is charged with seeking, collecting, preserving and exhibiting objects of artistic and historic value connecting with the mining industry in the country.

Vitor Meirelles Museum ("Museu Vitor Meirelles") — Installed in Florianópolis, in the State of Santa Catarina, in the very house where the painter Vitor Meirelles was born.

National Museum ("Museu Nacional") — Founded in 1816 by Dom John VI and situated in the former imperial park of the Quinta da Boa Vista not far from the centre of Rio de Janeiro, this museum is considered one of the most important centres of research in South America. Apart from laboratory work, zoological and botanical systematization and cataloguing, and the preparation and preserva-



"UNDISERVED PUNISHMENT"

Work of the Painter Oswaldo Teixeira.

tion of collections, the naturalists attached to the museum set out regularly on scientific expeditions to every corner of the country.

National Museum of Fine Arts ("Museu Nacional de Belas Artes") — In 1815, the Marquess of Marialva, Portuguese **chargé d'affaires** in France, was entrusted by Dom John VI with the organization of an artistic Mission to Brazil.

This Mission, headed by Lebreton, was made up of artists of renown such as Taunay, Debret, Grandjean de Montigny and Pradier, who brought with them a collection of 54 canvasses by well-known painters, some of which may still be seen in the fine arts museum of today. The first Salon was held in 1840, marking the inception of a new phase in the artistic development of Brazil. The present organization of the Museu Nacional de Belas Artes, situated in the downtown district of the federal capital, with spacious halls for both permanent and temporary exhibitions, dates from 1937.

The Salon, entitled the **Salão Nacional de Belas Artes,** is held annually in the fine arts museum. The Jury awards two gold and six silver medals, in addition to two scholarships, one for home and the other for foreign travel.

Protection of Historic and Artistic Treasures — A department of the Ministry of Education and Public Health, known as the "Patrimônio Histórico e Artístico Nacional" is charged with the preservation and safeguard of Brazil's artistic and historical heritage and to this end keeps an inventory of the principal riches of this nature distributed thoughout the country (historic buildings and those of typical colonial architecture, fortresses, churches, fountains, artistic, archeological and ethnographical collections, manuscripts, etc.).

The museums of Brazil come within the scope of this department which assists them in every possible way and is responsible for the planning and realization of the museums of Missões, Inconfidência and Ouro, discussed above.

Geographical and Statistical Institute ("Instituto Brasileiro de Geografia e Estatística") — Great progress has been made in the province of statistics. A system is being actively developed which consists in a standardizing and executive organ at the head, with powers of supervision and coordination, spreading out to 1,669 municipal agencies, in touch with every aspect of the local situation. Two other systems are associated therewith, one, permanent, dealing with geographical documentation, and the other, intermittent, with census enumeration.

The former is proceeding systematically with filling in the details of the Map of the Country with increasing accuracy. Work on the periodical census comprises ten-year plans of preparation, collection and compilation of data in the fields of population, agriculture, industry, commerce, transportation and communication.

The Press — The Brazilian Press has always held a leading position in the cultural progress of the country.

The Information Department ("Departamento de Informações") centralizes registration and authorizes the circulation of periodicals.

Two of the oldest newspapers in South America are published in Brazil: the "Diário de Pernambuco" and the "Jornal do Comércio" of Rio de Janeiro.

"Estância" at the health resort of Campos de Jordão — altitude: 6,000 feet

TOURING

A perusal of the various chapters of this book cannot fail to lead to the conclusion that the possibilities of touring in Brazil are immense.

The topography of the country, with its inexhaustible natural resources, the incomparable beauty of its beaches and the enchantment of mountains and forests, can but stir the natural curiosity of whoever feels the urge to explore one of the most opulent regions in the world. Furthermore, the comfort of the watering-places and the varied nature of the excursions that can be made to historic cities and active centres of production, are well calculated to maintain the flow of tourist traffic to Brazil all the year round.

