The New Telegraphy.

An Interview with Signor Marconi.

By H. J. W. Dam.

A YEAR has elapsed since Röntgen gave us the new photography. To-day, on the same general lines, we are confronted with something more wonderful, more important, and more revolutionary still, the New Telegraphy. After Röntgen's announcement that his rays will penetrate certain substances at short distances, comes now a young Italian to tell us that electric rays or waves, generated in a way which he has discovered, will penetrate all substances at all distances. That, generally speaking, telegraphy needs no wires, and that, through walls, through houses, through towns, through mountains, and, it may possibly even happen, that through the earth, we can send despatches to any distance, the only apparatus needed being a sender and a receiver, the communication taking place by means of electric waves in the ether.

Before proceeding to describe this gentleman and the scientific indorsements which give the fullest weight to his words, it is advisable, in order that all the readers of this Magazine may understand the nature of the inventions, to say a few words about the ether. It is further advisable, from the fact that the ether is the great scientific field of the immediate future, and the certainty that for fifty years to come the word which will oftenest appear in the accounts of new and astonishing scientific discoveries will be this familiar name of something which has long been one of the deepest of the scientific mysteries.

The English language uses the word ether in two totally different senses. The first is as the name of a colourless liquid easily vaporized, whose vapour is used to allay pain. This liquid has nothing whatever to do with the subject, and should be put entirely out of the mind. The second use of the word is as the name of a substance, colourless, unseen, and unknown, we will say—except in a theoretical sense—which is supposed to fill all space. The original conception of this substance is as old as Plato's time. Newton, Descartes, all the beacon lights of science through the ages, have assumed its existence, and all modern physical students accept it. The ether theory of the formation of worlds must be familiar to many. In fact, up to twenty years ago, as the men of to-day who were then at the Universities will remember, the word ether was a familiar name, a harmless necessary conception, a great convenience in bridging a tremendous void in science which nobody knew anything about, or ever would know anything about, so far as could then be seen.

But the electrical advance in the last twenty years has been most extraordinary. Invention and experiment have daily, if not hourly, thrown open new doors in the electrical wing of the Temple of Truth. And now, at the close of the nineteenth century, the great mass of new facts concerning light, electricity, inaudible sound, invisible light, and the Lenard and Röntgen rays; the eager inquiry, based upon new discoveries, into the properties of living matter, crystallization, the transference of thought, and the endeavour to establish scientifically the truth of certain great religious concepts—all the special sciences thus represented, marching abreast of one another along the old Roman Road of Science, which leads no one knows whither, have come upon a great high wall, blocking the way completely in all directions.

It is an obstacle which must be conquered in whole or in part before science can go any farther. And upon the wall, as upon the wall in the palace of Babylon, is a strange and as yet unintelligible inscription, the mysterious word "ether." What new and great discoveries lie beyond this wall no one knows, but more than one high authority believes that these discoveries will startle the twentieth century more greatly than the nineteenth has been startled. We know from the history of science in the past, and from the excellence of its tools in the present, that the wall will be at least partly surmounted before very long. Until that happy event, however, we can only fold our hands and wait.

To suggest, in the crudest possible fashion, how ether is at present regarded by scientists, let the reader imagine that the whole universe, to the uttermost stars, is a solid mass of colourless jelly. That, in this colourless jelly, the stars, solar systems, and space-worlds are embedded like cherries in a mould of fruit jelly for the table. That this jelly, though it is at present believed to have density and rigidity, is so inconceivably thin that it soaks completely through all the cherries and through everything upon them.

That the minute atoms composing the cherries are so large when compared with the thinness of the jelly, that each atom is surrounded by the jelly just as the whole cherry is surrounded. That, in short, the jelly is continuous, without a point in the whole universe at which there is a single break in its continuity. That, consequently, if we tap the glass containing the jelly on the table, a quiver will run through the jelly completely. The cherries will not quiver, but the quiver will run through them—the jelly which has soaked through them carrying the quiver through them as easily as through the spaces between the cherries. That, in short, this jelly or ether is a universal substance so thin that it permeates through everything in space and on earth—glass, stone, metal, wood, flesh, water, and so on; and that it is only by its quivering—by means of the waves in it, that light rays, electric rays, and Röntgen rays, excite—that all these rays are enabled to travel and produce their various results.

