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FOREIGN OFFICIAL AND PRIVATE MAP PUBLISHERS—BRAZIL

M-13

Published November 1950

DOCUMENT NO. 1
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NEXT REVIEW DATE:
AUTH: HR 70-2
DATE 8-28-79 REVIEWER: 372044

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Approved For Release 2000/04/17 : CIA-RDP79-00976A000200010001-6

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I. INTRODUCTION

A. The Status of Cartography in Brazil.

The establishment of the Conselho Nacional de Geografia (CNG) in 1937 marked the beginning of the era of systematic mapping in Brazil. For the first time, the coordination of all mapping and geographic activities became the continuing responsibility of a single agency. Since 1937, great cartographic progress has been made in Brazil, but the task of mapping the entire country is still far from complete.

The problems of mapping Brazil are particularly complex because of the large extent of its territory and the retarded development of large parts of the interior of the country. Although the easternmost point of Brazil was the first part of South America to be discovered and has been shown on maps since the early 1500's, only the narrow coastal zone and a still narrower strip of the adjacent highlands are today exploited and settled to any great extent. Except for a few scattered areas, the vast interior is little known, sparsely populated, and undeveloped.

Practically all of the State governments as well as the federal government and a number of private cartographers make some kind of maps, charts, or plans.[1] There has never been, however, a complete compilation

1. An alphabetical list of Brazilian map publishing agencies mentioned in the text is given with English translations in the glossary at the end of the paper.

Note: This report has not been coordinated with the intelligence organizations of the Departments of State, Army, Navy, and the Air Force.

of all known cartographic source materials into a single map of the country comparable to the Codazzi maps of Colombia and Venezuela or the DeMoussy and Instituto Geográfico Argentino maps of Argentina. Maps made by federal and state agencies have usually covered only small areas within the boundaries of a single state, or relatively small regions including several of the smaller states. The few federal organizations that have mapped areas that overlapped state boundaries have done so principally as a part of the preliminary studies that preceded the construction of public works. Coverage by such maps is both scant and scattered. The work of private firms and individuals has been equally fragmentary. All of the maps produced by private and official organizations combined do not provide complete, reliable map coverage of Brazil. In 1922, the Clube de Engenharia produced, as a private effort, a 1:1,000,000 map in 44 sheets, but it was compiled too hurriedly to give more than a generalized idea of major topographic features of the country and cannot be considered as reliable. No map at a comparable scale has been made by any other Brazilian mapping agency. Aerial photographs, topographic and other reliable surveys, and compiled maps are now being used by the Conselho Nacional de Geografia in the compilation of a set at 1:500,000 for the eastern highland and coastal area and at 1:1,000,000 for the interior of Brazil.

In 1938, a year after the establishment of the Conselho Nacional de Geografia, each of the 1,574 Municipios (counties) of Brazil was ordered

to prepare within one year a map (1:25,000 to 1:1,000,000) of its area, indicating the locations and names of all prominent physical and cultural features. During the next five years, 1939 through 1943, no changes were to be made in boundaries or place names. After receiving the maps, the CNG was to study them, adjust the boundary lines, and prepare a new set of place names in which there would be no duplication. The revised boundaries, including those of a few newly created municipios, and the new set of place names were to remain unchanged for another five-year period from 1944 through 1948, except in the few cases where new territories might be created by executive order. The spelling of all place names was changed to agree with the new Brazilian orthography, a simplication of the Portuguese which became official on 23 February 1938.

The municipio maps, now numbering over 1,700, were compiled for the most part without good geodetic control. For the first time, however, the entire extent of Brazil was mapped at a fairly large scale. In addition, an immense amount of geographic detail became available for study, classification, and use in future compilations.

Wartime trimetrogon aerial photography by U S Army Air Forces (USAAF) reconnaissance squadrons covers approximately 45 percent of Brazil -- chiefly in the north and northeast, east of a line drawn from Rio de Janeiro to Manaus. About 15 percent of the country is covered by vertical photography flown by various private and official Brazilian organizations. These photographs provide another valuable source of

information, but full use of them cannot be made until a sufficient number of control points are established. The Inter-American Geodetic Survey is currently working with the Brazilian Government to improve coverage and control for Brazil.

B. Triangulation.

At present, there are only about 6,000 observed points in Brazil, many of which are of doubtful accuracy. Triangulation networks are also poorly developed. The Brazilian Navy has been making observations along the coast and the lower Amazon since the early 1820's. Early surveys of the coast were made by the British and French and, in recent years, the U S Navy and U S Coast and Geodetic Survey have cooperated with the Brazilian Navy. The Departamento Nacional de Pôrtos, Rios e Canais (DNPRC), in cooperation with the local port authorities and the Navy, has made second- and third-order triangulations and observations in and about most of the ports and harbors of Brazil. The Serviço Geográfico do Exército and its predecessors in the Ministério da Guerra have been taking observations and triangulating in Rio Grande do Sul since 1913, and in northeastern Brazil since the late 1930's.

Since its establishment in 1937, the CNG is reported to have triangulated a larger area than did the mapping agencies of the Ministério da Guerra in the past 45 years. In July 1949, the CNG completed a long first-order triangulation chain along the 49th meridian from Torres in Rio Grande do Sul to Goiânia in Goiás. The CNG is now working east along

the 20th parallel. The Serviços Aéreos, Cruzeiro do Sul (CdoS), a private agency under government contract, has made a good second-order triangulation of a 1,500-kilometer stretch of the São Francisco River and is to triangulate the entire basin, about one-tenth of the area of Brazil. In the States of Paraná and Santa Catarina, observations and triangulations have been made by Dr. Reinhard Maack.

State and national road departments have made low-order surveys, traverses, and leveling in connection with studies for road construction. State geographical organizations in Espírito Santo, Bahia, Minas Gerais, São Paulo, Santa Catarina, and Rio Grande do Sul have made low-order triangulation and leveling surveys and many observations of geographical positions. As yet, no organization has made more than a half hearted attempt to collect, evaluate and make use of all available materials of this nature.

C. Topographic Maps.

Although topographic mapping has been in progress since 1903, only about 15 percent of the total area of Brazil has been mapped at scales of 1:100,000 or larger. Most of the topographic maps at scales ranging from 1:5,000 to 1:100,000 have been produced by one federal agency, two state agencies, one private company, and one private surveyor.

The Serviço Geográfico do Exército (SGE) was created in 1932 by the amalgamation of two mapping organizations then under the Ministério da Guerra -- the Comissão da Carta Geral do Brazil (CCGdoB) and the Serviço

Geográfico Militar (SGM). The former was established in 1903. The latter was created in 1917 from the Secção de Estereofotogrametria of the Estado Maior do Exército (SE), which had been established in 1914. Whereas the CCGdoB published topographic charts made from field surveys, the SGM worked principally on photogrammetric maps. Both functions have been continued within the SGE, but the topographic maps at 1:50,000 and 1:100,000 that have been made to date are limited to the Federal District and parts of the State of Rio Grande do Sul. Planimetric maps at 1:25,000 cover only parts of the states of Pernambuco, Paraíba, Rio Grande do Norte, and Ceará. All mapping is based on good quality geodetic surveys.

The Instituto Geográfico è Geológico de São Paulo (IGGSP) was established in 1896 as the Comissão Geográfica e Geológica de São Paulo and, although it has been reorganized eight times under different names and with slightly different functions, it has been active in the field of mapping in the State of São Paulo since 1900. At present, over one-half of the state is covered by good topographic maps at 1:100,000 based on field surveys.

The Departamento Geográfico de Minas Gerais (DG-MG), organized as the Comissão Geológica de Minas Gerais in 1891, has completed 50 sheets at 1:100,000 covering the southern third of the state of Minas Gerais. All sheets published to date are based on topographic field surveys, but future sheets will be completely photogrammetric.

The Departamento de Aerofotogrametria of the Serviços Aéreos Cruzeiro do Sul (CdoS) was established in 1935 as a section of the German-owned "Condor" air lines but today it is an independent Brazilian organization. It is outstanding as the most prolific producer of excellent quality large-scale topographic maps in Brazil and, with the possible exception of the Servicio Aerofotogramétrico Nacional of Perú, is the best equipped and organized service of its kind in Latin America. Large-scale aerial photogrammetric maps based on high-precision second-order triangulation are made on contract for government and private organizations. Most of this mapping is limited to small scattered areas extending from the State of Rio Grande do Sul to Ceará, but maps have also been made of the São Francisco River for the Departamento Nacional de Pôrtos, Rios e Canais (DNPRC).

Reinhard Maack, now chief geologist and topographer of the Instituto de Biologia e Pesquizas Tecnológicas (IBPT) of the State of Paraná, has been active in cartographic work for over twenty years and, as a private individual, has published topographic maps of parts of the State of Paraná at scales ranging from 1:25,000 to 1:100,000, based on his own triangulations.

D. General Maps.

One official and several private organizations produce general small-scale maps of Brazil. These maps tend to be over-generalized and vary

greatly in quality. Most of them have been compiled from a number of incomplete official and unofficial sources.

The general maps of Brazil prepared by the Conselho Nacional de Geografia (CNG) are the best and most nearly accurate, but only a few have been published. The CNG, as the official coordinator of geography and cartography for Brazil, has access to many types of information not generally available to other compilers. The best general map produced to date is the CNG Mapa do Brazil at 1:5,750,000, published in 1945. The map has hypsometric tints that appear to have been taken, with only slight revision, from the 1:5,000,000 Map of the Americas published by the American Geographical Society of New York. All of the numerous place names included are given in the new official spelling, internal and international boundary lines have been corrected, and road and railroad information has been brought up to date. A new edition of the CNG map is being prepared at 1:5,000,000 for publication in 1950.