The Brazilian Government, thoroughly awake to the advantages of the tourist trade, has adopted a new guiding policy, for not only does it facilitate the foreigner's entry into the country, but it also provides him with the maximum of comfort, making it feasible to build luxurious up-to-date hotels and controlling the price of everything that is related to the well-being of the visitor.

WATERING-PLACES

Geological conditions peculiar to Brazil have determined a fairly widespread occurrence of mineral springs, particularly in the eastern and southern regions, and the network of spas gives the country a privileged position as regards continental travel, in view of the variety and healthgiving properties of the waters.

The province of Brazilian mineral waters has begun to be explored rationally in the last ten years and much scientific research work

Hotel Quitandinha at Petrópolis, near Rio de Janeiro — altitude 2,600 feet

has been carried out to determine the therapeutic value of the various types.

Care has been taken to develop the mineral springs in accordance with sound modern principles, so as to take full advantage of their healing and revivifying properties.

PRINCIPAL SPAS IN BRAZIL

Caldas de Cipó — Situated in the valley of the Itapicuru river, in the State of Bahia, these springs are renowned for their high rate of flow, temperature (102° F.) and degree of mineralization (chlorides and bicarbonates of calcium, sodium and magnesium). A beautiful thermal resort has been built up around them within easy access of the State Capital, Salvador, better known to foreigners as Bahia. Every year, the comfortable hotels cater to more than four thousand guests, who come in search of rest or a cure for disorders of the digestive apparatus, liver, skin diseases, etc.

Caxambú, Cambuquira, Lambarí and São Lourenço — This group of sparkling carbonated waters are found in the south of the State of Minas Gerais and have brought prosperity to the picturesque towns, whose mountain climate and attractive scenery are the delight of tourists. The long experience of Brazilian clinics goes to show that these waters produce excellent therapeutic effects, principally in cases of liver, kidney and digestive complaints. Owing to the convenient means of travel from Rio and São Paulo by rail, road and air, these spas are visited annually by more than 70,000 people.

Poços de Caldas — This is one of the most important watering-places in the country. The baths are complete in every detail and possess the necessary equipment for every kind of treatment, and the hotels and casinos are the most up-to-date in South America. The hot springs (109.4° F.) are sulphurous, alkaline, bicarbonated and radioactive and have a really beneficial effect on patients suffering from rheumatism and skin diseases. The city is built on a plateau 4,000 feet above sea level and enjoys a cold, dry climate. With a

Araxá, a luxurious spa in the State of Minas Gerais

capacity of 1,100 baths a day, the spa is visited by 25,000 tourists a year.

Araxá — This is another important group of springs in the State of Minas Gerais, for clinical experience and research have demonstrated the amazing dynamic effect of these waters on the metabolism of the glycosides in the treatment of diabetes. Constructive town-planning and the building of a luxurious hatel have produced one of the most perfect watering-places that can be imagined.

Águas de Prata — Situated on the slopes leading up to the plateau of Poços de Caldas, at an altitude of 2,600 feet, this comfortable, though not luxurious, resort has alkaline springs with an average content of 4 grammes of sodium bicarbonate per litre.

Águas de São Pedro — These springs of great medicinal value are situated near the city of Piracicaba, in the State of São Paulo, and were discovered by chance in the course of drilling for oil in the region. One of them is sulphurous, the second contains sodium chloride and sulphate, and the third sodium chloride and bicarbonate. There are magnificent baths and a hotel-casino, surrounded by playing-fields, swimming-pools, etc., making the watering-place one of the most important in the country.

Termas de Lindóia — Situated in the State of São Paulo, the waters were recommended for their high degree of radioactivity by Mhe. Curie when she visited the spa.

The Brazilian Government is giving careful attention to a well-designed plan for endowing watering-places and climatic resorts with modern hospitals, intended not only to fill the needs of the local population but also and especially to respond to the demands of those who come to these regions every year in search of a cure for their various ailments.

MOUNTAINS AND FORESTS

The Brazilian Government has had the foresight to create various National Parks so as to safeguard the natural beauty of some of some of the most interesting regions in the country, and this initiative has helped in no small measure to swell the flow of tourists.

