

Can you use a typewriter? If you can, in a few years you will be able to use a typewriter to send telegrams to London by paying a small fee in the nearest telegraph office and clicking out your message on an ordinary typewriter keyboard. The message will be printed almost immediately in London—printed so that it will be intelligible to any one who can read.

This is one of the amazing prophecies of Donald Murray, who is taking the leading part in revolutionizing the telegraphic service of the world. And Mr. Murray's prophecies are to be taken seriously—the British Post Office and the Western Union Telegraph Company think so, at any rate. They have proved their confidence by buying the rights to his system of printing and transmitting telegrams.

Mr. Murray was brought up on a farm in New Zealand. For several years he was a newspaper man in Sydney. Later he came to New York with a telegraphic printing device which he had invented in his leisure hours, and was employed as an engineer by the Postal Telegraph Company. During this time and during a later period of five years at the General Post Office in London, he worked on his multiplex telegraphic system. Two years ago he sold the United States rights of this system to the Western Union, and he is now on a brief visit to New York to see the progress being made with the development and manufacture of the apparatus in this country.

His system is based on the Baudot, a French system, invented about thirty years ago, and widely used in Europe. The principle of the Baudot system is that a number of operators, working on a single wire, are by automatic interruptions of the current given in turn control of the line. The Murray invention does away with the five keys of the Baudot system and the necessity of learning their intricate combinations. The operator uses a typewriter keyboard and does not need to listen for his turn. The machine prints directly on the delivery form and automatically pages up for the next message. With the new keyboard and transmitter messages can easily be transmitted at the rate of forty-five words a minute.

"Printing telegraphy," said Mr. Murray to a TIMES reporter who recently called on him, "is an old story. This is more than printing telegraphy—it might be called super-telegraphy. It is going to make as big a change in the telegraph situation as the linotype has made in newspaper offices."

"Since the invention of the electric telegraph, over four hundred printing telegraph patents have been taken out in the United States alone. Yet, except for the Hughes printing telegraph, the French Baudot system and the stock ticker these devices have been of little practical use, and at any rate in America the Morse key still reigns supreme. "Now the speed of the stock ticker is only thirty or forty words a minute, and its use is confined to cities. The Hughes printing telegraph, so widely used in Europe, prints only thirty or forty words a minute, and it prints them on a tape, which must be passed to telegraph blanks before delivery."

**Many New Systems.**

"During the past twelve or fifteen years many inventors have been at work on rapid printing telegraph systems. Prof. Henry A. Rowland of Baltimore invented an apparatus for transmitting eight messages simultaneously on one telegraph wire and printing them in page form ready for delivery. This system is not now in use, for it showed no saving of labor compared with the Morse key. Then there is the Buckingham-Barclay Automatic Printing Telegraph, which is still in use on about sixty telegraph circuits of the Western Union. It has achieved only limited success, and within a year or two it will be supplanted by the new multiplex printing telegraph. The Western Union purchased the United States rights of this from me two years ago."

"In just what respects does your system differ from that now in use?" asked the reporter.

"Before you can understand that," said Mr. Murray, "you must understand the two fundamental principles of printing telegraphy—the automatic principle, and the multiplex principle. The automatic systems are based on the English Wheatstone automatic system and the multiplex systems on the French Baudot multiplex system."

"In the automatic telegraph systems the messages are first prepared in the form of perforated paper tape. This tape is run through an automatic transmitter that transmits the signals at high speed over the telegraph wire to the distant station, where they are printed at high speed by automatic mechanism."

"In the multiplex systems the work is not done at a high speed. Instead, an instrument called a distributor is used at each end of the telegraph line to give the line successively for a portion of a second to each of several operators. These distributors contain steadily revolving contact arms, which revolve in synchronism so that when the contact arm at Station A points to the 1 o'clock position the corresponding contact arm at Station B will also point to the 1 o'clock position. If the telegraph operator sends a signal into the line at the 1 o'clock position it is received at the other end of the line also at the 1 o'clock position, and so on for all the positions around the clock."

