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SHALL WE EVER SEE BY WIRE?

THE telephone enables us to transmit sound to a distance by electricity, and the question has arisen whether we shall ever transmit light by the same mysterious agency. We can talk from London to Paris, or from New York to Chicago; and when the new telephone cable is laid across the Channel, it is expected that some of the provincial towns—for example, Liverpool and Manchester—will also be able to speak with the French capital. There is even a prospect of the Old World and the New being put into communication with each other by word of mouth some day; either by a method of overcoming the “induction” of the trans-Atlantic cables, or by overland lines through Siberia and Alaska with a cable across Behring Straits.

Will it ever be possible to enable the persons who speak with each other by telephone to see one

another at the same time, as “in a glass darkly” perhaps, but still “face to face”? Will it ever be feasible for a man in London to see the Opera in La Scala, or the Falls of Niagara, or the Feast of Lanterns in Canton, without stirring from home? It is a captivating idea, and although we cannot pronounce with certainty, there is a good deal to be said in favour of the possibility of its realisation.

To begin with, it is known that light is merely a form of energy, or, as the late Professor Tyndall would call it, a “mode of motion.” It is, in fact, a wave-like motion in the exquisite medium that we call the luminiferous ether, which is understood to permeate all bodies. The waves resemble those set up in water when a stone is dropped into it; that is to say, they are transverse rays, the particles of water rising and falling alternately across the line on which the waves travel. In this respect light differs from sound, in which the particles of air conveying the sound vibrate to and fro along the course of propagation of the sound. Now it has been found of late years that waves similar to those of light in all but size can be set up in the luminiferous ether by oscillatory discharges of electricity, and there is growing evidence to show that some well-known effects of electricity are the result of wave motions in the ether of the same kind as those of light. If, therefore, we could find a means of transforming the waves of light into corresponding electric waves, and transmit these to a distance by wire, or even without wires, then retransform them back again into light, the problem would be solved. The progress of electrical research appears to tend in that direction.

The answer to your question "shall we ever see by telegraph?" is "Yes. When millionaires cease to delight in the mere growth of their fortunes, & take a little delight in spending money for the good of the world, one of them may think it worth while to chuck away £2000 in doing this thing. But if I had the money to throw away I wouldn't do it for I know of much better things than to messle do what all electricians know can be done

*Yours
Wm Perry*

PROFESSOR JOHN PERRY, F.R.S.

First Attempts.

Meanwhile, crude methods of realising the idea have not been

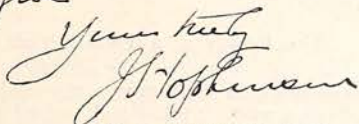
wanting. We do not refer to forms of telegraph-apparatus by which drawings and photographs can be transmitted by wire, but to apparatus for reproducing luminous effects. Such, for example, is the telephotograph by Shelford



MR. W. H. PREECE, C.B., F.R.S.

Bidwell, by which light falling on a selenium cell changes the strength of an electric current, which on passing through the wire is caused to decompose a chemical at the distant place, and thus produce a representation of the luminous object in light and shade. A still earlier plan, and the first real attempt to grapple with the problem, is that of Professors Perry and Ayrton, the distinguished electricians, which was explained in a lecture to the Society of Arts in 1881, and is fully described in Dr. Wormell's "Electricity in the Service of Man" (Messrs. Cassell and Co.). It will be sufficient to say that it consists in employing a selenium cell, which, when exposed to light, has the property of altering the strength of a current flowing through it and to a degree corresponding with the brilliance of the light. The current thus modified travels along the wire to the distant station, where it passes through a magneto-electric device which operates a shutter, so as to modify the brightness of an illuminated spot and imitate the brightness of the original object at the transmitting end of the line. This may be regarded as a simple element in the arrangement, and by combining a number of these

The question you put is one which it would be rash to answer shortly and without consideration. Much consultation and discussion I have not at present time to give

Yours truly


DR. J. HOPKINSON, F.R.S.

elements into a "mosaic," so to speak, the light-and-shade pattern of an object could be reproduced at a distance—but not colours and tints.

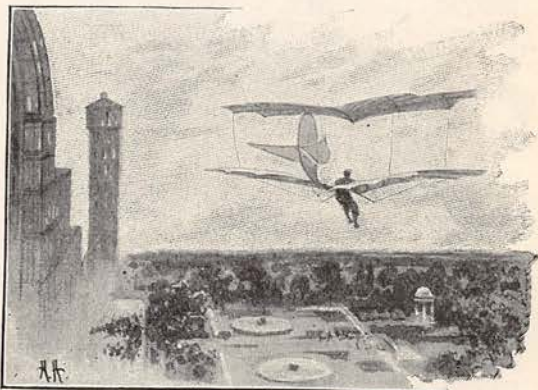
"Provide Me With £2,000."

Professor Perry has been kind enough to inform us that although he has been too busy otherwise

during the last fifteen years to give much time to the working out of this plan, he is still convinced that it would succeed. "Provide me," he said, "with £2,000 to play 'ducks and drakes' with, and I promise to transmit such mosaic pictures of people moving as I have described. I see my way to using only ten wires, and I think that this number might be reduced if I had leisure to think the thing out. I do not think I would use selenium cells now."