Light enables us to see. But all the light which comes to us from any object, and enables us to see that object, comes by way of waves in the ether. These light waves pass through glass, that is, the wave continues right through the glass in the ether which lies between the particles of glass. From causes yet undefined, the ether carries light rays through certain substances, but will not carry Röntgen rays through those substances. Röntgen rays, on the other hand, are carried through substances which stop light. Electric rays, or electric rays of a low rate of vibration, differ in some respects from both light and Röntgen rays in the substances which they can traverse. Electric rays of high oscillation show other differences still. Other classes of rays or waves which remain to be discovered, and which will also have different properties, will doubtless be found to receive different treatment from the ether, the sum and substance of the whole matter being that the comparatively new research for new rays has now concentrated the whole scientific world's attention on the ether, and that its different treatment of different rays affords to-day a means of studying the ether that has never been enjoyed before.

The density of the ether has been calculated from the energy with which the light from the sun strikes the earth. As there are twenty-one ciphers after the decimal point before the figures begin, its density is, of course, less than anything we can imagine. From its density its rigidity has been calculated, and is also inconceivably small. Nevertheless, with this small rigidity and density, it is held to be an actual substance, and is believed to be incompressible, for the reason that otherwise it would not transmit waves in the way it does. As it is believed to fill all the inter-planetary space, many most profound and searching experiments have been made to determine whether, as the earth moves in its orbit through space at the rate of nineteen miles per second, it passes through the ether as a ship goes through the water, pressing the ether aside, or whether the ether flows through the earth as water flows through a sieve forced against it. Through the elusive character of the substance, however, none of these experiments have as yet produced any very satisfactory results. It has been found, however, that the ether inclosed in solid bodies is much less free in transmitting waves than the ether in the air. Thus, glass alone transmits transverse vibrations at the rate of about three miles per second. The ether in the glass transmits them at a rate 40,000 times greater, or about 124,000 miles per second, while the ether in the air transmits them at the rate of 192,000 miles per second. The reason why the ether in the glass and other solids transmits more slowly than that outside, is a mystery; but the whole subject is as yet one of many mysteries. Ether waves are at present variously named as heat waves, light waves, Hertz waves, Lenard waves, Röntgen waves, etc., and the most evident differences between these different kinds, so far as they have been investigated, consist in different lengths of wave and the varying number of vibrations per second. Heat waves are believed to be vibrations of the ether, whose number per second lies between 200 and 400 billions. Light waves lie between 400 and 800 billions per second, the longer and slower ones producing in the eye the sensation of red, and the colour scale mounting, as the number of vibrations mounts, through the yellows, greens, and blues to the violets.

The human eye is not sensibly impressed by vibrations below 400 billions per second or above 800 billions. These are the waves of what is called invisible light, just as vibrations of the air, above and below certain limits, do not impress the ear and constitute the waves of inaudible sound. The Röntgen waves are at present supposed to be above 800 billions. Doctor Bose, the Calcutta scientist, has been working with short electric waves, say, from a quarter to half an inch in length, and a vibration of fifty

millions per second. Marconi has been employing much longer waves whose vibrations were 250 millions per second. These are simply a suggestion of the gathered facts which have now, as said before, placed science in a position to more hopefully attack the mystery of the ether.

Leaving Sir Isaac Newton's suggestions and the theories of other writers out of the question, electric waves may perhaps be said to have been discovered by an American scientist, Joseph Henry, in the year 1842. He discovered that when he threw an electric spark, an inch long, on a wire circuit in a room at the top of his house, electrical action was instantly set up in another wire circuit in his cellar. There was no visible means of communication between the two circuits, and after studying the matter he announced his belief that the electric spark set up some kind of an action in the ether which passed through two floors and ceilings, each fourteen inches thick, and caused induction—set up what is called an induced current—in the wires in the cellar.

The fact of induction is now one of the simplest and most common-place phenomena in the work of electricians. Edison has already used it in telegraphing to a flying railway train. Hertz, the great German investigator, developed the study of these waves, and announced, in 1888, that they penetrated wood and brick, but not metal. Strange to say, however, considering all the brilliant electricians in the more Western countries of to-day, and the enormous amount of interest in and experimental investigation of electrical phenomena therein, it has been left to a young Italian, Guglielmo Marconi, to conceive what might be done with electric waves, and to invent instruments for doing it.