"With these distributors it is possible to have six operators at each end

of the line, each sending his signal in turn. The signal is swept into the line at station A, and then swept out of the line at Station B, into one of six printing machines, which print the signals. The operator works at a speed of only from thirty to fifty words a minute; but as there are several operators using one telegraph wire almost simultaneously the number of messages transmitted per hour may be very high.

"Now, I saw several years ago that the multiplex system was proving its superiority over the automatic system for all ordinary telegraphic work. But I also saw that the multiplex system had its serious limitations, and that it was desirable to add to it the advantage of the automatic system. So I developed the Murray multiplex printing telegraph, taking the French Baudot system as a basis and adding to it machines with typewriter keyboards for preparing messages in the form of perforated paper tape, as in automatic systems. I provided each keyboard operator with a separate automatic transmitter of his own. This was done by the inventor of the Baudot system, but not satisfactorily, and his arrangement never came into general use."

"In the Baudot multiplex the operators send messages by means of five keys, much like Morse keys. At the receiving end of the line the mes-

sages are printed on a paper tape, the speed of each transmission being thirty words a minute. I have raised the speed to forty or fifty words a minute for each transmission, and provided automatic machines that print the messages in page form at the receiving station. I have added another new feature—a reperforator at the receiving station, by means of which messages sent over the telegraph wire are reperforated automatically at the receiving station and this perforated paper tape is used to retransmit the message on to another city. Two years ago the Western Union Telegraph Company bought the United States rights of my system and handed it over to the Western Electric Company to be developed to suit Western Union conditions. The apparatus has only recently been put into practical use."

"Then the apparatus is now in use, is it?" asked the reporter.

"Yes. The Western Union has a circuit between New York and Boston equipped with the apparatus, and eight messages are being sent simultaneously on one telegraph wire and printed ready for delivery at the other station. Although it has been in use only two months, New York and Boston are already exchanging nearly 3,000 messages per day of nine and a half hours. This is more than double the previous record of the Western Union, and it is considerably below the record that is to come."

"The Rowland system also transmitted eight messages simultaneously on one wire, but it transmitted the messages direct from a typewriter keyboard instead of by perforated paper tape. So when the Postal Telegraph Company tried it on several circuits a few years ago it was found that the output and the saving in labor were not sufficient to make it practical and it was withdrawn from use. The Rowland is the only completely developed high-capacity multiplex system that can be compared with the new Murray multiplex."

**Baudot's Multiplex Device.**

"The Baudot multiplex printing telegraph was invented about thirty-five years ago by M. Emile Baudot, a telegraph official. It has been developed and improved extensively, and its use has spread all over France. In addition, the leading capitals of Europe are now all linked by the Baudot system. It is used also in Russia, India, Brazil, and other countries. The traffic between London and the continent of Europe is handled almost entirely by the Baudot system. In France the Baudot gives a maximum of six transmissions on one wire. On one wire between London and Birmingham, by means of what is called the duplex balance, the British telegraph engineers have obtained with the Baudot eight transmissions on one wire at thirty words for each transmission. Five thousand messages have been exchanged in one day between London and Birmingham by this Baudot installation. The British messages, however, average only twenty words, while the American messages average thirty words. So the Western Union Company, transmitting three thousand thirty-word messages a day, has, after only two months' practice, nearly equaled the output of the octuple Baudot between London and Birmingham. When the Western Union operators have grown accustomed to the new apparatus they will easily break the British record."

"What is the world's record at present?" was the next question.

"A few weeks ago," said Mr. Murray, "the British Post Office established a twelve-channel Baudot between London and Birmingham, and twelve messages are now transmitted simultaneously on one wire between those cities. This is the world's record. The speed on each channel is 30 words a minute, the total speed for the line being 360 words a minute."

"Before long, however, the world's record will pass to this side of the Atlantic. In the case of the Western Union, the development will be either to increase the speed of each transmission or the number of the transmissions. Probably the Western Union will send 12 messages simultaneously on one wire at a rate of 40 words a minute, giving a total speed of 480 words a minute. This will give an output of one telegraph wire per day of nine and a half hours of 5,000 American messages, which is equivalent to about 7,500 British messages. This is a figure far beyond any previously accomplished by any telegraph system."

