

History of the
Telephone and Telegraph
in
Brazil

1851—1921

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BRAZIL

Area: 3,276,358 square miles

Population: 30,553,000 (census of 1920)

Capital: Rio de Janeiro. Population 1,130,000 (census of 1920)

STATE TELEGRAPH

Introduction and Development under the Empire, 1851-1889

The introduction of the telegraph in Brazil is contemporaneous with the war waged by the Empire from 1851 to 1854 in defense of Uruguay against the Argentine dictator, Rosas. According to the "Memoria Historica"* Euzebio de Queiroz Coutinho Mattoso da Camara, then Minister of Justice, notified the Director of Semaphores on May 5, 1851, that he had decided to replace the optical telegraph with the then recently invented electric telegraph. In the same year the Brazilian Minister at Washington, Sergio Teixeira de Macedo, transmitted to his home government a proposal of J. L. Leonardt, a citizen of the United States, to interconnect various important cities of Brazil by electric telegraph lines. This offer, however, was not accepted.

It is reported that Euzebio de Queiroz decided to discontinue the slow-working optical telegraph, which up to that time had been the only means of transmitting messages in Brazil, as rapid communication

*Official publication of the Brazilian Telegraph Administration, printed in Rio de Janeiro, 1909.

between Rio de Janeiro and the port of Mangaratiba had become imperative so as to prevent the illegal landing of slaves, which was a frequent occurrence in those days. To carry out this project Euzebio de Queiroz instructed Dr. Paula Candido, a professor at the School of Medicine, to build a short trial line between the police headquarters in the capital and the optical telegraph station on Castello Hill. Dr. Candido, with the assistance of Colonel Polydoro Q. da Fonseca Jordão, police commissioner, secured the loan of a telegraph apparatus from Dr. G. Schüch de Capanema, professor of physics at the Escola Central. A few days later the Colonel, bitterly disappointed, returned the apparatus to the professor, saying: "Tome lá as suas machinas que não prestam." (Take back your apparatus which is useless.) He soon learned, however, that he was mistaken, for Dr. Capanema connected up the apparatus properly and gave Colonel Polydoro an actual demonstration of electrical transmission. Realizing the value of the new means of electrical communication, Colonel Polydoro went immediately to Queiroz and obtained from him an order instructing Dr. Capanema to build a line from Quinta Imperial, the country residence of the Emperor, to the Quartel do Campo, the military headquarters. This line, although constructed with cheap material, operated satisfactorily, and on May 11, 1852, telegrams were exchanged between the Emperor and Queiroz and Capanema, both stationed at military headquarters. This date is officially recognized as the date of the introduction of the telegraph in Brazil. Shortly after this took place the Consul of Brazil in Prussia was requested to

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obtain five sets of Morse duplex telegraph apparatus and some line material. This equipment was received from Europe in the following year and a line was constructed between the various military establishments and the capital.

The first ordinance relating to the electric telegraph was issued by the Minister of Justice on January 17, 1864, and provided for the telegraphic interconnection of important administrative offices.

In Brazil, as in many other countries, the electric telegraph lacked the support of the public during its early development. In fact, an examination of the newspapers published in Rio de Janeiro during this period shows that there were the usual scoffers who predicted that, on account of the climatic conditions prevailing in Brazil, that country was unsuited for the successful use of the electric telegraph. Undaunted by such statements, however, Dr. Capanema commenced the construction of a line from the capital to Petropolis. The total length of this line was 50 kilometers (about 31 miles) of which 15 kilometers consisted of a submarine cable. By an imperial ordinance of March 17, 1855, Dr. Capanema was appointed Director Geral dos Telegraphos Electricos (Director General of Electric Telegraphs), and was requested to create an administrative office known as Direccão Geral.

The electric telegraph was used for official business only until 1858, when on August 1st the Government opened the Prainha-Mauá-Fragoso-Petropolis line to the public.

The first "Reglamento" or rules and regulations governing the telegraph service are embodied in

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decree No. 2614 of July 21, 1860, which stated that the telegraph service should be placed under the direct supervision of the Ministry of Agriculture, Commerce and Public Works. This decree prescribed that service should be furnished to the public between the hours of 6 A.M. and 6 P.M. in summer and 7 A.M. and 5 P.M. in winter, and established a tariff consisting of a charge of 80 reis* (2.6 cents) per word for a message of 20 words and 40 reis (1.3 cents) for each additional 20 words.

From 1852 to 1860 the Government spent 136,863 milreis (\$45,165) upon the electric telegraph, of which 68,993 milreis (\$22,768) was for salaries and wages and the balance for material. In 1861, nine years after the inauguration of the telegraph in Brazil, the total extension of line was 65 kilometers (about 40 miles), consisting of the Prainha-Petropolis line of 50 kilometers and 15 kilometers of line within the city of Rio de Janeiro. At that time there were 10 telegraph offices and 16 sets of telegraph apparatus in the country.

Decree No. 3519 of September 30, 1865, changed the telegraph tariff of 1860 and made the rate for an ordinary telegram of 20 words sent over a line of 200 kilometers (124 miles) one milreis (33 cents), with a further charge of 500 reis (16.5 cents) for each additional 10 words. This rate increased proportionally for each additional 200 kilometers of line.

From 1865 to 1870 the Empire employed all its resources in carrying on the sanguinary war against the Paraguayan dictator, Francisco Lopez, who had invaded Argentina, Uruguay and Brazil. Robert P.

*One paper milreis (1,000 reis) approximately 33 cents in U. S. currency.

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Porter, in his book "The Ten Republics," states that this war cost Brazil £50,000,000 (about \$243,000,000), and adds, "an expenditure which indicates the material progress she had made, since it did not quite ruin her." It was in the second year of the war that Dr. Capanema conceived the idea of having a telegraph train accompany the field forces and to use the telegraph for connecting the military headquarters in Tuyu-Cué with the advance guards. At the outbreak of the war the Government instructed the Director of Telegraphs to build a line from the capital to Porto Alegre, which line was opened in September, 1866. Later on Rio de Janeiro was placed in telegraphic connection with Tijuca and Botafogo, and the line from the fortress of Santa Cruz was extended to Nictheroy.

Although the rules and regulations stated that the electric telegraph constituted a monopoly of the Government, decree No. 4350 of April 5, 1868, provided for competitive telegraph service by private companies. In accordance with this decree a 20-year concession was granted to F. A. Kieffer for the construction of a telegraph line between Rio de Janeiro and Ouro Preto, with branch lines to Rezende and S. João da Barra.

Under decree No. 4491 of March 23, 1870, Charles T. Bright, E. B. Webb, and William Jones received a 60-year concession to lay a submarine cable to the north and south of Rio de Janeiro, the northern terminal to be the city of Pará (province of Pará) and the southern S. Pedro (province of Rio Grande do Sul), thus practically extending along the entire coast of Brazil. This concession also gave the

syndicate authority to link up its northern cable routes with transatlantic lines to Europe and to the United States of North America. Article 2 of this contract, which was signed by Diogo V. Cavalcanti de Albuquerque, representing the Imperial Government, stipulated that telegraphic connection should be established with the following provinces:

- A. To the North: Rio de Janeiro, Espirito Santo, Bahia, Sergipe, Alagoas, Pernambuco, Parahyba, Ceará, Piahy and Maranhão.
- B. To the South: São Paulo, Paraná, and Santa Catharina.

Article 4 provided that the concession should be valid for 60 years from the date of the signing of the contract and that during this period the Government would not permit any other submarine cable to be laid to any point reached by the cable of this syndicate. Article 6 specified that the cable had to be in operation by two years from the date of the signing of the contract. Article 14 declared that at the expiration of the concession the cable and land line plant of the concessionaire should revert to the Brazilian Government "sem indemnisação alguma" (without any indemnity), while in the following article the Government reserved to itself the right to take over the cable after the first ten years of actual operation at a price to be ascertained by arbiters. In 1873 the concession obtained by the syndicate was transferred to the Telegraph Construction & Maintenance Company, Ltd., which in turn transferred it to the Western & Brazilian Telegraph Company.

Telegraph service between Rio de Janeiro and the

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provinces of Bahia, Pernambuco and Pará began on December 24, 1875, the first message being sent by the Emperor congratulating the three provinces "por tão fausto acontecimento" (for such a proud achievement).

At this point it is of interest to note that from the beginning of the Government telegraph Dr. Capanema opposed granting concessions for furnishing telegraphic communication to private parties and maintained that the telegraph service should be the exclusive monopoly of the Government. One of the main reasons for his taking this stand was the heavy annual deficits of the telegraph service and his desire to so increase the receipts, which he evidently believed could be done if the Government owned all the telegraph lines, that the Legislature might have no cause for cutting down the large appropriations demanded by the Director General for the rapid extension of the telegraph. Naturally his firm opposition made him unpopular with various business interests who severely criticized him for his lack of good judgment. To combat these attacks Dr. Capanema wrote a series of valuable articles in 1869 which were published in the newspapers of the metropolis in which he refuted the charges brought against his administration and revealed to the public what he termed the shortsightedness of the Government in failing to protect one of its most important monopolies against dangerous private competition.

The report of the Minister of Commerce, submitted to the first session of the Fourteenth Congress of Brazil, gives the extent of the State telegraph plant in 1869 as follows: "We have at present 316½ leagues

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(about 1,297 miles) of telegraph besides 40 leagues (164 miles) under construction and 75 leagues (307 miles) already authorized to be built." Up to 1869 the Government had spent 282,000 milreis (\$93,000) on the telegraph, an expenditure of 135 milreis (\$44.55) per kilometer of line, "preços estos que me parecen muito elevados" (figures that appear to me extremely high). The detailed statistics of the State telegraph at that time were:

	Kilometers of Wire	Number of Offices
City lines	22	11
Line to Petropolis	50	3
Line to lighthouse near Cabo Frio	165	3
Line from Rio de Janeiro to Porto Alegre	1,452	18
Line from Porto Alegre to Pelotas	60	4
Line from S. João da Barra to Campos	340	12
Total	2,089 = 1,297 miles	51

Toward the end of 1870 the Government promulgated decree No. 4653 together with rules relating to the construction and maintenance of telegraph lines along railroads. In accordance with this decree the concessionaire was authorized to construct and maintain the lines and obliged to hand over to the Administration a special wire for the transmission of public messages. The decree also authorized industrial establishments to connect their places of business with the nearest telegraph office.

In the same year the Telegraph Administration, with the approval of the Legislature, published a new rate schedule based upon an ordinary message of 20 words plus one-half of the first charge for each additional 10 words, and also plus certain amounts for the longer distances traversed by a message.

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This schedule established the following rates for an ordinary message:

Distance up to	200 kilometers	1 milreis
From 201	400	2
" 401	600	3
" 601	800	4
" 801	1,000	5
" 1,001	1,300	6
" 1,301	1,600	7
" 1,601	2,000	8
" 2,001	2,400	9
" 2,401	2,800	10
" 2,801	3,200	11
" 3,201	3,600	12
" 3,601	4,000	13
" 4,001	4,500	14
" 4,501	5,000	15

For messages written in a foreign language or in cipher, and also for preferred or urgent telegrams, twice the ordinary rates were charged. This rate scheme remained in force until 1881.

The report presented to the Brazilian Congress of 1871 by the Minister of Commerce, reviewed the progress of the telegraph since its origin, and concluded as follows: "It is well known that only after 1864 did the construction of telegraph lines in Brazil receive any encouragement, but it is equally true that, so far, we have done very little with this service when we consider that the telegraph is a public service which plays an important rôle in the promotion of commerce and good government and whose advantages are recognized by all civilized countries. Consequently, despite our drawbacks, we should try to make up for the time lost."

Meanwhile, in the neighboring republics of Argentina and Uruguay the telegraph had rapidly developed so that their lines approached close to the frontiers of Brazil and made international telegraphic

communication highly desirable. The first international telegraph line was constructed by an English firm and extended from the boundary of Uruguay to Jaguarão, Brazil. Soon afterward another concern laid a cable to the city of Rio Grande. In 1871 the Telegraph Administration finished a line to Curityba (province of Paraná) and also one connecting Pelotas and Porto Alegre (province of Rio Grande do Sul). The Jaguarão office, at the southern frontier of Brazil, was opened for service October 29, 1871.

The most important event of the following year was the granting of a 20-year concession, by decree No. 5058 of August 16, 1872, to Baron de Mauá to lay and operate a submarine cable between Brazil and Portugal and the Portuguese possessions, thus establishing direct telegraphic communication between Brazil and Europe. The contract drawn up between Baron de Mauá and Viscount de Itaúna, representing the Emperor of Brazil, stipulated that the cable should start from the Cape of S. Roque (province of Rio Grande do Norte) and should go via Cape Verde Islands and Madeira to Lisbon. By decree of June 18, 1873, Baron de Mauá was permitted to transfer this concession to the Brazilian Submarine Telegraph Company, Ltd. The latter arranged with the Telegraph Construction and Maintenance Company, Ltd., to perform the work of laying the cable, and service was inaugurated in July, 1874.

During 1873 the telegraph was extended to the city of Itapemirim (province of Espírito Santo) which also made possible the continuation of that

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line to Maceió (province of Alagoas) in northern Brazil. The gain in important telegraph lines in the south is noteworthy, the branch from Santos to S. Paulo being of particular importance. During the next year the Government continued its policy of providing telegraph lines to northern Brazil, the Victoria (province of Pernambuco) office being opened February 26th and those at Bahia (province of Bahia) and Aracajú (province of Sergipe) on November 8th of the same year.

Active construction work continued during 1875, the telegraph reaching the capital of the province of Parahyba in that year and in the year following was extended to the province of Rio Grande do Norte. By the end of 1879 thirteen of the twenty provinces of the Empire were in telegraphic communication with the capital and in 1881 communication was established with Fortaleza (province of Ceará).

By decree No. 8354 of December 27, 1881, the Administration again introduced a new telegraph tariff which established a charge of 100 reis (3.3 cents) per word, counting 10 letters as one word, for a domestic message and a unit distance of 400 kilometers (248 miles). While the new tariff decreased the cost of ordinary messages over comparatively short distances, it greatly increased the cost of telegrams over longer hauls, such as that between the capital and Belem, a line distance of about 5,000 kilometers ((3,105 miles). This fact is commented upon in the 1899 Relatorio, where it is stated that the cost of such a message, figured on the 1881 tariff, amounted to 26 milreis (\$8.58). This tariff was retained until the fall of the Empire in

1889 and was modified by decree No. 372A, issued by the Provisional Government on May 2, 1890.

By 1884 the telegraph had been completed to S. Luiz (province of Maranhão). By order of the Emperor, Don Pedro II, the telegraph stations included on this line were opened to the public on December 14, 1884. The day before the inauguration of the service, Dr. Capanema, Director General of Telegraphs, with the assistance of D. Eduardo Jones, Manager of the Uruguayan telegraphs, arranged to have a message sent from Therezina (province of Piahy) via S. Luiz to Montevideo, a distance of 9,700 kilometers (6,023 miles). The experiment proved an entire success, the message taking only six minutes to pass between the two terminal points. Due to the satisfactory transmission over this trial line the Director General of Posts and Telegraphs of Argentina ordered direct telegraphic connection to be established between Rio de Janeiro, Montevideo and Buenos Aires.

