

tempo.

Glo - rious Spring! A - gain we greet thee! Thou art ours! With

rall. *tempo.*

songs we meet thee! Glo - rious Spring! Glo - rious Spring! Thou art ours! With

rall.

songs we meet thee!

rall. *tempo.*

A CONVERSAZIONE OF TELEGRAPH ENGINEERS.



HE profession of the telegraph engineer is one of the most modern of all the higher means of livelihood. Forty years ago it was hardly dreamed of, since the first public telegraph line had then only begun to be worked on a small and obscure scale between Paddington Railway Station and West Drayton, a distance of thirteen miles; and twenty-five years ago the first successful submarine cable had just been laid between Dover and Calais. It has risen into existence as a recognised profession, with the marvellous development of the electric telegraph which has taken place during the last generation. The construction and maintenance of overland lines, and the making, laying, and repairing of submarine cables, now employs thousands of gentlemen, specially trained in the theoretical and practical science of their work, and scattered all over the earth's surface,

some undergoing the monotonous career of a cable-station electrician, others watching the manufacture of cables at construction factories, or the erection of land-lines, and others at sea engaged in the exciting but trying work of repairing faulty cables.

The life of the telegraph engineer, who is employed in the service of the great submarine companies, is one of great uncertainty and change. Iron destiny, represented by the Board of Directors in some fusty City chamber, has him completely in hand, and he must hold himself prepared to obey their sudden decree, and start off to any point of the company's system, or farther, at a moment's notice. While he is enjoying the opera at Malta, the teredo-worm is, perhaps, at work under the sea gnawing out the "fault" which will summon him next morning to Bombay; or while he is spending a quiet evening with his friends in London, whom he has not seen for years, the telegram is on its way ordering him to Monte Video or to New Zealand. A young friend of mine who was

employed on the staff of the Eastern Telegraph Company, but who had not hitherto been sent out of London, was suddenly requested to appear before one of the principals of the Directory, and brusquely told to leave for an out-of-the-way African station the same night.

"That is very short warning," stammered my friend.

"Humph!"

"I have several things to arrange before I can leave."

"Humph!"

"I want to see my wife and child first."

"Humph! When I was of your age I learned to do without wife and child."

Telegraph directors cannot consider the affections, and my friend had to submit. The telegraphist is the tool of a company, and must obey its behests. Time is a most important element in telegraphy, and prompt action saves a great deal of money. Add to this the fact that the mishaps of telegraphy, the "break-downs" of cables, land-lines, and instruments, are usually of a sudden kind, and we have the main cause of the unsettled character of telegraph work. There are sudden meetings and partings, but few real enduring friendships, in this kind of life. It trains a man to worldliness; to the taking of life as it comes, without unnecessary fretting; to patient waiting until perplexities unravel themselves; to being at home anywhere and everywhere; to seeking one's pleasure in the present hour and place; and, in short, to accepting the situation, whatever it may be. Still the life is not without its own delights and its own freedom. The telegraph engineer is in some respects a Bohemian of science: his profession unites practical science with travel and adventure. He is constantly experiencing the pleasure, dear to the nomad, of being thrown amidst entirely new scenes, or turning up at odd places which he has visited only once or twice before. The glimpses of curious manners and customs, or of natural scenery, which he catches on his journeys, the various men he meets, or scraps of story which he hears, all serve to give the colour and peculiar charm of foreign travel to his business.

The Society of Telegraph Engineers is one of the youngest of our scientific societies. It was founded in 1871 by Colonel T. P. Bolton, and Major Webber, R.E., and speedily took a prominent position. The Institution of Civil Engineers, of which it is a kind of younger brother, has always helpfully accorded to it the use of its large meeting hall; but the society itself has its own excellent rooms and library in Broad Sanctuary. The papers read at the meetings comprise such practical engineering questions as the material, construction, and preservation of telegraph lines and instruments, rock-blasting, torpedo-firing, signalling, and any theoretical question within or bearing on the domain of electrical and magnetic science. The conversazione of members and associates of the society takes place yearly about Christmas-time, and it is undoubtedly the pleasantest and most interesting of all our scientific conversaciones.

