# REVISTA TELEFONICA INTERNACIONAL

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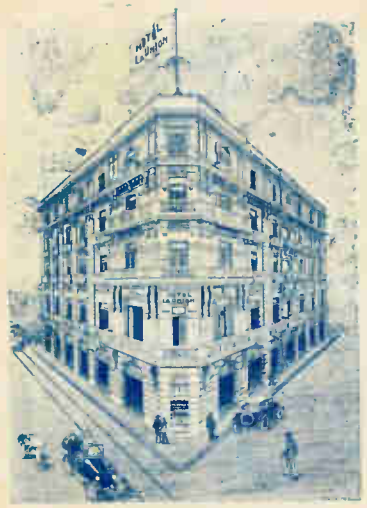

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|---|---|---|
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| Reserve for all other liabilities | | Reserve for all other liabilities |
| 342,291.68 | | 20,592,997.95 |
| Net surplus | | Net surplus |
| 26,798.79 | | 12,213,010.92 |
| Assets | | Assets |
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# NEW HOME OF INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION


This is 41 Broad Street, New York City, designated as the International Telephone Building, home office of the International Telephone and Telegraph Corporation, where plans are being developed to give Latin America an improved and standardized quality of telephone service which will bring the Spanish-speaking peoples of the New World closer together socially and commercially. (See page 12)

# REVISTA TELEFONICA INTERNACIONAL

Vol. V HAVANA, NOVEMBER, 1922 No. 11

## What is Telephone Service?

HE word "service" appears prominently in the telephone language. Companies say that they sell "service," that they offer "local and long distance service," that their rates for this or that class of "service" are so much. The subscribers are presented regularly with bills for "service."

What, then, is this "service"?

Let us get down to the fundamental element of a telephone system, the basic unit, the telephone instrument in the house of the citizen.

If a telephone company sells service, it must be sold through the functions of that instrument. Whatever this telephone "service" may be, it lies at the other end of the tightly-wrapped cord that connects the telephone instrument with the wide outside world.

Somewhere beyond that cord there is a central office, where the line of the subscriber may be connected at his request with other lines leading to any part of the vast system of cables and wires which, in turn, through other central offices, are connected with other lines that lead to other tightly-wrapped cords and other telephone instruments.

Simple, yet complicated, it sounds.

The fact is that the telephone company stands ready throughout the day and night to connect the subscriber with anybody in the same town or another town who also has a telephone. In these times, that means almost anybody of consequence, for the telephone, long since past the luxury stage of development, is now a prime necessity.

It is there to summon the doctor in the event of sudden sickness; to call the police when thieves break in; to bring the firemen when the house is burning; to muster help when an accident has caused confusion and disaster; to establish immediate contact between the business man and his broker when the stock market has gone bad.

But it has its happier duties, too. For it serves to brighten the hours of the shut-in invalid; to provide social diversion and maintain the friendships and acquaintances of the always busy mother of a large family; to keep up the family life during the day of the loving but occupied father.

It performs innumerable useful chores in a day. It orders the groceries, brings the cleaner, invites the guests, arranges the appointment with the dentist, reports the broken pipe to the plumber, gets the missing paper of pins or spool of thread when the dressmaker is in the house.

To the business man it is always his right-hand servant. Never more than an arm's length away, it stands by to make a sale, collect a bill, consult the attorney, place an order, countermand another, call an employee, direct a job, advise a salesman, learn the latest market quotation, settle an argument.

It does these things, and everything else, as easily and efficiently in one town as another, or between towns separated by thousands of miles. It keeps the man far away within a few minutes of his home and business. It brings the absent loved ones close to the family hearth. It eliminates distance.

Furthermore, the telephone is just as ready to bring anybody and everybody to the subscriber as it is to take him to them. Half of its duty, in other words, is to take messages from the subscriber, and the other half is to bring them to him. Whether he sends and receives messages often or seldom, it is always on duty, immune to fatigue or discouragement, to perform such service when the moment arrives.

And that, then, is telephone "service."

No human servant ever performed his duty one-hundredth so faithfully, untiringly, uncomplainingly or reliably.

The Good Book says, "The servant is worthy of his hire."

He is; and that hire should depend not only upon the services which he actually renders, but also upon the service which he would have rendered if called upon.

The servant who toils early and late each day may be worth a more generous hire than he whose duties are light. That seems just.

In the case of the telephone servant, eternally vigilant, the amount of service rendered is determined by the number of times he is called upon by the subscriber by whom he is employed, or by the friends and associates of that subscriber at distant points. If nobody takes advantage of his presence in a month to use him, still he has rendered a certain amount of service.

But if he has performed a hundred duties in a day, who can say that he has not been a more valuable and useful servant?

There are men who use the telephone seldom because of lack of necessity; there are some who use it seldom through lack of appreciation for its merits as a conserver of time and money.

Then there are those who use it often and profitably, with full understanding of its possibilities in the development of business and the economy of minutes.

Which class has the most valuable servant in the house?

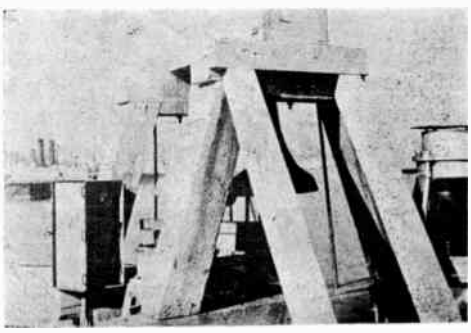
## Unique Safety Device Protects Ferries from Harm

PROBABLY there is no city in the world which uses ferries so much as San Francisco, California. The harbor is a maze of ferry slips. These the pilots have to learn thoroughly, since there are many strong currents running through the bay, and frequently the harbor is blanketed with dense, low-lying fog.

Thanks to the telephone, however, passengers are in no danger. There is a system of bells, tapping at known intervals, which guide the ferry captains to their proper slips.

But there was the possibility that the bells might get out of order, so the always reliable telephone was introduced as an additional measure of security. As soon as a bell gets out of order, a telephonic device installed near the bell warns an operator who is kept always on the alert.

Electricians are then rushed to the scene of trouble, and an emergency bell is set in operation until the defective one can be repaired.



(Photo by Gilliams Service, 82 Union Sq. E. N.Y.)

The faithful telephone, which gives warning when signal bell gets out of order, thus serving as a protection to the lives of millions of ferry passengers each year

# Repairing a Submarine Break

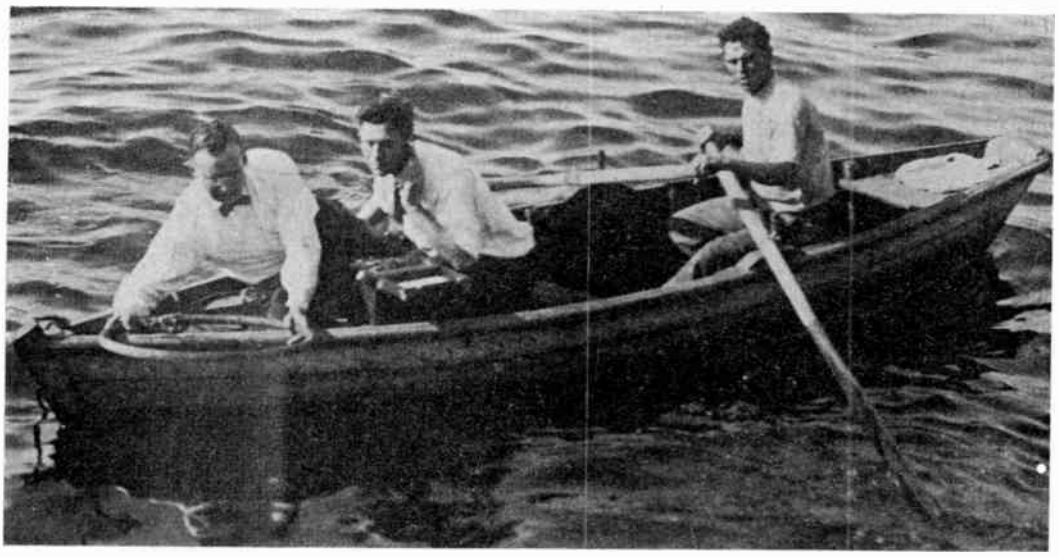
"A SHIP'S anchor did it."

That was the unanimous and immediate verdict of the engineers the minute they set eyes on the two damaged places in submarine telephone cable No. 2 of the Cuban-American Telephone and Telegraph Company.

The cable had been flattened out so badly that the copper conductor protruded between two strands of the tough iron armour. Even the iron wires were partly flattened. No wonder the service stopped so abruptly on the evening of October eleventh.

It was the first trouble of any sort that had developed in the telephone service between Havana and Key West, on any one of the three cables, since they were dedicated on April 10, 1921, by President Menocal of Cuba and President Harding of the United States. Up to that moment, there had been ideal service between all parts of Cuba and every section of the United States and Canada.

Owing to the forethought of the engineers who designed the cables, neither telephone nor telegraph service was suspended, however. One of the ideas of three cables had been to reduce the risk of complete interruption through accident. Therefore, when Cable No. 2 went out, the telegraph service was transferred to the other two cables, it being possible to transmit a telephone message and three telegraph messages simultaneously over the one conductor. This was decidedly important, as these cables are used by the press associations and various large banks and brokerage houses.



Testing for the cable damage. R. N. Spence of Atlanta listening, while A. L. Richey of New York holds the ring. The man at the oars is the Cuban diver who attached the rope to the damaged cable

It was a fortunate thing, too, that it did not happen a little later in the season, when the telephone traffic is at its heaviest owing to the presence of thousands of American winter tourists in Cuba.

James D. Stephens, in charge of the Morse service of the Cuban-American cables at the Havana end, immediately began to make tests and decided that the trouble was about 2,000 feet from the Havana cable hut, or just outside of historic Morro Castle. This

Dragging the cable on board the barge

led to the decision to attempt repairs without the use of a cable ship.

The American Telephone and Telegraph Company, which, with the International Telephone and Telegraph Corporation, is joint owner of the Cuban-American Telephone and Telegraph Company, immediately got together four of the best cable experts in the Bell organization and sent them to Havana. They were A. L. Richey of the Development and Research Department of the American Telephone and Telegraph Company in New York; R. N. Spence, of the American Telephone and Telegraph Company's engineering force in Atlanta, Ga.; W. L. Koch, of the submarine cable department of the New York Telephone Company, an armor expert, and Bruno Trebes, gutta percha expert for the Western Electric Company at their great manufacturing plant near Chicago.

These technical men, co-operating with the engineers of the Cuban Telephone Company under F. T. Caldwell, chief engineer and assistant to the president, are deserving of the credit for an unusually difficult job quickly and efficiently handled.

Richey, Trebes and Koch reached Havana on October 19. The next day was spent in assembling gear and placing it on board a lighter, and on the morning of the 21st the tug "Margaret," of the Port of Havana Docks Company, towed the lighter out into the harbor entrance opposite the cable hut.

Somebody was lucky enough to pick up a

Running the barge under the cable by man-power

Cuban boy along the waterfront who owned a small boat, and could swim and dive like a seal. In fact, he seemed to prefer being in the water to elsewhere. With his assistance, a half-inch line was passed under the damaged cable about fifty feet from the hut, and worked out about 150 feet, where the diver put a 1 1-2 inch rope under the cable. Both ends of the rope were then passed to the barge, and with further assistance from the diver, the rope was worked out a distance of about 400 feet, where the cable was hauled aboard

lengths, and then abandon the task for the night. On the second pull, however, a damaged section of cable came to the surface. Owing to the weather and the proximity of the barge to the ship channel, a rope was fastened to the bad place and sent ashore by launch, and the cable was thrown overboard. This damage was approximately 2,100 feet from the hut.