Marconi's story will be told with the utmost simplicity and care. But it sounds like a fairy tale, and if it had not for a background a committee of engineers representing the British Army, the British Navy, the British Post Office, and the British Lighthouse Service, which are now investigating it, it might well be doubted. As it is, the imagination loses itself, in the face of Marconi's experiments, in trying to conceive what indefinite marvels and miracles may soon be produced by the new power which has been put into human hands.

From a] SIGNOR MARCONI AND HIS INSTRUMENT. *[Photograph.*

By a not unnatural misconception, the fame of having discovered the new telegraphy has been awarded indirectly to the Calcutta scientist just mentioned, Doctor Jagadis Chunder Bose, the Professor of Physical Science in the Presidency College at Calcutta. Doctor Bose, whose great and valuable work in the study of electric waves appears in the records of the Royal Society, and his recent address to the British Association, is certainly the last man in the world to seek unmerited fame or the honours of discovery where no discovery lies. He assured the writer that he has no interest in what is called the "new telegraphy," and that nothing could be more painful to him than the sensational aspect of researches on his

part which had for their sole object the assistance of scientific investigation, and could be properly appreciated by men of science alone.

Guglielmo Marconi, whose name will doubtless be often heard in the years which lie before us, is a young Anglo-Italian. He was born in Bologna, Italy, and will be twenty-two years old next April. His father is an Italian gentleman of independent means, and his mother an English lady connected with several well-known English families. He is a tall, slender young man, who looks at least thirty, and has a calm, serious manner and a grave precision of speech which further give the idea of many more years than are his. He is completely modest, makes no claims whatever as a scientist, and simply says that he has observed certain facts and invented instruments to meet them; but the facts and the instruments are so new, that the attention they are at present exciting is extraordinary.

This attention is largely due to the enterprise and shrewdness of Mr. W. H. Preece, the able chief of the Electrical Department of the British Postal System. Marconi's invention is a year old, but he could obtain no satisfactory recognition of it in his own country. Mr. Preece, however, had for a long time been at work upon the problem of telegraphing through the air where wires were not available. Last year the cable broke between the mainland and the Island of Mull. By setting up lines of wire opposite each other on the two coasts, he was enabled to telegraph by induction quite successfully over the water and through the air, the distance being four miles and a half. He sent and received in this way 156 messages, one of them being 120 words in length. Ordinary Morse signals were used, the despatches being carried by the ether in the air.

In a late lecture at Toynbee Hall, Mr. Preece admitted that Marconi's system, which is electro-static, far surpassed his own, which is electro-magnetic. He expressed the fullest faith in Marconi, describing his inventions as new and beautiful, scientifically speaking, and added that he (Mr. Preece) had been instructed by the Postal Department to spare no expense in testing them to the fullest degree. It will be understood, therefore, that it was due to Mr. Preece that Marconi has received the fullest recognition in England, and that engineers from different departments of the Government are now supervising his work.

Marconi was educated at Leghorn, Florence, and Bologna, and has more recently been following his special study at his home in the last-named city. He speaks English perfectly, and said, in his London home, in Westbourne Park :—

"For ten years I have been an ardent amateur student of electricity, and for two years or more have been working with electric waves on my father's estate at Bologna. I was using the Hertz waves from an apparatus, which you may photograph, a modified form of the apparatus for exciting electric waves, as used by Hertz. My work consisted mainly in endeavouring to determine how far these waves would travel in the air for signalling purposes. In September of last year, working a variation of my own of this apparatus, I made a discovery."

"What was the discovery?"

"I was sending waves through the air and getting signals at distances of a mile or thereabouts, when I discovered that the wave which went to my receiver through the air was also affecting another receiver which I had set up on the other side of a hill. In other words, the waves were going through or over the hill."

"Do you believe that the waves were going through the hill?"

"That is my present belief, but I do not wish to state it as a fact. I am not certain. The waves either went through the hill or over it. It is my belief, based on many later experiments, that they went through."

"And what was the thickness of the hill?"

"Three-quarters of a mile."

"And you could send a despatch with Morse signals through this hill or over it to someone on the other side?"

"With ease."

"What followed?"

"What followed was the conception and completion of my special invention, the instruments I have been using at Salisbury Plain in the presence of the Royal Engineers. I find that while Hertz waves have but a very limited penetrative power, another kind of waves can be exerted with the same amount of energy, which waves, I am forced to believe, will penetrate anything and everything."

