Improvement in Flooring Clamps.

A want has long been felt in laying floors for some device, that could be quickly applied to press the boards together before nailing. The improvement shown in our engraving has been used, and is claimed to answer all the purposes required.

A represents the stock of the clamp, having two right-angled brackets, B and C, which are in use placed over and under the joists. The lower bracket is provided with a set-screw or stud, D, which is designed to bite into the wood to prevent slipping. The upper bracket supports a hinged tongue, E, which may be raised to permit the application of said stock to joists, and swings down again to prevent the stock from falling laterally. Near the top of said stock a cranked lever, F, is pivoted to A, having a sharp heel, G, which, when in use, bites into the top of the joists, to prevent slipping. It is also provided with a segmental rack, H, to hold what is gained by the clamping lever, I, which is provided with a pawl to catch into the rack, H; but the clamp may also be used without the rack.

In operation a clamping block, J, is laid on the joists in front of the board to be clamped, and nailed. The tongue or guard, E, is then raised, and the stock or clamp, A, is placed on the joist in front of said block, letting the tongue, E, swing down. By pulling the levers apart the flooring is effectually clamped.

The lever, F, forces the set-screw or stud, D, into the bottom of the joist, and by the same motion the sharp heel of F is inserted above, thus giving a sure hold to the clamping lever, I.

The inventor claims that this implement will pay its cost in saving of time and labor in a single fortnight. Patented through the Scientific American Agency, Aug. 3, 1869. For further information or for State rights apply to the inventor, David Nevin, Boulder City, Colorado.

THE CANADIAN PATENT SYSTEM.

The Ottawa Times, in replying to some strictures applied to the recent so-called amendment to the Canadian patent laws, feels compelled to put in a sort of quasi apology. It says:

"The central idea of the commercial policy of England at the present day is free trade; the commercial and manufacturing interests, of which the last are most directly influenced by patent rights and their regulation at home and abroad, will not brook any legislative action interfering with their pet theories, and where they believe that they can bring any pressure on outside communities, as upon these Colonies, by means of Imperial remonstrances they never hesitate to exercise it to the utmost. But in a new country such as ours, where our natural resources are undeveloped, our population sparse and scattered, except in a few large cities, and our manufactures wanting in the large capital necessary to give that stability which they possess in the Mother Country, our policy must be to a certain extent protective, to give any degree of strength to our infant resources, and it is as great folly to complain of that system, as it would be to expect us to adopt in a day the land system, or any of those other peculiar forms of English social or commercial life, which have been the growth of centuries of increasing wealth among a dense and skillful population.

"The new patent law has been complained of for the illiberality of its enactments, but even a casual glance at its provisions will enable any one to see that the residence of one year, which is made compulsory for taking out a patent, is calculated to give more privileges to the foreign inventor than the old system under which patents might be 'introduced' into Canada, without any protection for the original patentee."

Very true. We admit that the new law is somewhat better than the old one, but why insist that a non-resident inventor shall come into your Dominion, and there reside for one year before he can be allowed to take out a patent for his own invention? Canada, we admit, is a pleasant country to visit at certain seasons of the year; but, independent of the cost of a year's board at some boarding house or hotel, we cannot see what other fair advantages are to be gained by this system.

The truth is that the people of Canada want to get hold of all the valuable inventions made by others and use them without compensation. This is neither fair nor honest.

THE OCTOPOD, OR BRAZILIAN CUTTLE FISH.

BY LUCIE L. HARTT.