The next day the cable was picked up, and a second damaged place was found a little more than 50 feet from the first. The

R. N. Spence testing for the trouble after the cable was aboard the barge. The gentleman with the cigar is R. B. Hall of the engineering department of the Cuban Telephone Company. The third member of the group is one of Mr. Hall's crew who did efficient work in recovering and repairing the cable

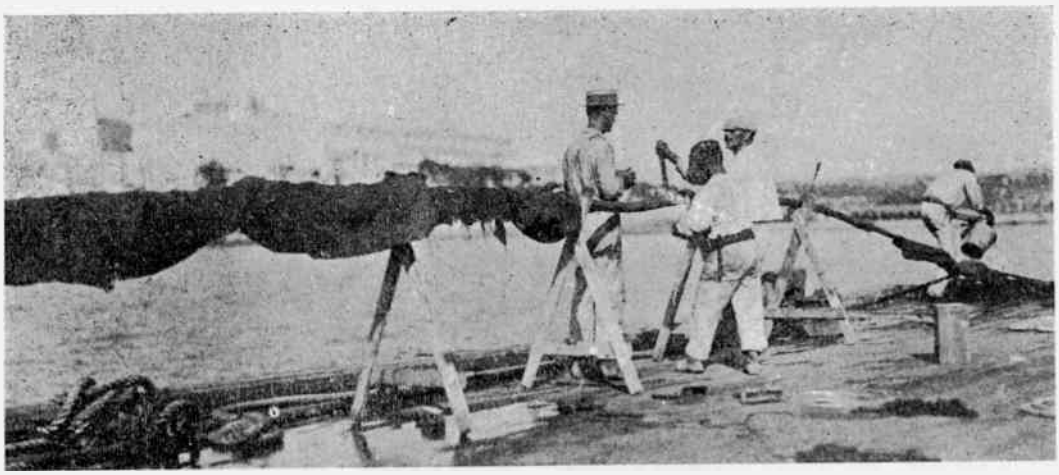
the barge, passing through a pulley at the front end. This was accomplished at 12:10 p. m.

The attempt to run under the cable by the power of the tug proved unsatisfactory, a hand winch was rigged up and the barge was pulled under the cable by man-power at the rate of about 50 feet every 10 minutes.

Darkness had settled over the harbor when Mr. Caldwell decided to pull three more

bad section was cut out and an attempt was made to pull in enough slack to make a splice, but at last it was decided it would be necessary to send to Key West for a new piece of cable.

Throughout that day the work was considerably hampered by a rough sea. There was a good deal of seasickness, and it was necessary to cut loose entirely from the tug, which stood by at some distance. One member of the crew fell overboard in transferring from



Wrapping the cable with marlin preparatory to cutting out the bad part. Notice the man at the far end of the barge, pouring water on the cable to protect it from the sun's effect

the barge to a launch, but fortunately was quickly pulled aboard.

Tests having established that there were no other faults, both ends were sealed, lines were attached, and the cable was dropped overboard at 6 p. m. A telephone message was sent to Key West for 200 feet of shore-end cable.

The gasoline launch "Petrel" left Key West at 8:30 p. m. on October 23 with the cable, arriving at 8:15 next morning. By 2 o'clock in the afternoon every question with the customs and quarantine officials had been settled, and the cable was transferred to the barge.

In picking up the anchor lines attached to the two ends of the cable on the morning of the 25th, it was found that they had fouled with wreckage and irregularities on the bottom of the harbor entrance. The Havana end was cleared, and one-half of the splicing job completed that day, but it was impossible to lift the Key West end, so permission was obtained from the Captain of Port to leave the barge in position all night.

The following day was devoted to completing the armor splice, and on the morning of the 27th a diver was sent down in a shark-proof cage to try to release the Key West end. After 20 minutes he came up and reported that the lighter would have to be shifted. On his second trip down, he remained 30 minutes and succeeded in releasing the cable end.

It was not much of a trick after that to bring the cable end aboard, and by 6:32 p.

The first damage. The copper conductor is showing between the displaced iron armor wires

The second damage, about 50 feet from the first

The engineers who did the job. From left to right—Charles Baughn, Cuban Telephone Company; F. T. Caldwell, chief engineers, Cuban Telephone Company; W. L. Koch, New York Telephone Company; A. L. Richey, American Telephone and Telegraph Company, New York; R. N. Spence, American Telephone and Telegraph Company, Atlanta; R. B. Hall, Cuban Telephone Company; J. M. Leonard, Cuban Telephone Company; J. D. Stephens, Cuban-American Telephone and Telegraph Company; Bruno Trebes, Western Electric Company, Chicago. The boy kneeling is the Cuban diver used in the first day's operation

Diver preparing to descend in shark-proof cage

Running the cable through the pulley on board the barge

Bruno Trehes splicing a good piece into the mashed cable

Bringing the cable back on board, second day. The engineers in the foreground, left to right, are: J. D. Stephens, Cuban American Telephone and Telegraph Company; R. B. Hall, Cuban Telephone Company; H. C. Hart, assistant chief engineer, Cuban Telephone Company

ma using acetylene flood lights after the sunlight died, 100 feet of good cable had been spliced in and service was restored over No. 2 cable.

Although the transmission has been slightly better over No. 2 than the other two cables since the splice was made, Mr. Caldwell has spurned all suggestions to drop an anchor on No. 1 and No. 3.

# International Telephone and Telegraph Corporation Moves into New Home

ON November 1st the International Telephone and Telegraph Corporation moved into its own home, in the International Telephone Building, 41 Broad Street, New York City.

The new quarters of the Company mark the third home the Corporation has had, and when it is considered that it is less than three years since the Company was founded, some idea may be had of its remarkable growth and expansion. Unlike, however, its previous two locations the Company now has its offices in a building bearing its own name. This building is located diagonally across the street from the New York Stock Exchange and is about midway on Broad Street between Wall Street and The Consolidated Stock Exchange.

This section of the city is rapidly becoming the communications center of New York; for in the immediate vicinity of the International Telephone Building is located the French Cable Company, the All America Cables Company, The Commercial Cables Company, the Radio Corporation of America and offices of the Western Union Company and the New York Telephone Company. These companies, all within a stone's throw of each other, might well be said, each with its affiliated and associated companies, to control the communications system of the world.

At present the International Telephone and Telegraph Corporation has established in its new building its Executive, Engineering, Accounting and Purchasing Departments, and from time to time it plans to increase these departments by others so that eventually, as the Company extends and pushes its activities, it will have in residence in the International Telephone Building, a complete staff of experts covering every phase of the telephone industry.

# History of the Telephone in Brazil

EDITOR'S NOTE—The information contained in this article, like that published in several previous articles on development of the science of telephony in Latin-America, has been assembled by the Statistical Department of the American Telephone and Telegraph Company. We are especially indebted to Victor M. Berthold. in charge of Latin American statistics for that company.

IN reciting the history of the telephone in Brazil, it is necessary to hark back to the very beginning of the telephone itself, and recall the picture of Don Pedro de Alcántara, Emperor of Brazil, personal friend and admirer of the late Dr. Alexander Graham Bell, whose historic remark, "My God, it talks!" uttered at the Centennial Exposition in Philadelphia in 1876, brought recognition to the tall, rawboned young inventor.

Young Bell was on the verge of discouragement; he had been ridiculed and rejected wherever he had gone with his invention. But the dramatic recognition of an emperor did for him what nothing else at that moment could have done. It was the power of publicity working in his behalf.

The next year, private telephones appeared in Brazil, but it was not until 1879 that the government granted the first concession for the commercial use of the telephone. In the following year, the Legislature assigned to the Telegraph Administration the contruction of all private telephone lines. Thereafter, on the advice of the Director of Telegraphs, all requests for the construction of private telephone lines were refused.

A circular letter, dated May 6, 1881, advised the governors of the various provinces that the Government might grant concessions for the construction of private telephone lines. But a decree from the ministry of communications a year later declared that no further concessions for the building of telephone lines would be granted, and that all pending applications were rejected. In 1883 a decree was signed establishing rules and regulations governing subsequent telephone concessions.

With the adoption of the new constitution under the republic, the Telegraph Administration was authorized 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 authority to build special telephone lines for the collection and distribution of telegraph messages, and to install telephone toll stations for public use.

A local exchange had been opened in the city of Maceió, Alagoas, by the Telegraph Administration, and it continued in service for eight years. It was closed in 1892, reopened shortly after, and finally abandoned on December 1, 1896.

State telephone service came into official existence in Rio de Janeiro on Nov. 20, 1890. There was then a 69-line central in the Telegraph Administration building, and a 37-line exchange in the War and Navy building, besides various private telephone lines. Service over the Government lines reached only to Fazenda de Santa Cruz, the plant being a make-shift proposition, with 2 mm. galvanized iron wire as the conductor.

This plant was reconstructed in 1896 at a cost of 100,000 milreis ($33,000), and the municipality turned over to the national government the lines used for the fire alarm system.

Replacement of single wire lines by metallic circuits began in 1906, but came to an end next year when the Administration closed a contract with the Brazilianische Electricitats-Gasellschaft to furnish the official telephone service. There were three centrals established, in the Telegraph Administration building, in the Largo do Mochado, and in the rua de S. Christovao, besides four centrals used by the War and Navy Department, police headquarters and the general police.

Siemens Brothers of London obtained an order in 1909 for a 400-line central battery switchboard with lamp signals, using metallic circuits. A year later, the Telegraph Admin-

istration constructed a line from Rio de Janeiro to Petropolis, consisting of 303 kilometers of wire, and ran a 42-kilometer circuit from Petropolis to Therezopolis.

Jumping to 1911, the report of the Telegraph Administration for that year showed that interurban service existed between the capital, Nichteroy, Petropolis and Therezopolis. Development of the State telephone from that year to the beginning of the World War was steady, but slow.

The real story of telephone development in Brazil, however, is written around private enterprises which were progressively active insofar as permitted during the years already covered. Credit for the first telephone constructed in that country, according to the "Histoire de la Telephonie," published in Paris in 1890 by Julien Brault, should go to the Western and Brazilian Telegraph Company, which built a stock exchange line in 1877.

A ten-year concession, with five-year exclusive privileges, was granted in 1879 to Charles Paul Mackie of Boston. This concession was allowed to lapse.

However, only 18 months after the incorporation of the Bell Telephone Company of New York, Theodore N. Vail, the great business genius of the Bell System, created the Continental Telephone Company. The company was incorporated in 1880 by Mr. Vail, William H. Forbes, the first president of the American Bell Telephone Company, George L. Bradley, Charles E. Hubbard and Charles Emerson. It was dissolved April 18, 1894. Dr. Alexander Graham Bell and his early associates assigned all their patent rights to the Continental Telephone Company for territory outside the United States.

The Telephone Company of Brazil was formed on Oct. 13, 1880, by Vail and his associates. An application, amounting to a request for the restoration of the old Mackie concession, was made to the Brazilian Government, and the new company was recognized and authorized to furnish telephone service by Decree No. 8065, signed April 17, 1881.

Within a year, the company had 372 miles of wire in the capital and suburbs. A second decree was obtained, granting the right to establish telephone service in Maceió, San Salvador, Petropolis, Rio de Janeiro, Porto Alegre, Pelotas and Rio Grande, but this franchise was rescinded by Decree, Oct. 16, 1886.

Meanwhile, a rival concern, the Companhia Uniao Telephonica do Brazil, had started exchanges in Rio de Janeiro, Santos and Sao Paulo. In 1889, this system was purchased by the Empreza Obras Publicas do Brazil, which the next year obtained a new concession to operate in Rio de Janeiro.

The Companhia de Telegraphos Urbanos came into existence in 1880 by a decree which authorized Morris N. Kohn to organize the Empreza Telegraphica Electrica Urbana de Servicio Domestico, and which company in turn organized the Companhia Telegraphos Urbanos e Servicio Domestico, with a 10-year exclusive franchise to furnish messenger, police and fire alarm service in Rio de Janeiro and Nichteroy. It is said that the Companhia Uniao Telephonica do Brazil operated under the above concession.

All telephone lines within the boundary of the capital were transferred to the municipal administration by a decree of Feb. 6, 1890, four months after the fall of the Empire. At the same time, the Telegraph Administration gained the right to establish telephone plants for government and public purposes throughout the republic.

A contract with the Empreza Obras Publicas do Brazil, to furnish telephone service in the federal district, was entered into under the above decree on March 25, 1890, by the Conselho da Intendencia Municipal. So far as the records show, this contract continued operative for six years.

In 1897, the contract with the Empreza Obras Publicas do Brazil was cancelled. A new 30-year contract was drawn up with Siemens and Halske Aktien-Gesellschaft and Alberto Frend & Co., for telephone service in Rio de Janeiro. After several organization changes, the concession was transferred in

1899 to the Brazilianische Electricitats-Gesellschaft. The latter company went out of business in 1907, the entire stock having been acquired previously by interests associated with the Rio de Janeiro Tramway, Light and Power Company.

The Rio de Janeiro Telephone Company received its charter in 1907, and was dissolved in 1911, when the shares of the Brazilianische Electricitats-Gesellschaft became the property of the Rio de Janeiro Tramway, Light and Power Company. At the close of the latter year, the Rio de Janeiro Tramway, Light and Power Co. had in operation 6,275 telephones, not including 721 operated by the Interurban Telephone Company of Brazil, which operated in Nichteroy and had long distance lines to Petropolis and Rio de Janeiro. In the year in question, this last-named company was acquired by the Rio de Janeiro Tramway, Light and Power Co., which in turn soon after passed into the hands of the Brazilian Traction, Light and Power Company, Ltd.