"What is the difference between these and the Hertz waves?"

"I don't know. I am not a professed scientist, but I doubt if any scientist can yet tell. I have a vague idea that the difference lies in the form of the wave. I could tell you a little more clearly if I could give you the details of my transmitter and

receiver. These are now being patented, however, and I cannot say anything about them."

"How high an alternation were you using?"

"About 250 million waves per second."

"Do these waves go farther in air than Hertz waves?"

"No. Their range is apparently the same. The difference is in penetration. Hertz waves are stopped by metal and by water. These others appear to penetrate all substances with equal ease. Please remember that the amount of exciting energy is the same. The difference is in the way they are excited. My receiver will not work with the Hertz transmitter, and my transmitter will not work with the Hertz receiver. It is a new apparatus entirely. Of course, the waves have an analogy with the Hertz waves, and are excited in the same general way. But their power is entirely different. When I am at liberty to lay my apparatus and the phenomena I have observed before the scientists there may be some explanation, but I have been unable to find any as yet."

MR. W. H. PREECE, C.B., F.R.S.
From a Photo. by Elliott & Fry.

"How far have you sent a telegraphic despatch on the air?"

"With a small apparatus we have sent them a mile and three-quarters. We got results at two miles, but they were not entirely satisfactory. This was at Salisbury Plain, across a shallow valley between low hills."

"What battery were you using?"

"An eight-volt battery of three ampères, four accumulators in a box."

"Did you use a reflector?"

"Yes. It was a roughly made copper parabolic reflector with a mistake of an inch in the curve. I shall not use one in future, however. A reflector is of no value."

"Nor a lens?"

"Nor a lens."

"Why not?"

"Because the waves I speak of penetrate everything and are not reflected or refracted."

After Professor Röntgen's distances of a few yards and limitations as to substances, this was rather stunning. Marconi, however, was entirely serious and visibly in earnest in his statement.

"How far have you verified this belief?"

"Not very far, but far enough, I think, to justify the statement. Using the same battery and my transmitter and receiver, we sent and received the waves at the General Post Office Building, through seven or eight walls, over a distance of one hundred yards."

"How thick were the walls?"

"I can't say. You know the building, however. It is very solidly constructed."

"And you sent an ordinary telegraphic despatch by those signals?"

"No. We did not do that, though we could have done so. We were working with agreed signals, and we obtained the taps which we sought and repeated them till there was no room for doubt."

"Do you think that sitting in this room you could send a despatch across London to the General Post Office?"

"With instruments of the proper size and power, I have no doubt about it."

"Through all the houses?"

"Yes."

We were in a drawing-room in Westbourne Park, a distance of about four and one-half miles from the General Post Office.

"And how far do you think a despatch could thus be sent?"

"Twenty miles."

"Why do you limit it to twenty miles?"

"I am speaking within practical limits, and thinking of the transmitter and receiver as thus far calculated. The distance depends simply upon the amount of the exciting energy, and the dimensions of the two conductors from which the wave proceeds."

"What is the law of the intensity at a given distance?"

"The same as the law of light, inversely as the square of the distance."

This means that, whatever the energy with which the waves are sent out, their power at say 20ft., when compared with their power at 10ft., would be in the proportion of 10 times 10 to 20 times 20, or one-fourth in those special instances.

"Do you think they are waves of invisible light?"

"No, in some respects their action is very different."

"Then you think these waves may possibly be used for electric lighthouses when fog prevents the passage of light?"

"I think they will ultimately be so used. A constant source of electrical waves instead of a constant source of light waves, and a receiver on the vessel, would indicate the presence of the lighthouse and also its direction."

"But would not the fog interfere with the passage of the waves?"

"Not at all."

"Nor metal?"

"Nothing affects them. My experience of these waves leads me to believe that they will go through an ironclad."

"Concerning the size of the apparatus. How large is it?"

"The transmitter and receiver we have been using at Salisbury Plain and at the Post Office are each about"—he held up his hands to indicate the dimensions—"say, 15in. by 10in. by 8in. Small ones, effective enough for short distances, can be made of half that size."

"What are you working on at present?"

"Mr. Preece and I are working at Penarth, in Wales, to establish regular communication through the air from the shore to a lightship. This will probably be the first direction in which my apparatus is utilized, communication with the lightships. The lightships lie off this coast at any distance from half a mile to twenty miles or more."

