CABLEGRAMS FOR THE MILLION.

BY J. HENNIKER HEATON, M.P.

NO magician in the "Arabian Nights" ever worked such wonders by aid of incantations and genii as Mr. Edison has accomplished through magnets, coils of wire, and motors. He is the greatest of inventive electricians — those master spirits who fear not to unloose forces from the bowels of the earth, to light their lamps in the clouds, to harness the lightning and make it turn wheels, bear messages, and even transmit the human voice and features to a distance of thousand of miles.

I have concerned myself for many years with one application of electrical science, which is, perhaps, the most useful of all—I mean telegraphy, and especially submarine telegraphy—wherein there is much to delight and entertain both young and old. Probably the very youngest reader has some acquaintance with its methods, and yet, I will venture to say, very few, whether young or old, are aware of the great degree in which telegraphy is restrained by selfish and mistaken interests. When the wires and cables of the world shall be released from this bondage, telegraphy will doubtless be brought into uses far more general than this generation could rightly conceive.

It is difficult to say who invented the electric telegraph, but the men who perfected it were Cooke, Wheatstone, and Morse. Of course every young American knows that Professor Morse, of New York, devised the simple method, still generally in use, of representing each letter of the alphabet by a special group of dots and dashes, marked by the electric current on a moving slip of paper. This alphabet made telegraphy commercially practicable.

The transmitter, or operator, taps a key—perhaps in Liverpool—and a dot, meaning a letter, is consequently marked on a paper slip in New York. He next makes a tap, and then holds down the key for a second, the resulting marks in New York being a dot and a dash, which together represent another letter ; and in this way the message is spelled through.

The modern telegraph consists of a wire supported by posts, or laid in the bed of the ocean, and conveying currents of electricity generated by the battery placed at each end

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(From a photograph by Russell & Sons, Baker Street, W.)

of it. What this electricity is no one can tell —not even Mr. Edison or Lord Kelvin—they only know what the current does in given circumstances. As the knowledge of what it will do continually grows by new experiments, more elaborate systems of transmitting messages are employed. The most perfect of these is, perhaps, that of the Hughes transmitter, by which a clerk, manipulating a kind of typewriter, can actually print a message in plain type thousands of miles away. But this is not all. With additional apparatus it has been possible to send, on one wire, three messages at a time each way.

A submarine cable consists of a copper wire, or "conductor," for conveying messages, covered with gutta-percha, which is a "non-conductor," and therefore prevents the current of electricity from escaping into the water. The gutta-percha is itself covered with iron wires to strengthen the cable, and these wires are saved from rusting by a coating of hemp soaked in tannin.

A section cut through a cable reminds one of a nerve in the human body. The copper wire in the centre conveys messages, just as the "grey matter" in the centre of a nerve telegraphs sensations to the brain; and the wire is protected and isolated by sheathing, just as the "grey matter" is by muscular fibre.

Again, the cable system of the world is strikingly like the nervous system in a man's body. The brain may be placed in New York, whence the cables branch out to all parts of the earth. In each country the cable is in connection with an infinite network of local land wires, just as the great nerve entering a limb is sub-divided into thousands of smaller nerves.

Any person in any part of the world may employ the whole or a section of this vast net-work; and this is, indeed, a development vastly beyond the dreams of electricians fifty years ago. Yet I shall show that the telegraph might speedily be made of infinitely greater convenience to human kind.

But let us, first, return to our cable. It may almost be believed that perfection has been attained in the construction of it; gutta percha is, in particular, an ideal protector. When a piece of the Dover and Calais cable of 1850 was fished up recently, the covering was found to be quite sound and fresh, even after so long an immersion. Most marine creatures avoid it as a tough, unsavoury, and indigestible substance. But it is sometimes attacked by burrowing sea-worms, or, when stretched over a depression, or submarine valley, it may be filed by the sharp edges of icebergs, or snapped at by angry sharks and other fish which swim against it.

Once a broken cable was pulled up with the carcase of a whale entangled in it. The unfortunate creature had twisted it into a loop round his tail, and, after desperate efforts to escape, had been drowned, and half devoured by sharks.

Another cable was found pierced by a sword-fish, which had left a splinter of his weapon in the core. Think of the persistence and energy exhibited, in the gloomy depths of the sea, by that successful lencer! The sword-fish is twice as long as man, and must execute a long rush through the water in order to attain high velocity. And how narrow was his target! How many times the huge creature must have rushed before hitting the cable! It reminds one of Robin Hood shooting at an upright wand.

Because the mechanical problems connected with the telegraph have been so well solved, it is sometimes said that the telegraph service admits of little more improvement. The benefits that humanity gets from it are so obvious and numerous that men are rather given to congratulating themselves on these benefits than to thinking how greatly they might be increased by the same means. And yet experts know that telegraph messages might be made almost as cheap as postal cards.