The last-named deal brought into the control of a Canadian corportion the interests of the Sao Paulo Tramway, Light and Power Co., Lt., the Sao Paulo Electric Co., Ltd., and the Rio de Janeiro Tramway properties. A year later, the annual report showed 8,376 business and 3,003 residence telephones operated by this consolidated company in Rio de Janeiro.

The year 1914 saw the control of the Companhia Rede Telephonica Bragantina and of the Cia. Telephonica do Estado de Sao Paulo pass into the hands of the Brazilian Traction, Light and Power Co., Ltd. This meant the absorption of the system in the State of Sao Paulo and in the cities of Sao Paulo, Santos and Campinas.

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 Sao Paulo.

In 1916, there was incorporated under the laws of Canada the Rio de Janeiro and Sao Paulo Telephone Company, with a share capital of $5,000,000 and authorized issue of $7,500,000 in 6 percent, 30-year bonds, which acquired the shares of the Brazilianische Electricitats-Gesellschaft, The Interurban Telephone Company of Brazil, the Companhia de Telephones Interestadoaes, the Companhia Telephonica do Estado de Sao Paulo, and the Companhia Rede Telephonica Bragantina.

It is significant that since 1912 there has been a strong and insistent demand in Rio de Janeiro for measured telephone service. This has been advised by the mayors of the capital in their messages to the Municipal Council repeatedly. The company also has requested the Municipal Council for authority to introduce this system of charges. It is a system which is now in effect in all the large cities of the United States.

The growth of the Rio de Janeiro and Sao Paulo Telephone Company from 1916 to 1920 was notable, showing an increase of 107 percent, represented by 33,816 telephones. On January 1, 1921, this company operated about 75 percent of the total number of telephones in Brazil, the remaining 25 per cent being represented by about 50 private companies, of which the largest was the Companhia Telephonica Rio-Grandense, of Porto Alegre, State of Rio Grande do Sul, with 7,200 subscribers.

Based upon such information as has been available, it is estimated that at the beginning of last year Brazil had 85,000 telephones. This would mean a development of 0.28 telephones per 100 population. The report from which these statistics are taken, however, concludes by saying, "Undoubtedly, if complete recent statistics were available from all private companies, the telephone development of the republic would be considerably higher."

# REVISTA TELEFÓNICA INTERNACIONAL

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KENNETH MCKIM, *Editor*

## THE MAN WITHOUT A TELEPHONE

Do You Know a Man Without a Telephone?

If so, you know a man who is not keeping pace with the procession. You know a man who is never going to be much of a success. You know a man who is unfair to himself and his acquaintances. You know a man who cannot see as far as the end of his own nose.

Do you have to do business with a man who has no telephone?

Then you are doing business with a man who is not treating you right; a man who is indifferent to the interests of those who deal with him; a man who has no consideration for your time, convenience or efficiency; a man who cares nothing for service in commerce; a man whose business judgment and vision are not to be trusted.

Do you know a man who has no telephone in his home?

All right; you know a man who is willing to impose on the good will of his neighbors; a man who has no objections to making a nuisance of himself; a man who permits his family to go without ample protection and comfort; a man who is ready to take a chance with the safety of his family and his property.

Harsh words?

No; just straight facts.

Let's see what we have said:

A man without a telephone is lagging behind in the advance of civilization. For the telephone is as essential today to the everyday life of the wide-awake and ambitious man as his shoes. A man may get along without either, but he will be uncomfortable and ridiculous. The telephone enters into most of the little as well as the big activities of the present generation. He who denies himself this necessity is standing still.

No man can succeed today who does not avail himself of the facilities which his competitors adopt for speeding up and expanding their operations. Success is not for him who takes an hour to do what might have been done in a minute; who leaves his office to do what might have been done at his desk;

who denies his patrons or clients the conveniences which others extend.

The man who is not convinced that a telephone is a necessity does not think fast enough to keep up in front.

Isn't the man without a telephone unfair to himself? He is not protecting his investment, he is not encouraging himself to grow. He is wasting his time and his energy doing things by slow and tedious methods which might be dispatched quickly over the telephone. He is cheating himself and his employees—if, indeed, such a man is fortunate enough to have employees.

The acquaintances of such a man, whether they be social or business acquaintances, are not getting a square deal. If they have to do business with him, or if they wish to say something to him, they must go where he is, or may be, taking the chance that they will find him absent. They can not make appointments with him. They must spend their own time travelling to wherever they may find him—perhaps waste two hours to hold a ten-minute conversation—when a telephone would have prevented this extravagance of the most precious thing in the world.

If a man can see as far as the end of his nose, he can see that a telephone transmitter right under the end of his nose will save him time, worry and money, increase his daily output and his annual income, conserve his energies, bring him friends and prosperity, and keep him in the driving seat of his own affairs

Any business man without a telephone is not doing right by those who have to deal with him—and he may feel sure that nobody will do business with him long who does not have to do so. He is putting them to a lot of bother, he is demanding too much of their attention away from other things; he is guilty of gross discourtesies toward them.

It is a moral obligation of any honorable man in business to respect the rights and interests of his customers and his creditors. Even if he does not care for his own welfare, he owes it to them to give them every opportunity to keep in touch with him. He has no right to demand more of them than other business men do.

Service is an important factor today in all forms of commercial life. People have a right to expect good service for their money, as well as good merchandise. It is not enough that a man should hand out goods over a counter in exchange for money. If he expects persons to trade with him again, he must give them some attention. When they cannot call him on the telephone, he is guilty of the worst form of inattention.

He is sadly in the minority who thinks he does not need a telephone. Public opinion is so overwhelmingly against him that there is no defense for his judgment; if it is bad in this important matter, it will be equally bad in others.

So much for the telephone in the place of business.

What does the man do who has no telephone in his home? He goes to a neighbor's house when he wishes to telephone, or he goes to some nearby store, tying up the line when somebody else may be trying to get that number. Perhaps he costs the corner grocer or druggist a sale. Often he gives persons, who wish to call him up, the telephone number of some neighbor. He thinks he is beating the company, but he is cheating himself more.

For even though his neighbors may endure his presumption, his family is still denied the convenience and the insurance of having a telephone in the house. When one of the family is taken violently ill in the middle of the night, when a burglar is sacking the silver downstairs, when the house is on fire, he will not have time to wake a neighbor and ask permission to use the telephone. Such an unfortunate calamity may cost him more in money and heartache that all the satisfaction of a lifetime with neighbors to pay his telephone bills.

Every man with a business or a family ought to have a telephone, and ought to be willing to pay for the amount of use he gets out of it; for each time he uses it he saves money.

"A telephone for every home," is a commonsense slogan.

Do you know a man without a telephone?

Tell him he ought to have one.

# AN OPEN LETTER

Anywhere, Nov. 1, 1922.

Mr. Intelligent Man,

Main Street,

Everywhere.

Esteemed Friend:

I am writing this letter to remind you that I am now in position to give you unequalled service, not only in the lines with which you are familiar through frequent and satisfactory dealings with me, but also in many new ways.

I have behind me the best selling organization in the country, having access to every business man's private office at all hours of the day, and being able to guarantee that when I call I will receive a prompt and attentive hearing.

I can give you the same quality of buying service, keeping you always in touch with quotations and stocks on hand, and obtaining for you more quickly and successfully than anybody else the most advantageous bargains.

I am also at your disposal to provide a very cheap but dependable form of fire, accident or burglar insurance, maintaining constant and instantaneous touch with the fire and police departments, the hospitals, and every doctor in town.

It is impossible to enumerate here the many ways in which I can supply you with the highest class of service, but I trust that in view of our past pleasant relations, you will feel disposed to call upon me at any time for anything under the sun.

Your faithful servant,

THE TELEPHONE.

# Broadcasting a Convention

STATION PWX of the Cuban Telephone Company got itself into the aristocracy of broadcasting this month by successfullly transmitting the proceedings of a convention.

Although the station had been in operation only a little more than a month, it had already become one of the best known and most favorably received in the Western Hemisphere; but this achievement has made the Cuban station the talk of the month in the radio world.

Even the applause of the audience, during and after each speech, was transmitted clearly.

The convention was the Sixth Latin-American Medical Congress. On the first night, one delegate from each of the twenty-eight nations represented made a brief speech, and the wide differences in the tones, quality and volume of their voices provided one of the several problems to be overcome on the ground and without time for study.

To understand what this achievement entailed, it is necessary to visualize the convention hall. The delegates sat in two rows on the stage of the National Theatre, in the shape of a letter "V", the two rows converging at a table occupied by the chairman and other officers of the congress. In front of them was a large and demonstrative audience, given much to cheers and hand-clapping. In the patio of the theatre was a brass band of sixty pieces.

The chairman introduced each speaker from his table at the apex of V-shaped rows of chairs. Then the band in the foyer, or patio, struck up the national air of the particular delegate, and the volume was tremendous. The delegate walked across the stage to a little platform near the wings, the band stopped playing, and the delegate began to speak.

This rather complicated proceedure was planned by the doctors, and the radio engineers of the Cuban Telephone Company had to work out their own salvation. What they did was to place one microphone in front of the chairman, a second in front of the speakers' stand near the wings, and a third was suspended from a second-story window above the band.

An operator was placed at a control station in the wings, and it was up to him to switch on first one microphone and then another, modulating with the greatest possible speed to get the right quality. On his ears he wore a head-set which was connected by direct telephone with the broadcasting station, while the operator in charge sat with a telephone transmitter to his mouth and gave constant instructions.

THE MICROPHONE

Three of these delicately constructed instruments, placed at different parts of the hall, and regulated by a control switch, made it possible to broadcast the happenings of the convention

The speakers, of course, were talking with their minds principally on the visible audience in front of them, and to pick up and deliver their messages clearly by radio to the unseen audiences in Mexico, Central and South America, as well as those in the United States

and Canada, who understood Spanish well enough to listen, kept the men of Station PWX on their toes. But they got away with it creditably.

The Brazillian delegate spoke in Portuguese. In the middle of his speech, a Cuban amateur called up excitedly to ask that he be instructed to speak in Spanish.

On the second day, the congress moved to the Santa Clara Convent, one of the oldest and most historic structures in Havana, as well as one of the largest. It covers four square blocks. That meant moving all the transmitting apparatus, and establishing new connections. The problem was simplified somewhat, however, by the fact that the convention by that time had got down to listening to professional papers instead of five-minute speeches.

In each case, the work of the sensitive microphones was to receive a small portion of the voice energy of the speaker and change it into electrical energy. This electrical energy was amplified, transmitted through underground cables to Station PWX, again amplified, fed into the radio transmitter and sent out as radio energy.

The microphones are of a special type and are so designed that every gradation of tone is faithfully reproduced. Special attention has been given to features which insure an even response over a wide frequency range and an absence of resonance effects and variations in efficiency, which if present even to a very small degree would seriously affect the quality of the reproduced speech.

The microphone is mounted in a small, inconspicuous housing with special supports to insure freedom from mechanical vibrations which might impair the quality of the sounds to be transmitted.

This housing was mounted three or four feet in front of the speaker, thus allowing him considerable freedom of movement, as he was not hampered by having to direct his words into the mouthpiece of a telephone transmitter.

The weak voice currents obtained from the microphone passed through three stages of vacuum tube amplification in a special speech amplifier which was installed at a point near the microphone.

This amplifier was equipped with controls for regulating the amplification, and was in charge of a trained operator who was in constant communication with the radio operating room by means of a special telephone circuit.

The output of the speech amplifier was connected to a cable pair which terminated in the radio operating room and which was carefully selected for freedom from noise or cross-talk. A very slight disturbance which could not be heard were the pair used for an ordinary telephone conversation, would have been very serious owing to the tremendous amount of amplification used in this system.

At the radio operating room this cable pair was connected to a duplicate of the voice amplifiers used at the National Theatre and the Convent Santa Clara. This amplifier was in charge of the Chief Radio Operator, who carefully regulated the amplification to prevent overloading of the vacuum tubes which would produce distortion, and at the same time to provide sufficient energy to insure proper modulation.

The reason for the use of such high grade, carefully designed apparatus, for the selection of special cable pairs, and for close attention to, and perfect operation of the equipment, may perhaps be more fully understood when it is realized that before it reached the modulator the voice energy which was picked up by the microphone was amplified 51,200,000,000 times.

It will readily be appreciated that the slightest foreign disturbance in the microphone circuit, when amplified 51 billion times, would be disastrous.