"Of course 480 words a minute is a low rate of speed compared with that of the automatic dot and dash systems by which 2,000 words a minute have been transmitted on one wire. But these systems waste time and

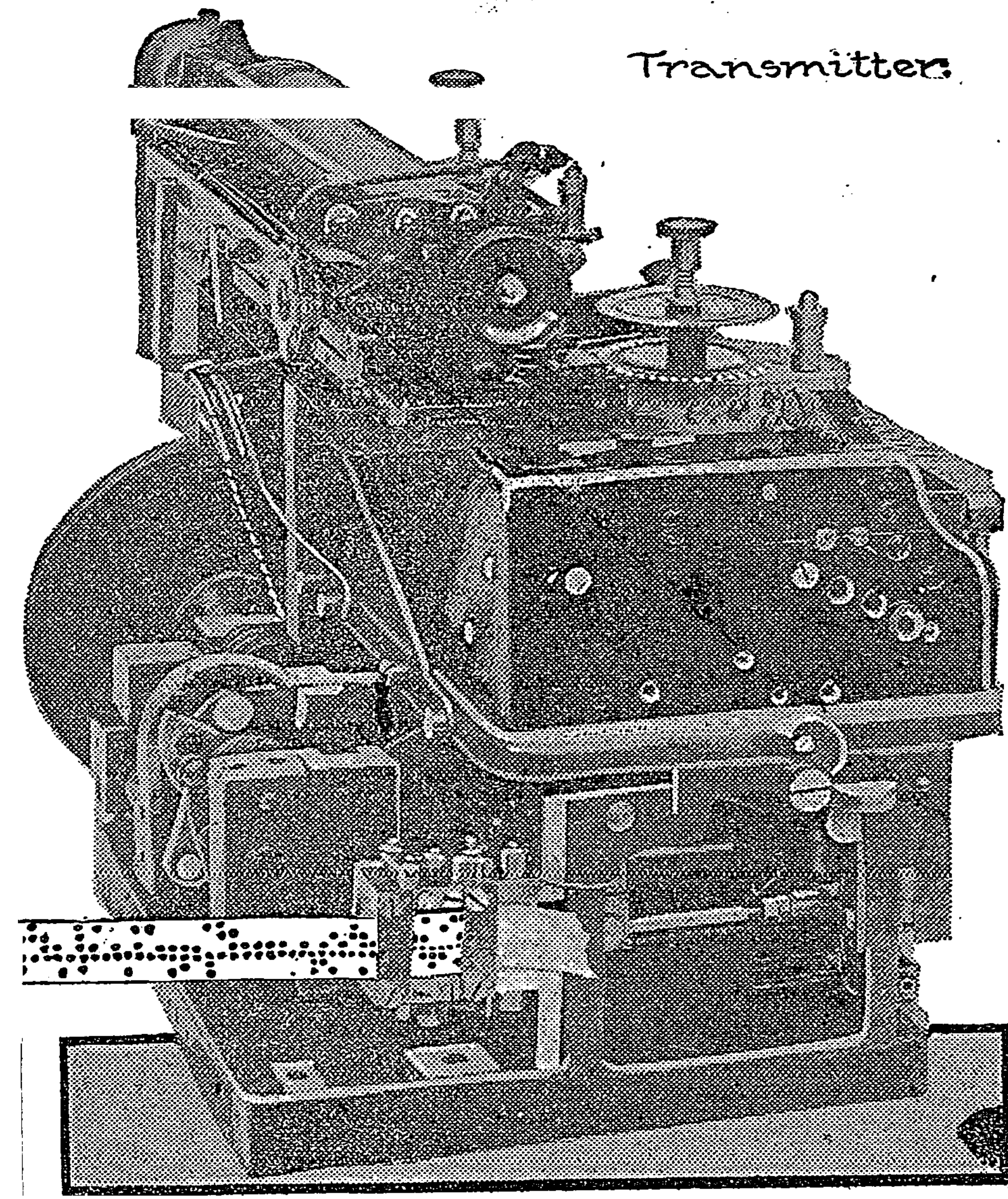
## Donald Murray of New Zealand Tells About His Invention That Has Already Been Bought by Leading Telegraph Companies and May Revolutionize Telegraphy.

labor and do not print the messages. There is much delay with them, and the number of messages handled per day has never corresponded with the speed of transmission. With my system, however, there is a large saving of labor and there is practically no delay."