Another important work executed under the supervision of Dr. Capanema was the construction of a line to Pará (or Belem), the terminus of the submarine cable that was to connect Brazil with the United States of North America. This line was finished October 13, 1886.

Except for the construction of some branch lines connecting various cities along the coast of Brazil, nothing of importance was done in connection with the telegraph service during the year prior to the fall of the Empire and the establishment of the Republic.

The "Memoria Historica" states that the conditions which confronted the Director General during

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the last years prior to his retirement became more and more unsatisfactory and that, despite the many years of incessant toil, the old Director General, who had earned the proud title of "Father of the Brazilian Telegraphs," saw his best efforts prejudiced because the Republican Government failed to provide the necessary funds for new lines and proper maintenance of the existing plant which was rapidly deteriorating. Moreover, his authority as managing director was frequently weakened or overridden by the promotion of incompetent persons over the heads of the thoroughly competent and well-trained old employees. At the same time the volume of traffic of unwarranted official free messages frequently assumed such proportions as to seriously interfere with the transmission of private paid telegrams, and the consequent delay in their delivery led to many bitter complaints by the general public. In addition, the ever increasing number of official messages steadily reduced the telegraph revenue which was also detrimentally affected by the competition of the private railroads and the powerful English cable companies. Consequently, the annual telegraph deficit rose higher from year to year. Finally, the telephone service, which the Government should have developed as a feeder to the National telegraph revenue, had been entirely abandoned to private interests who frequently obtained unwarranted concessions. According to the writer of the "Memoria Historica" these conditions caused Dr. Capanema to resign and thus avoid a clash between his own well-established method of managing the telegraph and the antagonistic methods advocated and enforced

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by those at the head of the Republican Administration.

STATISTICS OF THE BRAZILIAN TELEGRAPH

1861-1889

Year	Kilometers of Wire	Number of Stations	Number of Telegrams	Gross Revenue (milreis)	Annual Deficit* (milreis)
1861.....	65	10	233	328	41,000
1865.....	187	23	3,088	6,293	534,000
1870.....	2,089	51	44,775	127,829	207,000
1874.....	6,286	81	103,689	252,745	1,445,000
1881.....	13,000	135	383,147	1,241,770	390,000
1882.....	13,249	136	338,053	1,220,182	660,000
1883.....	13,651	139	331,884	1,039,932	739,000
1884.....	15,262	159	367,779	1,345,203	764,000
1885.....	18,197	171	390,277	1,219,794	1,381,000
1886.....	18,311	171	656,575†	1,789,939†	1,078,000†
1887.....	18,363	170	521,886	1,304,207	729,000
1888.....	18,488	173	637,382	1,968,649	309,000
1889.....	18,925	182			

*Includes capital expenditures.

† Includes second half of 1887.

The Telegraph under the Republic, 1889-1921

The Republic of Brazil was established on November 15, 1889, under the military dictatorship of Marshal de Fonseca amidst civil contention and a severe financial and economic crisis. Through the emancipation of the slaves under the former Emperor the country had been plunged into a state of disorder which in 1892 culminated in a revolution lasting in the province of Rio Grande do Sul until July, 1895.

The change of government introduced more modern ideas concerning the management of all public services, including the telegraph as is illustrated by decree No. 199 of February 6, 1890, which cedes to the municipality of Rio de Janeiro the telephone

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service within its boundaries. Unfortunately, however, decree No. 372A, issued the following May, flatly contradicted the disposition of the February decree by providing in article I that both the telegraph and telephone lines in the territory of the Republic, built for service to be furnished either by the Administration or by private parties, are the property of the Government. The legislative tangle was finally straightened out by article 7, paragraph 4, and article 9, paragraph 4, of the new constitution, adopted on February 24, 1891, which authorized the States comprising the Union to construct telegraph lines, not only within their own territory, but also to points in adjacent States not reached by the Federal telegraph, provided, however, that all such lines might be acquired later on by the Federal Government. The new constitution also established the absolute sovereignty of municipalities over the electric, traction, light and power services.

For a clear understanding of the powers granted by the constitution both to the Federal Government and to the States in regard to legislation upon matters pertaining to the telegraph and telephone services, the following paragraph, written by a leading Brazilian lawyer in answer to a request for a correct interpretation of articles 7 and 9, is quoted.

"In regard to the competency of the Federal and State Governments to legislate upon this matter it is clear that both have this power, which, however, cannot be exercised concurrently. It evidently was the intention of the Brazilian legislators not to give the Union the monopoly of such services for fear such monopoly would tend to discourage the development of these public utilities in a country of such

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vast area. For this reason the power given to the Union by article 7, paragraph 4, to make rates for the Federal telegraph was also extended to the States by article 9 which reads: 'the States possess also the exclusive right to make rates for their own telegraph lines,' while paragraph 4 of the same article reads: 'the right to establish telegraph lines between points within their own territory and likewise to points within other States not served by telegraph lines is reserved to the States; however, the Union may take possession of such lines in the interest of the general welfare of the country.' In other words, although the States of the Union have the right to establish telegraph systems within their own territory or with neighboring States, such right cannot be exercised in conflict with the Federal power."

No change occurred, however, in the policy of the Government to oppose the interconnection of neighboring States by private lines, which opposition was based on the ground that such concessions would interfere with the National telegraph system, reduce the earnings of the Government lines, and afford means of communication over which the Government would not have the control it desired to maintain. While this policy did not restrict to any appreciable extent the construction of private telegraph lines, of which by far the majority served the operation of railroads, the same policy, when applied to the telephone, prevented and suppressed the building of interstate long distance lines thus hindering the development of one of the most efficacious means of advancing the commercial life of a nation.

As this subject will be taken up in the chapter dealing with private telephone service, it suffices to state here that it was through the efforts of the Rio

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de Janeiro Tramway, Light and Power Company, Limited, that the Federal authorities decided in 1909 to refer the entire matter to the Brazilian Congress with the understanding that the latter would dispose, not only of the petition then pending to interconnect the Federal District telephonically with the State of Rio de Janeiro, but would pass such legislation in the treatment of this particular case as to definitely settle the matter of interstate telephone communication. Such legislation was duly enacted and by removing the former interstate restrictions made possible the direct connection of the principal commercial centers of Brazil by telephone.

Shortly after the establishment of the Provisional Government, which lasted from November 15, 1889, to January, 1891, that body considered it advisable to connect the States of Goyaz and Matto Grosso with the National telegraph, and for this purpose instructed the Telegraph Administration to install telegraph offices at Goyaz and Cuyaba, where service was inaugurated October 1, 1890, and December 31, 1891, respectively.

The budget for the year 1890 also carried an appropriation of 1,500 contos* (\$495,000) for the construction of a telegraph line between Belem (State of Pará) and Manaus (State of Amazonas). Work was started and continued for one year when, after an expenditure of 1,000 contos (\$330,000) operations were suspended due to the lack of funds in the National Treasury.

Desiring to popularize the telegraph service, the Provisional Government issued decree 372A of

* One conto (1,000 paper milreis) approximately \$330 in U. S. currency.

May 2, 1890, which reduced the rate for a domestic telegram to 70 reis (2.3 cents) per word, a word not to exceed 15 letters, and also authorized a 50% reduction in the regular rate for press messages. An annual charge of 10 milreis (\$3.30) for the telegraphic registration of addresses was an innovation introduced at this time.

Of far-reaching importance for the development of the commerce of the country was the determined effort of the Provisional Government to provide additional cable facilities. By decree No. 944 of November 1, 1890, the Western and Brazilian Telegraph Company, Ltd., received permission to lay a second coastal cable to the north and south of the capital. In furtherance of the same policy the Provisional Government advertised that it was ready to receive bids for the laying of a submarine cable connecting Brazil with the United States of North America, with the result that the Société Générale des Téléphones and the Société Française des Télégraphes Sous-Marins received a 25-year concession by decree No. 216A of February 22, 1890. This contract provided that Vizeu (State of Pará) should be the starting point, but subsequently, with the permission of the Government, the licensee transferred the starting point to a place near Salinas, also in the State of Pará. Service over this route began September 1, 1892.

Additional cable facilities were provided by decree No. 128 of April 11, 1891, whereby the Provisional Government granted a 25-year concession to William Parsoné, representing the India Rubber, Gutta Percha and Telegraph Works Company, Ltd., of

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London, for the laying of a cable, or cables, between Pernambuco (State of Pernambuco) and St. Louis in Senegal, Africa, this cable to touch at the Island of Fernando do Noronha. Decree No. 965A of June 30, 1892, transferred this concession to the South American Cable Company, Ltd., an English concern registered July 4, 1891, which, under an agreement with the former concessionaire, acquired the 2,165 miles of cable already laid.

That the change of Government caused a remarkable expansion of Brazilian commerce and industries is shown by the increase in telegraph traffic during the 10-year period 1890-1899 as compared with the preceding decade. From 1880-1889 the average yearly number of telegrams was approximately 420,000, and the largest number of messages in a single year was 657,000 in 1887, while during the period 1890-1899 the average number of telegrams per year was 1,290,000 (over three times the volume in the previous decade), with the largest number of messages in a single year 1,722,000.

To take care of the increased traffic the Telegraph Administration equipped a number of the great trunk lines with additional wires. However, despite such increased facilities the service did not improve because, as the writer of the "*Memoria Historica*" states, the trouble was not due to lack of wires, but to imperfect and bad transmission which resulted in an average transmission of scarcely three words per minute. Naturally, the Administration turned its attention to the use of rapid telegraph systems and in 1897 installed Baudot apparatus on the line between Rio de Janeiro and S. Paulo.

The success attained with this system led to the general use of Baudot apparatus on the line between Rio de Janeiro and Recife (State of Pernambuco) a distance of 1,800 kilometers (1,118 miles) and also between Rio de Janeiro and Porto Alegre (State of Rio Grande do Sul). A further improvement in the service was brought about by the use of the Hughes Printing Telegraph.

Decree No. 2000 of April 2, 1895, signed by the first civil president of Brazil, Prudente J. de Moraes Barros, granted a 30-year exclusive concession to Richard J. Reidy, as the representative of the Amazon Telegraph Company, Ltd., for the establishment of telegraphic communication through a subfluvial cable between the capitals of Pará and Amazonas, the two most northern States of Brazil. The cable was constructed and laid by Siemens Brothers & Company, Ltd., at a cost of £211,000 (\$1,027,000) and was completed in February, 1896, with a total length of 1,365 miles. In later years when the laying of a second cable between Belem and S. José de Amatary became imperative in order to guard against the frequent interruptions to the service, the Government extended the life of the contract to April 2, 1945.

Upon the enactment of law No. 391 of October 7, 1896, a dispute of long standing between the Administration and the privately owned and operated railroads furnishing public telegraph service was terminated. This contention originated in 1870 when the Government issued decree No. 4653 with rules and regulations for the construction and maintenance of telegraph lines along railroads. In the memoir accompanying the decree the Minister had advised

the Government that in the interest of the State telegraph service the railroads should be called upon to cede to the Administration one conductor on each of their telegraph lines. As the railroads reached many places at a considerable distance from the then existing State telegraph offices it was evident that by making this proposal obligatory the State telegraph could gain a large number of offices and lines without any expense to the National Treasury. Nothing was done until 1878 when the Legislature passed decree No. 6995 which established the basis for the granting of railroad concessions and which authorized the Government to use the poles of the railroad telegraph lines for a State telegraph wire, which was to be maintained by the railroad companies. As this law put a heavy burden on the companies it was changed in 1881, eliminating the provision compelling the companies to maintain the State owned wire, and providing in its place that the companies should grant to the Government the use of one wire on each railroad telegraph line. This obligation, however, was not fulfilled on the part of the companies. Moreover, relying upon the terms of their concessions, the railroads gradually became sharp competitors of the State telegraph and diverted a considerable volume of traffic from the State lines by offering to the public service at rates lower than those charged by the Telegraph Administration. After various attempts to settle this unsatisfactory condition the Government, on October 7, 1896, enacted law No. 391 by which all railroad telegraph lines became an integral part of the Federal Telegraph. This act stipulated that the traffic over

railroad telegraph lines, including the rates to be charged, was to be governed by the rules and regulations of the Telegraph Administration.

The years 1895 to 1907 constitute a period during which the Telegraph Administration made a continuous effort to find a rate system which would lower the constantly recurring heavy deficits produced by this branch of the public service, and at the same time induce the public to make a far more extensive use of the Federal Telegraph. Bearing in mind the tremendous area of Brazil and consequently the need of providing extremely long and costly trunk lines, often built through vast and almost uninhabited regions, it is evident that the task of elaborating a tariff system which adequately covered the cost of what may be termed a short and a long haul telegraph message was one that required the exertion of the utmost ingenuity on the part of the Legislature and therefore many tentative rate schedules were tried, the most important of which are the following:

Law No. 359 of December 30, 1895, which reduced to 60 reis (2 cents) the rate per word, provided a basic charge of 400 reis (13.2 cents) per telegram, and made the total charge of a message dependent upon the number of zones through which it passed, each State of the Federation constituting a telegraphic zone.

Law No. 391 of October 7, 1896, conceded a reduction of 50% to telegrams sent by State officials, and law No. 428 of December 10, 1896, granted press messages a reduction of 75% of the ordinary rate.

Law No. 741 of December 26, 1900, reduced the rate per word from 1.50 francs (30 cents) to 1 franc (20 cents) for international telegrams exchanged between the Republics

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south of Brazil with its northern zone, and to 0.50 francs (10 cents) for the same class of messages exchanged with the zone south of the capital.

Law No. 813 of December 23, 1901, authorized the Government to introduce deferred messages at greatly reduced rates. The schedule for this class of telegrams was published in 1902 and ranged from 80 reis (2.6 cents) per word for a telegram passing through but one State to 530 reis (17.5 cents) per word for a message traversing the entire 16 States of the Federation.

Law No. 1616 of December 30, 1906, abolished the use of deferred messages and adopted the following rates for domestic telegrams:

100 reis	per word	for a message	within 1 State.						
200	"	"	"	"	"	passing through	2 States.		
300	"	"	"	"	"	"	3	"	
400	"	"	"	"	"	"	4	"	
500	"	"	"	"	"	"	5	"	or more.

Law No. 1837 of December 31, 1907, which reduced the five rate classes of the 1906 law to three, was as follows:

100 reis	per word	for a message	within 1 State.						
200	"	"	"	"	"	passing through	2 or 3 States.		
300	"	"	"	"	"	"	4 or more States.		

As an item of historical interest the celebration in 1902 by the Telegraph Administration of the 50th anniversary of the inauguration of the first telegraph line by Dr. Capanema deserves mention. It is also of interest to note that in 1904 the exchange of a telegram by Morse apparatus took place between Rio de Janeiro and Chile over the Trans-Andine line, a distance of about 7,000 kilometers (4,347 miles), and in 1906 the operation by Baudot rapid telegraph apparatus of the great trunk line between Rio Grande and Fortaleza, a distance of about 5,500 kilometers (3,415 miles).

Except for the development of the radiotelegraph and State telephone service, which subjects are

treated in separate chapters, the Telegraph Administration directed its efforts from 1907 to the outbreak of the World War in 1914 largely to the further expansion of the Federal lines, the betterment of the living conditions of the employees, and the reorganization of the staff with a view of cutting down the annual expenses of the service.