Tests made by the engineers at Station PWX show that the proceedings of the Sixth Latin-American Medical Congress should have been heard not only throughout the Island of

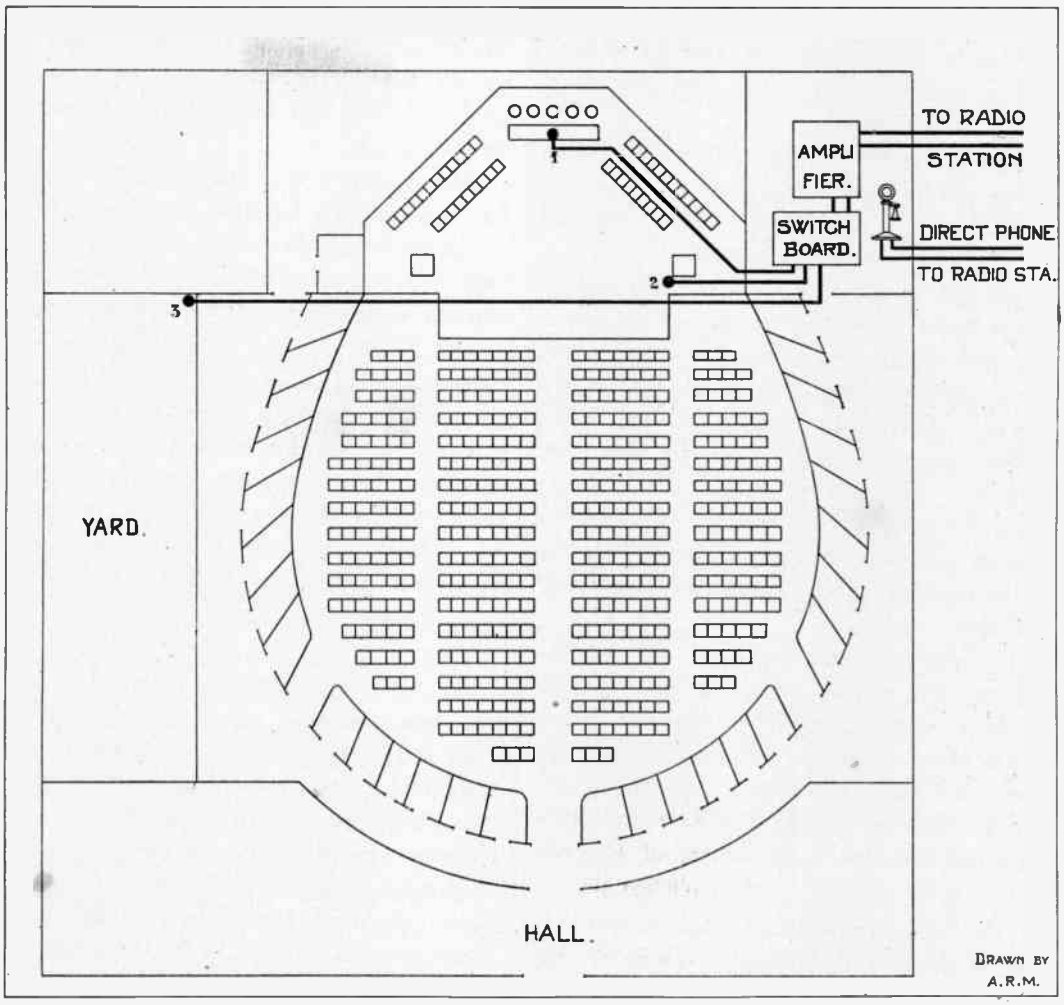



Diagram of National Theater, Havana, showing how the convention proceedings were picked up for Broadcasting Station PWX. Nos. 1, 2 and 3 in the diagram indicate the locations of the three microphones. No. 1 is the chairman's table, No. 2 the speaker's platform, and No. 3 the patio where the band was stationed

Cuba, but in the United States, Canada, Porto Rico, Haiti, Santo Domingo, Jamaica, Mexico, Central America, and a large portion of South America, an international audience unequalled in the history of the world.

## Morse's Key goes to Rio, Guarded

INCASED in a glass box the telegraph instrument invented by S. F. B. Morse was taken aboard the Lamport & Holt liner Van Dyck a few hours before she sailed from Hoboken for Barbados and Buenos Aires.

The instrument, which is to be exhibited at Rio de Janeiro until the close of the Exposition there, is in charge of B. H. Reynolds, vice president of the All-America Cable Company, and will travel in a room adjoining that occupied by Reynolds and under a guard during the entire trip. It was lent to Reynolds as an exhibit by officials at Washington, and he is held responsible for its safe return.

The instrument is of wood, 3 feet high and 2 1-2 feet wide. It is the original device developed by Morse in 1835, and still is in working order. It can be operated by a single cell battery.

# Blanketing a Continent with Music

It is now conservative to say that Broadcasting Station PWX of the Cuban Telephone Company, opened a month ago, is spreading its programs over the continent of North America, and also far into South America.

Reports received from Mexico, the West Indies, the United States and Canada establish the fact that the station has an effective radius of approximately 3,000 miles, using a wave length of 400 meters.

The farthest point reporting clear reception is Prince Albert, Saskatchewan, Canada. Among other long distance reports are one from Santa Catalina Island, in the Pacific Ocean; another from H. Vehrs, 1009 North West street, Visalia, California; and a third from R. Bartholomea, Porto Rico, who heard the address of Dr. Domingo Mendez Capote, former vice-president of Cuba, using a home-made set and detector only.

Among the thousands of letters received was one from Edgar C. Gause, of Kennett Square, Pa., who enclosed a photograph of his "original radio dog."

The following letters are typical of the many:

Bank of Montreal.
Prince Albert, Sask., Canada,
October 26, 1922.

The Cuban Telephone Co.,
Havana, Cuba.

Radio Station P.W.X.

Dear Sir:

Was very much surprised to pick up the last selection of your program last night which came in very loud and clear on a Tresco, detector and two-step amplifier.

Hoping to hear more from you in the future, I remain

Yours truly,

(Signed) W. F. MACLEOD.

National Metal Trades Association
Indianapolis, Ind.,
November 2, 1922.

Cuban Telephone Company,
Havana, Cuba.

Gentlemen:

Hello Cuba Radio Station PWX!

Last night I tuned in your station twice, (Wednesday night, November first) at 8:15 to 8:30 Central Standard time and again from 9:00 to 9:15 o'clock. This is a distance of about 2,000 miles airline.

Your modulation and strength of signal was excellent. You came in loud and clear through a small Arkay horn using a single super-sensitive Baldwin receiver as the loud speaker. I received you over regenerative circuit of my own designing using V. T. Detector and two stage audio amplifier. I did not have Radio frequency ahead of my circuit. Enclosed is a diagram of my Detector hookup.

Also I am using an inside aerial of about 150 feet strung in the attic of my house, "S" shape.

Other members of my family enjoyed the excellent musical program of the "Meyers Orchestra Extraordinary of the Hotel Sevilla." We were also much interested in the talk on Cuba as "America's most enjoyable winter playground." We heard you detail the distance by rail, steamship and airplane. In fact you almost got me in the notion of going to Cuba via wireless, because it would be much quicker than even Aladdin's lamp. We also enjoyed the talk in Spanish, even though we could not understand. We tuned you in the first time just as you were making the announcement for the beginning of your program, and heard you identify the station and say that it is a part of the International Telephone and Telegraph Corporation of New York City. We understood you to say that the announcer was R. P. Debs, and that the

Orchestra leader was Ernest Thompson. Then followed your musical program. The second time we tuned you in was during a talk in Spanish and also in English on Cuba's attractions.

During the second interval in which we received you, a friend of mine, Dr. Lloyd C. Weiss, who operates a drug store within a few squares of my residence, called me on the telephone to advise that he was also receiving your station.

Received both of your programs on the setting I usually use for 485 meters. You may be interested in knowing also of the weather conditions at the time which were most extraordinary for November. Yesterday it rained most all day and last night the sky was heavily overcast with storm clouds. In previous hours strong electrical and wind storms had prevailed within a few miles of Indianapolis. Last night while I was receiving you, the sky was occasionally illuminated by lightning flashes, and of course with resulting static interference in my receivers.

Nevertheless your program came in strong and distinctly. Will appreciate your sending me a schedule of your programs and I will try to pick you up often.

Very respectfully yours,

(Signed) ANDREW J. ALLEN,
3530 Salem Street.

* * *

The Brawley News
Brawley, California.
October 28, 1922.

International Telephone and Telegraph Co.,
Havana, Cuba.

Dear Sirs:

Your broadcasting station at Havana was heard here very clearly at close to 7 o'clock Pacific Coast time October 25th. Announcer was talking in Spanish, changing to English which was better appreciated as my knowledge of Spanish is limited. Heard statement that Saskatchewan, Canada, was farthest distance report. Believe they beat us by a couple of hundred miles.

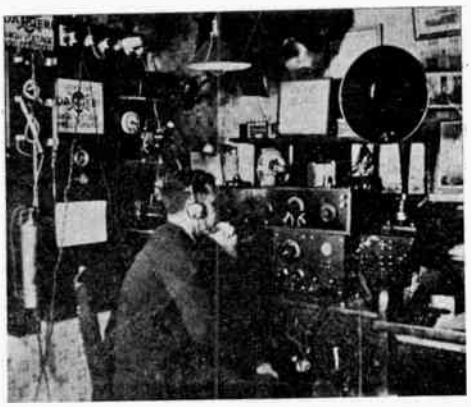
Brawley is in the Imperial valley, 119 feet below sea level, 25 miles from the Mexican border, and 100 miles in airline from San Diego.

Our best previous record was Pittsburgh, although we get the Atlanta Journal almost any night attempted.

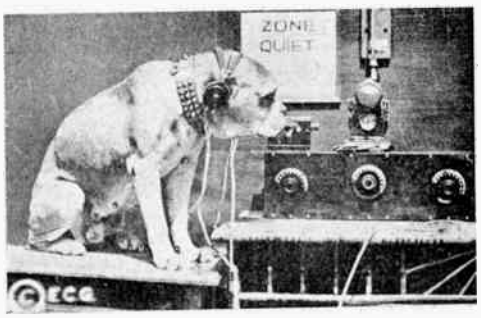
Very truly,

(Signed) M. D. WITTER,
Publisher

Using detector and two stages audio.



Edgar C. Gause of Kennett Square, Pa., one of the thousands of radio enthusiasts who has picked up the programs of Station PWX successfully and frequently. Mr. Gause is shown in his experimental station




"The Original Radio Dog"

Midmore & Downton
Wilcox, Sask., Canada,
October 26, 1922.

Radio Broadcasting Station PWX,
Havana, Cuba.

Dear Sirs:

Your program last night came in here

clear and loud. We did not get the first part of it as we were listening to another station, but as they were not coming in very good, I turned the dial just a little and heard piano music very clear, so stayed on that setting until the music stopped, then somebody gave a short talk, but I don't know what he said as it was not in English; then he started in English and told about the piano you were using being supplied by the Giralt Piano Company of Havana, and signed off giving the time as 10:35 P. M., Havana time, which was 9:00 P. M. by our time. We are about 2,300 miles from Havana.

Will you please write me in the enclosed envelope giving the size of your station, how long you have been operating and your hours of broadcasting, as I sure would like to hear you again.

Yours truly,
(Signed) H. H. DOWNTON.

* * *

Mayaguez, P. R.
October 16, 1922.

Broadcasting Station Cuban Telephone Co.,
Havana, Cuba.

Dear Sirs:

It gives me great pleasure to inform you that I have been fortunate enough to hear your broadcasting which comes in stronger than any other station I have heard, excepting San Juan, P. R., only 100 miles away. However, the reception is very QSA though the QRN is very troublesome down here. My set is home-made and is a one-stage amplifier.

Hoping this information may be of value to you, I remain,

Very truly yours,
R. CARRERO,
P. O. Box 512.
Mayaguez, Porto Rico.

(P. S. The broadcasting of your station can be heard, using a loud speaker, at a distance of over 50 feet from the set.—R. C.)

Reading Terminal, Philadelphia,
October 23, 1922.

Radiophone Broadcasting Station,
Havana, Cuba.

Gentlemen:

Saturday night (10-21-22) at 10:36 (E. S. T.) I heard you announcing "What would I do without you." Interference was bad and I could not follow all of your program.

I am using a *bed spring* for an aerial and at that time no *amplification*.

Yours truly,
R. A. STRATTON,
625 Cedar St.,
Camden, N. J., U. S. A.