"What length of waves have you used?"

"I have tried various lengths from 30 metres down to 10in."

"Why would not these waves be useful in preventing the collision of ships in a fog?"

"I think they will be made use of for that purpose. Ships can be fitted with the apparatus to indicate the presence of another ship so fitted within any desired distance. As soon as two ships approach each other within that distance the alarms will ring on each ship, and the direction of the other will be indicated by an index."

"Do you limit the distance over which these waves can be sent?"

"I have no reason to do so. The peculiarity of electric waves—which was noted, I believe, by Hertz—is the distance they travel when excited by only a small amount of energy."

"Then why could you not send a despatch from here to New York, for instance?"

"I do not say that it could not be done. Please remember, however, that it is a new field, and the discussion of possibilities which may fairly be called probabilities omits obstacles and difficulties which may develop in practical working. I do not wish to be recorded as saying that anything can actually be done beyond what I have already been able to do. With regard to future developments, I am only saying what may ultimately happen; what, so far as I can now see, does not present any visible impossibilities."

"How large a station would be necessary, assuming the practicability, to send a message from here to New York?"

"A station the size of this room in a square area. I don't say how high."

The room was twenty feet square.

"What power?"

"Fifty or sixty horse power would, I think, suffice."

"What would be the cost of the two stations, completed?"

"Under ten thousand pounds, I think."

"Would the waves go through the ether in the air or through the earth?"

"I cannot say with certainty. I only believe they would go that distance and be recorded."

"You say that no lens or reflector is of value. Then the waves would go outward in all directions to all places at the same distance as New York?"

"Yes."

"Do you think that no means will ever be found to stop this progress in all directions and concentrate it in one direction?"

"On the contrary, I think that invention will give us that."

"Do you see any way of accomplishing this?"

"No. Not as yet."

"In what other directions do you expect your invention to be first utilized?"

"The first may be for military purposes, in place of the present field telegraph system. There is no reason why the commander of an army should not be able to easily communicate telegraphically with his subordinate officers without wires over any distance up to twenty miles. If my countrymen had had my instruments at Massowah, the reinforce-

ments could have been easily summoned in time."

"Would the apparatus be bulky?"

"Not at all. A small sender and receiver would suffice."

"Then why would it not be equally useful for the admiral of a fleet in communicating with his various ships?"

"It would," said Marconi, with some hesitation.

"Is there any difficulty about that?"

"Yes," said he, very frankly, but in a way which set the writer to wondering. "I do not know that it is a difficulty yet, but it appears to be."

The writer pondered the matter for a moment. Then he asked:—

"Did you ever try exploding gunpowder by electric waves?"

"Yes."

"Could you not from this room explode a box of gunpowder placed across the street in that house yonder?"

"Yes. If I could put two wires or two plates in the powder, I could set up an induced current which would cause a spark and explode it."

"At what distance have you exploded gunpowder by means of electric waves?"

"A mile and a half. This was not directly by means of the waves. They simply upon reaching the receiver set loose a stronger current, which produced the explosion."

"But could you have exploded it by the direct action of the waves?"

"Yes. But it would require much more energy than I was using."

"Then if you threw electric waves upon an ironclad, and there happened to be two nails or wires or plates in the powder magazine which were in a position to set up induction, you could explode the magazine and destroy the ship?"

"Yes."

"And the electric lighthouses we are speaking of might possibly explode the magazines of ironclads as far as light from a lighthouse could be seen?"

"That is certainly a possibility. It would depend on the amount of the exciting energy."

"And the difficulty about using your instruments for fleet purposes——"

"The fear has been expressed that in using the instruments on an ironclad the waves might explode the magazine of the ship itself."

It is perhaps unnecessary to say that this statement was simply astounding. It is so much of a possibility that electric rays can be used to explode the magazine of an ironclad, that the question has already been raised by the Royal Engineers. Of all the coast defences ever dreamed of, the idea of exploding ironclads by electric waves from the shore and over distances equal to modern cannon ranges is certainly the most terrible possibility yet conceived.

PROFESSOR H. HERTZ.
(Inventor of the Hertz Transmitter.)
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Such are the astonishing statements and views of Marconi. What their effect will be remains to be seen. Considering the many able experimentalists of to-day, and their admirable and original equipments, like Tesla's dynamos, the imagination abandons as a hopeless task the attempt to conceive what — in the use of electric waves—the immediate future holds in store. The air is full of promises of miracles. Strange results appear to be coming, and coming comparatively soon.