Early in 1908 an important strategical line was started to connect the States of Matto Grosso and Amazonas. This is a fair example of similar long and costly lines which the Federal Administration felt required to build through the almost uninhabited regions of the distant States. In his annual report for 1908 to the Minister of Ways and Public Works, the Director General, Luiz van Erven, in speaking of the above line states that the majority of the laborers employed on the branch lines had been so badly affected with malaria that they had to be laid off, and that the gang working on the main line, under the direction of Lieutenant Colonel Candido Rondo, had been attacked by the Indians who had fled from their villages at the approach of the construction gang. Only the liberal distribution of gifts prevented serious loss of life and induced the warring Indians to return to their homes.

Aside from the long interruption of 246 days in telegraphic communication between Belem and Manáos, owing to the breaking down of the Amazon River cable, the year 1908 is noteworthy in the history of the Brazilian telegraph because during that year the Government granted to a German firm an important concession for laying a cable between the coast of Brazil and the Island of Teneriffe, connect-

ing at that point with the cables of the South American Cable Company to West Africa. Thus Brazil obtained a new telegraph route to Central Europe and South America with a subsequent substantial reduction in the transatlantic cable rate. This concession was transferred to the Deutsch-Südamerikanische Telegraphengesellschaft by decree No. 7598 of October 14, 1909.

In October of the year 1909 the Government granted a concession to Richard J. Reidy for laying a cable between Belem and Nictheroy and from Nictheroy to Chuy. This concession was opposed by the Western Telegraph Company which demanded that it should be cancelled, and finally, by decree No. 10819 of March 18, 1914, the concession was declared forfeited.

During 1910 the Telegraph Administration at last completed a task of long standing, the revision of the rules and regulations established by decree No. 4053 of June 24, 1901. It had been evident for years that the salary expense incident to the management of the telegraph had been exorbitant, due largely to the number of superfluous highly paid officials. The new rules and regulations divided the service into four groups or sections, each in charge of a sub-director, and eliminated among others the positions of Vice General Director, Assistant Chief of the Technical Section, and Assistant Treasurer.

The subsequent two years, 1911 and 1912, were rather uneventful as far as the telegraph was concerned, the most important events being the opening of transatlantic service over the cable of the Deutsch-Südamerikanische Telegraphengesellschaft on March

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29, 1911, and by decree No. 9616 of June 13, 1912, the introduction of deferred international telegrams at a 50% reduction from the ordinary rate.

To satisfy the demands of the business people who were continually asking for cheaper service, the Legislature in authorizing the appropriation bill for 1913 again reduced the rates, making the basic charge for a domestic telegram 500 reis (16.5 cents) and creating two rates of 100 and 200 reis respectively (3.3 and 6.6 cents) for a message passing through one or more than one State.

The immediate result of this reduction in the rates was a heavy increase in the telegraph deficit in 1914 over that in 1913, the 1914 figure totalling 9,840 contos (\$3,247,000) as compared with 9,282 contos (\$3,063,000) for the preceding year. Concerning the loss in revenue, the Director General in his annual report to the Minister of Ways and Public Works writes: "The main cause of the decrease of the gross receipts is to be ascribed to the extremely low rates and the fact that there did not occur the expected corresponding increase in traffic."

During the first year of the World War the Brazilian Telegraph Administration, as well as similar departments of all other South American Republics, was forced to restrict its efforts primarily to the maintenance of the existing plant which in itself was a difficult problem as all the sources of European supplies had been cut off and the price of domestic material had increased enormously. Moreover, due to the disruption of general business the Government was obliged to exercise the strictest economy in all public services. Despite these con-

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ditions, the Director General, Euclides Barroso, in his annual report for 1915 was able to assure the Government that the plant had been maintained in perfect working condition.

During the third year of the World War the Brazilian Government issued decree No. 3296 of July 10, 1917, which made the radiotelegraph and radiotelephone services the exclusive monopoly of the Federation and established definite rules and regulations for these services. In connection with the 1917 annual report the Telegraph Administration published for the first time a complete list of the concessions granted by the Government since 1870 to companies and private parties for submarine and subfluvial cables. This is one of the most valuable sources of information available on that subject.

Although the Telegraph Administration has not issued an annual report since 1918, it appears from the last Message of the President to the Brazilian Congress, May 3, 1921, that the financial returns from the State telegraph service have greatly improved during the past 2 or 3 years. The following paragraphs are taken from this document:

"The telegraph system of Brazil reached on December 31, 1920, a development of 44,534 kilometers (27,655 miles) of pole lines with 79,791 kilometers (49,550 miles) of wire conductors. An examination of our telegraph map shows that the system is more compact in the States of Rio Grande do Sul, Minas Geraes, and Rio de Janeiro than in northern Brazil. The central part, being less populated, needs fewer lines, though there are in Matto Grosso about 4,500 kilometers (2,794 miles) and in Goyaz 1,552 kilometers (963 miles) of wire. The inhabited parts of the States of Pará

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and Amazonas use subfluvial lines and the radiotelegraphic stations, which render a great service to the inhabitants of the Territory of Acre.

STATISTICS OF THE BRAZILIAN TELEGRAPH

1890-1920

Year	Kilometers of Wire	Number of Stations	Number of Telegrams	Gross Revenue (milreis)	Annual Deficit (milreis)
1890.....	20,299	212	750,621	2,042,755	841,000
1891.....	28,268	233	1,001,535	2,765,899	909,000
1892.....	31,229	256	1,151,689	3,127,079	2,048,000
1893.....	34,251	272	1,132,432	3,256,873	2,830,000
1894.....	35,494	306	1,280,824	3,694,501	4,084,000
1895.....	37,218	338	1,469,404	3,915,538	4,997,000
1896.....	39,779	379	1,667,026	4,613,447	4,715,000
1897.....	40,138	372	1,724,192†	4,857,760	3,356,000
1898.....	40,232	371	1,380,528	6,666,917	434,000
1899.....	40,352	366	1,371,914	6,970,955	535,000
1900.....	41,677	390	1,353,675	6,819,307	642,000
1901.....	42,254	403	1,163,522	5,804,312	1,708,000
1902.....	44,640	426	1,201,849	6,141,276	1,490,000
1903.....	47,359	471	1,373,974	6,722,858	1,112,000
1904.....	49,384	488	1,524,987	7,347,003	612,000
1905.....	49,776	513	1,538,885	7,166,696	1,410,000
1906.....	51,286	531	1,745,848	8,097,172	2,045,000
1907.....	53,059	546	1,929,706	7,757,683	3,376,000
1908.....	54,817	578	2,249,586	7,847,584	4,270,000
1909.....	56,086	597	2,438,324	8,309,981	3,799,000
1910.....	57,140	630	2,788,906	9,748,017	3,326,000
1911.....	60,848	672	2,836,836	10,919,533	6,836,000
1912.....	61,681	717	3,680,026	12,257,687	7,589,000
1913.....	63,968	740	3,790,294	11,363,056	9,840,000
1914.....	68,082	752	3,974,562	11,403,075	9,282,000
1915.....	67,354	729	3,650,590	14,378,547	3,507,000
1916.....	70,439	748	3,930,144	15,701,669	2,892,000
1917.....	72,012	801	4,405,450	17,298,351	1,968,000
1918.....	72,658	857*	5,350,000*	19,000,000*	.....
1919.....	76,000*	914*	5,900,000*	20,800,000*	.....
1920.....	79,791	971	6,493,689	22,625,642	.....

* Estimated.

† For years subsequent to 1897 international telegrams are included.

“In 1920, 6,493,689 telegrams of 127,327,724 words were sent and in 1915 only 3,487,670 telegrams of 65,970,808 words, indicating that the traffic has doubled in the space of five years.

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"Last year 1,114 kilometers (691 miles) of lines were built and 26 telegraph stations were opened for traffic. The 971 telegraph stations of Brazil produced last year a revenue of 22,625,641 milreis (\$7,466,000) of which 5,897,055 milreis (\$1,946,000) represents the value of official messages.

"22,224,760 milreis paper (\$7,334,000) and 300,000 milreis gold (\$163,800) were expended during the past fiscal year for the conservation of the National telegraph. After deducting the cost of material purchased for the construction of new lines one can say that the revenue of the telegraph in Brazil covered the expenses. Five years ago, in 1914, the gross revenue of the telegraph was not half of what it was in 1920, while in addition, the expenses in 1914 were 20,685,144 milreis (\$6,826,000) with the revenue (excluding miscellaneous receipts) 10,905,185 (\$3,598,000) resulting in a deficit of nearly 100% of the revenue."

"Gross Revenue" consists of revenue from paid domestic and international telegrams, value of official telegrams, radio-telegraph receipts, State telephone revenue, and miscellaneous receipts.

"Annual Deficit" is largely due to the inclusion in expenditures of amounts spent yearly for new construction and material. Deducting this item, the telegraph revenue would cover expenses.

CABLE SERVICE

At the outbreak of the World War in 1914 the Republic of Brazil had four separate cable routes connecting it with the outside world, as follows:

1. Madeira Line. The Madeira line is operated by the Western Telegraph Company, Ltd., which was registered at London January 8, 1873, as the Brazilian Submarine Telegraph Company, Ltd., the name being changed on November 10, 1899, to the Western Telegraph Company, Ltd. This cable starts from Recife (State of Pernambuco) and goes via Cape Verde Islands and Madeira to Carcavellos

(near Lisbon, Portugal). The first cable connecting these points was laid in 1874 and had a length of 3,750 nautical miles. A second, laid in 1884, shortened the distance to 3,657 nautical miles. The Western Telegraph Company, Ltd., also owns and operates a number of submarine coastal cables between the cities of Pará, Maranhas, Ceará, Pernambuco, Bahia, Rio de Janeiro, Santos, Florianopolis and Rio Grande. From the latter city the cable goes to Montevideo (Uruguay). The longest of these cables are from Pará to Pernambuco, with 1,242 nautical miles, and another of 1,367 nautical miles from Pernambuco to Rio de Janeiro, both laid in 1900.

2. Fernando Noronha Line. By decree No. 128 of April 11, 1891, the Brazilian Government granted a concession to the India Rubber, Gutta Percha and Telegraph Works Company, Ltd., for the laying of a cable between Pernambuco and Senegal (Africa). Decree No. 965A of June 30, 1892, permitted the concessionaire to transfer his rights to the South American Cable Company, Ltd., registered at London July 4, 1891. The cable starts from Recife, touches at the Island of F. Noronha, and then continues to Dakar (Senegal). The length of this cable, which was laid in 1892, is 348 nautical miles from Recife to F. Noronha and 1,620 nautical miles from F. Noronha to Dakar, making a total length of 1,968 nautical miles.

3. Salinas Line. This cable is operated by the Compagnie Française des Cables Télégraphiques which received a concession from the Brazilian Government by decree No. 216A of February 22, 1890, authorizing the Société Générale des Télé-

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phones and the Société Française des Télégraphes Sous-Marins to establish telegraphic connection between the city of Vizeu (State of Pará) and the coast of the United States of North America. The life of the concession was for 25 years. At Santiago de Cuba this cable connects with those of the West India and Panama Telegraph Company and at Guantanamo (Cuba) connects with the cables of the All America Cables system which go to New York. This line was opened for service on September 1, 1892. The most important routes operated by the Compagnie Française des Cables Télégraphiques are:

Salinas to Cayenne (Fr. Guiana).....	505 nautical miles
Cayenne to Paramaribo (Dutch Guiana).....	268 " "
Paramaribo to Fort de France (Martinique).....	700 " "
Fort de France to Charlotte-Amélie (St. Thomas).....	372 " "
Charlotte-Amélie to Puerto Plata (Dominican Republic)	409 " "
Puerto Plata to Cap Haitien (Haiti).....	116 " "
Cap Haitien to St. Nicholas (Haiti).....	96 " "
St. Nicholas to Guantanamo (Cuba).....	119 " "

4. Teneriffe Line. This cable formerly belonged to the Deutsch-Südamerikanische Telegraphengesellschaft which prior to the World War operated five cables with a total length of 7,386 nautical miles. The original concession was granted by decree No. 7,051 of July 30, 1908, to Felten & Guillaume-Lahmeyerwerke Actien-Gesellschaft. A second decree (No. 7598 of October 14, 1908) permitted the concessionaire to transfer his rights to the Deutsch-Südamerikanische Telegraphengesellschaft. The route of the cable was:

Island of Borkum (near Emden) to Teneriffe (Canary Islands).....	2,107 nautical miles
Teneriffe to Monrovia (Liberia, Africa).....	1,798 " "
Monrovia to Pernambuco (Brazil).....	1,873 " "

Service over this route commenced on March 29, 1911.

In none of the South American countries having an extensive seacoast was the early need of rapid telegraphic intercommunication between the important commercial cities felt more intensely than in Brazil, where the Atlantic Ocean forms the natural boundary on the east and also on the north for a distance of about 5,000 miles from the frontier of Dutch Guiana to the boundary line of Uruguay.

The Telegraph Administration of Brazil fully recognized the importance of providing rapid telegraphic communication between the coastal cities and the capital, but was deterred by the enormous expense of constructing land lines over such vast distances with difficult engineering problems to be met. The need for submarine cables became more and more pronounced as the commerce and industries of these seacoast cities increased by leaps and bounds, making such inland lines as had been built entirely inadequate to take care of the volume of telegraphic traffic. Consequently, when various foreign interests proposed to the Government the interconnection by submarine cables of the capital with important seacoast cities to the north and south their offer was readily accepted, for at that time the country was not financially able to do the work itself. It is certain, however, that if the Government had foreseen the injurious competition which later developed between the submarine cable companies and the established inland telegraph lines, the granting of permits for the laying of such cables would have been more narrowly restricted than it was.

It has been stated in the beginning of this chapter that at the present date of writing the Western Telegraph Company, Ltd., owns and operates not only the Madeira cable but also the various coastal cables to the north and south of Rio de Janeiro, and also that prior to 1899 this company was known as the Brazilian Submarine Telegraph Company, Ltd. In that year, by decree No. 3307, the Brazilian Government authorized the amalgamation of the Brazilian Submarine Telegraph Company, Ltd., with the Western and Brazilian Telegraph Company, Ltd., the new company being called the Western Telegraph Company, Ltd. Through such amalgamation the latter company became the owner of two basic concessions granted by the Government of Brazil, namely, the concession granted by decree No. 4491 of March 23, 1870, to Charles T. Bright, and the one granted by decree No. 5058 of August 16, 1872, to Baron Mauá.

The subsequent data have been added to show through how many companies these concessions passed until they were finally combined under the management of the Western Telegraph Company, Ltd.

Decree No. 4491 of March 23, 1870, granted to Charles T. Bright, E. B. Webb, and William F. Jones a 60-year exclusive concession to lay and operate two submarine cables, both starting from the capital, one extending north to Pará (province of Pará) and the other south to S. Pedro (province of Rio Grande do Sul).

Decree No. 5234 of March 24, 1873, authorized the transfer of the original concession (decree No. 4491) to the Telegraph Construction and Maintenance Company, Ltd.

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Decree No. 5270 of April 26, 1873, authorized the renewal of the contract made with Charles T. Bright and others, and transferred to the Telegraph Construction and Maintenance Company, Ltd., for the construction of submarine cable lines to the north and south of the capital. Attached to decree No. 5270 were new stipulations concerning the time limit for establishing cable communication between the capital and the northern and southern terminals.