## A Tribute to Doctor Bell

THAT the late Dr. Alexander Graham Bell contributed to civilization was thus ably described by General J. J. Carty recently at the ninth annual meeting of the Telephone Pioneers of America:

"The manifold activities of his life, devoted to the service of mankind, would require volumes to portray. The medals and other honors which he received from learned societies, his honorary degrees from universities at home and abroad, and special recognition by governments, all testify to the esteem in which he was held. His scientific researches in the field of heredity and eugenics, his experiments in aeronautics, his work in improving the phonograph, and in teaching the dumb to talk, and his invention of the photophone, reveal the scope of his mind. This record alone is enough to insure his fame, but his discovery of the method of transmitting articulate speech by electricity, and his invention of the apparatus to do this marvel, have placed his name among the immortals."

# Radio-Photography

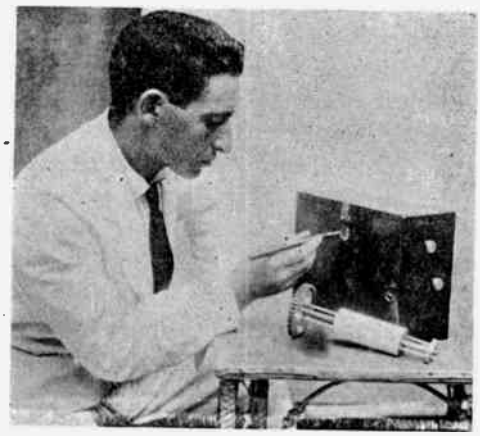
By AGUSTIN RIÚ

*of the Technical Staff of Station PWX*

NO other science has been more rapidly developed or received contributions from a larger number of persons than what is now known as the Radio-Science. Only twenty-five years have elapsed since Marconi first inaugurated the practical side of RADIO TELEGRAPHY, and the gigantic strides it has made since that date have made it necessary to study it, excluding everything else, in order to follow its evolution. The fact that Marconi was obliged to operate using the unpleasant language of dots and dashes, and with damped waves which produced the sensation of hearing discordant strokes, while now the hearer is charmed by the perfect harmony of songs and instrumental music and the pleasant modulations of the human voice, is sufficient to give us an idea of the strenuous efforts made to improve this invention, which is so far the most marvelous ever conceived by human genius.

But, although the results so far obtained have been mostly confined to RADIO-TELEGRAPHY and RADIO TELEPHONY, it must not be inferred that those are the only fields opened to the experimenter. It is likewise possible to transmit photographs by means of the electro-magnetic waves, which are also the transmitters of the Morse alphabet, music, and human voice through infinite space.

The successful experiments which I have made with excellent results have carried conviction to many, who now realize that RADIO-PHOTOGRAPHY is a reality. The purchase of a Radio-Photograph receiving or transmitting set at establishments where Radio-Telephone apparatus is sold, is a mere question of a brief period of time, especially if we take into account the fact that the apparatus, either for transmitting or receiving, used in RADIO-TELEPHONY, may, without any alteration whatever, be also employed for receiving and transmitting photographs by radio. In fact,



Mr. Riú with his Radio Photograph receiver

the only necessary change is to replace the microphone in the transmitter with a closed box, in which the photograph is placed, in transmitting, and, in the receiving set, to put, instead of the telephones or loud speaker, another closed box, similar to that of the transmitter, and in which the photograph received is gradually printed on bromide paper.

Let us consider the details of what happens in these two boxes, and at the same time draw a parallel, in order to show the difference between RADIO-TELEPHONY and RADIO-PHOTOGRAPHY.

In RADIO-PHOTOGRAPHY the transmitting apparatus essentially consists in a box into which, when closed, the light can only enter through a lens. Within the box in question there is a glass cylinder which revolves with a helicoidal movement and upon which the photograph to be transmitted is developed (Negative Film). The lens we have mentioned concentrates a luminous point exactly upon the film, and inasmuch as the latter is animated by a helicoidal movement, this luminous point will successively explore the whole film, and it will draw a spiral line proportionate to that of the screw which moves the glass cylinder forward. After the luminous

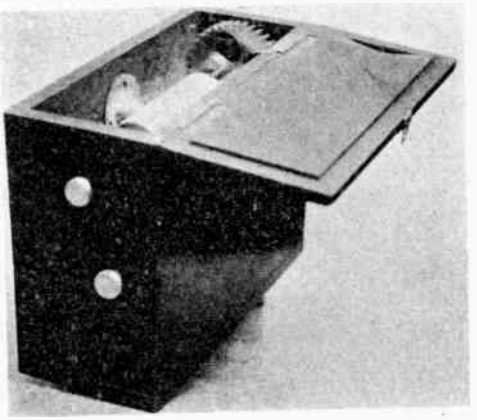
point has crossed the film, it will fall into the sensitive surface of a selenium battery. The selenium, which is a metaloid, has the singular property of varying its electric resistance with any variation of the intensity of the light illuminating its surface, and thus the difference of luminous intensity produced when the luminous point passes through the different tones of the photographic film, will be transformed into difference of electric intensity, which, previously modified by the transmitting apparatus employed in Radio Telephony, is thrown from the antenna at the wonderful rate of speed of 300,000 kilometers per second.

In reality, we have merely substituted the microphone of a Radio-Telephonic transmitter with the box containing the lens, the glass cylinder and the selenium battery, in order to transform the light variations into proportionate variations of the electric current. The selenium battery forms part of the primary circuit of a transformer, in the same way as the microphone in the case of a Radio-Telephonic transmitter. This transformer amplifies the weak currents produced by the selenium battery and causes a variation of the potential of the grid of the oscillation modulator. The details which I now would have to add simply to a description of the Radio-Telephony transmitter, are beyond the reach of the scientific vulgarization which characterizes this article. I will only state that the classic transmitting circuit is the modulating circuit of Hershing.

The exterior of the receiving set consists of a box similar to the transmission box, in which a wooden box cylinder revolves, synchronously with that of the transmitter (both of the same dimensions), upon which a sheet of bromide paper is wrapped, destined to receive the imprint of the photograph.

The complete receiving set consists of a Radio-Telephonic receiver and the box we are now considering.

The variations of electric intensity, previously amplified, go through the circuit of a galvanometer, the deviations of which, proportionate to the intensities received, enlarge more



Transmitter Apparatus of Radio Photography

or less the opening of the receiving lens, thus varying the intensity of the light which enters into the box, and the bromide paper will, therefore, receive impressions from the light, which, at each moment, are proportionate to the transparency of the film of the transmitter, as in the case of Radio-Telephony, when the variations of sound are propagated from the transmitter and receiver by the telephones or loud speaker. After the photographic imprint is received, it is developed in the ordinary way.

I have endeavored, in writing this article, to demonstrate the similarity existing between Radio-Telephony and Radio-Photography, because in the future, perhaps, the Radio-Telephonic transmitting stations may transmit, besides concerts, lectures, etc., one or two photographs, an operation which would only require six or eight minutes, and would certainly be considered as a pleasant, and at the same time, instructive complement. For this purpose, the owners of a radio-telephonic receiver would only have to acquire the receiving box for the photographs already described, at the proper time and establish the connection with the same, instead of using the telephones or loud-speaker.

It is to be hoped that the moment will arrive when, in announcing some important fact through the Radio-Telephone, the announcement may be accompanied with the proper photographs.

# The Fundamentals of Radio

*By* BERNARD A. WURM

*Operator in Charge, Station PWX, Havana*

INTEREST in radio has developed rapidly in the last few weeks in Cuba and Porto Rico, just as the enthusiasm began to spread like a prairie fire in the United States less than two years ago.

There are many in the two countries mentioned, of course, to whom the word "radio" has only a vague and mysterious meaning. It is for their benefit that this article is written, to try to present in simple form the fundamental principles of the science.

Everyone understands that radio signals, either telegraphic or telephonic, are sent out from a station by means of an electrical machine known as a transmitter; also, that to detect such signals, it is necessary to have some sort of tuning device. But what happens or how it happens remains a dark secret to the majority.

To draw a simple analogy, let us consider the transmitting station in the position of a public speaker standing on a platform, surrounded on all sides by a large audience. In the accompanying diagram, we will consider the large square the central point of distribution, and the smaller squares the various receiving points.

Radio waves are sent out from the transmitting station in exactly the same fashion that sound waves move out in concentric circles from the orator's platform as he speaks. Both radio and sound waves travel through the same medium, ether, which occupies all space, in the air, in liquids and in solids.

Clarity of sound, the amount of power, distance between the sending and listening points, and interference of other sounds within the listening range all are determining factors

BERNARD A. WURM

in the quality of the reception of either the orator's voice or the radio signals.

Just as a speaker with a clear and powerful voice can be heard better and farther than one with a weak voice and bad enunciation, so the distance at which sounds can be picked up by radio and understood depends primarily upon the power and construction of the transmitter. A man whose hearing is bad will have difficulty in understanding the remarks of an orator, however competent the speaker may be, and likewise much of the success of radio reception depends on the quality and construction of the receiving apparatus, be the sending station ever so powerful.

The radio waves, travelling out in all directions concentrically, as shown in the diagram, strike on the antenna of the receiving station setting up vibrations identical in char-

acter with those at the sending point which produced the waves. When the receiving station has been put in tune with the sending station, the sounds uttered at the sending station are reproduced.

If you were standing out in the audience facing the orator, and some person near you started to speak in a loud voice, or make some other noise, you would have difficulty in hearing the orator. When the same thing happens in radio it is called interference.

The principles involved in radio telephony are the same as those of the telephone on your desk, except that in the one case the sound waves set up electrical impulses which travel through the ether, whereas in the case of your well-known friend, the everyday telephone, these impulses, or waves, are conveyed by a wire to the receiving station.

There is an important difference between the two, however. That is the difference between secret and widespread distribution of the message. There is no secrecy to radio transmission, as the waves travel equally fast in all directions through the ether, and any properly constructed receiving station may be tuned in to reproduce the sounds at the sending station.

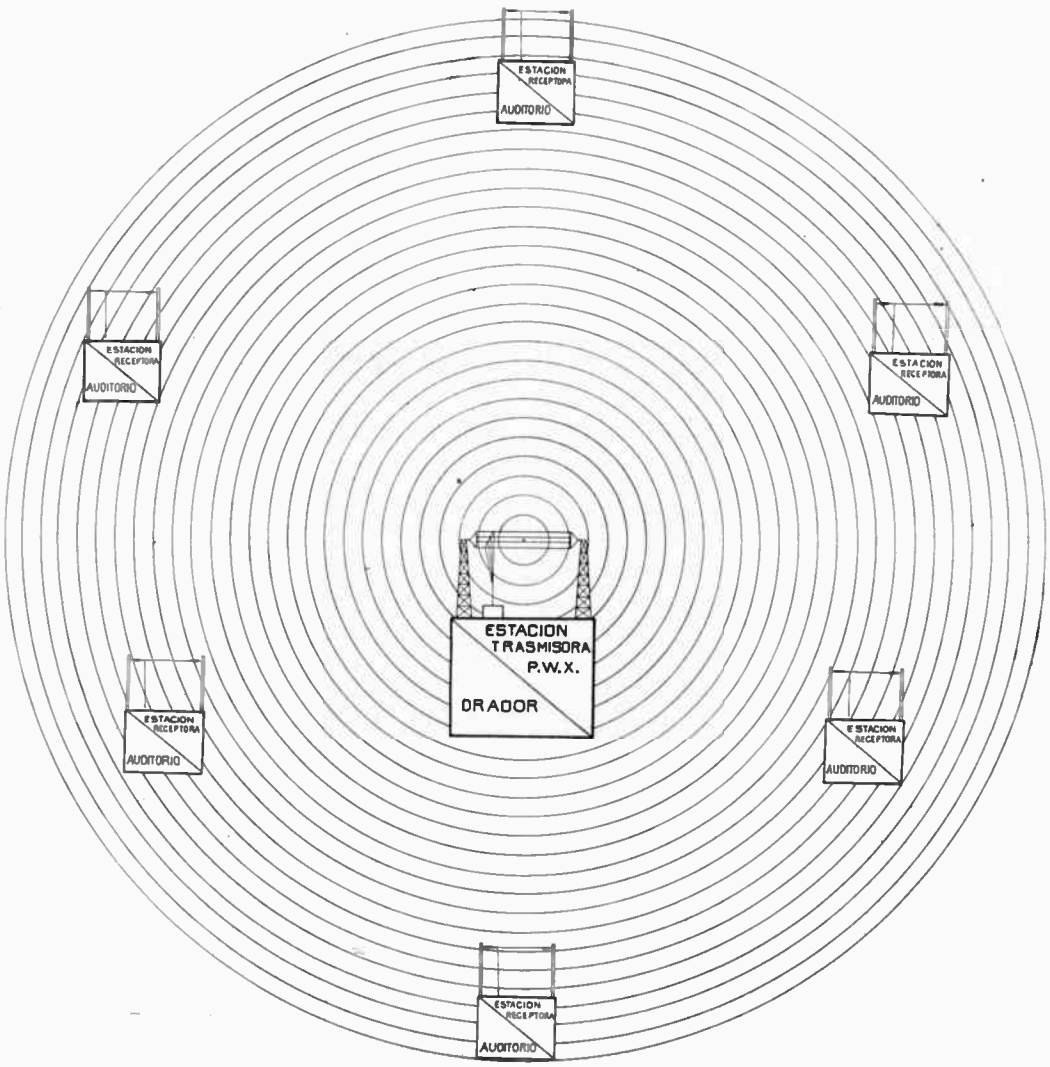



Diagram giving analogous explanation of the principle of radio broadcasting

The radio telephone is here to stay, but there is no danger that it ever will supplant the wire system. Each will have its separate field of usefulness, and the wire system will always have the preference in social and business intercourse between individuals. For the distribution of music and information to the wide world, however—that new and fascinating business called broadcasting—the radio telephone has a growing and practical province all its own.