Because, underlying the possibilities of the known electric waves and of new kinds of electric waves which seem to be numerous and various, underlying these is still the mystery of the ether. Here is a field which offers to those college students of to-day who have already felt the fascination of scientific research, a life-work of magical and magnificent possibilities, a virgin, unexplored diamond-field of limitless wealth in knowledge. Science knows so little, and seems in one sense to have been at a standstill for so long. Lord Kelvin said sadly in an address at Glasgow the other day, that though he had studied hard through fifty years of experimental investigation, he could not help feeling that he really knew no more as he spoke than he knew fifty years before.

Now, however, it really seems that some Columbus will soon give us a new continent in science. The ether seems to promise fairly and clearly a great and new epoch in knowledge, a great and marked step forward, a new light on all the great problems, which are mysteries at present, with perhaps a correction and revision of many accepted results. This is particularly true of the mystery of living matter, and that something which looks so much like consciousness in certain non-living matter, the property which causes and enables it to take the form of regular crystals. Crystallization is as great a problem as life itself, but from its less number of conditions will perhaps be easier and earlier attacked.

The best conception of living matter which we have at present, completely inadequate though it be, is that of the most chemically complex and most unstable matter known. A living man as compared to a wooden man responds to all kinds of impulses. Light strikes the living eye, sound strikes the living ear, physical and chemical action are instantly and automatically started, chemical decomposition takes place, energy is dissipated, consciousness occurs, volition follows, action results, and so on through the infinity of causes and infinity of results which characterize life. The wooden man is inert. There is no chemical or physical action excited by any impulse from without or within. Living matter is responsive, non-living is not. The key to the mystery, if it ever comes, will come from the ether. One great authority of to-day, Professor Oliver Lodge, of the University of Liverpool, has already stated his belief that if the ether and electricity are not one and the same, the truth will ultimately be found to be near that statement. If this be true, it will be a great, a startling key to the now fathomless mystery of life.

So also with regard to that question which is the field of so much inquiry in the Psychical Societies of England and America, the transference of thought. Thus far there is no experimental basis on which one can definitely say that an impulse from one brain affects another over indefinite distance. The belief that there are such things as thought waves is, however, held by many intelligent thinkers, and as soon as someone appears who is ingenious enough to subject the human brain to mathematical conditions, the silent influence of brain on brain may not only be established as a fact, but measured in its extent.

If thought waves exist they are unquestionably ether waves, and in this connection the latest work of Doctor Ramon y Cajal, the world's greatest authority on brain action, is full of interest. He has come to the conclusion that the communication between the brain-cells does not take place by conduction, but by induction. Nerves, known to be excellent electrical conductors, were supposed to bind all the thought-cells into a related dynamic whole, but it now seems as if the impulses flashed from cell to cell instead of being conducted, and the corollary is certain to be suggested — if they flash from cell to cell, why not from brain to brain?

And so, too, with the deeper and higher mysteries of post-mortem human conditions. Faith needs no facts to support it, but scepticism is as old as religion, and the conflict between them is as natural as life itself. The great concepts of religion are felt to be true, and it is the natural desire and effort of many minds to prove them true by the ordinary methods of proof. Man and the microbe seem to be disturbingly equal in importance, when viewed from the infinite, the absolute standpoint, but man will never submit to this apparent equality, and man will never rest till he has proved it false. In the ether the secret lies, and the present prospect is that only from the study of the ether is this desired proof likely to come.

And, with regard to this great study of the future, perhaps no better words could be quoted as a conclusion to this article than those of Professor Lodge. He said, in closing a lecture upon a closely allied subject at the Royal Institution :—

"The present is an epoch of astounding activity in physical science. Progress is a thing of months and weeks, almost of days. The long lines of isolated ripples of past discovery seem blending into a mighty wave, on the crest of which one begins to discern some oncoming magnificent generalization. The suspense is becoming feverish, at times almost painful. One feels like a boy who has been long strumming on the silent keyboard of a deserted organ, into the chest of which an unseen power begins to blow a vivifying breath. Astonished, he now finds that the touch of a finger elicits a responsive note, and he hesitates, half-delighted, half-affrighted, lest he be deafened by the chords which it seems he can now summon almost at his will."