On the banks of the Iguaçú flowing between Brazil and Argentina where the famous cataracts leap majestically into space, the Iguaçú National Park spreads its enchanting scenery for the benefit of the tourist. Commodious buildings are being erected, with a flying field and a beautiful motor road linking the city to the twenty waterfalls.

Iguaçú may be reached comfortably by air, or by railway as far as the banks of the Paraná, whence the traveller proceeds by river steamer, affording him the opportunity of admiring the falls of Guayra, also known as the "Sete Quedas", where the broad waters of the mighty river tumble over a series of ledges, dotted with wooded islands, to roar through a narrow chasm a bare fraction of the original width. These are considered to be the greatest falls in the country.

The Park of Itatiaia is situated in the Mantiqueira Range at the meeting-point of the States of Rio de Janeiro, Minas Gerais and São Paulo. Luxurious vegetation and a pleasant climate are features of the lower slopes of the mountain, while grandiose, rocky scenery is the reward of the tourist who climbs to the summit of the Black Needles ("Agulhas Negras").

There are several small hotels in the neighbourhood, where guests can enjoy good food and comfortable lodging, with equipment at their disposal for excursions in the region.

The Organ Range Park ("Parque da Serra dos Orgãos"), near the city of Teresópolis and not far from Rio de Janeiro, is another touristic attraction, with easy walks through picturesque scenery and even the zest of mountaineering for those so inclined. Rest-houses have been built in the most enchanting spots, and the excursion to the rocky pinnacle called the Finger of God ("Dedo de Deus") is one that should not be missed.

Forests and mountains are by no means inaccessible in Brazil and even thrust their way down into the cities, providing many an opportunity for the tourist to bury himself in the depths of Nature almost within a stone's throw of the bustling metropolis. Thus, many are the excursions that will tempt him in the wooded hills that surround Rio de Janeiro, in particular Corcovado where the statue of Christ blesses the city with outstretched arms, Tijuca with its pools reflecting the creepered trees, the Sugar Loaf dominating the bay, Gavea and its beach, and, farther afield, the mountain resorts of Friburgo, Teresópolis and Petrópolis, smartest of them all.

CITIES

Rio de Janeiro is the foremost touristic centre in Brazil. Seldom throughout the world has Nature been so lavish as when she endowed the capital city of Brazil with a bay, islets, beaches and mountains of such surpassing beauty.

Copacabana, Ipanema, Leblon and Gávea spread their silver sands; headed by Paquetá, whose charms have so often been chanted by the romantic poets, the islands of the bay are too numerous to name; for the sybarite, there are comfortable theatres, cinemas and night clubs, where even the tropical climate is banished by air conditioning; and for the more enquiring tourist there are the monuments of the town, the old churches, the museums, and the gay kaleidoscope of the crowds that throng the busy streets.

When the visitor has exhausted the sights of Rio de Janeiro, an hour's flight will bring him to the greatest industrial centre of South America, the city of São Paulo, which has risen from one of the richest regions of Brazil, producing coffee and cotton on a large scale. Many travellers enjoy a trip to a coffee plantation, where they can get some idea not only of local agricultural conditions but also of traditional country hospitality.

São Paulo is linked up to Curitiba, the beautiful capital of the State of Paraná, by a well-engineered highway that crosses the Serra do Paranapiacaba, where the scenery rewards the motorist at every turn of the road.

It is not to be thought that Brazil has no architectural past. Some of the cities in the old mining districts of Minas Gerais are well worth a visit, not only for their historical interest but also for the reposing old-world atmosphere and the intrinsic beauty of the grey buildings with their russet tiles, that follow the straggling cobbled streets as they wind up and down hill. Ouro Preto, a town classified as a national monument, is famed for its many churches which display the work of that genius of the XVIIIth century, Antonio Francisco Lisbôa, nicknamed "Aleijadinho", the Little Cripple, whose sculptures in wood and soapstone are indeed remarkable, when it is considered that many of them were executed when he was almost completely paralysed. The sixty-six statues of the Via Crucis at Congonhas do Campo are perhaps his most original work, revealing a sublime naiveté and vivid appeal that have withstood the test of time. There is a fine modern hotel at Ouro Preto which can be made the centre of many interesting excursions.