The Instituto Cartográfico Castiglione (ICC), successor to José Castiglione, who was the leading private cartographer of Brazil for over twenty years, has produced wall maps of the country at 1:4,000,000 and 1:7,000,000 that include considerable detail and have a fairly high degree of accuracy. Two other private publishing firms, the Companhia Melhoramentos de São Paulo (Melhoramentos) and the Livraria do Globo (O Globo) of Pôrto Alegre, have also compiled and published maps of Brazil as wall maps in smaller-scale editions. These maps are too

generalized and sketchy for any use other than in schools.

E. Part Maps.

General maps of parts of Brazil, either single states or groups of states, are more common and usually are of better quality than maps of the entire country. Few federal agencies have made maps of this type, but the geographic organizations that have been established in many of the state governments publish general and special subject maps of their states. Each of these organizations now serves two functions -- (1) as the principal geographic and geologic mapping agency of the state and (2) as a branch of the Conselho Nacional de Geografia. Private cartographers and compilers also have produced state and regional maps of good quality, for which much of the information was taken from official sources.

Since 1908, the Inspectoria Federal de Obras Contra as Sécas (IFOCS) has been active in mapping the periodically drought-stricken area of northeastern Brazil. This area of 258,620 square miles, almost as large as Texas, includes all or parts of the states of Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe and Bahia. Rapid reconnaissance surveys have been made of the whole area for maps at 1:400,000 to 1:5,000,000. The maps, while lacking adequate geodetic control, are fairly detailed, and are the best Brazilian maps available for the area.

The Instituto Geográfico e Geológico de São Paulo (IGGSP) in 1947 and the Departamento Geográfico of Minas Gerais (DG-MG) in 1944 have produced creditable general maps of their states at 1:1,000,000. Both agencies compile small-scale general maps only incidentally, the principal interest of both being topographic maps. The Departamento de Geografia, Terras e Colonização (DGTC) of the State of Paraná and the Departamento Estadual de Geografia e Cartografia of the State of Santa Catarina (DEGC) have issued maps of the two states at the scales of 1:500,000 and 1:800,000, respectively. Both maps were published in 1948 just before the 1949-53 changes in municipios were announced and consequently, a few internal boundaries and place names are erroneous.

Both the Instituto Cartográfico Castiglione (ICC) and the Companhia Melhoramentos de São Paulo (Melhoramentos) have published maps of states and parts of Brazil, compiled from official sources. The ICC, in 1944, issued a topographic map of the State of São Paulo at 1:500,000 and general maps of Goiás at 1:1,000,000, Mato Grosso at 1:2,000,000, Northern Brazil at 1:2,000,000, and Northern Brazil and Southern Brazil at 1:1,000,000. In 1949, a new gradient-tinted map of the State of São Paulo was issued at 1:1,000,000. Melhoramentos printed a gradient-tinted map of the State of São Paulo in 1948 and another of the states of Minas Gerais, Rio do Janeiro, Espírito Santo, and the Federal District at 1:1,450,000 in 1947.

F. Special Subject Maps.

Maps on special topics or for special uses covering all or parts of Brazil are produced by a large number of official federal and state organizations. Private cartographers and commercial concerns have shown little interest in this type of map and, except for road maps, have produced practically none.

1. Hydrographic Charts.

The Diretoria de Hidrografia e Navegação (DHN) of the Ministério da Marinha has produced excellent hydrographic charts of the coast of Brazil from Rio Parnaíba, in the north, to Uruguay and the Río de La Plata. Coastal surveying has been in progress since the early 1820's. In the early 1860's, the French navy surveyed practically all the coast and these calculations were used for a long time by the Brazilians. Within the last 15 years, however, new detailed surveys have been made and the hydrographic charts are being revised from aerial photography, which now cover all of the coast south of Vitória and five of the northern ports.

The Departamento Nacional de Pôrtos, Rios e Canais (DNPRC) has recently published large-scale topo-hydrographic charts of 20 of the most important ports of Brazil. These are based on local triangulations. Soundings are rechecked each year by the 18 field offices in cooperation with the local port authorities. The charts are reproduced only as Ozalid prints for DNPRC use.

2. Aeronautical Charts.

The Diretoria de Rotas Aéreas (DRA) is the only compiler of aeronautical charts in Brazil, although the CNG expects to enter the field in 1950. A series of 32 flight strips at 1:1,000,000 cover the major air routes of the country. Landing charts for many of the air fields, which include landing regulations, are published at large scales for inclusion in bulletins issued for DRA. Although these flight charts were reported by the CNG as being of better quality than the USAF charts of the same areas, commercial and military pilots generally prefer and use the charts made in the United States. Place names on the Brazilian flight strips have been corrected and the aeronautical information is recent and official.

3. Road Maps.

The best road maps of Brazil for general use are issued by private agencies. Although the Departamento Nacional de Estradas de Rodagem (DNER) and the Departamento de Estradas de Rodagem of each state issue official road maps, these agencies tend to emphasize projects for future road construction or details of construction. The IFOCS has made larger-scale, more reliable, and more useable maps for the states of Alagoas, Pernambuco, and Sergipe. The Touring Club do Brazil (TCB) has issued a map of central, eastern, and southern Brazil which, although at a fairly large scale, distinguishes only federal, state, and municipio roads and gives no indication of road conditions. The Standard Oil Company (Esso)

compiles the most reliable and useable road maps of central, eastern, and southern Brazil. Texaco has a series of 16 strip route-guides, which were revised and reissued in 1949 for the general public.

Alberto Entres, owner of the Livraria Central in Florianópolis, Santa Catarina, is now personally checking all roads in that state with a view to publishing a road map of Santa Catarina in 1950.

The Instituto Geocartográfico Sagres in Pôrto Alegre, Rio Grande do Sul, issued a road map of that state at 1:750,000 in 1948 and is now working on a new edition of it.

4. Railroad Maps.

The Departamento Nacional de Estradas de Ferro (DNEF) has published a series of maps of separate states and groups of small states, and two maps of all of Brazil in its entirety but some of the maps are out of date. State railroad agencies, such as the Departamento de Viação of São Paulo (DV-SP), issue few maps other than those showing details of construction and projected routes. The "Guia Levi," which is issued monthly, includes an adequate general railroad map of Brazil to accompany train schedules. The Rio de Janeiro and São Paulo editions of "Guia Levi" differ in only one respect -- each contains a street map of the town of issue. The Great Western of Brazil Railway, with headquarters in Recife, Pernambuco, published a map of its lines in Rio Grande do Norte, Paraíba, Pernambuco, and Alagoas at 1:1.000,000 in 1940.

5. Agricultural Maps.

Practically no maps on agricultural subjects have been published in Brazil. The Centro Nacional de Ensino e Pesquizas Agronómicas (CNEPA) has compiled an ecological atlas of the country showing major crops by municipios according to the most recent official data. CNEPA, however, has no immediate plans for publishing the atlas. The Divisão de Geografia (Division of Geography) of the CNG is making land use studies of areas potentially suitable for colonization. Maps are made from field and aerial photographic data.

6. Mineral Resources Maps.

Few geological or mineralogical maps of all or parts of Brazil have been issued. The Departamento Nacional de Produção Mineral (DNPM) published a geological atlas of Brazil in 1933, which includes a separate map of each state. Present plans include a revision of these maps from data collected since 1933. DNPM has also published a geological map of Brazil and neighboring countries at 1:7,000,000 (1938), a geological map of Brazil at 1:5,000,000 (1942), maps of the geographical distribution of Mineral deposits and of mineral industries (both 1944), and a map of possible petroleum fields in Brazil (1938). Numerous large-scale maps of small but important mineral areas have been printed to accompany reports in the various bulletins issued by DNPM. The Conselho Nacional de Petroleo (CNP) has let a contract to the CdoS to make topographic maps at 1:20,000 of the petroleum field of 20,600 square kilometers in the eastern

part of the state of Bahia.

7. Public Works Maps.

Maps of ports, canals, reservoirs, hydroelectric power station sites, and irrigation and drainage projects are made by the Departamento Nacional de Portos, Rios e Canais (DNPRC), IFOCS, the Divisão de Aguas of DNPM, and the Departamento Nacional de Obras de Saneamento (DNOS). These maps are at scales ranging from 1:1,000 to 1:100,000. The largest-scale maps are for special study and construction work.

8. Cadastral Maps.

Cadastral maps of real estate developments, cities, and municipios have been made at scales ranging from 1:250 to 1:50,000 by official and officially contracted private agencies. Also the cadastral sections of the local governments in Rio de Janeiro, São Paulo, Pôrto Alegre, Belo Horizonte and other cities make very large-scale maps for their own use. City, town, and municipio maps at scales of 1:1,000 or larger are made by CdoS, using aerial photogrammetric methods, and by the Empreza de Topografia, Urbanismo e Construções, Ltda. (ETUC), using only ground surveys. According to reports, there are seven other organizations similar to ETUC in Rio de Janeiro and ETUC itself has three branch offices in other states. The land and colonization offices in many states have made rough surveys and maps of much state-owned land, especially that which has been set aside for colonists.

9. Boundary Maps.

Boundary commissions of the Ministerio de Relações Exteriores have been surveying, delimiting and demarcating the international boundaries of Brazil since 1872. Boundaries between Brazil and the three Guianas, Venezuela, and Colombia are defined by treaty but in general have not been surveyed; the Peru, Bolivia, Paraguay, Argentina, and Uruguay boundaries have been surveyed by joint commissions. Most of the resulting maps are in manuscript form and are filed in the Serviço de Documentação of the library of the Ministério de Relações Exteriores.