Decree No. 5489 of December 10, 1873, authorized the Western and Brazilian Telegraph Company, Ltd., to do business in Brazil.

Decree No. 5359 of January 31, 1874, approved the transfer to the Western and Brazilian Telegraph Company, Ltd., of the concession granted to the Telegraph Construction and Maintenance Company, Ltd.

Decree No. 5545 of February 7, 1874, authorized the Western and Brazilian Telegraph Company, Ltd., to extend the submarine cable from the city of Pará to Cayenne (French Guiana) and Surinam. Work must be commenced within 5 months and be entirely finished within 7 years.

Decree No. 5971 of July 21, 1875, authorized the West India and Panama Telegraph Company, Ltd., to operate in Brazil, and accepted the transfer to this company of the concession granted by decree No. 5545 to the Western and Brazilian Telegraph Company, Ltd.

Decree No. 6874 of April 6, 1878, extended the time limit for finishing the submarine cable line to northern Brazil, as stipulated in decree No. 5270.

Decree No. 7105 of December 3, 1878, again extended the time limit, this time for six months from October 6, 1878.

Decree No. 7814 of August 31, 1880, granted a concession to the Western and Brazilian Telegraph Company, Ltd., to extend its submarine cable from Pará to the Guianas (see decree No. 5545).

Decree No. 9184 of April 12, 1884, declared the concession granted by decree No. 7814 forfeited.

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Decree No. 944 of November 1, 1890. The Provisional Government granted a concession to the Western and Brazilian Telegraph Company, Ltd., to lay a second submarine cable along the coast of Brazil, following the route of the cable already laid.

Decree No. 3307 of June 6, 1899, authorized the amalgamation of the Brazilian Submarine Telegraph Company, Ltd., and the Western and Brazilian Telegraph Company, Ltd., the new company to be known as the Western Telegraph Company, Ltd.

The Western Telegraph Company, Ltd., therefore holds all the rights and privileges granted under decree No. 5270 of April 26, 1873, and decree No. 944 of November 1, 1890

Decree No. 3557 of January 16, 1900, authorized the Western Telegraph Company, Ltd., to do business in Brazil.

WIRELESS TELEGRAPH

In 1902 Joaquim Gonçalves de Lalor, an engineer acting as representative for R. Mardock, a citizen of the United States, applied to the governors of the States of Pará and Amazonas for a concession permitting him to install wireless telegraph stations along the rivers Tocantine, Purús, Madeira and Amazonas, and cited in support of his request the frequent interruptions of telegraphic communication between the coast and these States because of the faulty working of the submarine cable operated by the English company. R. Mardock, through J. G. de Lalor, received such concession in 1904 and transferred it to the Amazon Wireless Telegraph and Telephone Company, a corporation chartered in the State of Maine, U. S. A. This company erected wireless stations in 1905, using the Fessenden system, in Pinheiro (about 11 miles from Belem) and at

Breves (about 80 miles from Pinheiro). On account of imperfect transmission the Breves station was dismantled in the following year and the Pinheiro station was moved to Belem. At the same time the system invented by Shoemaker and Stone was installed in place of the Fessenden system. Having succeeded in securing this concession from the States of Pará and Amazonas, J. G. de Lalor asked the National Congress for authority to establish wireless service between these two States. The Chamber of Deputies referred the petition to a commission which on August 2, 1905, reported adversely on the ground that such concession would interfere with the telegraph monopoly of the Federation. Despite this adverse report the American company continued its work in the State of Pará and installed another wireless station at Santarem, about 460 miles from Belem, which distance, however, proved to be too great for maintaining regular service between these two points.

In 1905 José L. L. de Souza requested the Government for a 50-year concession to establish wireless stations within the entire territory of the Republic, which petition was rejected, owing to objections raised by the State Telegraph Administration.

Various other requests like the foregoing at last called the attention of the Brazilian legislators to the fact that no law had yet been enacted governing the installation and use of wireless stations within the National territory. To clarify this situation Dr. Gracho Cardoso, member of the Chamber of Deputies from the State of Ceará, presented a bill to the Legislature on November 6, 1907, as follows:

“Article 1: The installation of wireless apparatus and

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the exploitation of that service is the exclusive monopoly of the Government:

"Article 2: Concessions may be granted to the States, or to private parties, for the installation and operation of wireless telegraphy, it being understood, however, that the Government may at any time, and without incurring any liability, close or operate such installations, or temporarily prohibit their operation."

The above constituted the first attempt to secure for the Government the monopoly of the wireless telegraph service, but the bill was not passed.

In 1911 the Amazon Wireless Telegraph and Telephone Company established wireless stations in Manáos, Santarem and Belem, with modern wireless apparatus which had been purchased from the Telefunken Company of New York. On April 26, 1911, decree No. 8186 was passed, authorizing the Amazon Wireless Telegraph and Telephone Company to operate wireless stations throughout Brazil. This decree was issued only after several other attempts to obtain wireless telegraph concessions from the Federal Government had failed.

While so far no mention has been made of the entrance of the Brazilian Telegraph Administration into the field of wireless telegraphy, the Administration had by no means remained inactive. As a matter of fact, experimental trials had been undertaken in 1904 between a station in the fortress of Santa Cruz and a receiving station which had been installed on Grande Island, the distance between the two points being about 68 miles. Experiments were continued during the next two years, both with wireless transmission between land lines and between land and ship stations. By 1907 the progress

which had been made led the Telegraph Administration to report favorably on wireless telegraph to the President. In the same year (May 15, 1907) the President submitted to the National Congress the protocol of the International Wireless Convention of Berlin, with the recommendation that Brazil should join the Convention and in November, 1907, by decree No. 1775, the National Congress approved this recommendation.

The rapidly increasing use of wireless transmission led the 1908 National Congress to attach to the bill which authorized the appropriations for the ensuing year a demand for the appointment of a technical commission to inaugurate wireless telegraph service in Brazil. This commission was made up of representatives chosen by the Ministry of Industries, Ways and Public Works, and the Ministries of War and Navy, and the work entrusted to them was so successfully performed that by the end of the year the draft of a new law specifying the rules and regulations for governing the wireless telegraph service was laid before the Government. This proposed law was passed by decree No. 8542 of February 1, 1911.

In March of the year 1909 the Telegraph Administration began the erection of a wireless station to replace the semaphore office on Babylonian Hill. Upon the completion of this work on July 14, 1909, the Administration vigorously applied itself to the installation of three additional wireless stations. Of these, Amaralina (State of Bahia) was opened for public service on August 9, 1910, Olinda on October 22, 1910, and the high power station of Noronha,

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with a sending radius of 1,000 nautical miles, on November 15, 1910. Statistics published in the report of the Telegraph Director for 1910 give the number of wireless messages transmitted during 1909 and 1910 as 310 and 3,711 respectively.

During 1911 the Government began the construction of two important stations, one in Juncção (State of Rio Grande do Sul) and the other in Lagoa (Island of Santa Catharina), both of which were opened on August 12, 1912. A smaller station at Monte Serrat (Santos) was placed in service on July 14, 1911.

In 1913 the Administration created the radiotelegraph district of Amazonas, with headquarters in Manáos, which included the 9 radiotelegraph stations located in the States of Pará, Amazonas, and in the Territory of Acre.

At the end of the year another proposed law for regulating the wireless telegraph service was presented to the Chamber of Deputies. After an exhaustive discussion it was approved by the Legislature and embodied in decree No. 3296 of July 10, 1917. This law places the radiotelegraph and radiotelephone services within the territory of Brazil and its territorial waters under the exclusive control and jurisdiction of the Brazilian Government. It further provides that the establishment and operation of radiotelegraph stations for public use shall be under the Ministry of Communications and Public Works, except where applied to the service of national defense, when they shall be under the Ministries of War and Navy. Though possessing the monopoly of wireless communication, the law permits the

Government to grant to persons of Brazilian nationality concessions (without any special privileges, however) to install and operate one or more high-power stations at suitable places on the coast, for the sole purpose of carrying on international and interterritorial communication with similar stations in other countries. All such stations must be connected with one of the National telegraph offices which shall have charge of the collection and distribution of the international wireless service and shall receive the terminal rate pertaining to the same.

The States of the Federation, not yet served by the telegraph, which desire to establish radiotelegraph stations within their territory are required to entrust both the installation and operation of the same to the General Department of Telegraphs.

A considerable portion of the law of July 10, 1917, deals with the use of wireless apparatus on board ships, and makes its use obligatory on certain types of vessels. It concludes with the provision that the Brazilian radiotelegraph service is to be governed by the rules authorized by the International Convention of London and such other regulations as shall be issued in connection with the execution of the present law. Furthermore, it provides that the Ministry of Communications and Public Works shall have charge of all measures for establishing wireless service with adjoining countries, and shall establish bases for treaties with such countries, which treaties, however, must be submitted to the National Congress for approval.

In 1921, in accordance with the above law, the Companhia Radiographica do Brazil received a con-

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cession to install and operate high-power radio stations for direct communication with the Americas and Europe. This concession, which is for a period of 45 years, grants no monopoly nor special privileges of any kind and restricts operations to international service, communications between localities within the National territory being prohibited. The first two stations are to be established in the cities of Rio de Janeiro and Belem.

The rate charged for wireless service within the National territory, as officially fixed by decree No. 3441 of September 15, 1921, is 200 reis (6.6 cents) per word in addition to a basic charge of 1 milreis (33 cents) per message.

The 1916 report of the Telegraph Administration contains the following statistics relating to the wireless stations in operation in Brazil:

WIRELESS STATIONS IN BRAZIL FOR PUBLIC USE, JANUARY 1, 1917

(a) Coast Stations		Working Limit (Nautical Miles)
Amaralina	State of Bahia	400
Babylonia	City of Rio de Janeiro	200
Belem	State of Pará	400
Fernando de Noronha	Island of F. Noronha	1,000
Juncção	State of Rio Grande do Sul	750
Monte Serrat	State of São Paulo	200
Olinda	State of Pernambuco	590
S. Thomé	State of Rio de Janeiro	750
(b) Inland Stations		
Cruzeiro do Sul	Acre Territory	400
Manãos	Acre Territory	750
Porto Velho	State of Matto Grosso	750
Rio Branco	Acre Territory	210
Santarém	State of Pará	400
Senna Madureira	Acre Territory	400
Tarauacá	Acre Territory	210
Xapury	Acre Territory	210

In addition to the above, the Ministry of Marine operates nine, and the Ministry of War seven wireless stations, which are for official use only.

STATE TELEPHONE

When it is recalled that it was Dom Pedro de Alcantara, the Emperor of Brazil, who at the Centennial Exposition in Philadelphia in 1876, after hearing the human voice over the telephone, made the historic exclamation, "My God, it talks!" it seems strange that upon his return to Brazil he should have permitted such an epoch making invention to remain almost inactive in the hands of the officials in charge of the transmission of intelligence by electricity.

The "Memoria Historica," under the head of "Telephone Service," states that the construction of telephone lines began in Brazil in 1879, in which year the Government also granted the first concession for the commercial use of the telephone. While this date is doubtless correct for the construction of the first State telephone line, which was built between the police headquarters and those of the fire department in the city of Rio de Janeiro, it is also true that private telephone lines existed as early as 1877, as will be shown in the chapter dealing with private telephone service.

The writer of the "Memoria Historica" next refers to the policy of the Government of granting concessions for telephone lines to private parties and declares that from the very start this policy was wrong. ("Logo en seu inicio o systema de concessões de linhas telephonicas a particulares provou mal.") This condemnation was due to the fact that the Government, at the time that private telephone line construction started, failed to issue ordinances for the protection of the National telegraph and fire

alarm lines against damage by adjacent telephone lines. To remedy this oversight and to prevent further trouble the Legislature of 1880 passed a resolution which assigned to the Telegraph Administration the construction of all private telephone lines. Foreseeing the commercial importance of the new rival the Director of Telegraphs advised the Government against granting any further licenses, and though no proper authorization to uphold this policy was obtained, thereafter all requests for the construction of private telephone lines were refused.

By 1881 the Brazilian State Council was considering the decision of the English Government, namely, that the telephone was of the same nature as the telegraph and should therefore be the monopoly of the Government. The Council adopted the same view and embodied it in a formal resolution, with the proviso, however, that the Government might grant concessions for the construction of private telephone lines, and by a circular letter dated May 6, 1881, so advised the governors of the various provinces. However, a decree of May 24, 1882, issued by the Ministry in charge of communications, declared that no further concessions for the building of telephone lines would be granted and that all pending applications were rejected. The situation was finally cleared by decree No. 8935 of April 25, 1883, which established rules and regulations governing subsequent telephone concessions. Although this legislation was intended to protect the monopoly of the Government, it failed in practice, largely on account of the laxity of various provincial authorities in upholding and enforcing it.

During 1885 the Telegraph Administration tested

the Van Rysselbergh system of simultaneous telegraphy and telephony, but found the results unsatisfactory.

Nothing of particular importance happened in connection with the State telephone during the four years following 1885. In speaking of the year 1889, when Brazil adopted the republican form of government, the writer of the "Memoria Historica" describes the condition of the State telephone service as follows: "Era essa a situação quando se extinguiu o antigo regimen. O serviço telephonico no Brazil estava ainda na infancia." (This was the situation when the former Government ceased to exist. The telephone service of Brazil was then in its infancy.) If this is meant to apply to the State telephone service only, no one will dispute its correctness, but at that time the private telephone service had already developed to a considerable extent.

The decrees of February 6, May 2, and November 20, 1890, have already been discussed in the chapter dealing with the telegraph under the republican government, as well as the practical difficulties which arose from the conflicting legislation which was enacted. These, however, were removed upon the promulgation of the new constitution. The latter authorized the Telegraph Administration to engage in urban as well as interurban telephone service, but without interfering with rights already acquired by private companies; likewise it gave the Administration the authority to build special telephone lines for the collection and distribution of telegraph messages and to install telephone toll stations for public use.

The Telegraph Administration as early as 1884 had opened a small local exchange as an experiment in the city of Maceió (State of Alagoas) and continued this service for eight years. In 1892 the exchange was closed but reopened shortly thereafter. It was finally abandoned December 1, 1896, and the apparatus and line material were offered for sale at public auction. Aside from the telephone exchange in the capital, this has been the only venture on the part of the Administration to establish a telephone exchange.

State telephone service in Rio de Janeiro became definitely established upon the promulgation by the Provisional Government of decree No. 1043 of November 20, 1890, which also created a distinct telephone district. At that time there existed two small telephone centrals in the capital, one in the building occupied by the Telegraph Administration to which 69 lines were connected, and the other in the War and Navy building with 37 lines for the exclusive use of the Minister of War. In addition to these Government owned and constructed lines, there existed in the city various private telephone lines.

Service over the Government lines reached only to the Fazenda de Santa Cruz. The plant had been constructed with such material as happened to be on hand, with the result that the poles were small and like those employed for the telegraph, while the conductors consisted merely of galvanized iron wire of 2 mm. diameter. Naturally lines built in such haphazard manner deteriorated very quickly so that the Administration was constantly called upon to

rebuild parts of them at a heavy expense to the Treasury. To avoid such unnecessary labor and expense the Administration reconstructed the plant in 1896 at a cost of 100,000 milreis (\$33,000), replacing the old poles with larger and better ones and attaching the conductors to porcelain insulators of good quality. As the service was considerably improved thereby the municipality turned over to the Administration the lines used for fire alarm purposes.