Bahia (Salvador) on the sea coast, capital of the State of that name and long the capital of Brazil, has also been called the "town of churches" and the charm of the tortuous streets is enhanced at every turn by a glimpse of the blue-green waters of the Atlantic. Pernambuco (Recife), the Venice of the north, still retains characteristics of Dutch architecture in the steep roofs of the buildings that date from the time of the short-lived invasion and the wise rule of the Count of Nassau-Siegen. Altogether, the student of antiquities should never find time hang heavy on his hands.

SPORT AND RECREATION

Rowing, football, golf, basket-ball, swimming, tennis, horseriding, and many other sports are practised by the members of associations and other institutions, which arrange matches, tournaments and competitions, some of international standing.

In several capitals, horse-racing is a popular sport, and the Rio de Janeiro Sweepstake arouses great enthusiasm; the last time it was run, in 1948, a Brazilian horse was the winner, carrying off the prize of 5 million cruzeiros.

Yachting also has its adepts in Brazil, and ardent competitors joined in the 1947 race from Buenos Aires to Rio de Janeiro.

TYPICAL FESTIVALS

Various traditional popular festivals are celebrated in certain cities of Brazil with a wealth of picturesque pomp and ceremony.

Carnival is the most animated of them all, particularly in Rio de Janeiro and Recife, where it acquires certain characteristic features.

Saint John is also fêted in all the towns with fireworks and gaily coloured fire balloons; the curling flames of a bonfire generally enliven the scene and special dishes are cooked for the occasion.

WHERE TO OBTAIN

INFORMATION ABÓUT BRAZIL

ARGENTINA

Buenos Aires — Brazilian Embassy (Embajada del Brasil) — Calle Arroyo, 1,142.

Brazilian Consulate General (Consulado General del Brasil) — Calle San Martin, 195, 4.º Piso.

Commercial Office (Escritorio Comercial) — Calle Corrientes, 330, 2.º Piso.

Bahia Blanca — Brazilian Consulate (Consulado del Brasil) — Calle Alsina, 272.

Rosario — Brazilian Consulate (Consulado del Brasil) — Calle Cordoba, 1,452, 7.º Piso, Salas 11 & 12.

AUSTRALIA

Camberra — Brazilian Legation — 9, Flinder Way.

AUSTRIA

Vienna — Brazilian Legation (Brasilianische Gesandtschaft) — Grimmelshausengasse, 12, Modena Park, Wien III.

BELGIUM

Brussels — Brazilian Embassy (Ambassade du Brésil) — 108, Avenue Louise.

Antwerp — Brazilian Consulate General (Consulat Général du Brésil) 34, Chaussée de Malines.

BOLIVIA

La Paz — Brazilian Embassy (Embajada del Brasil) — Avenida Arce, 802.

CANADA

Ottawa — Brazilian Embassy — 400, Wilbrod Street.

Montreal — Brazilian Consulate General — Drummond Building, 1,117, St. Catherine Street West.

Toronto — Brazilian Consulate — 80-C, Eglinton Street East.

CHILE

Santiago — Brazilian Embassy (Embajada del Brasil) — Alameda Bernardo O'Higgins, 1,652.

Commercial Agency (Agência Comercial) — Alameda Bernardo O'Higgnis, 1,652 — P. O. Box (Casilla de Correo) 1,444.

Valparaiso — Brazilian Consulate General (Consulado General del Brasil) — Calle Edwards, 608, 3.º Piso — P. O. Box (Casilla de Correo) 1,252.

CHINA

Nanking — Brazilian Embassy — Tien-Tsu-Lu, 15.