One of the torments of prison life is the restriction on communication with friends beyond the prison walls; but prisoners in emergencies of life or death are permitted to have such communication quickly. In that they are better off than multitudes of innocent people who have emigrated. These are compelled to wait weeks, and even months, for news of dear ones at home, although, thanks to the electrician, space and time have been annihilated. This delay is because telegraph messages of all kinds are far more costly than they should be.

The electric cable can be worked very cheaply, and it should be at the service of every man, rich or poor, whether he sit in the bank parlour or toil in a workshop. Electricity is everywhere bountifully stored by Nature for the benefit of all, and it should be sold as cheaply as gas or water. But there is a kind of "trust" in control of telegraphy, and such high rates are charged for cabling that only wealthy men can indulge in the luxury. On land, fifty out of a hundred telegrams are sent between friends about their private affairs; by cable only one out of one hundred messages is of this character.

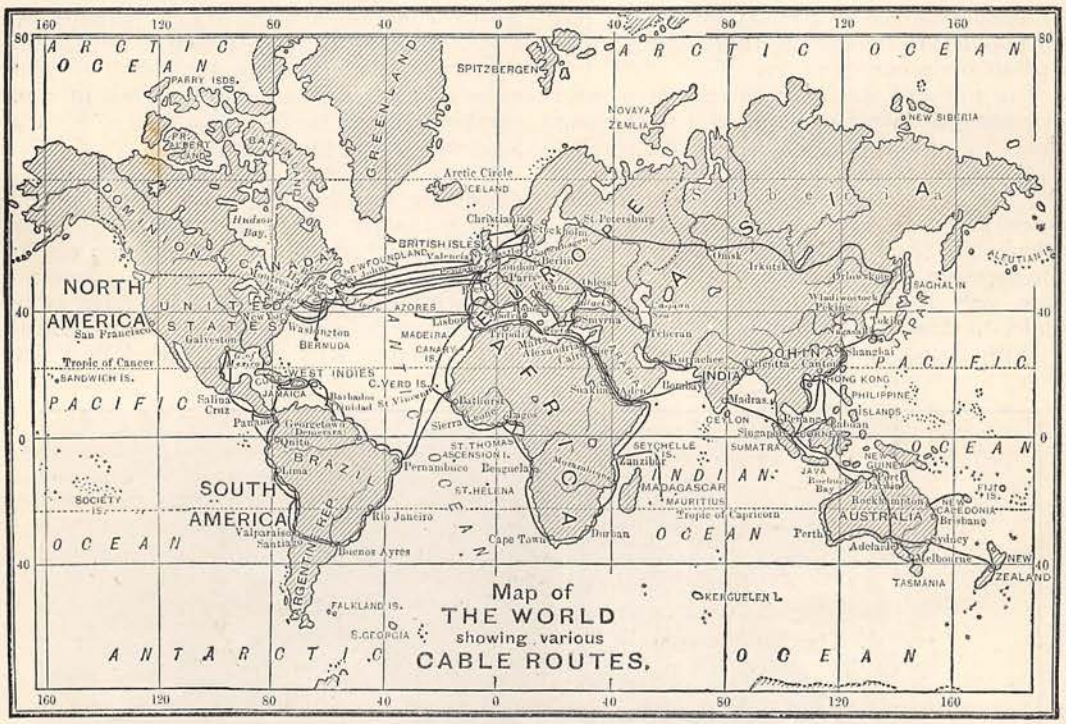
Suppose an immigrant to America—a labourer, or cow-boy, or hard-working servant girl—should meet with an accident, or learn that a number of men have lost their lives in

an English coal-mine, in which his or her father or brother is employed. No consolatory or reassuring message can be hoped for under two months, although the cable, by which news could be secured in three or four hours, lies idle. A short message by cable costs twenty dollars.

I have worked strenuously to get the cable rates lowered, and have to some extent succeeded; but they are still far too high for the poor man's pocket. It costs from a

At present the cables are little used, especially at night. It angers me to think of those wonderful channels of thought lying unemployed at the bottom of the ocean, while millions of human hearts are throbbing for the means of communication. With a low rate for night messages the wires would be working without cessation.

But this is not all. The highest speed now attainable is forty-five words per minute, and the average is probably not more than ten



dollar (4s. 2d.) to two and a half dollars (10s. 6d.) a word to telegraph from England to Australia; and even between England and the United States the charge is twenty-five cents (1s.) per word. When I tell you that there would be a profit in a rate of two cents (1d.) a word between England and America, and ten cents (5d.) a word between England and Australia, you will understand how much the use of cables is restrained.