It was during my first visit to Brazil, that one day, while busily engaged in examining a reef at a little town on the coast called Guarapary, my eye fell on an object in a shallow tide-pool, packed away in the crevice of the reef, which excited my curiosity. I could see nothing but a pair of very bright eyes; but, concluding that the eyes had an owner, I determined very rashly to secure him. I had been handling corals and seemed to have forgotten that all the inhabitants of the sea were not harmless. I put my hand down very quietly so as not to ruffle the water, when, suddenly, to my surprise, it was seized with a pressure far too ardent to be agreeable, and I was held fast. I tugged hard to get away, but this uncivil individual, whoever he was, evidently had as strong a hold on the rocks as he had on my hand, and was not easily to be persuaded to let go of either. At last, however, he became convinced that he must choose between us, and so let go his hold

upon the rocks, and I found clinging to my right hand, by his long arms, a large octopod cuttle fish, resembling the one illustrated in this article, and I began to suspect that I had caught a Tartar. His long arms were wound around my hand, and these arms, by the way, were covered with rows of suckers, somewhat like those with which boys lift stones, and escape from them was almost impossible. I knew that this fellow's sucking propensities were not his worst ones, for these cuttle fishes are furnished with sharp jaws, and they know how to use them too, so I attempted to get rid of him. But the rascal, disengaging one slimy arm, wound it

NEVIN'S PATENT FLOORING CLAMP.

about my left hand also, and I was a helpless prisoner. In vain I struggled to free myself—he only clasped me the tighter. In vain I shouted to my companion—he had wandered out of hearing. I was momentarily expecting to be bitten, when the "bicho" suddenly changed his mind. I was never able to discover whether he was smitten with remorse and retired with amiable intentions, or whether he only yielded to the force of circumstances. At any rate he suddenly relinquished his hold upon my hands and dropped to the sand. Then raising himself on his long limsy arms, he stalked away towards the water, making such a comical figure, that in spite of my fright I indulged in a hearty laugh. He looked like a huge and a very tipsy spider, staggering away on his exceedingly long legs.

The cuttle fish belongs to the Mollusks, a branch of the animal kingdom distinguished for its members being built on the plan of a sac, and to which Mr. Hyatt has applied the more appropriate name of *Saccata*. The cuttle fishes are distinguished from all the other Mollusks, such as snails, clams, etc., by having a large head, a pair of large eyes, and a mouth furnished with a pair of jaws, around which are arranged in a circle, eight or ten arms furnished with suckers.

In the common cuttle fish or squid of our coast, the body, which is long and narrow, is wrapped in a muscular cloak or mantle, like a bag fitting tightly to the back but loose in front. It is closed up to the neck, where it is open like a loosely-fitting overcoat buttoned up to the throat. Attached to its throat, by the middle, is a short tube open at both ends. This tube, or siphon as it is called, is fastened to its throat, and can be moved about in any direction.

The animal breathes by means of gills, which are attached to the front of the body inside the cloak and look like the ruffles of a shirt bosom. By means of these gills the air contained

in the water is breathed, and they answer the same purpose for the cuttle fish that our lungs do for us.

In order to swim, the animal swells out the cloak in front so that the water flows in between it and the body. Then it closes the cloak tightly about the neck so that the only way the water can get out is through the siphon. Then it contracts very forcibly its coat, which, it must be remembered, is a part of the animal, and the water is driven out in a jet from the siphon under the throat, and the body is propelled in the opposite direction; that is, backward like a rocket through the water. This siphon is flexible like a water hose, and can be bent so as to direct the stream not only forward, but sidewise and backward, so that the animal can move in almost any direction, or turn somersets with perfect ease, and so rapidly do some cuttle fishes swim that they are able to make long leaps out of the water. Usually, however, the animal swims backward, with its long arms trailing behind. Our common cuttle fish of this coast has, in addition to its eight arms, two long slender tentacles which may be withdrawn into the body. The tail is pointed and furnished with a fin on each side.

The Octopods, to which the Brazilian cuttle fish belongs, have round purse-like bodies, and eight arms united at the base with a web, and they swim by opening and shutting their arms like an umbrella; in this mode of swimming they resemble the jelly fishes.