Up to then the telephone service had been split up between the Telegraph Administration and the Ministry of War, and the latter had organized and paid for the special purpose of operating, constructing and maintaining telephone lines. Due to the increasing number of lines for the light and power circuits of the private companies, the single wire telephone lines of the Government suffered severely from induction which finally made it necessary to use metallic circuits. Replacement of the single wire lines by metallic circuits began in 1906 but was suspended in 1907 when the Administration found out that it would save much time and money by closing a contract with the *Brazilianische Electricitäts-Gesellschaft* for the furnishing of official telephone service. All these official lines were connected to three centrals, one in the building occupied by the Telegraph Administration, the second in the square known as Largo do Machado, and the third in the rua de S. Christovão. In addition to these three there were four other centrals used by the Ministry of War and Navy, police headquarters, and the general police. During 1908 the work of providing underground conduits for the Government telephone

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lines progressed slowly, and but 3 kilometers (1.8 miles) were added to the 5 kilometers (3.1 miles) which had been completed in the preceding year.

The statistics published in the annual report of the Telegraph Department for the year 1908 mention a total of 762 subscribers on December 31, 1908, as compared with 680 on December 31, 1907, with a total of 3,010 kilometers (1,869 miles) of telephone wire at the close of 1908 as compared with 2,738 kilometers (1,700 miles) in the preceding year.

The only noteworthy event in connection with the telephone service during 1909 was the giving of an order to the firm of Siemens Brothers of London for a 400-line central battery switchboard with lamp signals, which required the use of metallic circuits.

During the year 1910 the Telegraph Administration constructed a telephone line between Rio de Janeiro and Petropolis, a distance of 53.8 kilometers (33 miles) consisting of 303 kilometers (188 miles) of wire, and also a line between Petropolis and Therezopolis, a distance of 42.5 kilometers (26 miles) consisting of 86.6 kilometers (53 miles) of wire.

Fearing that the Federal Government intended to furnish the public with telephone service between the capital, Nictheroy, Petropolis and Therezopolis, the *Brazilianische Electricitäts-Gesellschaft* appealed to the Government that, because of its contract with the municipality, the company possessed the exclusive right to furnish telephone service within the municipal area and that consequently a Government interurban service would infringe upon the concession to the Interurban Telephone Company of Brazil, a licensee of the complainant, which had

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been authorized to provide telephone service within the State of Rio de Janeiro. To strengthen the argument the complainant pointed out that the interurban company had also received a permit to lay a submarine telephone cable between the capital and Nictheroy. Since the constitution authorized the Government to furnish interurban service, the complaint of the Brazilianische Electricitäts-Gesellschaft was dismissed.

STATE TELEPHONE STATISTICS

Year	Number of Subscribers	Kilometers of Wire
1890.....	106	.....
1895.....	250	.....
1900.....	409	.....
1901.....	449	.....
1902.....	486	.....
1903.....	530	.....
1904.....	564	.....
1905.....	603	.....
1906.....	607	2,315
1907.....	680	2,738
1908.....	762	3,010
1909.....	818	3,138
1910.....	918	3,439
1911.....	1,095	3,540
1912.....	1,165	3,777
1913.....	1,180	3,976
1914.....	1,195	4,491
1915.....	1,209	4,548
1916.....	1,205	4,596
1917.....	1,247	4,605

The report of the Telegraph Administration for 1911 shows that at that time interurban telephone service had been established between the capital, Nictheroy, Petropolis, and Therezopolis. For this service the following rates were charged for a conversation of five minutes' duration:

For a conversation established directly between two stations.....	1 milreis (33 cents)
For a conversation that had to pass through an intermediate station.....	2 milreis (66 cents)

From 1912 to 1917 the State telephone service continued to develop slowly, the only change which occurred being a slight reduction in the interurban rates which had been established in 1911.

PRIVATE TELEPHONE SERVICE

The development of the telephone service in Brazil is almost entirely the work of private enterprise.

The "Histoire de la Téléphonie," published in Paris in 1890 by Julien Brault, records that the telephone first appeared in the Brazilian Empire in the year 1877, and states further: "The first telephone was constructed in that year in the workshop of the Western and Brazilian Telegraph Company in Rio de Janeiro. Towards the end of 1877 Rodde & Company established a telephone between their offices and the Stock Exchange of Rio."

Two years later Charles Paul Mackie of Boston, Massachusetts, petitioned the Brazilian Government for a concession to furnish a local exchange service in the capital and its suburbs, likewise in Nictheroy. By **decree No. 7539** of November 15, 1879, he obtained a 10-year concession with exclusive privileges for the first five years. The decree made it optional with him as to whether he should engage personally in the enterprise or organize a corporation for the exploitation of his concession. For reasons unknown, Mackie forfeited his concession, for in the list of decrees published in the 1906 annual report of the Brazilian Director General of Telegraphs decree No. 7539 is followed by the words "esta concessão caducou" (this concession lapsed).

The Government granted no further telephone concessions until April, 1881, when the Telephone Company of Brazil entered the field. As the formation of this company is closely interwoven with the work of the telephone pioneers in the United States a digression is desirable before taking up anew the thread of the story of the telephone in Brazil.

At this point it is the pleasant duty of the writer to disclose a phase of the marvellous organizing genius of Theodore N. Vail which is almost unknown in the country that witnessed his proudest achievements.

Only eighteen months had passed since the incorporation of the Bell Telephone Company of New York when in the midst of a multitude of sorely perplexing problems at home Vail turned his unique business acumen to the introduction of the telephone in foreign countries, and forthwith created the Continental Telephone Company, thus planting the seed from which sprung not only the telephone service of Brazil, but also that of various other Latin American countries.

The Continental Telephone Company received its charter from the Commonwealth of Massachusetts on January 7, 1880, and was dissolved April 18, 1894. The incorporators were Theodore N. Vail, later President of the American Telephone and Telegraph Company of New York, William H. Forbes, the first President of the American Bell Telephone Company, George L. Bradley, Charles Eustis Hubbard and Charles Emerson. According to the charter the company had been formed with a

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capital of \$100,000 "for the purpose of manufacturing, selling or renting electric telephones and telephonic apparatus, and to establish, build and maintain lines for the transmission of messages by electricity, or otherwise, in any country, or countries, other than the United States of America."

Records which fortunately have been preserved show that Professor Alexander Graham Bell and a number of his early associates like Watson, Sanders, and Blake, men who helped make the invention of Bell a commercial success in the United States, assigned to the Continental Telephone Company all their patent rights outside of the United States, as well as the sole and exclusive right to sell, lease and use Bell telephones, Blake transmitters, and all other telephonic apparatus then manufactured by the Bell Telephone Company of Boston, Massachusetts.

TELEPHONE COMPANY OF BRAZIL (Companhia Telefonica do Brazil). With the creation of the Continental Telephone Company, Vail set to work to carry into effect his plan for developing the telephone service in foreign countries and selected Brazil as a starting point. On October 13, 1880, Articles of Association were signed in Boston for the formation of the Telephone Company of Brazil, with a working capital of \$300,000, consisting of 3,000 shares of \$100 each. Among the men composing the Association were Theodore N. Vail, Henry S. Russell, Charles P. Mackie, William A. Forbes, George L. Bradley, Charles Emerson and James H. Howard. At the request of the Continental Telephone Company H. C. Adams, the Brazilian Vice Consul, certified the signatures.

Immediately after the formation of the Association, application was made to the Brazilian Government for a concession which virtually amounted to asking for a reinstatement of the former telephone concession granted to Mackie, with the result that by decree No. 8065 of April 17, 1881, the Telephone Company of Brazil was duly recognized and authorized to furnish telephone service.

On account of its historic value, copy of decree No. 8065 is subjoined, together with a translation:

“Decreto No. 8065, de 17 de Abril de 1881. Autoriza a TELEPHONE COMPANY OF BRAZIL a funcconar no Imperio.

“Attendendo no que Me requereu a TELEPHONE COMPANY OF BRAZIL devidamente representada, e de conformidade com a Minha Immediata Resolução de 15 de corrente mez, tomada sobre parecer da Secção dos Negocios do Imperio do Conselho de Estado exarado em consulta de 12 de Março proximo passado, Hei por bem Autorizal-a a funcconar mediante as clausulas que com este baixam, assignadas por Manoel Buarque de Macedo, do Meu Conselho, Ministro e Secretario de Estado dos Negocios da Agricultura, Commercio e Obras Publicas, que assim o tenha entendido e faça executar.

“Palacio de Marianna em 17 de Abril de 1881, 60’ da Independencia e do Imperio.

“Com a rubrica de Sua Magestade o Imperador.

“Manoel Buarque de Macedo.”

(TRANSLATION)

Decree No. 8065 of April 17, 1881. Authorization to the TELEPHONE COMPANY OF BRAZIL to carry on business in the Empire.

In pursuance of the request addressed to me by the TELEPHONE COMPANY OF BRAZIL, duly represented, and in conformity with my Resolution of the 15th of the

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current month, based upon the report of the Section of Domestic Affairs of the Council of State, given in the consultation of the 12th of March last, I decide to authorize said company to operate under the clauses appended hereto, signed by Manoel Buarque de Macedo, of my Council, Minister and Secretary of State, Agriculture, Commerce and Public Works, whom I direct to comply with and execute this order.

Palace of Marianna, April 17, 1881, 60th year of the Independence of the Empire.

With the initials of His Majesty, the Emperor.

Manoel Buarque de Macedo.

It has commonly been assumed that because the Association was formed in Boston, the associates had asked the State of Massachusetts for a charter incorporating the Telephone Company of Brazil, but the fact is that the men who requested the Brazilian Government for authorization to supply a telephone service to the public failed to do so.

By May 28, 1881, the first three lines, with a total length of about one mile, were constructed in the capital. Ten months later the company had extended its telephone wire in both the capital and in the suburbs to 372 miles. About the same time it succeeded in obtaining a second decree (No. 8457 of March 18, 1882) giving it a concession for furnishing telephone service in various important cities, among them being Maceió, S. Salvador, Petropolis, Rio de Janeiro, Porto Alegre, Pelotas, and Rio Grande. This broad franchise, except in so far as it is referred to Rio de Janeiro, was declared void by decree No. 9664 of October 16, 1886.

Data contained in Brault's "*Histoire de la Téléphonie*" give the development of the Telephone

Company of Brazil from its inception to April 1, 1885, as follows:

"By 1882 the Telephone Company of Brazil had already opened 8 offices for the use of the public. By 1883 the company had established 5 exchanges with a total of about 1,000 subscribers. During the same year a long distance line of 100 kilometers (62 miles) had been built, connecting the capital with Petropolis, the residence of the Emperor. By April 1, 1885, the number of telephone exchanges in Brazil had increased to 7, with a total of 3,335 subscribers, of which the largest 3 were the capital and its suburbs serving 1,675 subscribers, Pernambuco with 275, and Bahia with 245 subscribers."

Early Brazilian records prove that but a few years after the inauguration of the telephone service in Brazil and the organization of the Telephone Company of Brazil, a rival concern, called the Companhia União Telephonica do Brazil, had started exchanges in Rio de Janeiro, Santos and São Paulo. It operated an opposition plant in the Federal Capital, finally incorporating the Telephone Company of Brazil and continuing to operate until 1889, when it was purchased by the Empresa Obras Publicas do Brazil, which, a year later, obtained a new concession to operate in the Federal Capital.

While the above information constitutes the only official reference to the Companhia União Telephonica do Brazil, some important data are contained in a leaflet published in October, 1885, by the Tropical American Telephone Company, which was incorporated in the State of New Jersey, U. S. A., on November 1, 1881, with headquarters at 95 Milk Street, Boston, Massachusetts. The leaflet states as follows:

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"This Company acquired from the Continental Telephone Company of Boston, all telephonic rights formerly its property in Central America, Colombia, Venezuela, Chile, Peru, Ecuador, and Bolivia, and the West Indies, except Cuba.

"By subsequent purchase it obtained from the Continental Telephone Company all its existing telephonic rights in Brazil and the remaining countries of South America, including valuable contracts with subsidiary companies; and now has the sole and exclusive right to sell, lease, and use 'Bell' Telephones, 'Blake' Transmitters, and all other telephonic apparatus manufactured by the American Bell Telephone Company, under patents owned or controlled by it in the United States and Canada, in the entire territory of South America, Central America, and West Indies, named below, and is the source of supply for telephones, transmitters, telephonic instruments and supplies, to the following telephone companies already organized and doing business, viz:

"COMPANHIA UNIÃO TELEFONICA DO BRAZIL, the successor of the Companhia Nacional de Electricidade and Companhia de Telegraphos Urbanos, operating in Bahia, Pernambuco, Pará, Santos, Campinos, and elsewhere in Brazil.

"COMPANHIA TELEFONICÃ DO BRAZIL, operating in Rio de Janeiro and Nictheroy, Brazil."

It will be noticed that the name of the Companhia de Telegraphos Urbanos is included in the list of subsidiary companies mentioned above. This company owed its existence to decree No. 7753 of July 5, 1880, which authorized Morris N. Kohn to form a telegraph company to be known as the Empresa Telegraphica Electrica Urbana de Serviço Domestico, to operate in Rio de Janeiro, Nictheroy, and any other part of the Empire. This company in turn formed a new concern, the Companhia

Telegraphos Urbanos e Serviço Domestico, which by decree No. 8307 of November 12, 1881, was granted a 10-year exclusive franchise for messenger, police and fire alarm service in Rio de Janeiro and Nictheroy. Although there is no evidence to prove it, it is said that the Companhia União Telephonica do Brazil may have established itself in Brazil under the above concession.

Four months after the fall of the Empire the Provisional Government issued decree No. 199 of February 6, 1890, which authorized the transfer of all telephone lines within the boundary of the capital to the Municipal Administration, and at the same time gave the Federal Telegraph Administration the power to establish telephone plants for official and private use throughout the Republic.

Acting under this decree the Conselho da Intendencia Municipal in its session of March 25, 1890, decided to contract with the Empresa Obras Publicas do Brazil for furnishing telephone service in the Federal District, and a contract to this effect was executed the following day. Presumably this company carried on the telephone service in this territory until 1896.

In the absence of any available official documents, little is known about the condition of the telephone service in the capital from 1890 to 1896, but it is evident that the municipality was by no means anxious to continue the prevailing arrangement at the expiration of this period, for decree No. 49 of January, 1897, declared the contract with the Empresa Obras Publicas do Brazil definitely cancelled. At the same time the municipality announced that

a new concession would be granted to any responsible party which would undertake to supply an efficient telephone service throughout the entire municipal area, which then covered about 1,116 square kilometers (430 square miles), and in accordance with this plan invited public bids.

On February 12, 1897, the Municipal Authorities executed a contract with Siemens & Halske Aktien-Gesellschaft and Alberto Frend & Company for telephone service in the capital for a period of 30 years. Alberto Frend & Company transferred their interest to Theodor Wille & Company on June 18, 1898, the concession being modified by decree No. 622 of November 9, 1898, to cover this transfer. On January 17, 1899, pursuant to decree No. 3250, a new contract was made with Siemens & Halske Aktien-Gesellschaft and Theodor Wille & Company, regarding the telephone concession. Finally, on June 6, 1899, the concession was transferred to the Brazilianische Electricitäts-Gesellschaft.