"The Word 'Impossible' Wiped Out."

Mr. William Henry Preece, F.R.S., the well-known Engineer-in-chief of the Post Office, whose remarkable feat of telegraphing through the air to a distance of several miles without wire has attracted so much attention, has favoured us with an expression of his views on the subject: "The word 'impossible,'" he says, "has been wiped out of the electrician's vocabulary. The unexpected is always



HUMAN FLIGHT.

happening in electricity. It is dangerous to prophesy unless you know. I can say only this, that it is not impossible to see by telegraph and that we know more of the probability of doing so now than we did of the probability of transmitting speech before the telephone was introduced."

Amongst other eminent electricians to whom we have applied, Professor J. A. Fleming, F.R.S., has answered that he has not given sufficient attention to the matter to express an opinion; Professor George Forbes, F.R.S., was on the point of starting for New Zealand, and Dr. John Hopkinson, F.R.S., President of the Institute of Electrical Engineers, regrets that he has not time to discuss it at present.



Human Flight.

Herr Lilienthal, of Berlin, has improved his apparatus for flying by doubling the supporting surfaces, which now extend to 18 square metres. Our figure shows his new flying, or rather soaring, apparatus, the upper and under bearing surfaces being connected by two rigid stays and thin wires. Taking up his position in the midst of the lower surface, and jumping from a tree-top or house against the wind, Herr Lilienthal is able to soar



A SOCIABLE CYCLE.

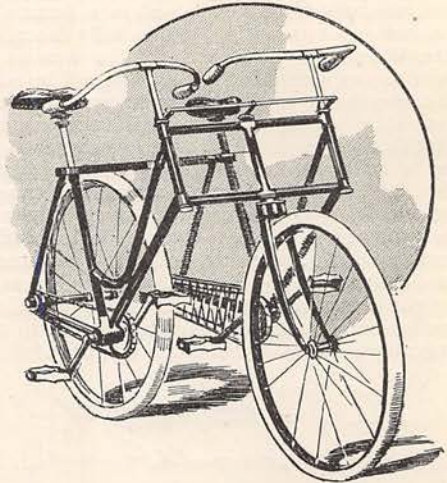
like a bird by the upward pressure of the wind on the floats. He also hopes to be able, by adding wings, to circle round in the air, and so take advantage of the most favourable currents.

A Sociable Cycle.

The tandem cycle does not permit of the travellers sitting side by side and talking *tête-à-tête*, in a sociable fashion, hence an American maker has introduced the machine which we illustrate. As will be seen, it is a bicycle with two seats abreast, two sets of driving pedals, and two steering handles; the hind wheel is thus actuated by two separate chains. A difference in weight between the two travellers only causes a certain *list* of the machine to one side. The start is made by one passenger getting into the saddle while the machine is at rest, and the other mounting when holding it vertical and putting it in motion. The descent from the bicycle is effected in the same way, but in inverse order—that is to say, one gets off while the machine is going and holds it upright until the other descends.

A Simple Pantograph.

The "paper-trammel" pantograph invented by Mr. Moon, B.E., of the Australian Geographical Survey, for the reduction of maps and drawings, has the advantage that it is made of paper, and can easily be made by any student of geometrical drawing. Our illustration shows this ingenious device, and the manner of using it; a map of Africa being reduced to half-size by means of the two scales. When the map to be reduced is larger than the pantograph, it is first ruled off into square sections, each of which is a little shorter than the long slit in the pantograph. Division lines A B, double the width of the long slot apart, are then drawn across the section, and the pantograph is moved to each of them in turn. When it is undesirable to cut up the original map into the sections, tracings of these should be made on smaller pieces of paper, and each reduced into its place on the drawing-paper which has likewise been divided into skeleton sections corresponding to those of the larger map. If a reduction of one-third or one-fourth is required, the small slot should

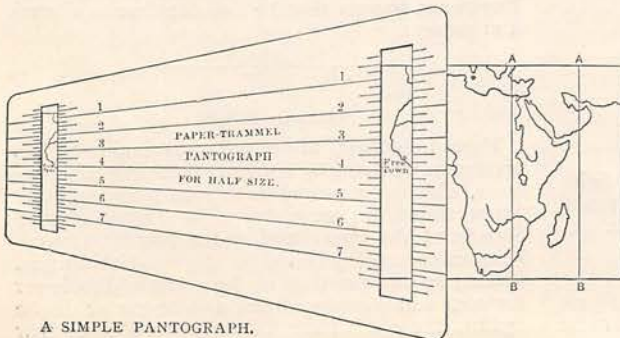


A SOCIABLE CYCLE.—FIG. 2.

be cut one-third or one-fourth of the distance from the wide slot to the apex of the converging lines, the slots being proportionately one-third or one-fourth the width of the wide slot. The same rule holds good for any other proportions.