The conversazione is usually held in the Ball-room of Willis's Rooms, King Street, Piccadilly, and it is

there that we wish to escort our readers. The handsome staircase is laid with crimson cloth, and decorated with living shrubs and palms. A growing plant of the india-rubber tree, with its glossy laurel-leaves, stands on one side of the entrance into the hall, and a plant of the gutta-percha tree on the other; while overhead a banner on the wall displays the proud motto, written by a member of the society who has earned distinction as a novelist:

"The lords of lightning we; by land and wave,
The mystic agent serves us as our slave."

The spacious hall is brilliantly illuminated. Long tables are covered with delicate electrical apparatus, some of which are in operation, and attracting eager groups of spectators. The whirr of wheels, the crackling of electric sparks, the sudden outburst of some dazzling electric light enlivens the busy scene, while the band of the Royal Engineers on a dais at the farther end of the room is playing a selection from Offenbach. Altogether the conversazione presents a glittering spectacle to the glance.

The president of the society receives us at the door. He is one of the heroes of telegraphy, and the highest living authority on electrical matters; one of the pillars of early Atlantic cable enterprise, who by his invention and mathematical analysis, as well as by his active skill on the expeditions at sea, contributed more than any other man to the success of the first Atlantic cables. His cordial greeting plunges us into the midst of a crowd of electricians and telegraphists, from all quarters of the globe: telegraph clerks not a little vain of their single accomplishment, the manipulation of the signalling key, and deciphering of messages; hoary old contrivers, who have spent their lives poring over ancient inventions, and devising new ones; professors from the universities; sunburned practical men, just home from erecting overland lines in the Transvaal or the Pampas; electricians from cable stations on the coast of Brazil or Nova Scotia; a few famous engineers or architects, perhaps, and a sprinkling of Indian Civil officers, and foreigners. Here a man who has been buried alive for years, in a remote station among the East India Islands, is introduced to another, who has just returned home from a surveying expedition for a land-line across the Rocky Mountains. There a young gentleman who has been in the habit, lately, of smoking his evening cigarette at the foot of Cook's monument at Botany Bay, unexpectedly encounters an old friend in another youth recently escaped from the alligators, mosquitoes, and filibustering Yankees of Colon and Panama. Clerks are here who have panted out the day for years in some close tropical instrument-room at Teheran, or the West Indies, or spent their holiday in English fashion salmon-hunting in some Newfoundland river, or ibis-shooting in the deserts around Aden. And there are one or two of the old Atlantic men, conspicuous over the crowd by their statelier bearing, for the men who were out on the first Atlantic cable expeditions bear something of the same kind of fame amongst their colleagues as the survivors of the Balaclava Charge.

Amongst the general mass of visitors, we can distinguish more than one "somebody." That energetic man with the handsome features, keen eye, and grizzled beard, who is witnessing the action of a new model grapnel for fishing up submarine cables from the bottom of the sea, is at the head of the profession of telegraph engineering, and is likewise eminent as a civil engineer. He was the pupil of Stephenson and the friend of Wheatstone. He is the introducer of the pneumatic system of transmitting messages, and the inventor of the floating docks now used for the circular ironclads of the Russian navy. Eight years ago, when on his way to India to lay the Persian Gulf cable, he was on board the *Carnatic* when she was wrecked with loss of thirty lives on the island of Shadwan in the Red Sea; and after keeping afloat for some time in spite of a broken collar-bone, he was picked up by one of the ship's boats.