The paper Nautilus is nothing in the world but a female cuttle fish that builds a shell. There was a very pretty story told of her habits, by Aristotle, the old Greek naturalist, which every one believed until quite recently. He said that she rode on the top of the waves, seated in her boat-like shell, and spread her broad arms to the winds for sails. But unfortunately the story has no foundation in fact. She either crawls about on the bottom of the sea, or swims quite like any other cuttle fish, shell foremost, only occasionally coming to the surface. Strangely enough she holds the two broad hand-like extremities of the arms against her body, and it is the inside of these arms that secrete the paper-like shell, which is only a sort of cradle for her eggs. Not so with the pearly Nautilus, which is furnished with a beautiful, coiled up, pearly shell, formed on the outside of the animal. This shell is divided into numerous chambers, and the animal living in the outer one builds a partition across the back part of it as the shell grows.

Cuttle fishes are sometimes used for food by the Brazilians and different species may be seen in the markets, where one frequently finds them still alive. Sometimes, as he stoops to examine one, its body is frequently suffused with a deep pinkish glow. Before he has time to recover from his sur-

prise this color fades, and a beautiful blue takes its place as rapidly as a blush sometimes suffuses a delicate cheek. The blue, perhaps, is succeeded by a green, and then the whole body becomes pink again. One can hardly conceive anything more beautiful than this rapid play of colors, which is produced by the successive distention of sets of little sacks containing fluids of different colors, which are situated under the skin.

The cuttle fish is also furnished with a bag containing an inky fluid, which, when the animal is attacked or pursued, it ejects into the water, thus completely blinding its adversary and effectually covering its retreat. It is from this fluid that the color *sepia* is made. Besides carrying an ink-bottle, some species of cuttle fish are provided with a long,

delicate, horny pen, which forms a sort of stiffener to the back. In some species the pen is hard, thick, and broad, and the cuttle fish bone of commerce is a pen of this kind. The species found in our waters is very small, and not at all dangerous, being barely large enough to draw blood from the hand; but in the tropical seas they are very large, powerful, and dangerous.

The cuttle fish is the original of Victor Hugo's devil-fish, so vividly described in the "Toilers of the Sea." If the devil fish were a beneficent creation, I should be sorry to destroy your faith in it; but as it is, I believe it will be rather a relief than otherwise to know that in some important respects, Victor Hugo's story of it is a fable. The Kraken was a mythical cuttle fish of fabulous size.—*American Naturalist*.

Boiler Explosions.—Anti-Incrustation Compositions.

At the Manchester (England) Steam Users' Association meeting, held recently, Mr. L. E. Fletcher, chief engineer, referring to one explosion, said the owner of the boiler had adopted a new composition for the prevention of incrustation for six or seven months before the explosion. This composition proved most efficacious for preventing incrustation. It removed the hard cakes adhering to the plates and reduced them to powder; so that when the men entered the boilers for cleaning, instead of finding them coated as before with a tenacious scale requiring hammer and chisel to remove, they found several bucketsful of flour or dust, which was readily washed out. There must evidently have been a large quantity of this fine floury deposit accumulated in the boilers, and floating about in the water when they were at work. The fine floury deposit appears to interfere with that intimate contact between the water and the plates which is necessary to pre-

vent over-heating, while it may be that, from the thickened water, the globules of steam cannot freely escape, and, thus caged within it, linger longer in contact with the plates over the fire than they should do, and thus form a film between the iron and the water, in consequence of which the heat is not carried off rapidly enough and over-heating ensues. It is not intended by this that they are made red hot, but that they are heated sufficiently to so increase their ductility as to lead to the undue compression and the consequent deflection of the over-heated parts. The explosion is, therefore, attributed to over-heating of the furnace crowns, though when covered with an ample supply of water, consequent on the accumulation within the boiler of a large amount of fine floury deposit, caused by the use of an arsenical composition for preventing incrustation, coupled with the suicidal practice of neglecting to open the blow-out taps. This is the first explosion which has ever occurred to a boiler guaranteed by this association; and it will be impossible, without the hearty co-operation of the members, to prevent such, without imposing restrictions upon them with regard to the treatment of their boilers, which the association has at all times been desirous to avoid. But this opportunity may be taken of strongly urging upon the members the advice which has repeatedly been given personally on previous occasions—that they should not experiment on their boilers with anti-incrustation compositions. They will find it a safe, and, in the majority of instances, a very efficacious plan to feed the boilers with two or three pounds of good soda ash daily; the soda not being introduced in heavy charges through the man-hole at cleansing times, but along with the feed, so that the boilers may be constantly fed with weak soda water; while the blow-out taps, both at the bottom of the boiler and surface of the water, should be regularly used. There is a composition now strongly advocated which acts rather mechanically than chemically, by forming a thin film of varnish upon the plates, and thus preventing the adherence of the scale. With some waters this has its dangers; the film or coat of varnish may protect the plate from the water as well as from the incrustation, and thus lead to over-heating, and two cases of injury have lately been met with which have arisen from this cause.