"In one sense there is nothing new about this 'super-telegraphy.' It is based on principles that are well known and well tried. It has developed from the work of the last thirty years, but the results are certainly revolutionary. Beyond a doubt this is the ideal system of telegraphy. It has been a battle between the English automatic principle and the French multiplex principle. The French have won, but the English and American engineers have now snatched from them the fruits of their victory."

"Do not think that this 'super-telegraphy' is a mere speculation. The machines are actually made and they are in use by the Western Union Company. There is no question about their working well."

"Here are some of the features of the Murray multiplex printing telegraph. There are perfectly free typewriter keyboards upon which typists



More Accurate and Easier.



Mr. Donald Murray (Photo by Arthur Gentry)

when he uses the Morse key. Also the fallible human operator takes part in the process only once. He strikes a key on his keyboard and the rest of the telegraphic process is purely automatic and mechanical. Actual statistics show that the mechanism is much more accurate than the human operator."

"Of course the Murray multiplex is useful only on lines between large cities where there is plenty of telegraph traffic. For smaller cities and for local district offices in big cities single printers and keyboards of a simpler character are provided. These will be placed in large offices, hotels, and corner drug stores for the transmission of telegraph messages to and from the head telegraph office in every big city. Any person who can use a typewriter will be able to send a telegram on these instruments. It is more satisfactory than the telephone, for it is more accurate. There is, for instance, much less risk of confusion between letters and figures. Then, too, messages sent from a local office will be received at the head telegraph office in the form of perforated paper tape ready for retransmission on one of the big multiplex circuits. With the telephone no such thing is possible. As I said, these machines are in use and in a year or two they will be familiar sights in every hotel and corner drug store."

mission of the same messages by the same perforated paper tape over ocean cables and by wireless. There are technical difficulties in the way but there is reason to believe that these can be overcome. Engineering experts intimately acquainted with Atlantic cable work believe that this is possible. Messages will be exchanged between New York and London simply by playing on a typewriter keyboard."

### All Cities to be Linked.

"If the messages are to be retransmitted they will be reproduced as perforated tape ready for automatic re-transmission, as well as being printed in page form. In fact in the course of twenty or thirty years all the great cities of the world will be linked in this way so that a message once typed in any great city will go through to its destination in any other great city without any human intervention except that necessary to transfer the paper tape from the receiving mechanism of one circuit to the transmitting mechanism of another. It is possible that in this way four messages will be sent simultaneously over the Atlantic cables instead of two, as at present."

"Of course there are obstacles to the success of this. For one thing, the Tower of Babel blocks the way to some extent, but I have arranged a keyboard which meets most international requirements. In any case, most of the business of the world is now conducted in not more than two or three languages, and these present no difficulties in the way of the universal automatic transmission of messages."

Also, the Western Union Company in order to avoid any question of infringement on my automatic patents which are in other hands, has developed the machine it is using along lines of its own, which suits the Western Union, but which are not so well adapted to fine requirements as the machine I have designed for that purpose."

"Your apparatus is a labor-saving device also, is it not?" asked the reporter.

"In three ways," said Mr. Murray, "it saves labor. There is a perfectly free typewriter keyboard, on which the typist sends messages at the greatest speed possible to her fingers. Then the transmitter is entirely automatic. There is no need of a human attendant, as in the case of the old style automatic printing telegraphs, to put the perforated paper tape into the transmitter. The third great labor-saving feature lies in the reperforation and automatic re-transmission of the messages. "The number of errors in telegrams is greatly reduced by this multiplex system. Obviously there is small chance of error when an operator has to strike a key only once for one letter instead of several times, as he does

### Wonders May Soon Be Seen.

"As soon as a sufficiently large number of circuits has been equipped with the new multiplex machines it will be possible to send a message automatically through several cities to any important point in North America. This will certainly be possible in a few years' time. A still more interesting possibility of the next five or six years is the trans-