BRAZILIANISCHE ELECTRICITÄTS-GESELLSCHAFT. In accordance with the terms of the contract between the city and the Brazilianische Electricitäts-Gesellschaft, the company agreed to pay to the municipality 10% of the annual net profits, and in consideration of such payment was exempted from all municipal taxes. The Bulletin of the Pan-American Union of July, 1899, contains a report by the French Consul at Rio de Janeiro, relating to the new telephone company, part of which reads as follows:

“A new German Company, called the Brazilianische Electricitäts-Gesellschaft, has been formed in Brazil, and

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is authorized by a decree of April 7, 1899, published in the *Diario Oficial*, to operate in Brazil. This Company, with headquarters in Berlin, and which has a capital of 5,000,000 marks, seems to be destined to absorb all the other German electrical companies, thus forming one large syndicate."

The concession prescribed also the annual rates to be charged for telephone service and for this purpose divided the city into three zones. A feature of the concession was the provision that the rates would be varied according to fluctuations in exchange, and a schedule was appended setting forth the rates in the several zones at rates of exchange from 7 pence to 27 pence. Consequently, if the rate of exchange advanced, the telephone charges were decreased and, if the rate of exchange fell, the Company was at liberty to increase the charges. The rate schedule of the *Brazilianische Electricitäts-Gesellschaft*, at various rates* of exchange, was as follows:

Exchange Rate (pence)	1st Zone (milreis)	2nd Zone (milreis)	3rd Zone (milreis)
7.....	330	495	660
8.....	300	450	600
10.....	250	375	500
12.....	210	315	420
15.....	175	262	350
20.....	140	201	280
27.....	110	165	220

The above rates were still in use in 1920, although at frequent intervals since 1912 the company has asked the municipality to change them and to adopt a rate schedule on the number of messages used.

* For a number of years prior to the World War the value of the paper milreis was about 33 cents in U. S. currency. The present rate of exchange is about 14 cents (7 pence).

The Brazilianische Electricitäts-Gesellschaft continued to operate as an independent company until 1907, although as early as 1905 the entire stock had been acquired by interests associated with the Rio de Janeiro Tramway, Light and Power Company.

RIO DE JANEIRO TELEPHONE COMPANY.

This company came into existence in 1907 and received its charter of incorporation on November 15th of that year. James E. Manter was the first president of the organization. Without going into the details of the charter it may be asserted that it was a very broad one and could cover almost any conceivable general business. Some interesting data about the Rio de Janeiro Telephone Company are found in the Brazilian Yearbook for 1908, namely:

“The Rio de Janeiro Telephone Company was incorporated in 1907 under the laws of the State of Maine, U. S. A., with a capital of \$1,000,000 and a bonded debt of \$1,000,000 consisting of 5% bonds. It owns the entire share capital of the Brazilianische Electricitäts-Gesellschaft, a German company, which holds the telephone concession granted by the municipality of Rio de Janeiro.

“The Rio de Janeiro Tramway, Light and Power Company, Ltd., owns the entire share capital of the Rio de Janeiro Telephone Company, which capital stock has been transferred to the trustees for the bond holders of the Rio de Janeiro Tramway, Light and Power Company, Ltd. In payment for advances made by it on account of the purchase and for construction and interest charges, the Rio de Janeiro Tramway, Light and Power Company, Ltd., receives the interest on the telephone bonds and the proceeds thereof if and when sold.

This telephone concession gives the exclusive right to exploit the telephone business in the Federal District until 1928.”

The Rio de Janeiro Telephone Company was dissolved in 1911 when the shares of the Brazilianische Electricitäts-Gesellschaft became the property of the Rio de Janeiro Tramway, Light and Power Company.

THE RIO DE JANEIRO TRAMWAY, LIGHT AND POWER COMPANY, LTD. The second annual report of this company, covering the year 1907, refers to the telephone service in the capital as follows:

“During the past year the reconstruction of the building and plant, after the destructive fire at the central office, was completed, and an extensive reconstruction of the lines was undertaken. The entire overhead system has been practically reconstructed. In the new central station a new testing station has been installed and a switchboard for 4,900 lines has been provided. In addition to this four branch exchanges have been installed.”

The third annual report of the company, for the year 1908, states:

“During the year considerable progress has been made in the development of the telephone system. An active canvass for telephone subscribers has been made, with the result that the subscribers have increased during the past year from 2,680 to 3,520, or an increase of 31.3%. The gross revenue for the year was \$175,000, an increase of \$58,800, or 50% over 1907, and the net revenue increased from \$47,700 to \$104,700, or 119%.”

The report of the company for 1909 records a gain of 572 subscribers during the year. No detailed statistics are given in the 1910 report, but that of 1911 states the number of telephones at the close of the year as 6,275, not including 721 which were operated by the Interurban Telephone Company of Brazil, a company which operated in the city of Nictheroy and owned long distance lines to

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Petropolis and Rio de Janeiro, the latter being reached by means of a submarine cable across the bay. In 1911 this company was acquired by the Rio de Janeiro Tramway, Light and Power Company, Ltd., which in turn passed into the control of the Brazilian Traction, Light and Power Company, Ltd., in 1912.

BRAZILIAN TRACTION, LIGHT AND POWER COMPANY, LTD. This company was incorporated in July, 1912, under the laws of the Dominion of Canada, and was formed to consolidate the interests of the Rio de Janeiro Tramway, Light and Power Company, Ltd., the São Paulo Tramway, Light and Power Company, Ltd., and the São Paulo Electric Company, Ltd.

The first annual report of the Brazilian Traction, Light and Power Company, Ltd., covers the period from its incorporation to December 31, 1913, and shows the growth of the telephone business in Rio de Janeiro by the following statistics:

	Dec. 31, 1911	Dec. 31, 1912	Dec. 31, 1913
Number of business telephones.....	5,140	6,981	8,376
Number of residence telephones.....	1,135	2,039	3,003
Total.....	6,275	9,020	11,379
Telephone gross earnings.....	\$362,467	\$538,048	\$734,276

During 1914 the Brazilian Traction, Light and Power Company, Ltd., acquired a controlling interest in the Companhia Rede Telephonica Bragantina, which operated in the State of São Paulo, and in the Cia Telephonica do Estado de São Paulo,

which operated telephone systems in São Paulo, Santos and Campinas. The holding company continued its policy of absorbing the share capital of the last two mentioned companies during 1915, and at the end of that year held about 95% of the stock of each. Due to the World War the gain in subscribers was comparatively slow during the year, the total number of subscribers at December 31, 1915, being 11,811 in Rio de Janeiro, 1,151 in Nictheroy, 727 in Petropolis, and 97 in Barra do Pirahy.

Soon after the passage of legislation in December, 1914, authorizing the Government to permit connection of telephone lines at all State limits, the interurban service was connected with that of the Bragantina Company in the adjoining State of São Paulo.

RIO DE JANEIRO AND SAO PAULO TELEPHONE COMPANY. This company was incorporated under the laws of Canada in 1916 for the purpose of acquiring and developing the telephone enterprises owned by the Brazilian Traction, Light and Power Company, Ltd. The new company has a share capital of \$5,000,000 and an authorized issue of \$7,500,000 6% 30-year Bonds, and has acquired the shares of the following companies:

1. Brazilianische Electricitäts-Gesellschaft. This company serves the city and Federal District of Rio de Janeiro.
2. The Interurban Telephone Company of Brazil. This company serves the city of Nictheroy, capital of the State of Rio de Janeiro, Petropolis, and a number of smaller towns in the vicinity. The company's concession authorizes the extension of the service to all the important cities and towns throughout the State.
3. Companhia de Telephones Interestadoaes. This

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company serves the municipalities of Cataguazes, São Paulo de Muriahe and Palma in the State of Minas Geraes, and of the municipality of Santo Antonio de Padua in the State of Rio de Janeiro.

4. Companhia Telephonica do Estado de São Paulo. This company serves the cities of São Paulo, Santos, and Campinas, the three principal cities in the State of São Paulo, and operates the toll lines between the first named cities.

5. Companhia Rede Telephonica Bragantina. This company serves about 100 of the most important municipalities in the State of São Paulo and that of several adjoining districts of the States of Minas Geraes and Rio de Janeiro. Besides the local services established in the principal centers of these municipalities, toll lines connect them with the cities of São Paulo, Santos, and other important centers.

The 1916 annual report of the Brazilian Traction, Light and Power Company, Ltd., states:

"Under working agreements made between the new company and the five subsidiary telephone companies, the new company is entitled to all their earnings, and on the other hand, provides for their capital and other requirements.

"The plan of the new company is to consolidate these several undertakings into one comprehensive telephone system.

"Until recently the Federal Government refused to allow telephone lines to cross from the territory of one State to another. Last year a law was passed removing this restriction, and the necessary licenses have been granted permitting the systems of the several companies to be connected across State boundaries, thus removing the most important barrier to the future progress and development of the telephone industry."

Before leaving the discussion of the telephone in the capital, something further should be said about the rates charged for the service. It will be recalled

that the municipality established the rates to be charged at the time it closed the contract for supplying telephone service with the Siemens & Halske Aktien-Gesellschaft. Since 1912 the mayors of Rio de Janeiro in their messages to the Municipal Council have advised that body to revise this contract and to use measured service as the basis for rates. Similarly the company has applied several times to the Municipal Council for authority to introduce the measured rate system, but without success. In their last petition made in August, 1919, the company pointed out as justification for their request that up to the end of 1920 they had installed more than 50,000 telephones at an expense of \$15,000,000 and that no further capital for the development of the telephone service could be obtained unless the municipality authorized a change in the existing rates.

The growth of the Rio de Janeiro and São Paulo Telephone Company from 1916 to 1920 has been remarkable, the increase in telephones during this time being 33,816, or a gain of over 107%. On January 1, 1921, this company operated about 75% of the total number of telephones in the Republic of Brazil. The remaining 25% are represented by some 50 private concerns, of which the largest is the Companhia Telephonica Rio-Grandense, which operates in the State of Rio Grande do Sul, with headquarters at Porto Alegre. On January 1, 1921, this company had 7,200 subscribers.

The history of the development of the telephone service as related in this chapter proves that in Brazil, as in any other modern progressive country,

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BRAZILIANISCHE ELECTRICITÄTS-GESELLSCHAFT (Rio de Janeiro)

Year	Number of Subscribers	Kilometers of Wire
1906	2,000	.....
1907	2,680	.....
1908	3,520	.....
1909	3,991	.....
1910	4,859	25,000
1911	6,275	32,000
1912	9,020	42,000
1913	11,379	52,000
1914	11,669	75,000
1915	11,811	90,080
1916	14,313	93,358
1917	18,404	114,090
1918	22,263	135,192
1919	26,240	131,443
1920	29,275	150,000

RIO DE JANEIRO AND SAO PAULO TELEPHONE COMPANY

Number of Telephones:	1916	1917	1918	1919	1920
Brazilianische Electricitäts-Gesellschaft	14,313	18,404	22,263	26,240	29,275
The Interurban Telephone Co.	2,214	2,473	2,762	3,538	4,003
Cia. de Tel. Interestadoes	382	386	422		
Cia. Tel. Estado de São Paulo	9,392	11,768	14,677	27,438	32,089
Cia. Rede Tel. Bragantina	5,250	6,680	7,518		
Total	31,551	39,711	47,642	57,216	65,367
Kilometers of Wire:					
Brazilianische Electricitäts-Gesellschaft	93,358	114,090	135,192	131,443	150,000
The Interurban Telephone Co.	.....	13,740	16,016	9,831	.....
Cia. de Tel. Interestadoes	.....	1,037	1,981	2,477	.....
Cia. Tel. Estado de São Paulo	.....	78,107	78,107	138,085	.....
Cia. Rede Tel. Bragantina	.....	52,369	49,577		
Total	.....	259,343	280,873	281,836	302,169

the extensive development of the telephone requires the organizing ability and the up-to-date management of experts thoroughly competent to provide an efficient service, and a ready willingness on the part of the Government to aid all public enterprises that are earnestly striving to promote the welfare of a country.

GENERAL TELEPHONE DEVELOPMENT

Bearing in mind that from the very start the development of the telephone had been left to private enterprise, it is not at all strange that for 30 years the Administration did not possess complete information concerning the telephone development of the Republic. In the 1906 report of the Telegraph Administration, in the chapter entitled "Serviço Telephonico Particular," the Director General writes that it is the intention of the Administration to prepare a detailed statement of the telephone development of the country. This is followed by an explanation of the difficulties which the Administration faced in gathering the necessary data. The report for 1907, referring to the telephone development of Brazil, contains the following paragraph:

"In the majority of the States of the Federation the companies that furnish a private telephone service are of small importance, and only in the States of São Paulo and Rio Grande do Sul are these telephone companies of an appreciable size. In the last mentioned State the Administration has had occasion to interfere with the action of the Minister of Industries, Ways, and Public Works, by refusing to grant concessions for telephone lines to be built in zones already served by the lines of the National telegraph."

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The first "Quadro do Serviço Telephonico Particular," or summary of telephone companies, is contained in the 1907 report of the Telegraph Administration. It is, however, quite incomplete, and gives a total of 11,207 telephones and 12,342 kilometers (7,664 miles) of wire.

In the 1909 report the Director General of Telegraphs made another effort to assemble the statistics of private telephone companies in each State of the Federation. As in the former list, the data are deficient, the total number of telephones having increased, according to this statement, to 14,345 with 15,200 kilometers (9,439 miles) of wire. In its five subsequent annual reports the Telegraph Administration furnishes no information whatever on the development of private telephone systems in Brazil, but in the 1915 report there is a condensed summary of telephone statistics, as shown in the following table. As the Administration has omitted the statistics of the *Brazilianische Electricitäts-Gesellschaft* they have been added in order to make the table complete.

The latest report of the Telegraph Administration, that for 1917, merely repeats the above table, while the "Anuario Estatistico do Brazil," also published in 1917, only contains the 1907 statistics for the private telephone companies.

That the Government of a country, occupying such a leading rôle in the commerce of the world, has apparently so far overlooked the importance of possessing accurate and up-to-date statistical information about one of its most valuable public services, is regrettable.

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TELEPHONE STATISTICS OF BRAZIL, 1915

States	Kilometers of Wire	Number of Telephones	Investment (milreis)
Alagoas.....	379	296	.....
Amazonas.....	432	374	190,000
Bahia.....	2,130	1,459	.....
Ceará.....	653	268	.....
Espirito Santo.....	88	480	.....
Federal District:			
Government system.....	4,548	1,209	.....
Braz. Elec.-Gesellschaft...	90,080	11,811	13,000,000
Goyaz.....	36	150	50,000
Maranhão.....	319	370	40,000
Matto Grosso.....	290	675	145,000
Minas Geraes.....	168	532	.....
Pará.....	139	603	.....
Paraná.....	1,070	722	1,000,000
Pernambuco.....	2,000	1,072	.....
Piauhv.....	127	57	.....
Rio de Janeiro.....	13,138	1,141	300,000
Rio Grande do Sul.....	44,383	10,368	5,458,000
Santa Catharina.....	573	550	140,000
São Paulo.....	45,725	7,648	8,820,000
Total.....	206,278 128,000 miles	39,785	29,143,000 \$9,617,000

Based upon such information as has been received from private sources the total number of telephones in Brazil on January 1, 1921, is estimated as 85,000, which represents a development of 0.28 telephones per 100 of population. Undoubtedly, if complete recent statistics were available from all private companies, the telephone development of the Republic would be considerably higher.