It is now possible by radio telephone to communicate from a fixed location to moving objects, or from one moving object to another. This leads us into the realm of the possibilities for communications of a practical sort with vessels, trains and automobiles. The radio telephone also promises to remove the terrors of isolation from expeditionary parties, so that it may never be necessary again for an explorer to remain entirely out of touch with his fellow men for years, as has so often been the case in the romantic history of the pioneers.

The wire telephone and the wireless telephone are not enemies or competitors; they are partners working for the extension and improvement of communications throughout the civilized world, bringing men, nations and continents ever closer and closer together, to the vast advantage of the human family.

# Address of Dr. Carlos de la Torre

## Rector of the University of Havana, Delivered by Radio-telephone, Saturday, November 18, 1922, from Station PWX

THOUSANDS of radio listeners in Cuba, the United States and other countries of the western world, were deeply stirred on the night of November 18 by the eloquent and poetic address of Dr. Carlos de la Torre, rector of the University of Havana, in which he described his vision of a larger institution, dedicated to "the greatness of science and to the culture of the Cuban people."

Dr. de la Torre spoke at the studio of the Cuban Telephone Company's broadcasting station PWX, and his masterful oration was projected into space to an audience of uncounted tens of thousands within a radius of 3,000 miles. His speech follows:

"The marvels of radio! This wonder of man's genius! Thought is held in suspense, amazed, before this conquest of science, and even reason queries to what unexplored fields might lead the supreme effort of the mind in unravelling mystery.

"My humble words will impinge upon a microphone and be carried by the invisible Hertzian waves radiated by the transmitter to be intercepted by the antenna of a receiving station, where tuner, detector and amplifiers, marvels of inert matter, which will vibrate as with the breath of life, will collect them as the cosy nest gathers to itself the wandering fowl lost in space.

"Such were my musings, when the kind and repeated invitation of Mr. Francisco Comas, director of the radio telephone of the Cuban Telephone Company, prompted me to speak, in my character of provost of Havana University, a few words in relation with the vast plan of university reform, tending towards its modernization, which has been my standard and my program, trusting that as the human voice transmitted by the marvelous radiated waves reaches thousands of listeners, another wave equally portentious, that of sympathy, might awaken a resonance in the heart of each graduate, of each man and woman of

good will, capable of enlisting their aid in developing and bringing to a culmination the supreme idea of my life; a University of which America could be proud, located in this happy land, which due to its geographical position, its international relations and warm hospitality, can well be considered the heart of the western continent.

"Almost a year ago today, the devotion and loyalty of the University faculty and its faith in my plan, invested me with the high dignity of office which I now hold, and on accepting this honor as the greatest of rewards for my humble toil in the province of science and tireless efforts in the noble chair of the professor, I contracted the solemn obligation with my conscience, my friends and my country, of raising on yonder University Hill, the monument of national solidarity and of physical and intellectual culture, which floats before my eyes as a constant mirage in our ever blue sky, as the imaginary plans of his divine Grenada appeared to the Moor Azuna of the 'Palace of Pearls.'

"Overwhelmed with joy I observed the awakening of our national spirit from its lethargy, and, receiving many promises of support, began the work of collecting resources seconded by the student body. The immediate response of the Provincial Council of Havana, at the initiative of Governor Alberto Barreras, was soon followed by a series of municipalities, including this capital, all desirous of contributing their mite towards the erection of the projected University town. But circumstances with which we are all familiar, especially the economic crisis, detained the initial impulse, making it impossible to finish within a year, which was the original plan, the work already begun.

"But at present more favorable omens spur me on, principally the improvement in the general economic situation, which promises the early re-establishment of normal conditions as soon as the beneficial effects of the coming loan, floated in the United States, are felt.

"I also consider as favorable, as it exemplifies the growing spirit of association, the founding of two new university clubs, which have offered their generous support and the unquenchable enthusiasm of the student body, all determined to raise upon the ruined foundation of the ancient powder factory, the massive and magnificent monument of modern science and national progress.

"And last, but not least, the great admiration bordering on envy, that capital sin of which I confess myself almost guilty in this case, awakened in me last summer by a few of the great universities of the United States, which I visited to gather impressions and to receive stimulus for my project. Besides old Harvard, the alma mater which is deeply rooted in my heart, I beheld the great buildings and magnificent laboratories of Columbia, the pride of New York; Pennsylvania, founded by Benjamin Franklin, which was preparing to receive its new provost, General Leonard Wood, that typical man of honor and public servant, whose brilliant career of achievement is so closely interwoven into Cuba's history; and Princeton, the alma mater of Woodrow Wilson, that great president of the United States, who at the most critical hour in the history of civilization, became the evangelist of the doctrine of universal peace and good will among the nations of the earth.

"I still retain the varied impression of grandeur, suspense and admiration produced by the Princeton buildings, especially by Alexander Hall, that architectural jewel of round towers and pointed arches which remind the observer of the great Gothic cathedrals, raised by the devotion and generosity of the faithful, and dedicated by its giver and founder, 'To the glory of the Almighty and the development of science.' Still emotioned by the mute witnesses of the generous donations which the American alumni make to their universities, after leaving their venerable halls, to begin the struggle for life, I offered a silent prayer, beseeching the Almighty that some day my beloved Cuba would produce the magnanimous son who would raise a memorial hall dedicated to 'the greatness of science and to the culture of the Cuban people'."

# Improving and Enlarging Santiago Plant

ACTIVE work is now going on toward the expansion and general betterment of the local automatic telephone service in Santiago de Cuba.

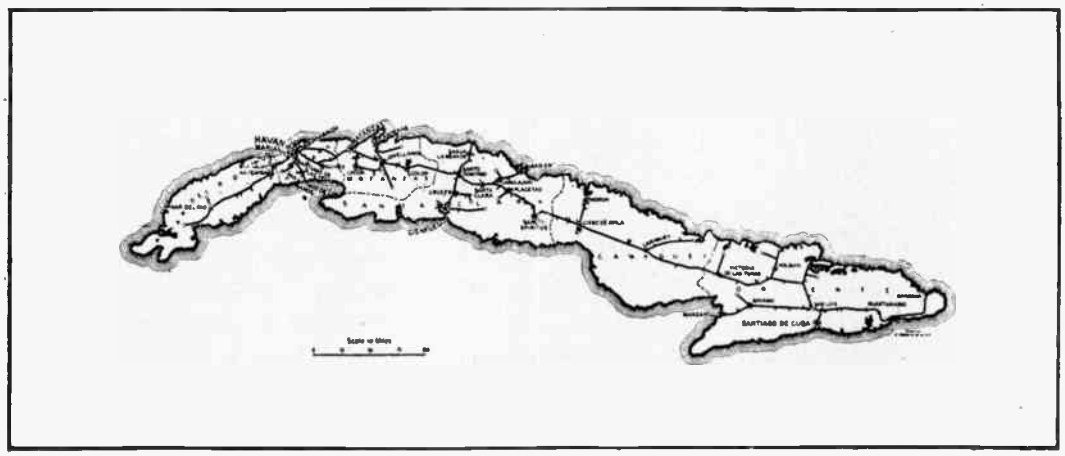
The metropolis of eastern Cuba has been enjoying considerable growth lately, in various localities, including the beautiful Reparto Vista Alegre, necessitating not only extensive installation of equipment, but the rearrangement of much of that already in service.

Santiago de Cuba within the last year and a half has been given the benefit of the best long distance telephone service in Cuba, through the reconstruction of the long distance system, and the rearrangement of traffic routes, so that the city is now at one end of an admirable through trunk-line service to Havana, and thence to the United States and Canada. With the installation of three repeater stations between Havana and Santiago, the transmission has risen to such a high quality that a conversation from Santiago to either Havana or the United States is as distinct and enjoyable as though the two persons were in the same room.

The completion before the end of this year of the work now being done on the local plant will place the telephone service in the Oriente capital on a plane with the best anywhere, or make it, in other words, much better than that of the average city of the same size, in other countries.

Building of the Cuban Telephone Company, Santiago de Cuba, where the automatic exchange is housed

There has been a marked increase in the number of applications for telephones in Santiago in the last month, which indicates that



Map of the long distance lines of the Cuban Telephone Company

the public is awake to the efforts of the Cuban Telephone Company, and appreciative of them.

F. T. Caldwell, chief engineer of the Cuban Telephone Company, and H. C. Hart, assistant engineer and long distance superintendent, recently visited Santiago, and decided upon a plan to give the subscribers a much better service, while at the same time taking care of the expected demands of new subscribers for the immediate future.

This new plan, which is now being carried out, involves the use of 26,500 feet of new lead-covered cables, or 4,500,000 feet of copper conductors. To support these cables will require the installation of 300 new poles.

One new 200-pair cable will provide ample additional connections for Reparto Vista Alegre. The rearrangement of a large amount of drop wiring is made possible by the extending of this new cable, and it will also provide a substitute for a great quantity of overhead wire.

The automatic switchboard, similar to the type used in Havana, Matanzas, Cienfuegos, Sagua la Grande and Cardenas, has been completely readjusted, and an addition of another 100-line automatic switchboard is now being set up under the direction of Carl Levy of the Havana plant.

Already more than 30 per cent. of the existing telephones have been readjusted, and this task of readjusting instruments or replacing old ones with new will continue until every subscriber is getting a superior quality of service.

An additional crew of about 25 men are now at work on these betterment plans in Santiago de Cuba.

# The Extension Telephone as a Money Maker for the Subscriber

WHAT a man's telephone is worth to him depends, of course, on what use he gets out of it.

There are many elements that go into making the total value of a telephone to any subscriber. Every telephone is a form of insurance against the calamitous results of fire, robbery, accident, illness and the loss of trade.

But one of the most valuable features of a telephone is that it saves time and wasted steps. That is the equivalent of saying that it saves money. No matter how rich or poor a man may be, he has a limited amount of time in this world. The more he conserves his time, the more he gets out of life, and the more chance he has of success.

The hours which a man saves are, in a practical way of speaking, added onto the total natural span of his life. It is like compounded interest.

The telephone saves the subscriber the time required to go down the street, or even to another town, to transact business with another. It saves the housewife the time that would be consumed in going to the grocer, the butcher or any other merchant for something which she needs in a hurry. On every occasion that the telephone is used, the parties at both ends of the line have been saved a lot of time.

But often this time-saving quality of the telephone in one's home or place of business may be expanded by the installation of an extension.

In the case of a large home, many needless steps are taken in a day to answer the telephone, which could be saved by having an extension. Suppose the telephone is on the first floor, in the front of the house. If the mistress is on the second floor, she has to come downstairs, perhaps she even has to lose time in dressing first, when she is called to

the telephone. The maid may have to walk half the length of the house a dozen times a day to answer, and afterward walk twice as far to summon the member of the family called.

If the family is large, it is generally the case that the particular person called is nowhere near the telephone when it rings. There is time lost on the part of the person whose lot it is to find the one called, and there is time lost by the called party in getting to the telephone and back again to whatever he or she was doing.

In any big home an extension telephone is a great convenience; in a house of more than one floor, it is almost a necessity. The man who has an extension in his place of business ought to be considerate enough of his wife to see that she has one in her home, also.

When a man spends any money, however little, for anything new in his place of business, he invariably wants to know first that it is going to make money for him. There is no argument necessary to convince any business man that a telephone is a money-maker for him: that is a universally accepted fact.