Inter-state and inter-municipio boundary maps are under the jurisdiction of the CNG, which has produced special outline maps of each state, showing the accepted boundaries and the administrative centers of states and municipios for the period 1943-48. The various State assemblies have authorized the creation of numerous new municipios, and all published municipio maps must consequently be revised.

II. INDIVIDUAL MAP PUBLISHERS

A. Federal Agencies.

1. Centro Nacional de Ensino e Pesquizas Agronómicas, Ministério de Agricultura (National Center for Agronomic Education and Research, Ministry of Agriculture) Kilometro 47 (on Rio-São Paulo Highway), State of Rio de Janeiro
Administrative Office: Avenida Pasteur 404, Rio de Janeiro, D. F.

Dr. Álvaro Barcelos Fagundez, Director
Dr. Francisco Domicio de Azevedo, Chief, Agricultural Climatology Section
Dr. Arturo Holanda, Chief, Soil Fertility Section
Sr. Fausto A. Fontes, Microphotographic draftsman

Although the Centro Nacional de Ensino e Pesquizas Agronómicas (CNEPA) is an agricultural school rather than a mapping agency, it has prepared manuscript maps for a crop atlas of Brazil. A soils map of Ceará and Piauí is also being compiled, probably for publication in an official report. Only one cartographer-draftsman is employed but several professors are engaged in research leading to the publication of maps.

Dr. Domício de Azevedo headed a group which drew up a questionnaire to be sent to the authorities of each of the 1,700 municipios of Brazil requesting official figures on crop production. Of the municipios, 50 percent returned complete information and another 27 percent supplied incomplete data. On the basis of these returns, 22 maps showing major, secondary, and minor crops were compiled. By mid-1949, all of the maps had been completed and they show the distribution of sugar cane, beans, wheat, castor beans, rice, millet, flax, cotton, coffee, cacao, mandioca, potatoes, and other crop production. Dr. Fagundez stated in October 1949 that although the atlas had been completed, it might never be published.

Dr. Holanda is preparing a generalized soils map of Ceará and Piauí as part of a study on northeast Brazil. At least six general soils types are to be shown, but the map is still in compilation. Chemical analyses of soils and data on the characteristics of the vegetation cover of the various soil types are available for much of northeastern Brazil. No indication as to the possible date of publication has been given.

The drafting of the atlas and soils map is being done by hand. The atlas maps show distribution by simple black and white symbols. Both the atlas and the soils map will necessarily be generalized, as complete information is not available. Both, however, will be valuable contributions to the geographic knowledge of Brazil, if and when they are printed.

2./ Conselho Nacional de Geografia, Instituto Brasileiro de Geografia e Estatistica (National Council of Geography, Brazilian Institute of Geography and Statistics)

Main office: Edificio Serrador, 5th floor, Praça Mahatma Gandhi 14, Rio de Janeiro, D. F.
Dr. Cristovam Leite de Castro, Secretary General
Dr. Jorge Zarur, Assistant Secretary
Divisão de Cartografia (Cartography Division): Av. Pasteur 404 (lower floor), Praia Vermelha, Rio de Janeiro, D. F.
Dr. Allyrio Hugueney de Mattos, Director
Dr. Armando S. Schnoor, Chief, Revision Section
Divisão de Geografia (Geography Division): Rua Senador Dantas 14, 21st. floor, Rio de Janeiro, D. F.
Dr. Fabio de Macedo Soares Guimarães, Director
Dr. Miguel Alves de Lima, Chief, Geographical Studies Section

The Conselho Nacional de Geografia (CNG) was established in 1937. It acts as the official coordinating agency for all government geographic and cartographic work. The CNG has been charged with all first-order

triangulation and geodetic observations, the checking and evaluating of all existing data on geographical positions, and the compilation of general maps and the Carta Geral do Brasil (General map of Brasil) at 1:500,000 and 1:1,000,000. All of these maps are for the use of government agencies and for public sale. The CNG has produced many maps on a number of subjects and at various scales during the last 13 years. The principal objectives at present are the topographic series at 1:500,000 and 1:1,000,000, a reconnaissance topographic series of the state of Bahia at 1:250,000, a general map at 1:5,000,000, and special-subject maps of states at various scales.

The Divisao de Geografia (Geography Division) has a staff of over 50 persons, only 8 of whom are cartographer-draftsmen. It produces only special maps to accompany geographic research and field studies on subjects such as the distribution and movement of population, land utilization, vegetation changes, and soils.

The Divisão de Cartografia (Cartography Division) which has a field force of 80 and an office staff of 106 (including photogrammetrists, researchers and compilers, cartographer-draftsmen, and calculators), does most of the cartographic work. As of September 1949, only 10 of the 1:500,000 sheets, 11 of the 1:1,000,000 sheets, and 5 of the 1:250,000 sheets had been published. Work is in progress on 60 other sheets at 1:500,000, 13 sheets at 1:1,000,000, and 3 sheets at 1:250,000. Photocopies of about 30 rough preliminary sheets were received in Washington

in 1947; most of those sheets have not yet been completed. Outline maps showing the internal political divisions (municipios) have been made for each of the states and for Brazil as a whole, but must be revised in view of the additional municipios set up. A general one-sheet map of Brazil at 1:5,750,000 has been published, but it is now out of print and a revised edition at 1:5,000,000 is scheduled for publication in 1950. Work is also in progress on a 1:3,000,000 map of the country. The CNG plans to complete the mapping of the country at 1:500,000 and 1:1,000,000 during the next two years and to eventually produce a larger-scale set.

Sources used for the 1:500,000 and 1:1,000,000 maps are listed on the individual sheets and include: (1) various surveys by SGE, CNG, and other official agencies; (2) aerial photographs taken by the USAF; (3) the American Geographical Society (AGS) 1:1,000,000 Map of Hispanic America; (4) the USAF aeronautical charts at 1:1,000,000, which include photogrammetric information; and (5) about 1,700 maps received in response to the CNG requirement that each municipio make a large-scale map of its area. Though many are poorly drawn, the municipio maps provide much detailed information and are widely used in map compilations by CNG, SGE, and other Brazilian organizations. Data on some 6,000 control points in Brazil are now being rechecked for accuracy by CNG and the Inter-American Geodetic Survey (US Army Engineers): Points observed by US Coast and Geodetic Survey, though accepted as accurate, are few in number and are located only along the coast. All maps are drafted by hand

on plastic with separate sheets for each color. Place names are pre-printed on transparent adhesive, which is applied to the manuscript map.

The 1:6,500,000 maps issued up to 1945 were highly generalized. The 1:5,750,000 map issued in 1946, although the best and most recent official map of the country, was copied to a large extent from the AGS 1:5,000,000 map. Only minor changes were made in the physical features, but all of the place names were corrected, according to the legal requirements.

At the scales on which CNG is working, the amount of detail that can be shown is limited. Accuracy varies with the sources used. Only those parts that have been taken from aerial photographs or maps made from aerial photos may be considered as being of good reliability. Nevertheless, when completed, the CNG maps at 1:500,000 and 1:1,000,000 will comprise the most recent and probably the most reliable cartographic sources of information on Brazil. The only comparable sets published are the 1:1,000,000 maps (now out of date) of the Clube de Engenharia, the 1:1,000,000 series of the AGS, and the 1:1,000,000 aeronautical charts of the USAF.

3. Departamento Nacional de Estradas de Ferro, Ministério de Viação e Obras Públicas (National Railroad Department, Ministry of Transport and Public Works)
Avenida Graça Aranha 416, 10th floor, Rio de Janeiro, D. F.

Eng. Arthur Pereira de Castilho, Director General

The Departamento Nacional de Estradas de Ferro (DNEF) is the official agency for the development of railroads in Brazil and publishes the official railroad maps of the country. The maps are made principally for the

use of the Ministério de Viação e Obras Públicas, although some are issued as wall maps for public use. The cartographic staff is small and has produced no maps recently. The maps previously published include general planimetric maps at scales ranging from 1:1,000,000 to 1:5,000,000 for each of the Brazilian states, or groups of small states. Special surveys, plans, and profiles are made for projected railroads, but they are at very large scales and are of no use in compiling smaller-scale maps. Plans for the future include periodic revision of the general maps.

Except for data on railroads, the maps are compiled from various sources, most of which are of doubtful reliability. All maps are hand drawn. They are suitable and have sufficient detail for wall maps, the coloring and lettering are well handled, and the legends are adequate. Details concerning railroads can be accepted as accurate as of the date of publication. As a whole, the accuracy of the maps is questionable, and they should be used only for general reference purposes.

4. Departamento Nacional de Estradas de Rodagem, Ministério de Viação e Obras Públicas (National Highway Department, Ministry of Transport and Public Works)
Edificio "A Niote", 19th floor, Praça Mauá, Rio de Janeiro, D. F.

Francisco Saturnino Braga, Director General

The Departamento Nacional de Estradas de Rodagem (DNER) is the official highway department of the national government and as such, produces maps for the use of engineers of the department and for inclusion in official reports. The staff is small and very few maps are produced. The

DNER makes maps of Brazil only. Most of these are maps of projected highways. The files of the organization contain fairly complete reports on highways, distances, the condition of roads, and plans for projected roads that have been collected from state highway offices. Only small-scale generalized road maps showing highways in operation and projected highways are issued for public use. The same type of maps will be made in the future, but the DNER also plans to make a larger number of maps in cooperation with the various state highway departments.

The sources used in the compilation of DNER maps are official road reports from various state highway departments and DNER records. The only acceptable geodetic information used is that acquired in surveying routes for new roads. All of the maps are hand drawn. A number have been reproduced as Ozalid prints and have been hand colored. The maps are neat but are drawn at such a small scale that details are highly generalized. Even the detail shown is of doubtful accuracy. The maps are of use principally in planning for future road construction in Brazil.