APPENDIX I

**Preface and Extracts from the Stipulations Attached to Decree
No. 8065 of April 17, 1881**

We the undersigned, Theodore N. Vail, Henry S. Russell, Charles P. Mackie, William A. Forbes, George L. Bradley, Charles Emerson and James H. Howard, for ourselves, our associates and successors, declare that we have formed in the State of New York a joint-stock company, consisting of seven or more members, for the purpose of carrying on the business of constructing and operating telephone lines in the city of Rio de Janeiro and its suburbs, and in the city of Nictheroy, in the Empire of Brazil, which latter city shall be placed in communication with said capital by means of a submarine cable, in accordance with the stipulations of decree No. 7539 of November 15, 1879; also for constructing and operating other telephone lines and for transacting any other business relating thereto which now, or in future, may be permitted or conceded by the Government of Brazil to the said Association and for the above mentioned purposes; also for buying and renting all kinds of movable or immovable property needed by said Association, in accordance with the stipulations attached hereto.

Article 1. The name of the Association shall be the **TELEPHONE COMPANY OF BRAZIL** (*Companhia Telefonica do Brazil*).

The Association shall continue until November 1, 1890, unless it be legally dissolved prior to that date, or in accordance with these stipulations.

Article 3. The following persons shall constitute the first Board of Directors of the Association and shall continue until retired, in accordance with these statutes, namely: Theodore N. Vail, Henry S. Russell, Charles P. Mackie, William H. Forbes and J. H. Howard.

Article 4. The headquarters of the Association shall be in the city of New York, or in any other place, or places, which at any time may be designated in writing by two-thirds of the Directors.

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Article 5. On the second Wednesday of January of each year a meeting of the stockholders shall be held at the headquarters of the Association. The first meeting shall take place on November 1, 1880.

Article 6. The capital of the Association shall be divided into 3,000 shares of a nominal value of \$100 each. This number may be increased or decreased at any time as set forth hereafter.

Article 7. The number of shares held by each member of the Association is:

Henry S. Russell.....	2,940
Theodore N. Vail.....	10
Charles P. Mackie.....	10
William H. Forbes.....	10
George L. Bradley.....	10
Charles Emerson.....	10
James H. Howard.....	10

The Articles of Association were signed and sealed on October 13, 1880, at Boston, State of Massachusetts, and filed with James B. Bell, Registrar of Documents for the State of New York in the city of Boston. The signatures were also certified to by Henry C. Adams, Brazilian Vice Consul in Boston, at the request of the Continental Telephone Company.

A translation into Portuguese of the Articles of Association was made by J. J. Christian Voigt, sworn public translator, at his office in Rio de Janeiro, on December 10, 1880, and was attached to Imperial Decree No. 8065 of April 17, 1881.

APPENDIX II

Interstate Toll Lines

The rules governing the construction of interstate telephone toll lines were attached to Article 99 of Budget Law No. 3089 of January 8, 1916, which fixed the general expenditures of the United States of Brazil for the financial year 1916.

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Article 99. The Government will issue concessions for interstate telephone lines, subject to rules assuring their regular and satisfactory working, but such concessions do not establish any exclusive privilege.

Regulations

I. The Telephone Company has permission to build lines from to over the boundaries of the States of and and to proceed with their operation, in accordance with the provisions of Article 99 of law No. 3089 of January 8, 1916.

II. The Company shall obtain the approval of the Government for the connection referred to in paragraph I, also for the plan showing at what point or points the lines are to be joined. Furthermore, the Company must submit to the Government a written report showing the position of the said lines in relation to other electric circuits, if there are any within a distance of twenty meters (66 ft.) on either side of the proposed line. This report must specify the type and number of posts and insulators which the Company intends to use, the number of conductors to be strung, their quality and diameter, also the method of construction.

If the Government requires no changes in the plan submitted within ninety days after the filing of the plan and the written report, both shall be deemed approved. After the approval of the plan and material, either by a special permit or by the lapse of ninety days, construction may be started.

III. The connections between frontier municipalities of two States shall be the subject of a special license whenever said municipalities are not included in the plan that has been approved. Nevertheless, the substitution of or addition of lines to the already approved plan may be made without obtaining a new concession, provided the conditions stated in paragraph II are complied with.

IV. The General Telegraph Administration shall supervise the proper construction of the line, or lines, and the Company shall pay the sum of 2,400 milreis (\$792) annually,

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payable semi-annually in advance, for each section of 25 kilometers (15.5 miles) of line, or fraction thereof, beyond the frontier.

V. In the conduct of the telephone service hereby authorized, the Company shall comply with the regulations of the General Telegraph Department.

VI. In case of civil disturbance, the Government may take charge of the telephone service or may suspend it, indemnifying the Company for losses which may result from such action; said losses shall be calculated on the basis of the earnings during the corresponding period of the previous year.

VII. The Company undertakes to guarantee the satisfactory working of the lines.

VIII. The rates between the different States shall not be higher than those in force for the same distances, measured in kilometers, within the respective States. Service required by the Government shall be entitled to a rebate of 50% of the rates established for interstate communications.

IX. Before signing the contract the Company shall deposit with the Federal Treasury the sum of 3 contos (\$990) as a guarantee of its faithful execution.

X. For non-fulfilment of any of the paragraphs of the agreement, fines of from 100 milreis (\$33) to 500 milreis (\$165) may be imposed upon the Company by the Ministry, on the recommendation of the supervising department, which fines shall be paid within 30 days from the date of their demand, and if not paid they shall be deducted from the guarantee deposit of 3 contos (\$990).

In such case the Company will be notified by the General Telegraph Administration to replace the said guarantee within the period of 30 days, and if the Company fails to do so, the rights which have been granted shall be cancelled, independent of any action or judicial intervention.

XI. If the Company decrees to transfer the contract to another company, enterprise or individual, it must first give notice to the Government of its intention to do so.

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XII. Aside from the right of expropriation, as specified in other pertinent laws, the Government may take possession of the telephone lines in operation upon an agreement with the Company, in accordance with the provisions embodied in the contracts which it may have with the State and municipalities.

APPENDIX III State of São Paulo

Law No. 11 of October 28, 1891

(A Concession for Telephone Lines does not establish an exclusive monopoly.)

Article 1. Within the provisions of the present law, every citizen is entitled to construct and operate telephone lines within the boundary of the State.

Article 2. For a telephone line which does not extend beyond the limits of one municipality, the permission for the construction and operation of such line shall be obtained from the respective municipality.

Article 3. However, if such line serves simultaneously two or more municipalities, the permission for the construction and operation of the line shall be obtained from the State Administration.

Article 4. Recipients of a State concession for a telephone line shall comply with all municipal regulations within the limits of each municipality traversed by the line.

Article 5. The right to grant concessions for telephone lines and to subject them to regulations, does not entitle the municipality to levy taxes or create onerous conditions in favor of municipal lines against lines that have received a State concession.

Article 6. The construction of telephone lines shall be permitted on all public thoroughfares, provided permission has been obtained from the proper authority.

Article 7. A concession for building telephone lines given by the municipality or by the State, shall not establish

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an exclusive privilege on the part of the concessionaire or the company.

Article 8. The parties to whom concessions are granted assume the following obligations to the State:

- a) To give preference to official calls.
- b) To surrender their lines to the State Government, in consideration of the payment of an indemnity, whenever the Government may deem such expropriation advisable.

Article 9. The Government shall issue the regulations necessary for the execution of this law.

Regulations

1. The.....Telephone Company is hereby granted permission to establish and operate a telephone line connecting the municipalities of.....and.....

2. The present concession shall remain in force for the period of 25 years from..... The Government may declare this concession forfeited

- a) If the construction of the line has not been commenced within six months from the date of the concession.
- b) If after construction has been started, telephone service has not been inaugurated within one year from the present date.
- c) If after its inauguration, service is interrupted for more than three consecutive months without due cause.

3. The present concession does not establish any monopoly or exclusive privilege in favor of the licensee, who must respect the legal rights of others. The Government may, at any time, grant new concessions for the telephone service, or itself establish such service between the points mentioned in paragraph I.

4. The present concession includes besides the lines and accessories, the intermediate or terminal stations which may be used in intermunicipal service. Service within any municipality shall be established exclusively by virtue of permission from the respective municipal board.

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5. The concessionaire shall have the right to build telephone lines on all highways included between the points referred to in paragraph I, but for such purpose he shall first obtain permission from the proper authorities. For the support of wires or erection of poles on private property the concessionaire shall obtain the necessary consent from the owner.

6. The concessionaire must submit to municipal regulations within the limits of each municipality through which the lines pass. The Government must protect the concessionaire against non-observance of the provisions which forbid municipalities to create taxes or onerous conditions against the licensee's line in favor of the municipal lines.

7. In the construction of the lines which the concessionaire may build, the rules and principles of the art shall be observed. The Government shall always have the right to prevent the construction of lines which do not present the proper conditions of solidity or of guarantee against accidents, and the removal or replacement of supports, wires, etc., that may in any way be detrimental to public transit.

8. Before beginning construction, and in order that the right mentioned in the preceding paragraph may be exercised, the concessionaire shall send to the Government a plan of the route of the main lines which shall show the terminal or intermediate stations, the distance from all telegraph, telephone, or electrical transmission lines which may be in the vicinity of the route, as well as the railroads and highways followed or crossed. The concessionaire shall also submit drawings showing the type of line to be constructed, whether aerial or underground, supports, crossarms, wires, etc., together with information regarding the material and apparatus to be employed and the protective devices employed when crossing other conductors of electricity or in crossing railroads. As soon as construction work has been finished the concessionaire shall furnish the Government with exact information regarding the route and length of lines (branch lines being listed separately), the number of terminal and intermediate stations, and the number of

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public and subscribers' stations. For the same purpose as above mentioned, the concessionaire shall give due notice in advance of all modifications adopted from time to time with reference to the route, character of line and means of protection.

9. The concessionaire shall observe the regulations issued for the faithful execution of law No. 11 of October 28, 1891, and the instructions establishing the conditions upon which the highways may be used and other instructions issued in the interests of the safety of transit, both on the highways and on the railroads which the telephone line may follow or cross, and for the protection from accident of the telephone users.

10. For intermunicipal service the Government may require that there be used at least two complete metallic circuits for calls from exchanges and public stations. The Government may also require the use of underground lines, or of overhead lines of a special type, in sections of the intermunicipal line where conditions demand such construction.

11. The poles, crossarms, wires and accessories of the concessionaire's line shall be so placed as not to interfere with or disturb the telegraph and telephone lines and apparatus already in operation. It is also his duty to see that the apparatus installed by him shall not be affected by existing electrical conductors. He must always avoid, as far as possible, running his lines parallel with others, and crossing other lines, such crossings, where necessary, being made preferably at right angles. The Government may require the use of special devices for protection or safety in cases involving risk of accident.

12. The Government shall require other concessionaires of telephone and electric power transmission lines, to make their installations in such manner as not to interfere with or disturb the operation of the concessionaire's lines.

13. The concessionaire shall give notice to the Government of the date of commencing the operation of his lines for subscribers' service, exchange and public stations, and shall attach to such notice a copy of the rates to be charged.

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All rates shall be uniform and without discrimination, so that any reductions shall be applicable to all subscribers in the same class. Changes in the rates shall always be brought to the attention of the Government.

14. The concessionaire shall keep the lines and all accessory apparatus in good condition so as to guarantee the continuity and regularity of service at all points where telephone service is furnished. The subscribers' contracts shall contain provisions protecting the subscribers' interests, with statements of the rebates or indemnities, also provisions for cancellation in case of continued interruption of service.

15. In localities reached or traversed by the lines, placing such localities in communication with one or more points in different municipalities, the concessionaire shall establish exchanges or public stations to which all subscribers' lines shall be connected, and where telephone service can be furnished to non-subscribers. Such public stations may be dispensed with by special act of the Government if the line connecting two points in different municipalities is so short that the subscribers' lines may be considered as being connected with the exchange or city system existing at one of the terminals of the line. However, establishment of such stations shall be compulsory when city systems are in operation at both terminals of the line, whether connected to the intermunicipal system or not.

16. At public pay stations for intermunicipal service the concessionaire shall install the usual devices to guarantee the privacy of telephone conversation. Calls shall be given precedence in the order in which they are requested. The rates, regulations, time-tables, etc., of the service shall be posted in these stations.

17. The recording in writing and the distribution of telephone messages shall be allowed only by express authorization of the Government and will not be allowed when telegraph service is available or is established between the points on the concessionaire's line.

18. The object of the present concession is telephone service. If the concessionaire, by use of his line or by un-

authorized delivery of telephone messages in writing, establishes an illegal competition with the Government telegraph service, the concession shall be annulled and the Government shall take steps, if necessary, to render such annulment effective.

19. For reasons of a public nature the Government may impose limitations on the telephone service, or may make exclusive use of such service, in consideration of an indemnity fixed by mutual agreement, or in the absence of such agreement, awarded by arbitration, as provided in paragraph 23.

20. The concessionaire shall:

- a) Give preference to official calls.
- b) Surrender its lines to the State Government in consideration of an indemnity, whenever the Government may decide that expropriation is advisable, such expropriation to be carried out in accordance with the law then in force.

21. All communications which the concessionaire may have to make to the Government shall be addressed to the Office of the Secretary of Agriculture, Commerce and Public Works of the State, or to such department as that office may designate, and all official communications relating to the service in charge of the concessionaire shall issue from such partment.

22. The concessionaire, or any party acting for him, shall inform the Government of all alterations which may be made in the organization of the undertaking by virtue of the transfer of the present concession. The concessionaire shall present to the Government within the first two months of each year statistical data covering the preceding year relating to the length of lines, number of telephones in the service of subscribers, receipts and expenses, and new construction and betterments. When the service is in charge of a company the latter must furnish to the Government a list of the officers and a copy of the report to the stockholders.

23. Any disagreements which may arise between the Government and the concessionaire shall be settled by arbitration, in the following manner: each of the parties shall

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appoint one arbiter; if these two do not agree, a third arbiter shall be selected by the two parties, and if they cannot agree each party shall designate one person, and the third arbiter, selected by lots between these two, shall decide the question.

24. If the system is in operation before the presentation to the Government of the plan of the main line and the other information referred to in the first and second parts of paragraph 8, the Government shall fix a reasonable time limit for such presentation and may impose a fine in case the limit is exceeded.

25. The State courts shall have exclusive jurisdiction over the concessionaire.

26. For non-observance of any of the above paragraphs the concessionaire shall be subject to a fine of from 100 milreis (\$33) to 1,000 milreis (\$330).

27. The concession to which the present rules refer shall become void if the concessionaire does not appear at the Office of the Secretary of Agriculture, Commerce and Public Works, to sign the contract within 60 days from the date of the publication of this decree.