Shanghai — Brazilian Consulate — Great Western Road, 423.

COLOMBIA

Bogotá — Brazilian Embassy (Embajada del Brasil) — Carrera 3.ª, n.º 77-00.

COSTA RICA

San José — Brazilian Legation (Legación del Brasil) — Paseo Colón.

CUBA

Havana — Brazilian Embassy (Embajada del Brasil) — 5.ª Avenida, 181.

CZECHOSLOVAKIA

Prague — Brazilian Legation — Sokolska, 54.

DENMARK

Copenhagen — Brazilian Legation (Brazilianske Gesandtkab) — Ryvangens Allé, 24.

DOMINICAN REPUBLIC

Ciudad Trujillo — Brazilian Embassy (Embajada del Brasil) — Avenida Cesar Nicolas Penson, 97.

EGYPT

Cairo — Brazilian Legation — 14, Sharia El Guezirah, Zamalek.

EQUADOR

Quito — Brazilian Embassy (Embajada del Brasil) — Avenida 12 de Octubre, 1,951.

FINLAND

Helsinki — Brazilian Legation (Brazilianska Legationen) — Brunnspashen, n.º 13-B.

FRANCE & FRENCH POSSESSIONS

Paris — Brazilian Embassy (Ambassade du Brésil) — 45, Avenue Montaigne, 8e.

U.N.E.S.C.O. — 19, Avenue Kléber, 16e.

Brazilian Consulate General (Consulat Général du Brésil) — 122, Avenue des Champs-Elysées, 8e.

Commercial Office (Office Commercial) — 28, rue de la Boétie, 8e.

Bordeaux — Brazilian Consulate (Consulat du Brésil) — 27bis., Allées de Chartres.

Lyons — Brazilian Consulate — (Consulat du Brésil) — 35, Place Bellecour.

Marseilles — Brazilian Consulate (Consulat du Brésil) — 2, rue Edmond Rostand.

Algiers — Brazilian Consulate (Consulat du Brésil) — Villa El Dyeno Elsiar, 42, rue Luciani.

Dakar (French East Africa) — Brazilian Consulate (Consulat du Brésil) — 4, rue Malenfant.

Cayenne (French Guiana) — Brazilian Consulate.

GERMANY

Berlin — Brazilian Military Mission to the Control Council — Hugo Vogel Strasse, 12, Wannsee.

GREAT BRITAIN & BRITISH POSSESSIONS

London — Brazilian Embassy — 54, Mount Street, W.1.

Brazilian Consulate General — Aldwych House, Aldwych, W.C.2.

Commercial Office — Mount Street, 54, W.1.

Cardiff — Brazilian Consulate — 59, Queen Street.

Glasgow — Brazilian Consulate — 124, Saint Vincent Street, C.2.

Liverpool — Brazilian Consulate General — 9, Croxteth Road, Liverpool 8.

Southampton — Brazilian Consulate — 21, Prudentiol Building obove Bor.

Port-of-Spain (Trinidad) — Brazilian Consulate — 1, Raprey Street.

GREECE

Athens — Brazilian Legation — R. Righilis, 15.

GUATEMALA

Guotemo'o — Brazilian Legation — 7.ª Avenida Sur, prolongación entre 6.ª e 7.ª Calles de Tivoli.

HOLLAND & DUTCH POSSESSIONS

The Hogue — Brazilian Legotion (Braziliaansche Gesantschop) — Lange Voorhout, 58 A.

Amsterdom — Brazilian Consulate General (Consulaat General van Brazilie) — Keizersgracht, 632.

INDIA

Delhi — Brazilian Embassy — Hotel Imperial, New Delhi.

Colcutto — Brazilian Consulote — Great Eastern Hotel.

IRAN

Teheron — Brazilian Legation — Porc Amined Dowlch (Khiobané Baharestan).

IRELAND (Eire)

Dublin — Brazilian Consulate — 11, Upper O'Connell Street.