This other quiet gentleman, examining a galvanic battery, has laid cables in all quarters of the world, and is recently returned from Australia and New Zealand *via* San Francisco. Once, it is said, when returning from Brazil, the mail-steamer he was a passenger in hooked up one of the cables which run from Cornwall to Lisbon, on her anchor, when putting out to sea. The cable was damaged, but the captain of the ship intended just to fling it back again to sea without loss of time, when the electrician begged him for an hour's delay, which was granted. A rude battery was soon extemporised, and by its aid the electrician communicated along the damaged cable with the telegraph station at the Lisbon end. He told the station electrician there what had happened to the cable, and exactly where the injury had been done, so that the place could be easily found for repairs. He received, it is said, the acknowledgments of the Lisbon electrician by the electric sensation on his tongue, applied to the end of the cable. This good Samaritan work done, the ship proceeded on her way.

That dark young man with the Jewish cast of features is the now famous inventor of the speaking telephone. He is by birth an Edinburgh Scotchman, although now a naturalised citizen of the United States, and a professor of music in Boston University. Five years ago he accompanied his father, Mr. Melville Bell, author of "Visible Speech," to Canada, and from thence went to Boston. He is now explaining to a little group the genesis of the telephone, how from the researches of his father into the position of the vocal organs in uttering the vowel sounds, he was led to teach deaf-and-dumb mutes to speak as well as those who hear, and then to communicate musical sounds to a distance by means of electricity, and from that step by step to discover the small articulating telephone which he holds in his hands, and which enables two persons to converse although twenty or a hundred miles apart. His own elocution is admirable, and it appears quite in keeping that he should have taught not only the dumb to speak, but even inanimate metal.

Let us now turn to the objects exhibited. The antiquarian department comprises many priceless old volumes, pieces of primitive apparatus, and portraits

of the pioneers of electro-magnetic science. Among the books we may notice the celebrated treatise on the loadstone, "De Magnete," of Dr. Gilbert of Colchester, physician to Queen Elizabeth, wherein he establishes the great truth that the earth itself is a globular magnet; the letters in which Franklin described his famous kite experiment at Philadelphia, which demonstrated the identity of thunder and lightning with the electric spark; and the Latin pamphlet in which Oersted, the great Danish natural philosopher, communicated to the world, in 1820, his important discovery that the electric current has power to deflect a poised magnetic needle, and thereby laid bare the long-sought connection between electricity and magnetism, and put into the hands of future inventors a practical means of telegraphing, which is still the basis of some of the finest telegraph instruments at the present time. Among the old apparatus there is to be seen a piece of the first submarine cable ever made, that laid between Dover and Calais in 1851, which "broke down" soon after being laid, and had to be superseded by a new one laid in the following year. Here, too, is the original "needle instrument" of Messrs. Wheatstone and Cooke, which was used on the Great Western Railway line, between Paddington and West Drayton, in 1837, the first public telegraph line in the world. In appearance it resembles an American clock; it is based on the principle discovered by Oersted, and has five needles, capable of being intelligently deflected by the electric currents sent along the line. This instrument is distinguished by a history which is both tragical and comic in its nature. Shortly after the Paddington to Slough line had been in operation, a daring murder was committed in Slough by a Quaker of the name of Tawell, who effected his escape by train to London. A clergyman gave the alarm at the Slough telegraph station, and a telegram was sent to Paddington giving particulars of the Quaker's appearance. That telegram was received on this instrument at Paddington, and as it was unprovided with the letter "q" as a signal, the clerk at Slough was forced to violate the Queen's English and describe the murderer as a "kwaker." The warning, however, was in good time—a detective was ready at the Paddington terminus when the train drew up at the platform, and we may imagine the astonishment of Tawell when the handcuffs were placed upon him, for at that time the telegraph was but little known amongst the public. This clever apprehension, however, spread abroad the fame of the new invention, and awakened the public to a wider and keener sense of its importance. Side by side with this superannuated old servant of the early telegraph, we notice the little rude coil of wire, tied up in coarse sheeting, from which Faraday drew the first magneto-electric spark, the parent of all the elaborate and powerful magneto-electric machines now in vogue, by whose means electric lights are generated of a brightness far exceeding any other earthly source known, and now employed to illuminate large buildings, wharves, ships, and locomotives. The beam from the Dungeness lighthouse, which is to be seen shining over the Channel with almost solar

splendour, has, we may say, been kindled at the tiny spark which Faraday drew from the coil before us forty years ago.