The Power of a Thunderbolt.

During a recent thunderstorm at Klansthal, in Germany, a thunderbolt struck a wooden pillar and melted two nails instantly. From the mass of the nails and the heat required to melt them Dr. Grottewitz, an electrician, has calculated that they could only be fused artificially by an electric current of 200 ampères at a pressure of 20,000 volts. Applied for one second this amount of energy is equivalent to 500 horse-power, and applied for $\frac{1}{10}$ second to 50,000 horse-power.



A SIMPLE PANTOGRAPH.

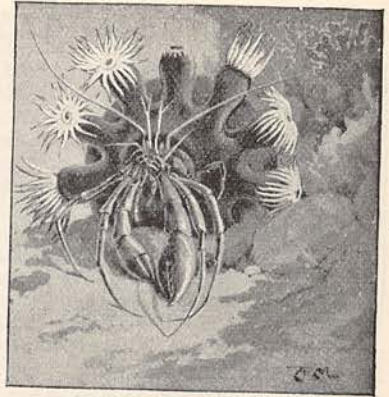
Crabs and Sea-flowers.

The hermit crab (*Pagurus Bernhardus*) lives in empty cockle-shells, but it has been observed by Mr. Percival Wright in the first place, and more recently by M. Faurot, that he prefers a shell on which the sea anemone (*Sagartia parasitica*) is growing. Experiments have shown that the crab and actinia are partners, the actinia keeping parasites from the crab, and the crab sharing his meal with the actinia. Indeed, the crab is known to remove the actinia from its position on a rock and plant it on the shell. Moreover, the actinia even transplants itself from an unfavourable site to a shell tenanted by the crab. Still more wonderful is the partnership between the *Pagurus Prideauxi* and the *Adamsia palliata*, which enlarges the shelter of the crab by a stony secretion from its foot or sucker. The crab purposely breaks up some of his meat fine enough for the actinia to swallow. This actinia dies when the crab forsakes the shell on which it grows, but the crab can secure another partner by transplantation. Fig. 1 represents the partnership of the Bernhard crab and the anemone, while Fig. 2 shows another variety of crab, the *Pagurus pilimanus*, inhabiting a colony of the beautiful violet deep-sea polype named *Epizoanthus parasiticus*. In this case the original shell in which the crab lived has been dissolved away by the sea-water, leaving a hole or cavern in the heart of the polype which continues to be its home.

More about the New Photography.

The Röntgen method of photographing the bones in the living body and other unseen objects is gradually undergoing improvement. Experiments are being directed to find a substance which when made phosphorescent or fluorescent in the Crookes vacuum tube, will yield the most effective rays for taking the photographs. Hitherto barium platino-cyanide has been one of the best materials; but according to a recent message from Edison to Lord Kelvin, tungstate of calcium is superior. Dr. Macintyre, of Glasgow, has succeeded in examining a bullet inside the skull by means of the rays and phosphorescent barium platino-cyanide; and Edison can, it is stated, see metal objects behind a partition of timber eight inches thick by employing tungstate of calcium. Dr. Uberto Dutto, of Rome, has shown how photographs of the arteries and internal parts of the body, other than the bones, can be photographed by injecting mineral solutions into them.

The Röntgen method has also gained a moral victory by demonstrating to a hysterical girl who believed the bone of her arm diseased that there was nothing the matter with it.



CRABS AND SEA-FLOWERS.

Three Years in Parliament.

From whatever point of view we look back upon them, the three years of the last Parliament were interesting ones. Very few of us can follow the inner history of political life for ourselves, but all who would correctly appraise the "personal equations" of public life in that period of strenuous Party warfare, have now an opportunity of looking again upon its fights, its triumphs, and its failures. Mr. H. W. Lucy, keenest of Parliamentary note-takers, gives us in "A Diary of the Home Rule Parliament" (Cassell) an addition to his excellent series of word-pictures of the men and the methods of modern legislative life. It is the history of yesterday, of course, but to read it as Mr. Lucy tells it is to gain many clues to the understanding of the news of to-day. And let no one pass this book by in the mistaken belief that it is a mere chronicle of party fights, for it is much more than that. It brings out the personal side of Parliamentary life, and does not a little to explain its quaint forms and cumbrous ways.

More New Books.

"Academy Pictures," the special supplement of the "Magazine of Art," for the reproduction of the most popular and most interesting pictures in the current Exhibition, is being published at short intervals by Messrs. Cassell, who are giving to the work every advantage of paper and printing to make it a valuable and permanent memento of the best pictures of the year.—The same publishers have issued the third volume of their Illustrated "Gazetteer of Great Britain and Ireland," carrying on the work as far as "Kiltarn." The descriptive letterpress is accompanied by useful maps and excellent illustrations of the places referred to.—Messrs. Cassell are also issuing, at a price which brings it within the reach of every household, a new edition of their "Natural History," in weekly parts and monthly numbers.

"Big Men at Play."

Erratum.—In the article under this title in our May number, "Hamlet" in the third line of the first column of p. 436 should read "Romeo."