ITALY

Rome — Brazilian Embassy (Ambosciata del Brasile) — Palazzo Doria Pamphili, 14, Piazza Navona.

Brazilian Consulate (Consolato del Brasile) — Via Solaria, 83.

Genoo — Brazilian Consulate General (Consolato Generale del Brasile) — Via Gabriele D'Annunzio, 2.

Leghorn — Brazilian Consulate (Consolato del Brasile) — Via Della Scalo, 11.

Milan — Brazilian Consulate (Consolato del Brasil) — Corso Matteotti, 9, 4.º piano.

Naples — Brazilian Consulate (Consolato del Brasile) — Vio Francesco Crespi, 31.

LEBANON

Beirut — Brazilian Legation (Legation du Brésil) — rue Abdel Kader, 61.

MEXICO

Mexico City — Brazilian Embassy (Embajada del Brasil) — Poseo de la Reforma, 241.

Commercial Agency (Agência Comercial) — Avenido Juarez, 56-205.

NORWAY

Oslo — Brozilian Legation (Brasilianske Legasjon) — Eckersbersgate, 47.

PANAMA

Panomo — Brazilian Legation (Legación del Brasil) — Avenida Federico Boyd, 40.

PARAGUAY

Asunción — Brazilian Embassy (Embajada del Brasil) — Avenida Mariscal Lopez, 875.

Brazilian Consulate (Consulado del Brasil) — Calle Palma, 384.

Commercial Agency (Agência Comercial) — Avenida Mariscal Lopez, 875 — P. O. Box (Casilla de Correo), 474.

PERU

Lima — Brazilian Embassy (Embajada del Brasil) — Avenida Comandante Espinar, 181, Miraflores.

POLAND

Warsaw — Brazilian Legation — Hotel Bristol.

PORTUGAL & PORTUGUESE POSSESSIONS

Lisbon — Brazilian Embassy (Embaixada do Brasil) — Rua António Maria Cardoso, 8.

Brazilian Consulate General (Consulado Geral do Brasil) — Praça Luiz de Camões, 22, 1.º Esq.

Commercial Agency (Agência Comercial) — Rua António Maria Cardoso, 8.

Funchal (Madeira) — Brazilian Consulate (Consulado do Brasil) — Avenida Zarco.

Oporto — Brazilian Consulate General (Consulado Geral do Brasil) — Avenida dos Aliados, 41, 2.º andar.

SPAIN

Madrid — Brazilian Embassy (Embajada del Brasil) — Fernando del Santo, 6.

Commercial Office (Escritorio Comercial) — Fernando del Santo, 6.

Barcelona — Brazilian Consulate General (Consulado General der Brasil) — Rambla de Cataluña, 88.

Cadiz — Brazilian Consulate (Consulado del Brasil) — Calle Eduardo Dato, 3, 4.º Piso.

Los Palmos (Canary Islands) — Brazilian Consulate (Consulado del Brasil) — Calle Eduardo Benot, 17, Puerto de la Luz, Grand Canary.

Vigo — Brazilian Consulate (Consulado del Brasil) — Calle de Castelar, 2, 1.º izq.A — P. O. Box (Apartado de Correo) n.º 284.

SWEDEN

Stockholm — Brazilian Legation (Brazilianska Legationen) — Sturogatan, 12.

Gothenburg — Brazilian Consulate (Brasilianska Konsulaten) — Gotabergsgatan, 1.

SWITZERLAND

Bern — Brazilian Legation (Brasilianische Gesandschaft) — Luisenstrasse, 46.

Geneva — Brazilian Consulate General (Consulat Général du Brésil) — 35, quai Wilson.

International Labour Organization and International Refugee Organization — 35, quai Wilson.

Zurich — Brazilian Consulate General (Brasilianisches General Konsulat) — Sihlstrasse, 43.

Tangiers — Brazilian Consulate (Consulat du Brésil) — 2, rue Sorolla.

TURKEY

Ankara — Brazilian Embassy — Karasapan apt. (building), özdemir caddesi, 104, Kavaklıdere.