5. Departamento Nacional de Obras de Saneamento, Ministério de Viação e Obras Públicas (National Department of Sanitation Work, Ministry of Transport and Public Works)
Avenida Venezuela 53, 4th floor, Rio de Janeiro, D. F.

Dr. Camilo de Maneses, Director
Eng. Clovis Correa Leitão, Chief, Hydraulic Section

The Departamento Nacional de Obras de Saneamento (DNOS) is the official government agency in charge of drainage developments and sanitary measures, and produces maps of those areas in which reclamation work is

in progress or is needed. Although it has a small cartographic staff, the DNOS has produced a comparatively large number of maps and sketches of sections of Brazil for its own use. Planimetric maps, especially of hydrography, are made at various scales. No large area has been covered by any one map, but much of the marshy area along the east coast has been mapped planimetrically. Some 3,000 original maps, sketches, and plans, mostly of rivers and canals, have been made for study or inclusion in DNOS reports. Few maps are made for general publication. The DNOS plans to continue production of maps of the same type and at the same rate, but in the future more use is to be made of aerial photography and mosaics.

Sources used in the compilation include DNOS river surveys without geodetic control, surveys and maps by other agencies, and ground and aerial photographs. A library of 3,000 original maps, sketches and plans, 350 air mosaics, and 3,000 photographs is available to the cartographers and engineers for reference. All drafting is done by hand and all maps, except those in printed reports, are issued as Ozalid prints. The work is neat and hydrographic features are particularly well shown. The amount of detail varies according to the scale of the map. The accuracy of the maps cannot be guaranteed, since little triangulation is used in their production. The maps are of value principally for the study of drainage basins and stream flow in eastern Brazil.

6. Departamento Nacional de Pôrtos, Rios e Canais, Ministério de Viação e Obras Públicas (National Department of Ports, Rivers and Canals, Ministry of Transport and Public Works)
Praça Mauá 10, Rio de Janeiro, D. F.

Dr. Clovis de Macedo Cortes, Director General
Dr. Gilberto Magalhães, Executive Director
Eng. Sylvio Lopes de Couto, Director, Division of Plans and Works
Dr. José G. de Amorim Garcia, Director, Division of Hydrography

The Departamento Nacional de Pôrtos, Rios e Canais (DNPRC) is the official agency for the development and care of ports, rivers, and canals in Brazil and for the production of maps for the use of engineers and officials of the Ministério de Viação e Obras Públicas. The 18 field (district) offices in operation are engaged in surveying and sounding ports and harbors within their districts in cooperation with the local port authorities. Charts are made, revised, and sent to the main office for information and study. The cartographic staff in the Rio office is small, and maps made are limited to Brazil. They are prepared for use in official studies and reports of the agency. Large-scale topohydrographic charts of 20 of the major ports of Brazil have been made on drafting paper suitable for Ozalid reproduction. A 1:4,000,000 map of navigable rivers in Brazil was prepared in 1947 but only Ozalid copies were made. A revised edition was lithographed for issue in late 1949 and should now be available. Large-scale topographic maps, sketches, and profiles are made for the planning and construction of ports and canals and for river control. Future production will continue along the same lines.

The DNPRC has contracted with the CdoS for the construction of 1:5,000 topographic maps of the São Francisco River based on aerial photography and good second-order triangulation. One-third of the maps have been drafted,

and two-thirds of the restitution and seven-eights of the triangulation were completed as of October 1, 1949. The maps are drafted on heavy drafting board and are reproducible only by photography. Apparantly DNPRC has no plans for printing distribution or other copies made from these originals.

Sources used in the compilation and construction of DNPRC maps are principally surveys by DNPRC and DNH engineers, and large-scale topographic maps and plans produced by the government agencies concerned with rivers. The amount of geodetic data used by the agency is limited and of unknown quality. All drafting is done by hand. Most of the maps are issued as Ozalid prints, blueprints, or photostats. Printed reductions are made for inclusion in reports of the DNPRC. The maps available show adequate detail for the special purposes for which they were planned and are well drawn and legible. The maps are of value because so few other maps have been made of Brazilian rivers and ports.

7. Departamento Nacional de Produção Mineral, Ministério de Agricultura (National Department of Mineral Production, Ministry of Agriculture)
Avenida Pasteur 404, Rio de Janeiro, D. F.

Eng. Mario da Silva Pinto, Director General
Eng. Waldemar José da Carvalho, Chief, Division of Waters
Dona Dolores Iglesias, Chief Librarian
Eng. Axel Löfgren, Chief, Topographic and Geologic Map Section

The Departamento Nacional de Produção Mineral (DNPM), is the official Brazilian geological service, and consists of a number of small

specialized offices. Its only publications are special geologic and large-scale topographic maps of Brazil produced especially for the use of the Ministério de Agricultura and for publication in mineral reports. No estimate can be given of total size of the staff, since it is divided among a number of offices. Few maps are made in any given year.

Several general maps at the scale of approximately 1:5,000,000 show geological formation, areas of occurrence of semi-precious stones, and deposits of ferrous and non-ferrous minerals. The 1933 geological atlas, with separate maps of each state, is in process of revision but no date for completion is given. Large-scale maps of zones of possible mineral wealth and of areas around known deposits have been made for publication in various bulletins and reports. The Secção de Força Hidráulica (Hydraulic Energy Section) has a large number of topographic maps of potential dam sites at 1:500 to 1:5,000. It also has a few special-subject maps showing the distribution of power plants, reservoirs, and dam sites in Brazil. In 1949, the Secção de Hidrologia (Hydrology Section) published an atlas of rainfall containing 28 maps, and it has drafted a series of 17 maps of the major river basins in Brazil. Large-scale relief models have also been made in the Secção de Força Hidráulica of at least three hydro-electric projects. Further work of the same type is planned for the future.

All source material used in compilation is taken from surveys and reports made by DNPM personnel. Little or no geodetic data is used in

the construction of small-scale maps, but large-scale site maps are usually based on triangulation. All of the drafting is done by hand. Except for the very large-scale topographic maps, the maps are generalized and show little detail. The large-scale maps cover such small and scattered areas that they would be of little use in the compilation of other maps.

8. Diretoria de Hidrografia e Navegação, Ministério de Marinha (Bureau of Hydrography and Navigation, Ministry of Navy); formerly Serviço Hidrográfico (Hydrographic Service)
Ilha Fiscal, Rio de Janeiro, D. F.

Contra-almirante Antonio Guimarães, Director General

The Diretoria de Hidrografia e Navegação (DHN), the official mapping agency of the Brazilian Navy, publishes charts, port plans, and other materials particularly for the use of the Brazilian Navy and Merchant Marine. It was set up along the lines of the United States Hydrographic office. Although the cartographic staff is small in comparison with those of the topographic mapping agencies mentioned, over 60 coastal charts have been published.

The charts and ports plans issued by the DHN are limited to Brazilian coastal areas. Charts made by foreign hydrographic offices are not reproduced, but master copies are currently revised. Publications of interest to mariners are also issued by the DHN. The Brazilian coast from Rio Parnaíba south has been covered by charts at scales ranging from 1:2,500 to 1:3,000,000. Revisions have been

made of a number of these charts. Plans for the future include: (1) aerial photography of the entire coast; (2) the construction of three series of charts on large, medium and small scale for the coastal area; and (3) the revision of all charts currently in use.

Surveys made by the DHN and charts published by the US Navy Hydrographic Office (USHO), the British Admiralty, and the French Hydrographic Service and DHN aerial photography are the principal sources used in compiling coastal charts. A Ryker plotter and 2 bars with 17 multiplex projectors are used in photogrammetric work. All charts are copper-engraved for printing. Cartographic methods of the DHN are comparable to those used in USHO. Unlike the US and British charts, all land areas are overprinted in green, with relief shown by contours and form lines wherever possible. The Brazilian charts also show greater detail of physiographic features near the coast. The charts may be reproduced easily. The USHO has rated the Brazilian charts as the best issued by any South American country, comparable to the United States charts in accuracy and content.

9. Directoria de Rotas Aéreas, Ministério de Aeronáutica (Bureau of Air Routes, Ministry of Aeronautics)
Ponto do Calabouço (Aeroporto Santos Dumont), Rio de Janeiro, D. F.

Ten. Brig. Eduardo Gomes, Director General
Capitão Eiser da Costa Felippe, Chief, Publications Section

The Diretoria de Rotas Aéreas (DRA) is the official agency for the production of aeronautical charts for civil and military use. No information is available on the size of the cartographic staff but the organization is relatively new and has not yet produced many charts.

To date, aeronautical charts are made only of Brazil, but charts covering other countries may be made later if they are needed by Brazilian commercial air lines. Some 32 flight strips at 1:1,000,000, covering the major air routes of Brazil, have been issued. These appear to have been compiled from the USAF aeronautical charts at the same scale, with minor revisions in aeronautical information and corrected place names. Bulletins on navigation and landing regulations, conditions of fields, meteorology, isogonic variation, and other flight information are published, usually with accompanying plans and maps. It is planned to cover all new flight areas and airfields in Brazil by maps and charts of the same types as those already published.

No information is available on the geodetic control used in preparing the charts. Although Brazilian authorities claim that the charts are better than the USAF charts for the same areas, Brazilian pilots prefer to use US charts. The Brazilian charts, are not well made and appear amateurish in comparison with those of USAF. Physical and cultural data cannot be shown in great detail at 1:1,000,000; the accuracy of those shown depends on the sources used, but information on sources is not available. The charts may be reproduced easily but since their reliability is open to question, they should be used as reference maps rather than sources for compilation.