In the case of an extension telephone, the only argument that should be necessary is that which is built around the number of times he or some employee has to quit work and walk some distance either to place a call or to answer one.

If the total number of minutes consumed thus daily were computed it would be surprising to the average business man, and when reduced to dollars it probably would stagger him. However, that would not measure the real loss, for when a person is called away from what he is doing, the longer he is absent, the longer it takes him on his return to pick up where he quit.

There is no efficiency in sending a messenger to the second or third floor of a store or factory, or to the back end of the building, to look for someone who is wanted on the telephone, when with one or two extension telephones that person could be located at once, and both he and the messenger saved valuable minutes.

If a man has two or three offices, or only one large office with several desks, he is wasting money not to have one or more extension telephones, according to his requirements. He is getting less work out of his employees in a day than he ought to, and that is one of the most wasteful factors in business.

There is also the person at the other end of the line to be considered. Whether it be a social or a business call, it is the part of courtesy and fair play to keep the calling party waiting as short a time as possible.

Many a business man has lost a customer or the opportunity of transacting a profitable piece of business by keeping another man waiting too long on the telephone. The money a man may lose in this way on one occasion might easily be enough to pay the cost of an extension telephone for a whole year, and avoid the recurrence of such an unfortunate circumstance.

"Hold the line till I call him" is a remark that seldom fails to annoy the person to whom it is addressed. To the person who is waiting with a telephone receiver to his ear for another person who is being summoned every minute seems like five.

The annoyance caused by that wait may or may not cost the man without an extension something that day, but it is pretty certain to cost him money eventually. The man who calls and has to hold the receiver while the person he wants is being sought and brought to the telephone is not likely to go through this experience very many times before he starts doing business with some other house that does not keep him waiting.

It is quite as important to have respect for the value of the other man's time as for that of one's own.

# Optimistic Business prospects in Cuba

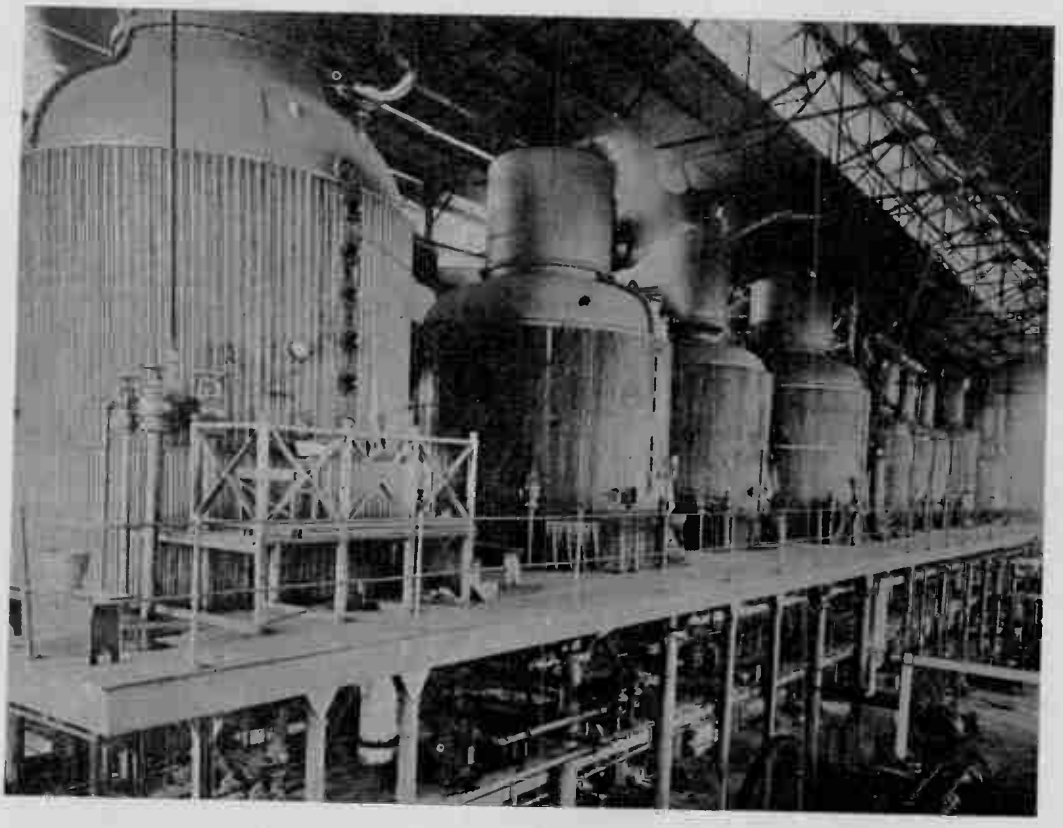
NOTE.—Revista Telefónica Internacional is indebted for this article to The Bureau of Public Service of Havana.—The Editor.

CUBA is fundamentally sound and the extent of her resources together with her remarkable ability to overcome difficulties augurs well for rapid advancement during the five years which lie directly ahead. Statements by the principal business men of the island are optimistic and passage of the $50,000,000 exterior loan bill by the Cuban congress, with assurance in the United States that the money will be forthcoming soon, marks the beginning of what is expected by leading financial and government executives to be an era in which the country will not only recover from her recent crisis, but will advance to such an extent as to occupy a place with the most prosperous nations of the world.

Completion of the loan will mean that money will circulate much more freely and business will boom as a result; construction will get under way and already there is much talk of building a central highway to link all the important cities of the island and provide an adequate feeder system, extending through the heart of the sugar plantations; the government will be able to clear up all its outstanding debts, pay in full salaries and wages owed to public employes and go ahead with numerous projects planned to fulfill requirement of the public and blaze the trail for new agricultural and business enterprises.

Touching upon the subject of Cuba's ability to come back, John A. Myers, assistant to Vice-President J. H. Durrell of the National City Bank of New York branch in Havana, declared that the mere fact the sugar planters and mill owners went ahead, handicapped by lack of funds and a great crisis in the island's

Cane carts in the yard of a typical Cuban sugar mill



Interior view of a Cuban sugar mill

main industry, and produced a record crop, marketed it at fair prices and ridded themselves of a large surplus from the last season, shows Cuba's ability to overcome obstacles and surmount difficulties.

Herbert C. Lakin, president of the Cuba Railroad, upon return from an inspection tour of the line and on the eve of his departure for New York, said that the mills on the Cuba Railroad expected to produce even more sugar this season than last, when about 6,500,000 bags were turned out. Of this number all but 324,000 bags, or about five per cent, has already left the island. Thus, if the same percentage should happen to hold good on the other railroads in Cuba and at the mills which ship from their own ports, there would now be a surplus here of less than 200,000 tons.

The mills along the Cuba Railroad line, in preliminary estimates, expected to make about 7,000,000 bags, or 1,000,000 tons of sugar during the coming crop. Unsuitable weather, with its resultant postponement of the grinding season, may cut these figures to some extent, but even in that case a better showing than in the last zafra is counted on, Mr. Lakin said. The following is quoted from a statement he made to The Bureau of Public Service just before going north:

"As all people who have engaged in business in Cuba for any number of years realize, Cuba has extraordinary power of recuperation. Signs of that power are already evident, notwithstanding the fact that collections of old debts are still slow. The volume of new business, both in merchandise and in passenger traffic, is undoubtedly somewhat greater than last year, although the present month and November are the dullest times of the year for general business and railroading.

"We have been devoting special attention

on our railroad to putting locomotives and cars in good order for the grinding season, and we are laying down a large amount of rock ballast. We will be in better condition to take care of the coming crop than ever before in the history of the railroad."

In line with the betterment of Cuban business conditions and the expected good times ahead, announcement has been made of the formation of the first managerial corporation on the island, Dayton Hedges, prominent contractor and owner of the Cuba Hydro-electric Company at San Antonio de los Baños, being president of the new concern. Pedro Villoldo is vice-president of the Dayton Hedges Management Corporation, and E. Antonio Vasquez, prominent sugar man who built several of the largest sugar mills in Cuba, is second vice-president. Miguel A. Campos is secretary and treasurer. The company will specialize in management of public utilities and sugar mills.

A high class engineering force as well as its own accounting department will be maintained by the company, the officers of which are owners of several large electric companies in Cuba as well as other public utilities which will be put in the company for management.

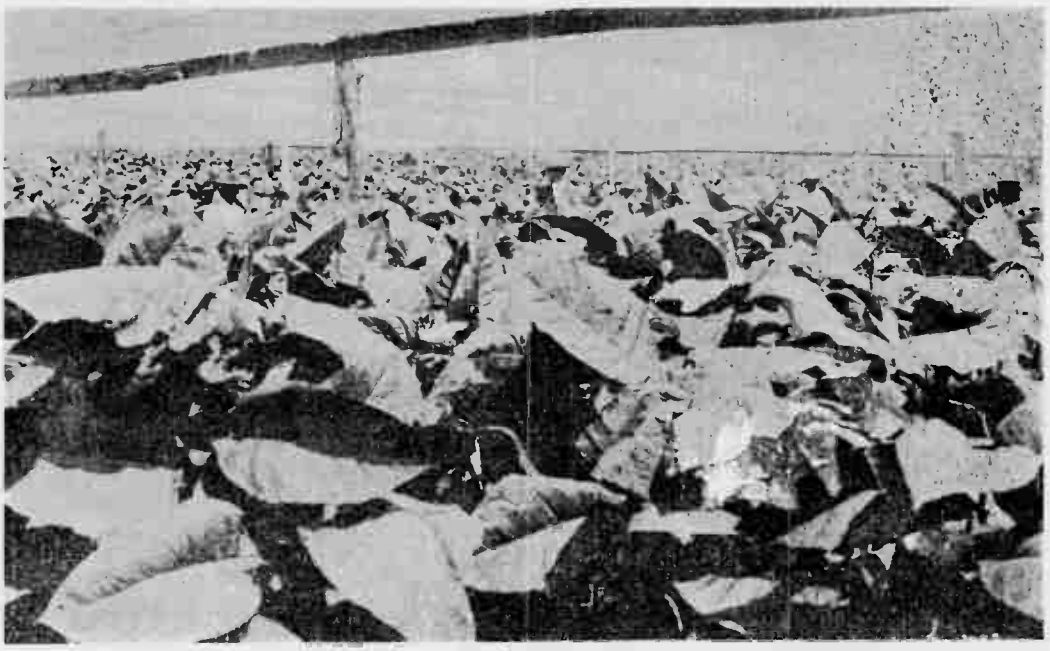
The present Isle of Pines grapefruit crop has consisted of 175,000 crates, 83,000 of which have moved via the car ferries of the Florida East Coast Carferry Company, Havana to Key West.

On account of the fact that this fruit reaches the American market well in advance of all other grapefruit a large percentage of the crop has been sold at fancy prices, netting the growers in the Isle of Pines a handsome return in the aggregate. Movement of the crop through Key West is a great advantage to the growers on account of the diversion privilege. It is understood that the results obtained in the marketing of last year's crop and this year's crop have been very satisfactory, which will have the effect of increasing the crop and undoubtedly the Isle of Pines growers will be placing on the market in the United States within the next few years at least a half million crates of this early grapefruit.

Recently a thorough examination has been made of the soil on the Isle of Pines by experienced pineapple growers and this soil is reported to be admirably adapted to pineapple growing as well as that of grapefruit. The result of this has been the planting of various pineapple fields in the Isle of Pines, this being a new industry there with bright prospects for success.

Another field which Cuba is about to

Picking grapefruit in Cuba's citrus belt



Shade-grown Cuban tobacco, from which the world's finest cigars are made

invade on a large scale is that of the canning industry. Guines, heart of the tomato growing section, is the location of a new and up-to-date cannery, erected by the Güines Products Company for operation beginning November 15. Roger Lefebure, of Havana, is president of the company and G. W. Dunbar, formerly of the Dunbar-Ducate Company of New Orleans, is in active charge of the factory. This progressive organization is also about to start canning shrimp at Cienfuegos, where the best in this variety of seafood is to be obtained.

With the rapid growth of the radio-telephone industry in the United States and other countries, Cuban mahogany has found an unlimited market, being the most suitable existing material for manufacture of sound amplifiers.

To say that Havana hotel men are optimistic is not sufficient to express their expectations for the 1922-23 season. So confident are the Hotel Sevilla owners of Cuba's future that they have ordered immediate work on the construction of a large new addition to contain 200 rooms and extend to the Prado, Havana's fashionable boulevard.