Space would fail us to go over even the most interesting of the recent and novel instruments and contrivances displayed before us at a conversazione of telegraph engineers. On all the new sending and receiving instruments designed to transmit messages at the surprising rate of 150 words a minute, or more, to print messages, write them, draw likenesses, and even send a number of messages on the same wire at the same time, we must perforce be silent. Nor must we say anything of the musical telephones, which convey musical notes only, and are distinct from the articulating telephone, which also conveys the human speech, but which may prove to be even more serviceable because of their greater power, and the means they afford for sending a number of messages along a wire simultaneously by help of a number of different notes. Before leaving, however, two striking effects of electric light force themselves upon our attention, one as conspicuous for its evidence of terrible power, as the other for its softness and beauty. We are startled by a series

of abrupt explosions proceeding from a darkened side-chamber, which has been reserved for all optical experiments requiring darkness, and find them to be the reports accompanying the discharge of Mr. Spottiswoode's giant inductorium, the largest in the world. The lurid zig-zag spark, rupturing the air by the intense electric energy, is in fact a lightning-flash—forty-two inches long—and the reports we heard are the accompanying thunder-claps. One feels inclined to shrink even from the violence of this miniature thunderbolt, and the eye is pleased to turn from it, to rest on the beautiful tints of the electric glow in a series of Geissler vacuum tubes close by. The current passing through the partial vacuum in these tubes, represents the electric discharges which take place in the upper and more rarified regions of the atmosphere; and the many-coloured light which its passage evokes is, indeed, a mimic aurora borealis. There is a delicious softness in the hues, on which the eye is never tired of gazing, and which can only be matched by some of the tender lights of a tropical sunset, or the flush of the aurora in the northern winter sky.

J. MUNRO, C.E.



WHEN THE TIDE WAS HIGH.

CHAPTER THE FIRST.



BY the sad sea waves, when the tide was high, I was not born, but re-born. I purposely avoid the expression "born again," lest it should be supposed that any metaphysical meaning underlies my words; and the real fact is that the circumstance to which I have alluded had a purely physical aspect.

Looking at it from every point of view, being born again must, I suppose, signify entering upon a new life, which again includes the idea of being cut away from some old life and its associations.

Now, this is precisely what happened to me on that remarkable day, I decline to say how many years ago. I may just observe, however, that when this noteworthy transformation took place I had reached the mature age of twelve years.

Some of us have found out, I believe, that this nineteenth century is carrying us on with a rapidity hitherto unprecedented; they say that we have inherited hearts

quicker to feel and brains quicker to understand than our forefathers. If this be true, it follows that development, taking its start from a higher point, will advance with a greater speed.

This being premised, I shall not, I trust, shock any philosophical mind if I venture to assert that already, at twelve years old, I had reached that inquiring period finely described by a modern writer in some such words as these:—

"Man goes his way carelessly; all at once there is silence—pause—a lacuna of sensation. 'How strange,' he says, 'is my fate! Is it true that I exist? What is the world?'"

I had not read these words then; probably they had not been written; but they illustrate well my state of mind. There was silence—pause—a lacuna of sensation; only in my case it followed, not carelessness, but a tempest, or rather a series of tempests, which one after the other had swept over me, and which at last, by the force that was in them, had brought me to these "precipitous, black, jagged rocks," under which for some hours I had been wandering, and to that one gaping mouth, still blacker than their blackness—fit opening to the "dead men's cave."

Into which, of course—having, as our French neighbours would express it, "death in the soul"—I crept. But the pause in sensation had not yet arrived; on the contrary, I was sensation all over. Sitting huddled together amongst the tangled sea-weed, I glared out upon the placid wavelets, that in the gentlest fashion