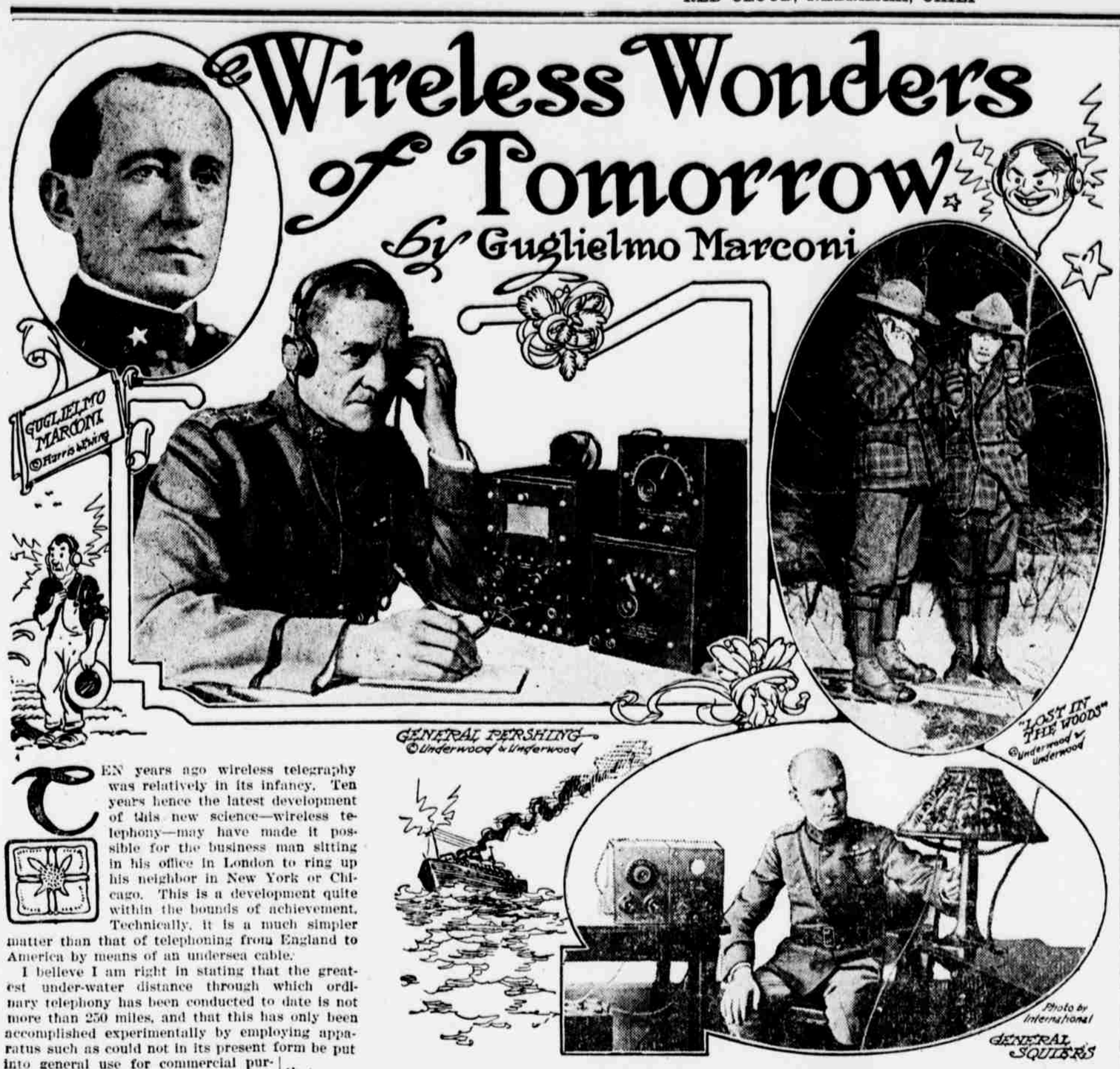
Wireless Wonders of Tomorrow

by Guglielmo Marconi



TEN years ago wireless telegraphy was relatively in its infancy. Ten years hence the latest development of this new science—wireless telephony—may have made it possible for the business man sitting in his office in London to ring up his neighbor in New York or Chicago. This is a development quite within the bounds of achievement. Technically, it is a much simpler matter than that of telephoning from England to America by means of an undersea cable.