10. Inspetoria Federal de Obras contra as Sêcas, Ministério de Viação e Obras Públicas (Federal Inspectorate for Drought Control, Ministry of Transport and Public Works); also known as Departamento Nacional de Obras contra as Sêcas (National Department of Drought Control) Avenida Nilo Peçanha 155, 1st floor, Rio de Janeiro, D. F.

Eng. Vinicius César Silva de Berredo, Director General
Antonio Hirsch Marcolino Fragoso, Chief, Aerophotogrammetric service

The Inspetoria Federal de Obras contra as Sêcas (IFOCS or DNOCS), the official federal drought control agency, is interested particularly in the semi-arid region of northeastern Brazil, which includes all of the states of Ceará and Rio Grande do Norte, and parts of the states of Piauí, Paraíba, Pernambuco, Alagoas, Sergipe, and Bahia. Maps are produced principally for the use of the agency and of engineers contracted to construct reservoirs or irrigation systems. No information is available on the size of the cartographic staff. The agency has been active since 1908.

Only maps of northeastern Brazil are made. Those published to date include some 35 general, geologic, phytogeographic, hypsometric, pluviometric, and road maps of the various states and of the region as a whole. The scales of the maps range from 1:400,000 to 1:5,000,000. In addition, the Photogrammetric Section of IFOCS has made several hundred maps and plans of small areas suitable for reservoirs, dams, wells, and other drought control installations at from 1:1,000 to 1:25,000. Further work along the same general lines is planned. Compilation of maps at scales larger than 1:25,000 is usually based on

photogrammetry, whereas maps at smaller scales are prepared from field reconnaissance and plane-table surveys. All drafting is done by hand. The maps are reproduced in black and white and are detailed, but tend to have inadequate legends. Brazilian authorities indicate that the reliability of IFOCS maps depends on their dates of compilation. The maps are a valuable source of information, especially since there are few other maps for much of northeastern Brazil.

11. Servico Geográfico do Exército, Ministério da Guerra (Army Geografic Service, Ministry of War)
Morro da Conceição, Rio de Janeiro, D. F.

Gral, Djalma Poli Coelho, Director General
Cel. Senna Dias, Administrative Officer
T. Cel. Dacio César, Chief, 1st Division, Geodesy
Cel. Jacyntho D. Moreira Lobato, Chief 2nd Division, Topography
Cel. Lannes J. Bernardes Jr., Chief, 3rd Division, Photogrammetry
Cel. José Brito e Silva, Chief, 4th Division, Cartography
Cel. Roberto Pedro Michelena, Chief, 1st Survey Division, Pôrto Alegre, Rio Grande do Sul

The Serviço Geográfico do Exército (SGE), the largest official publisher of topographic maps, produces maps of Brazil primarily for the use of the Army but also for sale to the public. It has a staff of over 80 persons in Rio de Janeiro, including 24 photogrammetrists and about 30 cartographers and apprentices. The 1st Survey Division, working out of Pôrto Alegre, Rio Grande do Sul, has at present a staff of 250 field men engaged in triangulation and leveling. The 2nd Survey Division, with a smaller group, is working out of Ponta Grossa, Paraná. Although the agency has been active since 1932, only a comparatively small area has been mapped.

The principal output of the SGE has been topographic maps at 1:10,000, 1:25,000, and 1:50,000. The larger-scale maps are of small areas of military importance. Sheets at 1:50,000 have been made of the Argentine and Uruguayan border area, the northeastern coast areas, and the Federal District. A new Carta de Comunicações of Brazil south of 24°S is being compiled at 1:250,000 from existing municipio maps. As of October 1949, 24 of the sheets for the states of Paraná and Santa Catarina had been published. Work is in progress on sheets of the same set for Rio Grande do Sul. A new topographic series at 1:100,000 is planned for the State of Rio Grande do Sul and at least one sheet has been published. Triangulation of second order and precision leveling are being carried on in northern Rio Grande do Sul. SGE plans to link its lower-order triangulations to the first-order work of the CNG at Torres, Rio Grande do Sul, and to make the necessary adjustments on the existing net.

The principal sources used in map compilation are SGE topographic and triangulation surveys, which have been made over a long period of years, and aerial photographs taken by the USAF and by private contractors. All drafting and lettering is done by hand. Aerial photographs are used in the Photogrammetry Section, where two Heyde aerotopographs, one Zeiss stereoplanigraph, one Poivillier plotter, several bars of Zeiss multiplex cameras, and a number of Wolfe plotters, developed in the SGE, are used to transfer information to paper. As many control points are used as possible. This material is then sent to the Cartographic

Section where contours, hydrography, and cultural data are drafted in ink by hand. The sheets are then reproduced at 1:50,000. Work is slow and the number of steps required may result in slight errors. Maps are usually published in black and white and have inadequate legends, but are otherwise satisfactory. Physical features are given in detail and are usually accurate. The amount of cultural detail shown varies according to the area mapped, much of which is sparsely populated. All of the sheets may be reproduced easily. Although the maps do not compare favorably with US maps at the same scale either in presentation or in accuracy, they are the only source maps available for much of the area they cover.

B. State Agencies.

12. Departamento de Estradas de Rodagem, Secretaria de Viação e Obras Públicas, Estado de São Paulo (Public Roads Department, Secretariat of Transport and Public Works, State of São Paulo) Rua Riachuele 115, 6th floor, São Paulo, São Paulo

Dr. Cicero da Costa Neves, Acting Director General
Eng. Civil Valdo Silveira, Assistant to Director General

The Departamento de Estradas de Rodagem (DER-SP), the official highway organization for the state of São Paulo, produces maps principally for the use of its own engineers and officials. Both the cartographic staff and the annual production of maps are small. Maps are prepared only for roads in the State of São Paulo. The few published maps have been made principally for inclusion in DER-SP annual reports or reports on projects in progress. Manuscript maps, plans, profiles,

and bridge and other construction details are prepared for all new state roads being considered or under construction. There are no plans to increase the rate of publication in the future nor is any change in type of work projected.

The DER-SP used the 1:100,000 topographic sheets of the IGGSP and aerial photographs, wherever possible, for planning the routes of new highways. The projected routes are then checked in the field. A map library of over 20,000 maps, plans, charts, and diagrams in manuscript form and at extremely large scales is available for reference. All drafting is done by hand, and the finished maps are usually issued as Ozalid prints. Detail on the state maps at about 1:1,000,000 is scant and generalized, but should be considered in compiling maps at smaller scales. Most of the plans, diagrams, and profiles are not usable in map compilation because of their very large scales and lack of topographic information.

13. Departamento de Geografia e Estatística, Secretaria Geral de Interior e Segurança, Prefeituro do Distrito Federal (Geography and Statistics Department, General Secretariat of the Interior and Security, Prefecture of the Federal District)

Avenida Beira Mar 200, Rio de Janeiro, D. F.
Dr. Sergio Nunes Magalhães, Jr., Chief

The Departamento de Geografia (DGE) is the official statistical and geographical research agency in the prefecture of the Federal District. It produces maps and statistical reports for official and public use. The cartographic staff is composed of about six cartographer-draftsmen.

The number of maps produced each year is small and the area covered is limited to the Federal District. Topographic maps at 1:20,000, 1:75,000, and 1:125,000 have been issued, but are probably copies of the 1922 SGE map of the Federal District. A special zoning map at 1:20,000 has been made of a part of the city. Other statistical data are published by the DGE in chart form. The DGE also plans to publish a 1:75,000 contour map in six or seven colors and a revised aerial photogrammetric map at 1:5,000.

Sources used in the preparation of maps are SGE topographic maps of the Federal District, cadastral maps, and photogrammetric surveys. All of the drafting is done by hand; the printing is contracted to private firms. Cartographic presentation is good except on the 1:125,000 map, on which too much reduction has resulted in illegibility in some places. The maps are detailed and accurate. They may be reproduced satisfactorily in black and white but are of limited use in map compilation because of the small size of the Federal District.

14. Departamento de Geografia, Terras e Colonização, Secretaria da Agricultura, Indústria e Comércio (Department of Geography, Lands and Colonization, Secretariat of Agriculture, Industry and Commerce
Av. Iguaçú, esq. Marechal Floriano, Curitiba, Paraná

Dr. Almir Miro Carneiro, Director General
Dr. Alceu Trevizani Beltrão, Chief, Division of Geography

The Departamento de Geografia, Terras e Colonização (DGTC) is the principal map-making agency of the State of Paraná. It produced general maps of the state at 1:750,000 in 1922 and 1938, and a 1:500,000 map in

1948. The latter was partially revised by CNG from aerial photography. DGTC is now working on topographic-cadastral sheets at 1:100,000 and on surveys of municipio boundaries. General maps for propaganda purposes are also made for other agencies, but they are usually prepared in single copies only. The DGTC has a library of 15,000 maps, which includes property, municipio, part, and state maps. The office has 6 draftsmen, 2 of whom have been with the organization for over 20 years.

15. Departamento de Viação, Secretaria de Viação e Obras Públicas, Estado de São Paulo (Transport Department, Secretariat of Transport and Public Works, State of São Paulo)
Rua Riachuelo 115, 5th floor, São Paulo, São Paulo

Dr. Alfredo Borelli, Director

The Departamento de Viação (DV-SP), the official organization for the development and administration of railroads in the State of São Paulo, produces maps for use within the Secretaria de Viação e Obras Públicas of the state. The cartographic staff is small and very few maps are produced. Only maps of São Paulo State, showing existing and proposed railroads are published, but large-scale manuscript plans, charts, and diagrams of surveys and construction details of particular interest to engineers are on file in the office. No maps for public distribution have been made recently but a 1949 map is being printed at present.