Correspondence.

The Editors are not responsible for the Opinions expressed by their Correspondents.

The Avondale Disaster.

MESSRS. EDITORS:—My suggestion will be too late to help the unfortunate miners at Avondale, but may be of use in some future disaster. The plan I suggest is, to have close by each mine two or more complete diver's suits, with all attachments ready for instant use. To enable the miner to drag the necessary air hose along the levels, he would require a hose carriage similar to that used for the compressed air coal cutters in England. For some points, when the hose would be liable to entanglement, small vessels of compressed air, or compressed oxygen, would enable a man to work for a limited time. Some of the suits should be the ordinary deep-sea dress so that assistance could be carried through drowned parts of a level.

The suits used merely to protect against gas could be made almost as light as an ordinary suit of clothes. By this means a few men could be supplied with air and could get at once to points that now require days to reach in safety.

My suggestion may not be practical in its present shape, but the principle of carrying the limited supply of air to the point when it will give its maximum useful effect in cases of disaster will bear working out by those who are practical miners.

J. G. S.

Philadelphia, Pa.

Marks Produced by Lightning Stroke.

MESSRS. EDITORS:—I notice an article on page 170, current volume of the SCIENTIFIC AMERICAN, on the subject of marks produced upon the body by lightning stroke.

I wish to state an instance of the kind which occurred in the upper part, or western portion of Washington county, Md., some time in July, 1851, to which I, with several others, was an eye-witness.

In an open lot near the residence of the late Captain John Ressler, about two and a half miles northwest of the town of Hancock, in the county named, stood an oak tree of medium size, under which, during a thunder storm, a sheep had taken shelter from the rain. On a limb or branch of the tree sat a robin, directly over the sheep; a flash of lightning struck the tree, the robin, and the sheep; killing both of the latter. We saw the sheep lying under the tree and went to see if it had been killed. When we arrived, we found the sheep dead, lying upon the left side, and found the dead body of the robin lying upon the right, or upper side of the sheep. Capt. Ressler, who owned the sheep, ordered his servants to skin the sheep, which they did immediately, and when they came to the spot on the right, and which was the upper side, where the body of the robin had fallen and where we had found it, they noticed a strange appearance, and called our attention to it. To our no small astonishment, we found on the inside of the skin of the sheep and also on the flesh of the body of it, a perfect picture of the robin, even to the fine fringes of the feathers of its wings. Now it could not have been the falling of the body of the robin upon the body of the sheep that caused the impression, as the figure or picture thus formed was not that of a dead bird lying sidewise on the sheep as we found it, but it was a perfect picture of the robin while sitting on the limb of the tree above the sheep. This circumstance at the time elicited a good deal of controversy among a small circle of educated gentlemen in the immediate vicinity, and the only conclusion that

could be arrived at was, that the current of electricity in the instant of its passage, carried the outline of the figure of the robin down upon the body of the sheep, the sheep having fallen (if it were not already lying) upon its side, before the body of the robin reached it in its downward descent. No doubt the sheep was lying down at the time of the stroke. Now whether the body of the robin absorbed a portion of the electric fluid, and in that way caused the picture (darkened as it was) upon the inside of the skin and upon the flesh of the sheep, I am not able to prove, but that has always been my theory of it. I do not desire to intrude upon your time and patience, but I will say that upon several other occasions I have witnessed effects of electrical action which I regard as totally outside of all information that I have yet been able to gain in regard to electricity, in any and all books written on the subject, or from any other source, having been somewhat of an experimenter myself with it, for the last twenty years. And at some future time when more expedient, I will endeavor to give several instances of strange productions by electrical force or power, which, I believe, will account for certain curious formations in nature in certain localities, which, up to this time, have not been accounted for on any scientific principles.