Under the most desirable system of working the cables, they might enable you to send a complete message in a moment from New York to London at the cost of five cents. It would only be necessary to encourage large numbers of persons, by means of a low tariff, to telegraph, instead of keeping the wires, by means of a high tariff, for the exclusive use of the rich.

words. By means of an invention which I have seen in operation, it is possible to cable four hundred words a minute, or ninety million words a year by each wire.

This apparatus is so interesting that it deserves description. The sender writes the message with a typewriter on a revolving cylinder. The cylinder is then connected with the cable, and in a few minutes the whole of the messages upon it are reproduced, with photographic accuracy, thousands of miles away.

By a somewhat similar instrument—the teleautograph—a sketch, likeness, or manuscript may be reproduced in facsimile at any distance. There is nothing to prevent the London police cabling the photograph of an escaped criminal to the police of New York.

The cables should certainly be so controlled as to give mankind the full benefit of their admirable devices.

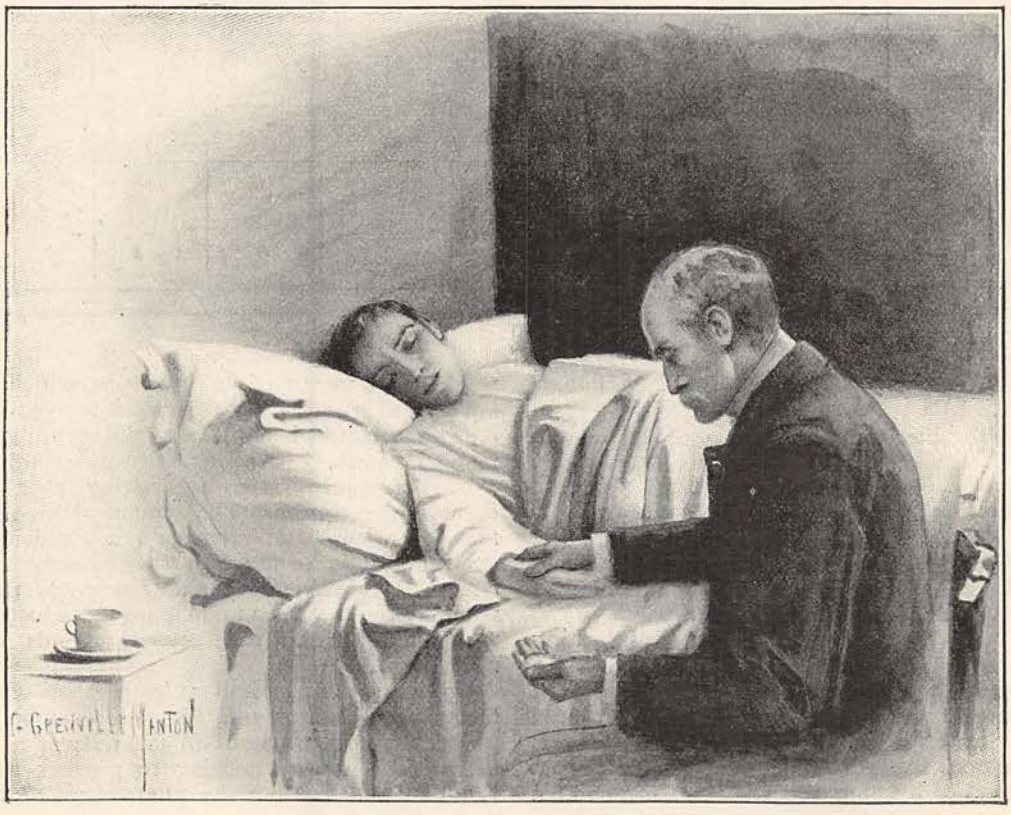
There is no telling how many other important inventions may be kept out of use by the present system of leaving telegraphy under a control that does not operate with a primary view to the general good. We must never forget that electricity as a practical science is only in its teens, and that new and more marvellous applications of it are discovered every year. Mr. Preece, a high authority, believes that we shall soon be able to telephone across the Atlantic. He has telephoned to a person three miles away *without any connecting wire*.

The message was transmitted on a wire extending for three-quarters of a mile along the shores of the Bristol Channel. A parallel wire of equal length, quite unconnected with the first, was set up on Flat Holm Island, three miles distant, and provided with a telephone. And the "dots and dashes" of the message sent over the first, or mainland wire, were distinctly heard on this telephone, understood, and replied to.