APPENDIX IV

State of Minas Geraes

Decree No. 3961 of July 19, 1913, governing the concessions for building telephone lines connecting the municipalities of the State.

Regulations

Article 1. In accordance with the provisions of the Federal Constitution, decree 1663 of January 30, 1894, and State Law No. 2 of September 14, 1891, No. 148 of July 26, 1895, and No. 596 of September 19, 1912, the power to grant exclusive privileges for the construction of telephone lines is entrusted to the State and Municipal Governments, in accordance with the provisions of the present Regulations.

Article 2. Concessions granted by the State may or may not involve exclusive privileges, and they become the per-

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petual property of the concessionaires. Exclusive privileges, however, shall not be granted for a term longer than 25 years, and shall not prevent or interfere with subsequent concessions for the construction of other lines passing through any of the municipalities covered by such exclusive privileges or the connection of such municipalities with other lines not covered in the original exclusive concession.

Article 3. Concessionaires seeking exclusive privileges must petition the Government of the State for such privileges, through the Secretary of Agriculture, Industry, Lands, Ways and Public Works, setting forth the municipalities which the lines shall serve or cross, the length of the lines, the distance from other lines existing in the same district, the probable cost of construction, and any other information which they may deem it desirable to present.

Article 4. When concessions have been granted by the issuance of a decree, the concessionaire shall sign the respective contract, in the office of the Secretary of Agriculture, within the period of 90 days from the date of said decree under penalty of the cancellation of the concession without further action on the part of the State Government.

Article 5. Concessions without exclusive privileges, as well as permits for line connections only, even if under exclusive privileges, shall be granted by act of the Secretary of Agriculture, Industry, Lands, Ways and Public Works. Such concessions shall not prevent the granting of exclusive privileges for other lines in the same municipality. The latter, furthermore, shall enjoy preference, other conditions being the same, over the lines having non-exclusive rights.

Article 6. No concession shall be transferred before the respective line is built, nor without previous consent of the State Government.

Article 7. No concession shall be granted for the construction of lines to connect more than 20 municipalities. In the case, however, of a line already built and in regular operation, even though it connects 20 municipalities, the concessionaire shall enjoy preference as regards the con-

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struction of extensions, provided the limit established in this article, with reference to concessions for such extensions, is not violated.

Article 8. Every concessionaire of telephone lines shall respect and observe the municipal laws within the limits of each municipality in which the lines run.

Article 9. The concessionaire of telephone lines shall give preference to official calls, which shall be free of charge. The concessionaire shall also give up his line or lines to the Government of the States, whenever the latter may so desire, in consideration of an indemnity previously agreed upon.

Article 10. Incoming press calls shall be entitled to a reduction of from 25% to 50% of the rate schedule approved by the Government.

Article 11. For the support of wires for the erection of poles on private property, the concessionaire shall obtain the necessary consent of the owners of such property.

If, for a line to be built under an exclusive concession, it is not possible to obtain such consent, even in consideration of an equitable indemnity by the concessionaire of the line, the Government shall grant to the latter the right of expropriation in the interest of the public and in accordance with the existing laws.

Article 12. The State Government shall always have the right to prevent the construction of lines which are lacking in solidity and protection against accidents. The Government may also require the removal or replacement of all such supports, wires, etc., as may in any way interfere with public traffic.

- a) For this purpose, the Government shall also have the right to supervise the construction of the lines through an employee whose compensation shall be paid by the Government, for the account of the concessionaire, who shall pay into the State treasury in advance, and also quarterly, the amount which shall be inserted in the concession.

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- b) Supervision shall begin as soon as construction of the line is commenced.
- c) In order that these provisions may be enforced, the concessionaire shall submit to the Government, before beginning actual construction work;
 - 1. A plan of the route of the lines, showing terminal and intermediate stations and the position of telegraph lines, other telephone lines, or electric power lines which may be in the vicinity of the proposed route, as well as the distance of all such lines from the proposed route. The plan shall also show the railroads and highways followed or crossed.
 - 2. Drawings showing the type of line to be erected, whether aerial or underground, and supports, crossarms, wires, etc.
 - 3. Statement of the material and apparatus to be employed, and of the protective measures to be adopted in the proximity of, or in crossing other existing electrical conductors, and in crossing railroad tracks.

Article 13. The line having been built before service can begin, the concessionaire shall submit for the approval of the State Government, at least 15 days in advance, the respective rate schedules. Any change in rates made thereafter shall also be subject to the approval of the State Government. If the Government has not approved the rate schedules or ordered changes within 15 days after presentation, such schedules shall be considered approved, and the concessionaire shall be free to commence service.

Article 14. In all public stations there shall be exhibited the regulations, rate schedules, and time-tables of the service, and the privacy of telephone conversation shall be assured.

Article 15. All calls shall be furnished in the order in which they have been submitted.

Article 16. For non-observance of the Government orders, issued in accordance with the provisions of the

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present Regulations, and for non-observance of the latter, the concessionaire shall be fined from 100 milreis (\$33) to 1,000 milreis (\$330), according to the gravity of the violation, such fine to be doubled for a second offense or in case violation continues after the imposition of the first fine.

Article 17. In addition to the provisions of Article 4, the concession shall become void:

- a) If the fines, in accordance with the preceding article, are not paid, and the fault not corrected, within 3 months after the imposition of the fine.
- b) If the time limits established for beginning the work and for finishing the lines are exceeded, without an extension having been granted by the Government, or if the construction work remains interrupted during 90 consecutive days, without justification.

Article 18. Before signing the contract, and in order to guarantee its execution, the concessionaire shall deposit in the State Treasury, in cash or in Government bonds, the sum of 500 milreis (\$165) for each group of 5 municipalities included in the concession. This guarantee shall be required even when a smaller number of municipalities than 5 is included in a concession, and shall be retained until the expiration of the term of the exclusive privilege. From this guarantee shall be deducted the fines imposed upon the concessionaire; after such deduction the guarantee shall be replaced within 30 days from the date of notifying the concessionaire by the proper department.

Article 19. No Municipal Chamber exercising the powers conferred by laws No. 2 of September 14, 1891, and No. 148 of July 26, 1895, shall grant a concession for the construction of telephone lines outside the limits of the respective municipality. In case it is desired to establish telephone service between two or more municipalities, the agreement of the Chambers affected and the consent of the State Government shall first be obtained.

Article 20. The Court which shall decide all questions,

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arising from concessions for extending telephone service by the Government, shall be that of the State Capital.

Article 21. The provisions of the Regulations, approved by decree No. 1018 of March 30, 1897, remain in force as far as they are not cancelled by the present Regulations.

APPENDIX V

International Agreements

Telegraph Convention between Brazil and Argentina

On June 15, 1899, Brazil signed a telegraph traffic convention with Argentina, by which Argentina agreed to furnish a special international wire between Buenos Aires and Paso de dos Libres, thence across the Brazilian frontier to Uruguayana (Brazil). On its part, Brazil undertook to provide a special wire between Uruguayana and Porto Alegre. As compensation for the transmission of international messages the Telegraph Administrations of the two Republics adopted the subjoined schedule, the debits and credits to be adjusted monthly.

A. TELEGRAMS FROM BRAZIL TO ARGENTINA:

The Brazilian Telegraph Administration will credit the Telegraph Administration of Argentina as follows:

- a) 20 centimes gold per word for an ordinary paid telegram to be sent over the lines of the Argentine State Telegraph Administration.
- b) 40 centimes gold per word for an ordinary paid telegram to be sent over lines other than those of the Argentine State Telegraph Administration; also messages to Paraguay and Bolivia.
- c) In addition to the charge made for transit messages (to be determined by the Berne International Bureau), an extra charge is made for telegrams destined to points not mentioned under a and b.
- d) 10 centimes gold per word for press telegrams to be sent over the lines of the Argentine State Telegraph Administration.

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- e) 20 centimes gold per word for press telegrams to be sent over lines other than those of the Argentine State Telegraph Administration and to Paraguay and Bolivia.

B. TELEGRAMS FROM ARGENTINA TO BRAZIL:

The Argentine Telegraph Administration will credit the Telegraph Administration of Brazil as follows:

- a) 50 centimes gold per word for a telegram to points within the zone designated as Southern Brazil.
- b) 1 franc 50 centimes per word for a telegram to points within the zone designated as Northern Brazil.
- c) 1 franc gold per word for an international telegram which passes over the Brazilian telegraph lines from one frontier to the other (transit messages).
- d) 25 centimes gold per word for press messages sent to any point reached by the Brazilian telegraph lines.

Telegraph Convention between Brazil and Uruguay

On April 8, 1899, Brazil and Uruguay entered into an agreement for the mutual exchange of telegraph messages by connecting the Brazilian frontier telegraph offices at Quarahy and Livramento with the nearest offices in Uruguay, which were at S. Eugenio and Rivera. The main features of this agreement were:

Article 3. The Brazilian Telegraph Administration agrees that for traffic purposes, in accordance with a former agreement which the Brazilian Telegraph Administration entered into with a private telegraph company of Uruguay (Empreza do Telegrapho Oriental), the route Livramento-Rivera shall be considered the "via de escolha," or the route left to the choice of the sender of the message.

Article 4. If for any reason the last mentioned agreement ceases to exist, the route Livramento-Rivera shall become the ordinary route for all continental and international transit messages over the land lines of Brazil and Uruguay.

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Article 6. If after one year traffic over the line Porto Alegre-Livramento-Montevideo becomes so heavy as to cause more delay in transmission than would result over the direct line via Jaguarão, the Telegraph Administration of Uruguay will undertake to connect Montevideo with Artigas by two special wires whose electrical resistance shall not exceed 7.5 ohms per kilometer.

Article 7. Assuming that the conditions stated in Articles 4, 5, and 6 prevail, the Brazilian Telegraph Administration agrees not to connect any of its telegraph lines with any others already built, or to be built, in Uruguay, so that all messages passing over the land lines of Brazil, destined for Uruguay, or for transit through the latter country, and vice versa, shall be sent via Jaguarão-Artigas or Livramento-Rivera, due regard to be had, however, to the route of preference indicated by the sender of the message.

Article 9. For a private message sent over the route Livramento-Rivera, the route of choice as indicated above, the Telegraph Administration of Uruguay is to receive the following compensation:

- a) 40 centimes gold per word for a message sent to any of the State telegraph offices of Uruguay.
- b) The same amount, plus an additional charge, due private telegraph companies, for a message directed to a point in the interior of Uruguay, not reached by any State telegraph lines.
- c) 40 centimes gold per word, plus any additional charge, due to other lines, for a telegram passing through Montevideo to Chile, Peru, and other South American countries.
- d) 80 centimes gold per word for a telegram sent to Argentina, Paraguay and Bolivia.

Article 10. If the conditions mentioned in Article 4 exist, the above charges shall be modified as follows:

- a) 25 centimes gold per word for a message sent to any of the State telegraph offices.

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- b) The same amount, plus any additional charge, due private telephone companies, for a message directed to a point in the interior of Uruguay, not reached by any of the State telegraph lines.
- c) 40 centimes gold per word for a telegram sent to Argentina, Paraguay and Bolivia.
- d) 25 centimes gold per word, plus any additional charge due other lines, for a message passing through Montevideo to Chile, Peru, and other South American countries.

Article 11. The Brazilian Telegraph Administration is to receive as compensation the terminal and transit charges stated in Schedule B, attached to the International Rules & Regulations, as revised in Budapest, i. e.

- a) 50 centimes gold per word for a telegram sent to the southern zone of Brazil.
- b) 1 franc 50 centimes gold per word for a telegram sent to the northern zone of Brazil.
- c) 1 franc gold per word for a transit telegram that passes over the Brazilian lines.
- d) 1 franc 50 centimes gold per word, plus the charge due to that company, for a telegram to be delivered to any of the telegraph offices of the Amazon Telegraph Company.
- e) For messages via the transatlantic cables which touch at Recife or at Pinheiro, destined for Central or North America, the charges are those published in the Boletín Telegrafico of the Brazilian Administration (No. 21 of November 15, 1898), deducting from the total, however, the amount due the Telegraph Administration of Uruguay.

Article 20. The above agreement is for 3 years from the date of the opening of the route Livramento-Rivera, but each Administration reserves to itself the right to propose modifications during the last 3 months of the duration of this agreement. If neither changes nor cancellations of the intertraffic agreement are proposed, the present agreement shall continue automatically for another period of 3 years.

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Telegraph Convention between Brazil and the Telegrapho Electrico de Montevideo, known as the "Telegrapho Oriental"

The following traffic agreement was entered into between the above mentioned parties on August 3, 1899.

Article 1. The "Telegrapho Oriental" agrees, within 6 months from the signing of this agreement, to put its line between Jaguarão and Montevideo in such working condition as to guarantee a rapid international service.

Article 2. The "Telegrapho Oriental" promises to use all proper means to assure a rapid service between Montevideo and Buenos Aires, using for this purpose either the line, or lines, owned by the company, or the line, or lines, of any other private company which will enable the company to operate a telegraph office in direct connection with its central office in Montevideo. In order to carry out this agreement the work must be finished within a year from the date of the signing of the agreement, but within that period the company may use the State telegraph lines, or any other lines, which in the judgment of the company may be most convenient for that purpose.

Article 3. If for any reason the company has failed to finish the work within the time stipulated in Article 2, the route Livramento-Rivera shall become the normal line of transmission for continental and international transit messages over the Brazilian land lines and the cables connecting with the latter.

Article 4. During the life of the present agreement the Brazilian Administration agrees, as regards the exchange of telegraph messages, not to connect its lines with those of any other private telegraph company within the territory of Uruguay.

Article 5. The Brazilian Telegraph Administration agrees to deliver to the "Telegrapho Oriental" all telegraph messages passing over its lines, and the cables connecting with them, destined for South American republics, and declares the route via Jaguarão to be the route of normal and rapid transmission, except for such messages as, by the

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sender's orders, shall be sent over a different route. On the other hand, the "Telegrapho Oriental" promises to route over the Brazilian lines all messages received from points within Brazil, or any other country reached by the cables connected with the Brazilian land lines, excepting such messages as by the sender's orders shall be sent over a different route.

Article 6. The Brazilian Telegraph Administration promises to prevent other companies from furnishing service at rates lower than those established by the "Telegrapho Oriental."

Article 9. Beginning with the date of the signing of this agreement, the "Telegrapho Oriental" shall receive 40 centimes gold per word for an ordinary private telegram and 40 centimes gold per word for the same class of messages from Montevideo to Buenos Aires. The Brazilian Telegraph Administration shall receive 50 centimes gold per word for all messages passing over its lines to points situated within the southern zone, and one franc gold per word for all messages sent to points within its northern zone.

Article 19. The present agreement shall remain in force until March 31, 1913, but it may be modified by mutual consent of the contracting parties.

Sources of Information

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4. "Anuario Estatistico do Brazil," issued in Rio de Janeiro in 1917.
5. "Brazil Ferro-Carril," of October, 1921, published in Rio de Janeiro.
6. Annual Reports of the Rio de Janeiro Tramway, Light and Power Co., 1907-1912.
7. Annual Reports of the Brazilian Traction, Light and Power Co., Ltd., 1913-1920.
8. Annual Reports of the Companhia Telephonica Rio-Grandense, 1912-1920.
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 - a. With officials of the Government Telegraph.
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