Stambul — Brazilian Consulate — Saran apt. (building), Yeni Çarsı caddesi, 20, Beyoglu.

UNION OF SOUTH AFRICA

Pretoria — Brazilian Legation — 8, Murray Street, Brooklyn.

Copetown — Brazilian Consulate General — Balfour House, 13, St. George's Street.

UNITED STATES OF AMERICA

Washington, D.C. — Brazilian Embassy — 3,007, Whitehaven Street, N.W.

Organization of American States — Wardman Park Hotel, Suite 711-A.

Boston, Mass. — Brazilian Consulate — 294, Washington Street.

Chicago, Ill. — Brazilian Consulate — Palmolive Building, Suite 509, 915, North Michigan Avenue.

Houston, Tex. — Brazilian Consulate — 1,431, Commerce Building.

Los Angeles, Calif. — Brazilian Consulate — 6,606, Sunset Boulevard, Los Angeles, 28.

Miami, Fla. — Brazilian Consulate — 600, Biscayne Boulevard, 9th floor, Miami, 36.

Norfolk, Va. — Brazilian Consulate — 427, Wainwright Building, Norfolk, 10.

New Orleans, La. — Brazilian Consulate General — 316, Pan-American Building, 610, Poydras Street.

New York, N.Y. — Brazilian Consulate General — 10, Rockefeller Plaza, New York, 20.

Brazilion Delegation to the United Notions — Empire Stote Building, Roam 6,005, New Yark City.

Brazilion Treosury Delegotion — R.C.A. Building, 30, Rockefeller Plozo, New Yark, 20.

Commercial Office — 551, Fifth Avenue.

Philadelphia, Po. — Brozilian Consulate — 738, Widener Building, Chestnut ot Juniper Street, Philadelphia, 7.

San Francisco, Colif. — Brozilian Consulote General — 625, Market Street, 14th floor, Son Froncisco, 5.

URUGUAY

Montevideo — Brazilian Embassy (Embojodo del Brosil) — Calle 20 de Setiembre, 1,415.

Brozilion Consulote General (Consulodo Generol del Brosil) — Colle 18 de Julio, 994, 5.º Piso.

Emergency Consultative Commissian far the Defense af the Continent — Avenida Agraciada, 1,442bis, 1.º Piso.

Commercial Agency (Agência Comercial) — Calle 20 de Setiembre, 1,945 — P.O. Box (Casilla de Correo) 330.

VATICAN

Vatican City — Brazilian Embossy (Amboscíato del Brosile) — Vio Sicilia, 136, Rame.

VENEZUELA

Caracas — Brazilian Embassy (Embajado del Brasil) — Country Club, Vilo Mercedes, Calle Altamiro.

YUGOSLAVIA

Belgrade — Brazilian Legation — Ivana Milutinavice ul. 11.

INDEX

NOTE: This index does not include:

1. The towns, nationalities, trades and occupations listed in the census tables, pages 40-53.
2. All the vegetable oils described on pages 82-84.
3. Cellulose- and tannin-yielding plants, pages 95, 96 and 100.
4. All the drugs on page 102 and useful plants, pages 103-109.
5. Units of weight and measure, pages 112-125.
6. Items from the production tables: agricultural, 128-131; animal products, 173; industrial, 160-161; mineral, 73; and vegetable extractive, 81; and those from the import and export tables under Foreign trade, pages 189-196.
7. Iron and steel products mentioned in the corresponding section, pages 164-167, including by-products from the coke plant, such as tar and ammonium sulphate.
8. Addresses of Brazilian Chancelleries, where further information may be obtained, pages 225-228.

Since alphabetical order has been observed wherever possible, no difficulty should be experienced in finding any particular item not figuring in the index.

Printed by
GRÁFICA VITÓRIA S.A.
Rua do Relogio, 31
Rio de Janeiro
Brazil

Translated by
JOHN KNOX,
Professor of English
Rio Branco Institute and Rural University.
Rio de Janeiro.