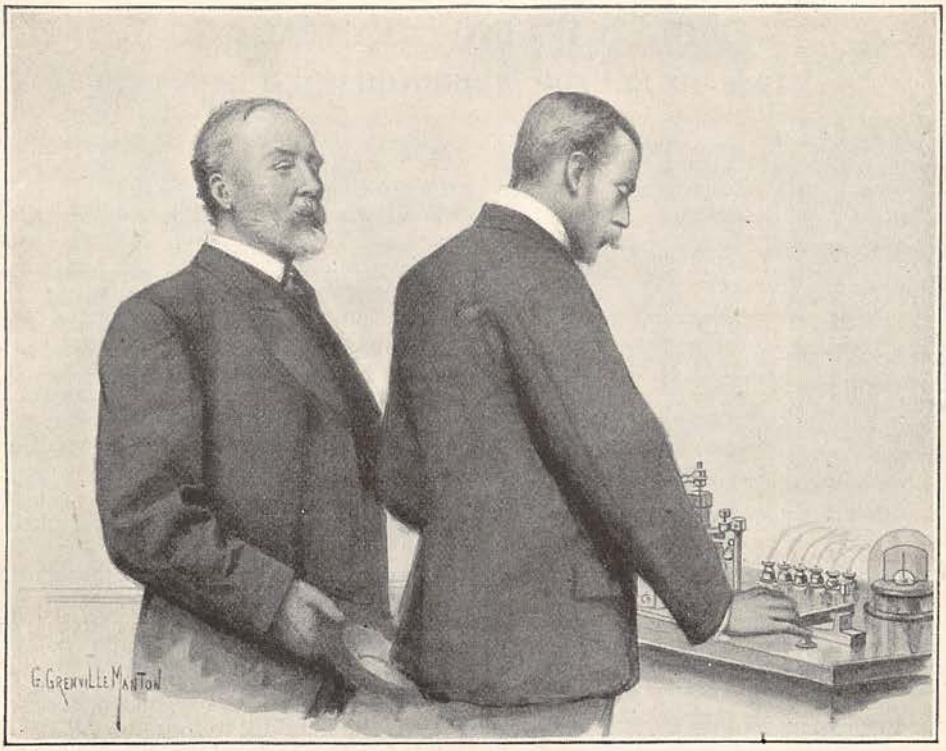
With proper apparatus Mr. Preece undertakes to telegraph without connecting wires between England and France. And so we may one day be able to communicate with countries at any distance without cables. But if the apparatus were allowed to go into the sole control of the telegraph trust, we should get no use of it except at rates which might debar the vast majority from its benefits.

The two groups of cable companies own between them some seventy-eight thousand miles of cable, radiating all over the world; and in a few months the projected Pacific cable, ten thousand miles long, will connect North America and Australia, perhaps by way of Hawaii. The stern fact staring us in the face is that these seventy-eight thousand miles of cable are useless to the great mass of mankind, simply because the owners have a legal right to fix the cable rates.

If the cables were managed, as the post-offices are, mainly with a view to the public good, we might fairly expect to see two cents the average charge for a short message within ten years. It would be as easy to communicate with a friend ten thousand miles away as with one in a neighbouring town. Business arrangements would be settled in a few



A CONSULTATION UNDER THE SEA—AT THE CALIFORNIAN END OF THE WIRE.



A CONSULTATION UNDER THE SEA—SIR ANDREW CLARK AT THE LONDON END OF THE WIRE.

minutes, instead of six or eight weeks. Time would be saved, and a man of business would be able to do fifty years' work in a career of twenty-five years. A tradesman would no longer be confined to the few customers passing his shop, but could push any rare or valuable article simultaneously in every great city of the world.

There is hardly a working family in some countries which has not an emigrant member far away. How happy cheap cablegrams and cheap telephoning would make these toiling millions! The misery of separation mainly consists in the uncertainty as to the *present* welfare of the loved one; and the cable removes this uncertainty.

Two years ago the son of a wealthy nobleman lay in San Francisco suffering from typhoid fever. Care and skill were lavished upon him, and still his fate remained uncertain. His friends longed to obtain the advice of the great English physician, Sir Andrew Clark, but Sir Andrew could not be brought over in time. Nevertheless, his aid was obtained—for what can money not do?

The famous doctor went to the London end of the cable; the other end was laid into the sick-room in California. Thus a strange consultation was held under the sea between the English medical authority and his American colleagues, the very beat of the sufferer's pulse being registered from time to time, thousands of miles away. The lad recovered; and who shall say how many lives might be saved or how many heart-aches allayed, if the millions who are not wealthy could communicate as easily with those across seas who might, perhaps merely by words, give them cheer or aid?

There is something very captivating in the conception of all mankind, assembled as it were under one dome for social communion. A thousand million minds brought into contact—the bodies still divided by the awful heights and depths and distances of Nature! Here is a consummation devoutly to be wished, and which will be essentially attained whenever the civilised people of the world shall refuse to submit longer to that control of telegraphy which shuts them out from a great part of the benefits that the science and art of electricity should confer.