This will make the Hotel Sevilla in all a $3,000,000 investment and one of the finest establishments of its kind in the Western Hemisphere. Resident Manager Holland B. Judkins has just returned from New York with complete plans of the new addition and it is expected the 1923-24 season will see it open.

The Hotel Plaza, under the management of Fausto Simons, has added a downstairs dining room since last season and has improved its roof garden extensively, that resort having gained in popularity to a marked degree during the summer.

One of the biggest hotel deals of the year was transacted here recently when W. E. Todgham, manager of the Hotel Harding, took the Hotel New York under his wing. Mr. Todgham's success with the first mentioned hostelry has been one of the most talked of achievements in recent years. With "meals like mother used to make," and "come on over home," he has worked wonders, and the Hotel Harding does a thriving business not only during the season, but the year

round. A similar policy has been announced for the Hotel New York, a large and modern building with complete and up-to-the-minute equipment now known as the Royal Palm.

Theater owners already report a substantial increase in receipts. This, according to Beverly Griffith, general manager for the Universal Film Manufacturing Co. in Cuba and the Campoamor theater here, is due to money having eased up and the early arrival of tourists from the north.

The Hershey corporation recently inaugurated service on its electric railroad line from Regla to Matanzas, this enterprise proving a success from its inception. By means of the Regla-Matanzas line, the latter city and Havana are in much better communication and trade conditions will be benefitted accordingly.

The P. & O. S. S. Company, of which R. L. Brannen is general agent in Havana, has placed its ships in tip-top condition to take care of the influx from the north this winter and every facility will be placed at the disposal of the visitors.

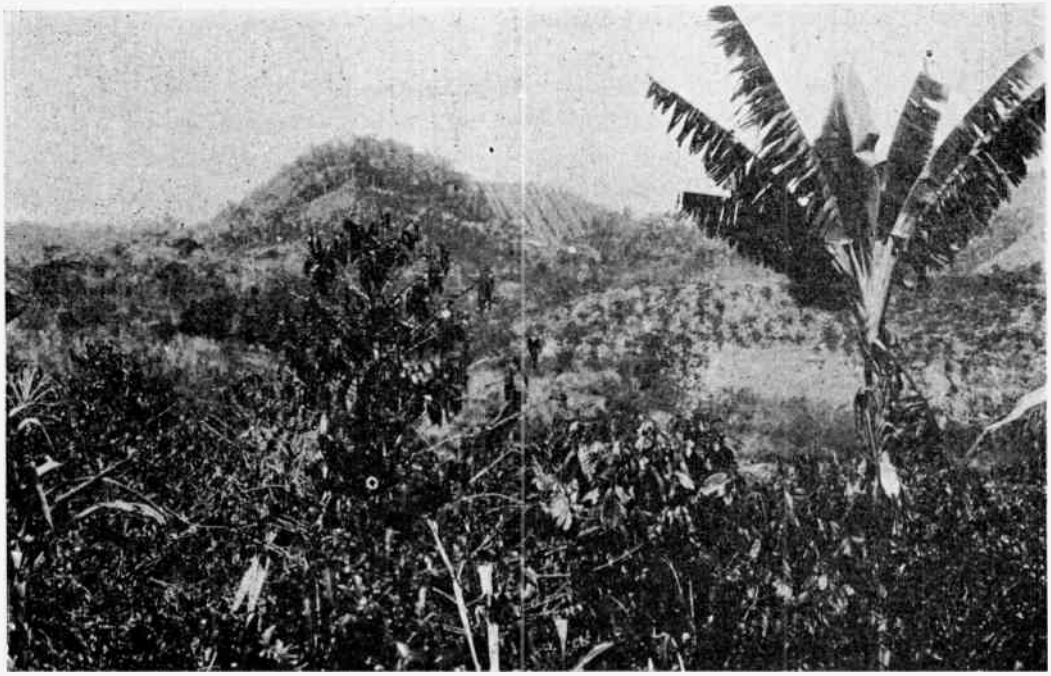
Railway and steamship men predict one of the greatest tourist seasons Cuba ever has known. Shortage of coal in the north as the result of the strike which rendered mines throughout the country idle all summer means the fast approaching winter is going to drive thousands of people south. Of these thousands, it is safe to predict a large percentage will come to Cuba.

Hotels, stores, cafes and other establishments catering to tourists are preparing for a record breaking year. Last year 64,000 tourists came to Havana. This number is expected to be but a drop in the pail compared with the number to arrive this winter.

More conventions than ever before are to be held in Cuba this year, seven being scheduled for November alone. This is proof conclusive that Havana is in line to become the convention city of the Western Hemisphere.

Early in October the government assigned a wave length for radio broadcasting in Havana and the Cuban Telephone Company immediately inaugurated its sending station, installed at great expense and complete in every detail, being equal to the best in the United States. President Alfredo Zayas delivered the opening address from the National Palace, speaking both in English and Spanish and addressing a message to the people of the United States, congratulations received later confirming that his words had been heard in various parts of the great American republic. A complete musical program

A typical shaded country road in Cuba



Coffee and rubber plantation in Eastern Cuba. The big tree in the foreground is a banana tree

also was rendered on the opening day and numerous receiving sets in Havana and other parts of the island picked up the sounds. The entire program was conveyed to the patrons of the Campoamor theater and Hotel Regladora by means of special receiving sets and sound amplifiers.

With reports from all the five provinces and the Isle of Pines optimistic, in the words of Frank Steinhart, president of the Havana Electric Railway Company and kindred companies, and known as a leader in finance and business of the island, Cuba's future is unlimited. Employment conditions will be bettered with resumption of building activities, assured through passage of the loan, and the freer circulation of money, also a certain result of the loan, means promising times for all concerned in the island's welfare.

# Havana Entertains Detroit Audience by Telephne

HAVANA entertained large audiences in the United States on the night of November 15 by two distinct methods of communication. While Broadcasting Station PWX of the Cuban Telephone Company was presenting a musical program by radio, in a nearby room the same company was entertaining with music and conversation an audience of 3,000 in Detroit, Mich., and a small group at San Francisco, Cal., who were connected with Havana by a 5,000-mile telephone circuit.

Professor Emilio León had the unique distinction of playing a violincello solo to an unseen audience, first over the thousands of miles of shining copper wires that stretch from the terminals of the Havana-Key West submarine cables, and later through the mysterious ether that extends everywhere, and makes radio broadcasting possible.

For the Detroit audience he played Handel's "Largo," and for his radio audience scattered over an area with a radius of 3,000 miles he played "Der Trompeter von Sakkingen" and "Eleanor," being accompanied by the Ramon Morena orchestra.

The audience in Detroit consisted of officials of the American Telephone and Telegraph Company, Michigan State Telephone Company, and a couple of thousand public utilities commissioners who were meeting there in convention. Officials of the Pacific Telephone and Telegraph Company were listening in San Francisco.

President H. B. Thayer of the American Telephone and Telegraph Company was one of the speakers at the convention. F. A. Stevenson, director of the Long Lines Department of the above company, was master of ceremonies, and called the roll of repeater stations from Havana to San Francisco. F. T. Caldwell, chief engineer of the Cuban Telephone Company, responded at the Havana end of the circuit, and carried on a spirited conversation with San Francisco, which was heard by the entire Detroit audience.

Vail Memorial medals were presented by President Franz C. Kuhn of the Michigan State Telephone Company to two plant men, Joseph Bowen of Lansing, and Ralph S. Smith of Detroit, for acts of unusual heroism.

## Typical Radio Program of Station PWX, Havana

*October 25, 1922*

First Part

Overture, by Ambrose Thomas
Presented by the Casas Orchestra of the Cuban Army General Staff Band.

Violincello solo, "The Last Rose of Summer"
Written by Prof. Rodolfo O'Farrill

Address, Dr. Domingo Méndez Capote, former vice-president of Cuba

Cuban dances—Ignacio Cervantes
"El Velorio" "Si" "Improvisada"
By the notable Cuban pianist, Vicente Lanz

Concert flute selection
"Brilliant Waltz," by Lieut. Luis Casas
Played by the author and Francisco Royas, accompanied on the piano by Vicente Lanz

Second Part

Two-Step "New Spain"—M. Tomas
Played by the Casas Orchestra

Violincello solo, "Meditation sur le Mur"
Prelude of S. Bach by Ch. Gounod
By Rodolfo O'Farrill

Recitation—Francisco Comas Bolfa

Xylophone solo, "Dance of Gioconda"
By Nilo Mendez, accompanied on the piano by Vicente Lanz

Cuban Danzón "Princesita"—Prof. Luis Casas
By the Casas Orchestra

# Reasonable Telephone Rates

*By* G. R. GRANT

*General Attorney, New England Telephone and Telegraph Company*

THE best definition of a reasonable rate I have ever heard is included in a comment made by Justice Swayze of New Jersey in the case of Public Service Gas Company *v.* Board of Public Utility Commissioners, 95 Atlantic, 1079. Justice Swayze said:

"On the one hand a just and reasonable rate can never exceed, perhaps rarely equal, the value of the service to the consumer. On the other hand, it can never be made on compulsion of public authority so low as to amount to confiscation. A just and reasonable rate must ordinarily fall somewhere between these two extremes so as to allow both sides to profit by the conduct of the business and the improvements of methods and increase of efficiency. Justice to the consumer ordinarily would require a rate somewhat less than the value of the service to him; and justice to the company would ordinarily require a rate above the point at which it would become confiscatory. To induce the investment and continuance of capital there must be some hope of gain commensurate with that realizable in other business. The mere assurance that the investment will not be confiscated will not suffice."

A just and reasonable rate is one which justly divides the difference between the cost of rendering the service and the value of the service to the subscriber. A difference between the cost of the service and the value of the service must always exist else the service would cease. Where the benefit goes only to one party to the transaction the business cannot continue. Unless telephone service is worth more than a person pays for it, the public will not buy the service, and unless the company receives for the service more than it costs, the company will not render the service. Therefore there must always be a spread between the cost of rendering the service and the value of the service. Somewhere between those limits lies the reasonable rate.

# Before Bell

MRS. GRIGGSLEY received a letter from Cousin Martha. Mrs. Griggsley lived in Boston, Cousin Martha lived in New York. They had grown up together, and the tenderness which existed between them was more like that of sisters than cousins.

Cousin Martha was seriously ill when she wrote. The uncertain, scraggly characters with which she had all too painfully formed the words showed with pitiful plainness how weak she was.

Moreover, Cousin Martha's husband was somewhere in the West, which at that time meant beyond the Mississippi. She was all alone except for a kindly neighbor who came in frequently to look after her.

Mrs. Griggsley was deeply worried. The letter was more than a week old when she received it. It might be another week or a fortnight before she would hear again. Meantime, Cousin Martha might be in dire need of attention.

It was a perp'exing problem. Mrs. Griggsley had a family of small children who demanded her attention. But Cousin Martha had nobody in Boston except charitable neighbors to attend her wants.

After all, Mrs. Griggsley could leave her children in the care of the trusty old negro servant in an emergency like this. Yet she pondered considerably over what she ought to do, for her husband, too, was out of town. His business had taken him to Philadelphia a week ago, and there was little reason to expect him back for ten days. And there was no way of communicating with him.

Finally, Mrs. Griggsley decided that her duty lay in the circumstances with the sick cousin. She hadn't much ready cash, but she could engage passage by vessel to New York, and with good luck be there by Saturday.

Reluctant to leave her little ones, yet convinced that she ought to be with Cousin Martha, she prepared for the tedious voyage.

The weather was decidedly unfavorable, and it was not until Monday forenoon that Mrs. Griggsley landed in New York. Three hours after she set foot on the pier, she was knocking at Cousin Martha's door.

Greatly to her relief, Cousin Martha herself opened the door, smiling and the picture of health. "Why, you big goose, I've been up and around for the past week," said Cousin Martha, "But of course I'm delighted to see you."

Mrs. Griggsley collapsed in a chair. "I'm utterly exhausted from fatigue and worry," she said. "Isn't it terrible for us to live so far apart?"

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That isn't a story, exactly; it's just a commonplace narrative of the sort of thing that used to happen constantly before Dr. Alexander Graham Bell invented the telephone.

If Mrs. Griggsley and Cousin Martha were living today, it couldn't happen. For if Cousin Martha were ill, she would telephone to Mrs. Griggsley every day and keep her advised of her condition. And Mrs. Griggsley, secure in the knowledge that she was only a few minutes removed from her cousin's bedside, would be able to visit her, comfort her, and attend to Cousin Martha's every want by telephone, without the necessity of leaving her children to a servant's care. Furthermore, both women would have been able to talk whenever they chose with their respective absent husbands. There wouldn't have been any problem at all.