Basic sources for maps at all scales are the IGGSP 1:100,000 and 1:1,000,000 maps, which are supplemented by original surveys by DV-SP engineers. Too few maps have been produced to make possible detailed

evaluation. Inasmuch as no maps more recent than 1937 are available, DV-SP maps would be of little use to compilers.

16. Departamento Estadual de Geografia e Cartografia (State Department of Geography and Cartography)
Edifiço Ipase, 4th floor, Florianópolis, Santa Catarina

Eng. Antonio Victor Peluso, Director (on leave in US)
Eng. Carlos Buchele, Junior, Interim Director

The Departamento Estadual de Geografia and Cartografia (DEGC) prepares municipio maps at various scales, as well as general maps of the state of Santa Catarina at 1:500,000 and 1:800,000. The staff includes two geographers, three topographers, and nine draftsmen. All of the maps prepared are tied to geographical coordinates, about 300 of which have been verified and approved by CNG. Precision leveling along roads has been done by DEGC engineers working with the CNG groups. DEGC engineers also assisted the CNG in its first-order triangulation net across the state along the 49th meridian.

DEGC plans to revise the general map of the State of Santa Catarina every two years, to publish topographical-cadastral sheets at 1:100,000, and to make an album of the municipio maps, principally for teaching purposes. General maps of the state are compiled from topographic and leveling surveys and from aerial photographs. The DEGC also publishes a Boletim that includes excellent geographical studies.

17. Departamento Geográfico, Serviço Público do Estado de Minas Gerais (Geographic Department, Public Service of the State of Minas Gerais)
Praca da Liberdade, Belo Horizonte, Minas Gerais

Benedito Quintino dos Santos, Director
José de Oliveiro Duarte, Chief, Astronomic and Geodetic Division
Valdemar Lobato, Chief, Topographic and Cadastral Division
Octávio Róscoe, Chief, Cartographic and Drafting Division

The Departamento Geográfico, Serviço Público do Estado de Minas Gerais (DG-MG) is the official topographic mapping agency for the State of Minas Gerais and is the state branch of CNG. Topographic maps are produced primarily for the use of state and national government departments. The staff is small and produces only a few topographic or general maps of the State of Minas Gerais in any one year.

General maps of the state at 1:500,000 and 1:1,000,000 and topographic maps at 1:100,000 are the principal publications. The DG-MG also cooperated with the Secretaria de Viação e Obras Públicas in 1944 in producing a road map of the state. To date, fifty sheets at 1:100,000, covering about one-third of the state, have been completed. No maps were produced between 1939 and 1948 for lack of printing arrangements. A contract has been made with SGE for future printing needs and eight sheets are expected to be published during 1949-1950.

In the past, about 5,000 square kilometers were topographically surveyed yearly by five field parties, each consisting of three topographers and two assistants. These old surveys are of low second-or possible third-order. DG-MG is cooperating with CNG in the first-order triangulation of the 20th parallel through Minas Gerais. Present plans call for the continuation of field work only for triangulation, leveling, and

the checking of existing control data. All other topographic data will be taken from locally contracted aerial photography. USAF photography will will be used if it is available, but the coverage is inadequate. A contract has been let to the Cia. Levantamentos Adrofotogrammetricos, S. A., of Rio de Janeiro, for 30,000 square kilometers of vertical photography in the "Triangulo Minero", or westward extension of the state. All control work and restitution will be done by DG-MG personnel. Only a few Fairchild stereoscopes, a rectiplanigraph, and a stereocomparagraph are now available for photogrammetric work, but two bars of Bausch and Lomb multiplex cameras are on order. Six of the fifteen draftsmen in DG-MG have been sent to the CNG and SGE in Rio de Janeiro for training in photogrammetry. Cartographic methods and equipment are modern.

In general, physical features are well delineated on the maps, but the amount and accuracy of the cultural data shown varies from sheet to sheet, many of which are considerably out of date. In most cases, the legends are not full enough. Usually three or four colors are used on the maps most of which have been printed by the Cia. Lithografica Ypiranga. In the future, they will be printed by SGE. The sheets may be reproduced in black and white without much loss of detail. They are fairly reliable and provide the only large-scale map coverage for the State of Minas Gerais.

18. Instituto de Biologia e Pesquizas Tecnológicas, Secretaria de Agricultura, Indústria e Comércio, Estado de Paraná (Institute of Biological and Technologic Research, Secretariat of Agriculture, Industry and Commerce, State of Paraná)
Caixa Postal 357, Curitiba, Paraná

Dr. Marcos Augusto Enrietti, Director
Dr. Reinhard Maack, Chief, Geological Service

The Instituto de Biologia e Pesquizas Tecnológicas (IBPT) is a small but active scientific organization. The Institute itself and most of the maps published and in progress are the results of the efforts of Dr. Reinhard Maack, who has spent over 20 years in private geographical, geological, and botanical exploration and studies of the states of Paraná and Santa Catarina. As yet, IBPT has published no maps except Maack's own, usually at greatly reduced scales and as inserts to accompany reports in the annual Arquivo and bulletins of the Institute.

Drafting is now in progress on a 1:750,000 phytogeographic map of Paraná. A preliminary rough draft of a geological map of the state at the same scale has been completed. Both are scheduled for publication in 1950. A hypsometric map of the state, also at 1:750,000, is planned for publication in 1951. Maack's surveys of the Rio Tibagí are in drafting and a five-sheet topographic map at 1:100,000 will be published in 1950.

Maack personally does the surveying using Wild T-2 and Hildebrandt Universal instruments. Drafting is done by one cartographer and two aides. IBPT has an Ozalid machine for simple reproductions and uses the state printing office for its publications. Production is slow, principally because of shortages of funds and personnel. Maack has at least eight field books and a large file of data that are as yet unused.

19. Instituto Geográfico e Geológico de São Paulo, Secretaria de Agricultura, Industria e Comércio, Estado de São Paulo (Geographic and Geologic Institute of São Paulo, Secretariat of Agriculture, Industry and Commerce, State of São Paulo)
Rua Antonio Godoi 122, 8th floor, São Paulo, São Paulo

Cel. Dilermando de Assis, Director (1949-)
Eng. Aristides Bueno, Chief, Topographic Service
Eng. Plinio de Lima, Chief, General Geologic Service
Eng. Theodoro Knecht, Chief, Economic Geologic Service
Eng. Nestor Aratangy, Chief, Hydrologic Service
Eng. Gastão C. Bierrenbach Lima, Chief, Geodetic Service
Sr. Otto Bendix, Chief, Cartographic Section

The Instituto Geográfico e Geológico de São Páulo (IGGSP) is the official topographic and geologic mapping agency for the state of São Paulo. It also serves as the São Paulo branch of the CNG and officials of the IGGSP serve on the Regional Directorate of the CNG along with representatives of other state mapping agencies. IGGSP is charged with the production of topographic maps of the entire state for the use of state government departments, but the maps are also available to the general public. The staff, including office and field personnel in the various services, numbers only 158 of which 40 are technicians and 20 are topographers. There are eight to ten staff members in the cartographic section. Only a few maps are produced in any one year.

Since 1906, the IGGSP has issued 51 topographic sheets and 6 geologic sheets at 1:100,000, 21 general maps at 1:1,000,000, 4 general maps at 1:2,000,000, and 6 sections of a tourist map of the State of São Paulo at 1:200,000. The IGGSP also publishes a monthly bulletin that usually contains several small-scale maps and a large number of special

bulletins and reports that include statistical data and special-subject maps. Current field work is limited to topographic surveying in southern and western São Paulo and to the re-surveying of the area covered by the topographic sheets for the city of São Paulo and its environs. Less than one-half of the state has been mapped to date. Eight sheets at 1:100,000 are currently in work and a 1:750,000 map of the state is in press. Plans call for the completion of the 1:100,000 set for the entire state before beginning on larger-scale maps. The IGGSP uses its own topographic surveys and data as its principal source material.

IGGSP was set up along the lines of U S Geological Survey and has practically the same standards. All drafting is done by hand, with a minimum of modern equipment. The agency has no reproduction plant and most of its maps are printed by the CIA. Lithográfica Ypiranga in São Paulo. The maps are usually printed in four colors; physical and cultural features are shown in adequate detail and accuracy, but legends are usually scanty. The maps reproduce well in black and white. They are usually reliable and are the best map coverage available for the State of São Paulo.

20. Secção do Cadastro, Diretoria Geral de Obras e Viação da Prefeitura de Pôrto Alegre (Cadastral Section, General Bureau of Works and Transport, Prefecture of Pôrto Alegre)
Palacio da Prefeitura, Pôrto Alegre, Rio Grande do Sul.

Dr. Bozano, Director General of Works and Transport
Eng. Fernando Ribero, Chief, Cadastral Section
Ernesto Sander, Chief, Drafting Office

The Secção do Cadastro (SC-PA) makes only extremely large-scale plans for the city of Pôrto Alegre for use of the staff of the agency. Over 20 draftsmen are employed. The annual production of maps is unknown but less than half of the city has been mapped at scales larger than 1:1,000. In 1939, the Cruzeiro do Sul (CdoS) contracted to furnish photogrammetric maps of the city in 69 sheets at 1:1,000, of the immediately adjacent suburban area in 53 sheets at 1:2,000, of the remainder of the municipio in 37 sheets at 1:10,000, and of the entire area in one sheet at 1:50,000.

The SC-PA uses these maps for checking its own more detailed 1:250 to 1:750 plans of separate blocks and property holdings. All drafting is done by hand and only record copies are made. The plans are currently revised. As all plans are on very large scale, they would be of limited use to map compilers in the Unites States.