I believe I am right in stating that the greatest under-water distance through which ordinary telephony has been conducted to date is not more than 250 miles, and that this has only been accomplished experimentally by employing apparatus such as could not in its present form be put into general use for commercial purposes. The longest telephone cable actually operating today is about 100 miles in extent. As a matter of fact ordinary cable telephony has not yet taken place between England and Holland, although these two countries have such intimate commercial relations that there can be no question about the demand.

The trouble in under-water cable telephony lies in the very pronounced distortion which takes place after the electrical waves, which are the equivalent of the vocal sounds, have passed a few miles through the cable. Even in the twenty-odd miles between England and France it has been found necessary to place on the ocean bed special appliances for overcoming this distortion. These appliances add considerably to the expense and upkeep of the circuit.

Now, it is a curious fact that, although an electrical oscillation projected through an under-sea cable becomes rapidly distorted, an electrical wave radiated across the ether by a modern wireless apparatus retains its original characteristics however great the distance over which it may travel.

In wireless telephony we convert the modulations of human speech into equivalent modulations of the electrical waves, and radiate them through the ether until they strike the aerial wires of a receiving apparatus. There they are reconverted into sound waves such as can be recognized by the human ear. As the ether is so elastic as to allow these electrical waves to maintain their original form, the question of reception is little more than that of magnifying the incoming signals.

Wireless speech has already taken place across the North Atlantic ocean, but the apparatus employed was of an experimental, rather than a commercial character, and therefore development is necessary before one can record transatlantic conversation as a commercial possibility.

To conduct uninterrupted speech over sea distances similar to that between London and New York will require, at any rate with our present-day experience, considerable power at the transmitting end. Until a few weeks ago I might have been tempted to estimate this power at the electrical equivalent of over 1,000 horse-power, but the experiments which I have been engaged upon recently on my yacht, the Elettra, lead me to modify my estimate. Hitherto, as everyone connected with wireless is aware, we have always found it necessary to keep in reserve on commercial wireless circuits a large amount of electrical energy for the purpose of breaking through terrestrial electrical disturbances. The sources of these disturbances are not always clear, but they are such that at intervals during the day, and notably in the summer months, they set up in the wireless receiving apparatus such a din of meaningless noises that it is difficult to read the systematically transmitted signal.

This new apparatus, which has been developed by engineers of my company, makes it possible for us to sift the mixed wireless and non-wireless impulses so that we obtain on our automatic recorders, or in the telephone receivers only the signals sent out by the distant wireless stations. I think that one of the outcomes of this invention will be the employment of smaller powers than have hitherto been considered necessary for covering certain distances.

It is still a little premature to talk of the day when everyone will possess his individual wireless telephone, particularly one of the portable variety, which may be carried about and used at will; but I am not going to suggest that it will never be possible for a large number of circuits to be used within the same area.

This does not mean that there is not already a valuable field of practicable usefulness for the wireless telephone. The field is greater than is generally realized today, and I regret to say that its application to industrial needs is taking place more rapidly in other countries than in this one. In Holland, for instance, the Amsterdam stock exchange circulates by wireless telephone at frequent intervals daily the latest financial information, and this is received simultaneously in nearly 200 banks in Holland by means of apparatus constructed by the Marconi company. I am informed that the arrangement has given great satisfaction and a considerable impetus to business.

What Holland can do can be done equally well in this and other countries, and the information radiated need not be confined to financial matters. All that is needed is a fair opportunity for demonstrating the possibilities and for conducting a similar service.

A few weeks ago representatives of the Times newspaper talked by wireless telephony between Southwold in Suffolk and Zandvoort in Holland. On that occasion they conversed freely for 50 minutes from the respective wireless telephone stations, and I hope that we may be permitted shortly to show that our experiments between Southwold and Zandvoort have a very practicable application, and that by linking up this wireless circuit with the telephone wires at the English and Dutch ends it may be possible for anyone in London possessing a telephone apparatus to ring up the exchange in London, ask for the wireless route to Amsterdam, and speak to a corresponding subscriber in Amsterdam. In this case the telephonic message from London to Southwold would be relayed automatically by wireless across the North sea, reconverted to land wire message between Zandvoort and Amsterdam, and received in Amsterdam exactly in the same way as a short-distance call over the ordinary circuit.

The Anglo-Dutch wireless telephone circuit operates on a wave length which permits of very sharp tuning, and causes no disturbance to the wireless circuits employed by the military, naval and air services. It would, in fact, be possible to multiply these routes and have quite a number of wireless circuits to the continent working in collaboration with the land lines.

While the experiments at Southwold are about to demonstrate the immediate practicability of wireless for trunk routes, whether they be overland or overseas, a series of experiments in another part of this country has demonstrated that it is now possible to speak by wireless in one particular direction. This discovery will remove the objection that conversations can be overheard by those for whom they are not intended.