21. Secção de Plántas do Cadastro, Secretaria de Fazenda da Prefeiture de São Paulo (Cadastral Plans Section, Secretariat of Finance, Prefecture of São Paulo)
Rua São Bento, 365, 3rd floor, São Paulo, São Paulo

Sr. José Foresti, Director

The Secção de Plantas do Cadastro (SPC-SP) produces only large-scale plans of the rapidly growing city of São Paulo, principally for official use and for recording property holdings. The staff includes over 20 draftsmen. Few maps are compiled for publication but many large-scale

plans of individual land holdings at 1:500, 1:1,000, and 1:5,000 are completed in manuscript form every year. Four maps at 1:10,000 have been published. A 1:20,000 plan of the city is currently being revised to include new streets and subdivisions. No change in type of work is projected.

Data for the plans are obtained by regular ground surveys by the SPC-SP. No aerial photogrammetric survey has been made since 1929 when the Societa Anonima Rilevamenti Aerofotogrammetrici (SARA), an Italian firm, produced maps at 1:1,000 of the central part of the city. The rest of the city was mapped at 1:5,000 with one-meter contours. Another set of five sheets at 1:20,000 with five-meter contours, was made for the whole city. These sheets, now badly out of date, have been used a great deal as a source of basic information and for checking. All drafting is done by hand and the maps are filed in manuscript form. As the plans are prepared at such large scale and are so highly specialized, they are of little use to map compilers in the United States.

C. Private Map Publishers.

22. Companhia Lithográfica Ypiranga (Ypiranga Lithographic Co.)
Rua dos Gusmões 457, São Paulo, São Paulo

Curt Reichenbach, Technical Assistant in charge of Cartography
Otto Bendix, cartographer

CIA Lithográfica Ypiranga (Ypiranga) is a general commercial publishing company. A small cartographic section prints maps on contract

for such official organizations as the DNEF, IGGSP, DG-MG, and DEE-MG, and for private organizations such as Geobrasil, Companhia de Energia Eléctrica Paulista, Esso, and Shell-Mex. The staff consists of one full-time technician, one full-time cartographer, and other cartographer-draftsmen contracted as needed. The total number of maps printed each year is not large since the staff must occasionally redraft the manuscript maps submitted, make color separations if needed, and always retouch the plates.

As all work is done on contract, the maps may be of Brazil or of foreign countries, but are usually of Brazil. All types of maps are printed by Ypiranga. The reproduction section has four cameras (the largest of which uses negatives 48 inches square), eight offset machines, and six flat-bed presses.

Only Esso maps are actually compiled by Ypiranga. For these, data from Esso and IGGSP files are plotted on a base map. This is cut into parts corresponding to the Esso distribution areas and the parts are sent to the appropriate Esso distributors for corrections in distances, routes, and road conditions. The sections are then reassembled, photographed, blue-lined, and traced to make the fair drawing. Esso sets up the format, suggests colors, provides raw data, but leaves other decisions to Ypiranga.

Blue line prints, screens, and preprinted designs are used as drafting aids. The combination of modern drafting techniques and

reproduction facilities gives the finished maps a clear and professional appearance.

23. Companhia Melhoramentos de São Paulo: Industrias de Papel
(Development Company of São Paulo: Paper Industries)
Rua Tito 479 (Lapa), São Paulo, São Paulo

Gunter Klusemann, Director General for Graphics
Emil Krausz, Chief of Cartography

The Companhia Melhoramentos de São Paulo (Melhoramentos), one of the largest private publishing houses in Brazil, specializes in children's books and textbooks, but also publishes maps for school and general use. Of the 750 employees, only 2 are cartographer-draftsmen. The annual map production averages about two per year, chiefly general maps of Brazil at 1:4,500,000 and of the six continents at 1:9,000,000. A map of the State of São Paulo at 1:1,000,000 was published 1948 and a general map of the states of Minas Gerais, Espírito Santo, Rio de Janeiro, and the Federal District at 1:1,450,000 in 1947. A new edition of Pauwel's atlas is prepared each year. A pocket-guide plan of the city of São Paulo is being drafted at 1:20,000 for printing at 1:30,000. Planned for the future are a map of southern Brazil at 1:1,500,000 and a new 1:1,000,000 map of São Paulo showing air lines and road distances in addition to gradient tints and general data.

Source materials used are those available to the general public and the resulting maps are highly generalized. All drafting is done by hand but the two cartographers are Germans with long experience. Although

lettering, grids, and legends are adequate, the colors used in printing are not well chosen. The maps are usuable principally as wall maps.

24. Empreza de Topografia, Urbanismo e Construções, Ltda. (Topography, Urbanism and Construction Publishing Co., Ltd.)
Manuel de Carvalho 16, 7th floor, Rio de Janeiro, D.F.

Eng. Civil Octavio Cantanhede, Director

The Empreza de Topografia, Urbanismo e Construções (ETUC) is a private mapping organization which makes cadastral and topographic surveys on contract for official and private agencies. The cartographic staff numbers only seven, but a relatively large number of maps have been made on contract during the last few years. Cadastral and topographic maps of cities, municipios, real estate developments, dam sites, transmission lines, and factory sites are made at scales ranging from 1:1,000 to 1:10,000. The number of contracts has increased and ETUC may possibly produce maps in large numbers in the future. Branch offices have been set up in Vitória, Juiz de Fora, and Florianópolis.

Sources used in construction of ETUC maps are actual ground surveys. No aerial photographs are used as yet. All of the cartographic work is done by hand and the maps are neat, detailed, and accurate. They are available only through the contracting agency.

25. Instituto Cartográfico Castiglione (Castiglione Cartographic Institute); successor to José Castiglione
Rua João Brícola 39, 7th floor, São Paulo, São Paulo

Armando Castiglione, Director-Cartographer

The Instituto Cartográfico Castiglione (ICC) is the most prolific private producer of general maps for public sale in Brazil. José Castiglione, the father, was the leading private cartographer in Brazil from 1906 until his death in 1944. The ICC is still a one-man organization, with Armando Castiglione doing all the research, compilation, drafting, and the final correcting of the plates. The annual production is about six maps per year, including revisions.

The ICC is interested principally in general maps of all or parts of Brazil, but it has published city plans of São Paulo and Santos and a few compiled topographic maps at 1:100,000 of the coastal area of the State of São Paulo. Lithographed general maps of Brazil have been published at 1:4,000,000 (1948) and 1:7,000,000 (1945), of South America at 1:5,000,000 (1945), of the State of São Paulo at 1:1,000,000 (1948), and of the State of Rio de Janeiro including the Federal District at 1:400,000 (1944). Maps in the form of Ozalid prints have been issued for Mato Grosso at 1:2,000,000, northern Brazil at 1:2,000,000, northeastern Brazil, southern Brazil and the State of Goiás at 1:1,000,000, and the state of São Paulo at 1:500,000, as well as a city plan of São Paulo at 1:20,000.

Plans for the future include the annual revision of the city plan of São Paulo (from aerial photographs) and the map of Brazil. In work are a general world atlas for school use, a large-scale plan of São Paulo city that shows bus and streetcar routes, a guide to the city

containing maps at 1:10,000 of each of the political divisions and a complete street index, and a topographic and transportation map of the state in large 1:100,000 sheets.

Sources used include official state and federal government maps, aerial photographs, and statistical data. Some of the ICC topographic maps are copies, with slight revisions, of IGGSP and SGE maps. A small reference library has been established, which consists of about 500 official maps and the most reliable privately produced maps, and a number of original, unpublished manuscripts of explorers, geographers, and engineers.

All drafting is done entirely by hand. Corrections are made on the final zinc plates rather than on the fair drawings because Castiglione considers it easier and cheaper. The lettering and line work are well done and the choice of colors is good. The maps published include a vast amount of detail, especially place names, and are fairly accurate. As all maps are compilations; they cannot be regarded as primary sources of information but may well be used as bases for plotting additional data.

26. Livraria do Globo, S.A. (The Globe Bookstore Co.)
Rua dos Andradas 1416, Pôrto Alegre, Rio Grande do Sul

Dr. José Bertaso Filho, Director of Commercial Section
Sr. Henrique Bertaso, Director of Editorial Section

Livraria do Globo (O Globo) is a private publishing house and book store that occasionally prints maps for school use and for official

agencies in southern Brazil. O Globo usually reproduces under contract and sells maps compiled by such government agencies as the Secretaria de Agricultura, Indústria e Comércio (SAIC) of the State of Rio Grande do Sul, and by private individuals. Few maps other than those of Brazil are published. In recent years, only general maps of Rio Grande do Sul at 1:750,000 and 1:1,500,000, and of Brazil at 1:5,000,000 have been issued. A new map of the State is being printed for SAIC for issue in 1950. A general world atlas by A.G. Lima, designed for students in grammar schools, was reprinted for the eighth time in 1948 with no obvious revisions or improvement in quality. One cartographer is at present employed in compiling and drafting maps of Brazil and of the various states for school atlases of southern Brazil and northern Brazil. The maps are fairly detailed for their scale and the atlases should be better than any now in existence. The maps printed for government agencies are compiled from official source material by the agency itself and are usually more reliable than those compiled by other private firms. The small-scale map of Brazil is over-generalized and of little use except as a wall map.

27. Serviços Aéreos Cruzeiro do Sul, Ltda., Departamento de Aerofotogrametria, (Cruzeiro do Sul Air Services, Aerial Photogrammetry Department)
Avenida Pasteur 429, Rio de Janeiro, D.F.

Eng. Edson de Alençar Cabral, Director
Eng. Pablo Barros, Asst. Director

The Photogrammetry Department of Cruzeiro do Sul (CdoS), a privately owned airline, does photogrammetric surveying and topographic mapping on contract for a large number of government agencies and private companies. Some maps are made for the use of the airline itself but most are for the use of other agencies. The staff numbers over fifty of which half are cartographers and draftsmen. A relatively large number of topographic and cadastral maps of Brazil have been produced since the agency was established in 1935.

The company specializes in large-scale maps and has completed over 60 projects to date. Cadastral maps at 1:1,000, 1:2,000, and 1:10,000 have been made of the municipio of Pôrto Alegre, and at 1:1,000 and 1:2,000 of the city of Salvador (Bahia). Topographic maps of various real estate developments near Rio de Janeiro have also been prepared for private interests, and of islands in Guanabara Bay (Rio Harbor) for the Ministério da Marinha. Several river valleys in Rio Grande do Sul and other states have been mapped for state or national sanitation organizations. CdoS has contracted to map an area extending for 1,500 kilometers along the São Francisco River at 1:5,000 (about 9,000 sheets) for the Departamento Nacional de Pôrtos, Rios, e Canais (DNPEC) of the Ministério de Viação e Obras Públicas. All of the photography, one-third of the maps, two-thirds of the restitution, and seven-eighths of the triangulation have been completed. A contract has also been signed with the Conselho Nacional de Petroleo for maps at 1:20,000 of the petroleum

field in the eastern part of the state of Bahia, an area of 20,600 square kilometers; all of the area has been photographed and photomaps are being made. The CdoS has also been contracted by CIA. Hidroeletrica do Sao Francisco to map the entire Sao Francisco basin, approximately one-tenth of the area of Brazil, at 1:25,000. Over 130,000 square kilometers in the southern part of the basin had been flown in 1949.

Photogrammetric equipment in use consists of two stereoplanigraphs and seven multiplex bars with about 50 projectors. To a large extent, new Bausch and Lomb equipment has replaced the older Zeiss cameras, but Zeiss cameras are still used on some work. The drafting is excellent and all possible care is taken to prevent subsequent distortion due to expansion or contraction of drafting papers or to reproduction materials. The maps are exceptionally detailed and are based on good quality second-order triangulation made by engineers of the company. The maps may be reproduced in black and white without great loss of detail. The work done by CdoS is the best and most reliable of any agency in Brazil. No maps, however, may be obtained directly from CdoS, since all source material and maps become the property of the contracting company or agency. Maps must therefore be obtained from such agencies.

28. Touring Club do Brazil (Touring Club of Brazil)
Praça Maua, Rio de Janeiro, D. F.

Dr. Edgardo Chagas Doria, Secretary General

The Touring Club of Brazil (TCB) is a private automobile association that issues only road maps of Brazil for the use of its members. One draftsman is employed and comparatively few maps have been made. One or two maps per year are being issued, generally of tourist attractions in the vicinity of Rio. One large map of east central and southern Brazil was published in 1946 but has never been revised. There is no indication that the rate of production will be increased in the future.

The sources used in the compilation of the road maps are DNER reports and data from the various state road departments and from surveys by TCB personnel. All of the drafting is done by hand. The information presented is highly generalized and roads are classified only as national, state, and municipio roads. Although the maps are easily reproduced in black and white, the information shown is of little use in map compilation.

III. GLOSSARY

I. Official Agencies.

	Abbreviations
A. National	
Centro Nacional de Ensino e Pesquizas Agronómicas, Ministério de Agricultura (National Center for Agronomic Education and Research, Ministry of Agriculture)	CNEPA
Comissão da Carta Geral do Brazil (Commission for the General Map of Brazil) Predecessor of SGE founded in 1917 from Secçao de Estereofotogrametria of the Estado Maior do Exército	CCGdoB
Conselho Nacional de Geografia, Instituto Brasileiro de Geografia e Estatística (National Council of Geography, Brazilian Institute of Geography and Statistics)	CNG
Conselho Nacional de Petroleo (National Petroleum Council)	CNP
Departamento Nacional de Estradas de Ferro, Ministério de Viação e Obras Públicas (National Railroad Department, Ministry of Transport and Public Works)	DNEF
Departamento Nacional de Estradas de Rodagem, Ministério de Viação e Obras Públicas (National Highway Department, Ministry of Transport and Public Works)	DNER

Official Agencies.

	Abbreviations
National (cont.)	
Departamento Nacional de Obras contra as Sêcas, Ministério de Viação e Obras Públicas (National Department of Drought Control, Ministry of Transport and Public Works)	DNOCS
Departamento Nacional de Obras de Saneamento, Ministério de Viação e Obras Públicas (National Department Sanitation Works, Ministry of Transport and Public Works)	DNOS
Departamento Nacional de Pôrtos, Rios e Canais, Ministério de Viação e Obras Públicas (National Department of Ports, Rivers and Canals, Ministry of Transport and Public Works)	DNPRC
Departamento Nacional de Produção Mineral, Ministério de Agricultura (National Department of Mineral Production, Ministry of Agriculture)	DNPM
Diretoria de Hidrografia e Navegação, Ministério de Marinha; formerly Serviço Hydrográfico (Bureau of Hydrography and Navigation, Ministry of the Navy)	DHN
Diretoria de Rotas Aéreas, Ministério de Aeronautica (Bureau of Air Routes, Ministry of Aeronautics)	DRA
Inspectoria Federal de Obras contra as Sêcas, Ministério de Viação e Obras Públicas (Federal Inspectorate for Drought Control, Ministry of Transport and Public Works)	IFOCS

Official Agencies.

	Abbreviations
National (cont.)	
Secção de Estereofotogrametria, Estado Maior do Exército (Stereophotogrammetric Section, General Staff of the Army)	SE
Serviço de Documentação, Ministério de Relações Exteriores (Documentation Service, Ministry of Foreign Relations)	SD
Serviço Geográfico do Exército, Ministério da Guerra (Army Geographic Service, Ministry of War)	SGE
Serviço Geográfico Militar, Ministério da Guerra (Military Geographic Institute, Ministry of War)	SGM
B. State.	
Comissão Geográfica e Geológica de São Paulo (Geographic and Geologic Commission of São Paulo)	
Departamento de Estradas de Rodagem, Secretaria de Viação e Obras Públicas, Estado de São Paulo (Public Roads Department, Secretariat of Transport and Public Works, State of São Paulo)	DER-SP
Departamento de Geografia e Estatística, Secretaria Geral de Interior e Segurança, Prefeitura do Distrito Federal (Geography Department, General Secretariat of the Interior and Security, Prefecture of the Federal District)	DGE

Official Agencies.

	Abbreviations
State. (cont.)	
Departamento de Geografia, Terras e Colonização, Secretaria de Agricultura, Indústria e Comércio, Estado do Paraná (Department of Geography, Lands and Colonization, Secretariat of Agriculture, Industry and Commerce, State of Paraná)	DGTC
Departamento de Viação, Secretaria de Viação e Obras Públicas, Estado de São Paulo (Transport Department, Secretariat of Transport and Public Works, State of São Paulo	DV-SP
Departamento Estadual de Geografia e Cartografia, Estado de Santa Catarina (State Department of Geography and Cartography, State of Santo Catarina)	DEGC
Departamento Geográfico, Serviço Público do Estado de Minas Gerais (Geographic Department, Public Service of the State of Minas Gerais)	DG-MG
Instituto de Biologia e Pesquizas Tecnológicas, Secretaria da Agricultura, Indústria e Comérico, Estado de Paraná (Institute of Biology and Technical Research, Secretariat of Agriculture, Industry and Commerce, State of Paraná)	IBPT
Instituto Geográfico e Geológico de São Paulo, Secretaria de Agricultura, Industria e Comercio, Estado de São Paulo (Geographic and Geologic Institute of São Paulo, Secretariat of Agriculture, Industry and Commerce, State of São Paulo)	IGGSP

Official Agencies.

	Abbreviations
State. (cont.)	
Secção de Plantas do Cadastro, Secretaria de Fazenda, Prefeitura de São Paulo (Cadastral Plans Section, Secretariat of Finance, Prefecture of São Paulo)	SPC-SP
Secção do Cadastro, Diretório Geral de Obras e Viação da Prefeitura de Pôrto Alegre, Rio Grande do Sul (Cadastral Section, General Bureau of Works and Transport, Prefecture of Pôrto Alegre, Rio Grande do Sul)	SC-PA

II. Private Agencies.

Clube de Engenharia (Engineering Club)	CE
Companhia Lithográfica Ypiranga (Ypiranga Lithographic Co.)	Ypiranga
Companhia Melhoramentos de São Paulo: Indústrias de Papel (Development Company of São Paulo: Paper Industries)	Melhoramentos
Departamento de Aerofotogrametria, Servicos Aéreos Cruzeiro do Sul (Air Photogrammetry Department, Cruzeiro do Sul Air Service)	CdoS
Empreza de Topografia, Urbanismo e Construções, Ltda. (Topography, Urbanism, and Construction Co., Ltd.)	ETUC
Great Western of Brazil Railroad	
Guia Levi (Levi Guide)	

Private Agencies.

	Abbreviations
Instituto Cartográfico Castiglione (Castiglione Cartographic Institute)	ICC
Instituto Geocartográfico Sagres (Sagres Geographical Institute)	
Livraria Central de Alberto Entres (Central Bookstore of Alberto Entres)	
Livraria do Globo, S.A. (The Globe Bookstore Co.)	O GLOBO
Esso Standard Oil Company	Esso
Touring Club do Brazil (Touring Club of Brazil)	TCB

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GPO—SSO—5897

Approved For Release 2000/04/17 : CIA-RDP79-00976A000200010001-6