The only commercial use for which wireless telephony has so far been sanctioned in this country is that of establishing a communication between the Bar lightship in the Irish channel and the offices of the Mersey docks and harbor board in Liverpool. Intercommunication is conducted almost every hour of the day with this apparatus by men who have had no special training, and without any interference with the wireless service conducted at the mouth of the Mersey by the Seaforth station belonging to the British post office. It is absurd to think that this is the only place where a useful service can be performed by wireless telephony.

I need hardly dwell on the growth of wireless telephony in connection with aerial communications. I believe I am right in stating that every British machine regularly flying between London and the continent has been fitted by the Marconi company with the wireless telephone, and we have numerous instances where these instruments have contributed to the safety of the services, and performed other valuable functions.

We have also demonstrated to one of the railways the possibilities of wireless telephonic communications as an auxiliary to the ordinary telephone lines, and it may be that now government control has been removed from railway operations, some progress will be made along the lines indicated by us.

I have suggested that the day has not arrived for the so-called pocket wireless set. The sensitiveness of wireless receivers has been so greatly increased in recent years that it is possible even now to possess portable apparatus capable of receiving signals from high-powered stations many hundreds of miles distant, but this is quite a different matter from transmitting signals. For wireless transmissions it is still necessary to raise a wire a considerable height above the transmitter, and if serious distances have to be covered it is also necessary to have a source of electrical power greater than can be at present conveniently carried by an individual. How near we have approached the ideal of a portable transmitter was demonstrated by the Marconi company a few months ago when the London fire brigade conducted wireless telephonic communications between one of their tenders on Putney Heath and their headquarters at Southwark, a distance of some seven or eight miles. In this case the aerial wire was hung from the branches of a small tree near the roadside, and the apparatus employed was stored in a small space at the back of the vehicle.

One thing is certain, the science of wireless telephony will not stand still. Like the ordinary telephone, it is passing through a period when it lacks official encouragement, and is dependent for its salvation entirely upon those who are engaged in its development.

In 20 years the mysterious all-pervading ether will be surging with human speech conveyed by ether waves. Whispered conversation with friends in lands as remote as Australia will probably be commonplace, and science, having revealed to humanity another wonder of nature, will have forged thereby a fresh link in the much-desired chain of international fellowship.

"The night of December 7, 1921," says Raymond Francis Yates in the New York Times' "Current History," marked a new era in amateur wireless work, for on that and succeeding nights more than a score of American and Canadian amateur operators first realized their ambition of "getting across" the Atlantic. Though the law limits amateurs to comparatively short wave lengths, some of their messages during that historic test covered 3,000 miles of ocean and were accurately recorded at an amateur receiving station in Scotland.

Toward the end of 1921 a photograph of President Harding was flashed across the Atlantic ocean from Annapolis to Paris in 20 minutes. This feat was achieved with an ingenious apparatus invented by Edouard Belin. The picture, of course, was not transmitted in material form, but was translated into radio-telegraphic impulses, which were recorded on the distant apparatus. The work done along this line opens up a new field. Within a few years we shall probably be transmitting important news pictures over great distances, and then how easy it will be even to sign checks and important papers through the ether! In fact, a signature sent by this method has already been recognized as legal in France. The possibility of criminal detection is also interesting in this connection. A criminal's likeness can be sent broadcast to any part of the country within the space of a few minutes.

It is gratifying to know that America has taken the lead in the development of radio telegraphy. There was recently opened at Rocky Point, Long Island, a powerful radio station designed to make New York the focal point of radio-telegraphic communication throughout the world. This powerful transmitter, the aerials of which are supported by no less than seventy-two 410-foot steel towers, and spread over a space of ten square miles, will enable this country to communicate with six foreign nations simultaneously. Besides this we have several other transatlantic stations and one transpacific station.

Although the United States has taken the lead in the development and application of radio telegraphy, England, France, Germany and Japan are by no means overlooking the value of this kind of communication. England has already started to carry out an ambitious plan which will give her an "All Red Chain" of wireless stations throughout the world. Japan recently completed the erection of a powerful transmitter which places her in direct touch with points as far distant as the United States. Germany's powerful Nauen station represents the latest advances in the art and keeps her in constant touch with the commercial activities of America. France has provided herself with a number of efficient radio stations for world-wide communication. The Scandinavian Peninsula is in direct touch with America through the use of a newly erected station.

IMPROVED UNIFORM INTERNATIONAL

Sunday School Lesson

(By REV. P. B. FITZWATER, D. D., Teacher of English Bible in the Moody Bible Institute of Chicago.)

LESSON FOR JUNE 4

JEHOIAKIM TRIES TO DESTROY GOD'S WORD

LESSON TEXT—Jeremiah 36.

GOLDEN TEXT—The Word of our God shall stand forever.—Isa. 40:8.

REFERENCE MATERIAL—Isa. 55:8-11; Matt. 5:17-19.

PRIMARY TOPIC—The Burning of a Good Book.

JUNIOR TOPIC—Jehoiakim Burns the Prophet's Book.

INTERMEDIATE AND SENIOR TOPIC—A King Who Scorned God's Word.

YOUNG PEOPLE AND ADULT TOPIC—How to Meet the Forces Antagonistic to God's Word.

I. The Book Being Written (vv. 1-4).

1. The Time of (v. 1). In the fourth year of Jehoiakim, Jeremiah had been exercising the prophetic ministry some thirty years.

2. Against Whom Spoken (v. 2). They were directed against Israel, Judah and all the nations.

3. The Purpose of (v. 3). The grand object of the Lord in sending this message by the prophet was Judah's repentance.

4. Method of (v. 4). Jeremiah dictated the words of the Lord to Baruch the Scribe, who wrote them upon a roll of a book.

II. The Book Being Read (vv. 5-21).

Jeremiah was unable to speak the message of the Lord to the people, as he was "shut up" (v. 5). "Shut up" most likely means a royal ban against Jeremiah's proclamation of God's Word to the people or against his entering the temple.

1. To the People (vv. 6-10). The occasion which brought the people together was a day of fasting (v. 6), because of the threatening of the Babylonians. Jeremiah directed Baruch to read to the people the words of the Lord which he had dictated to him, with the hope that the people would present their supplication before the Lord and return every one from his evil way.

2. To the Princes (vv. 11-19). While the reading of the book unto the people seemingly created no great impression, yet Michaiah was so deeply moved that he went to the scribe's chamber where the princes were assembled and declared unto them all the words which he had heard Baruch read. The princes sent for Baruch to come and bring the roll with them. Baruch came and read to them with the result that (1) they were aroused with fear (v. 16). (2) They inquired as to how he had written the words (vv. 17, 18). To this he replied that he had written in the book the words which Jeremiah had dictated to him. (3) Their concern for the safety of Jeremiah and Baruch (v. 19). They were instructed to hide themselves from man's sight.

3. To the King (vv. 20, 21). The princes regarded the words of the Lord to be of such importance that they should be read in the hearing of the king, for he was mainly involved in the judgments pronounced. Upon their report of the matter to the king, he had Jehudi bring the roll and read it to him in the presence of the princes.

III. The King Destroying the Roll (vv. 22-26).

Instead of becoming penitent and afraid he became enraged and cut the roll leaf by leaf and threw it into the fire until it was consumed. This he did against the intercession of some of the princes. When the roll was destroyed he ordered Jeremiah and Baruch arrested.

IV. The Roll Rewritten (vv. 27-32).

The burnt roll was reproduced by the command of the Lord, and many like words were added unto them. We should learn from this incident—

1. The Indestructibility of God's Word. Men may cut it to pieces and burn it, but the Word of God shall stand forever. It comes to light again with woes added to be visited upon its would-be destroyers.

2. The reason men attempt to destroy God's Word. It is because of the authoritative rebuke of their sins. The Bible arraigns man for his pride and wickedness and asserts God's sovereign power over man and his demand for a personal surrender unto Him and worship of Him.

3. The Method of Attempted Destruction of God's Word. It was part by part. "When Jehudi had read three or four leaves he cut it with a penknife." The rationalist today cuts out the biblical conception of God as a being whose essential nature demands punishment of sin; therefore he cuts out the Bible doctrine of man as created of God in His likeness and image. Instead of that he makes man a product of evolution; therefore he explains away the fall of man.

The Route to Heaven.

Show me the man who would go to heaven alone, and I will show you one who will never be admitted there.—Feltham.

Be Satisfied.

Rest satisfied with doing well, and leave others to talk of you as they please.—Pythagoras.

Dampness of Error.

There is nothing so true that the dampness of error has not warped it.—Tupper.

Also Make Good Wives.

Mrs.—It says here that clergy make the best husbands.

Mr.—They make the most, anyhow.

Her Bent.

"Hasn't Alice a decided leaning towards the men?"

"Yes, she is matrimonially inclined."