THOS. J. LOGAN.

Washington, D. C.

[We certainly hope our correspondent will favor us with any other facts in his possession relative to this interesting subject.—EDS.]

Has the Pacific Railroad Changed the Climate of the Plains?

MESSRS. EDITORS:—The scouts, guides, and hunters all agree in stating that on the Plains, as far back as their experience goes, little or no rains have fallen during the summer; but the experience of last summer and this one is, that we have sufficient rain for farming purposes, and the crops of hay and other produce raised here now attest it. The hunters with whom I have conversed all agree in stating that the rains only fall inside of a belt across the Plains of fifty miles in width, of which the railroad track is the center, that when they go beyond that belt the grass is red, crisped, and burnt-looking, while all vegetation inside is luxuriant. Has the iron of the rails or the upturned ground the credit of the change?

JOHN WHITFORD.

Pond City.

(Pope's Modern Practice of the Telegraph.) Conducting Powers of Materials.

According to the experiments of Mr. M. G. Farmer, made some years since, the relative electrical resistance of different metals and fluids at ordinary temperatures is as follows, pure copper being taken as 100:

Copper wire.....	1.00	Tin wire.....	6.80
Silver ".....	.98	Zinc ".....	3.70
Gold ".....	.113	Brass ".....	1.35
Iron ".....	.563	German silver wire.....	11.30
Lead ".....	10.76	Nickel ".....	7.70
Mercury.....	50.00	Cadmium ".....	2.61
Palladium.....	5.50	Aluminium.....	1.75
Platinum.....	6.78		

His experiments with fluids gave the following results:

Pure rain water.....	40,633,723.00
Water, 12 parts; sulphuric acid, 1 part.....	1,305,467.00
Sulphate of copper, 1 pound per gallon.....	13,450,000.00
Saturated solution of common salt.....	3,173,000.00
Nitric acid, 30 ".....	17,330,000.00
" of sulphate of zinc.....	1,606,000.00

The following table gives the specific resistance in ohms (an ohm is an amount of resistance equal to that exerted by $\frac{1}{16}$ of a mile of common galvanized iron telegraph wire No. 9) of various metals and alloys, at 32° Fah., according to the most recent determination of Dr. Matthiessen:

NAME OF METALS.	Resistance of wire 1 foot long weighing 1 grain.	Resistance of wire 1 foot long 1.000 inch in diameter.	Approximate per cent variation in resistance per degree temperature at 29 degrees.
Silver annealed.....	0.2414	9.935	0.377
" hard drawn.....	0.2421	9.151	
Copper annealed.....	0.0064	9.718	0.583
" hard drawn.....	0.2106	9.940	
Gold annealed.....	0.5349	12.52	0.255
" hard drawn.....	0.5349	12.74	
Aluminium annealed.....	0.0832	17.72	
Zinc pressed.....	0.5710	32.22	0.355
Platinum annealed.....	3.536	55.09	
Iron annealed.....	1.2425	59.10	
Nickel annealed.....	1.0785	75.78	
Gold pressed.....	1.317	80.26	0.363
Lead pressed.....	3.236	119.39	0.367
Mercury liquid.....	18.746	600.00	0.672
Platinum silver alloy, hard or annealed, used for standard resistance coils.....	4.243	148.35	0.031
German silver, hard or annealed, commonly used for resistance coils.....	2.652	127.32	0.044
Gold silver alloy, 2 parts gold, 1 part silver, hard or annealed.....	2.391	66.10	0.065

The use of this table is as follows: Suppose it is required to find the resistance at 32° Fah. of a conductor of pure hard copper, weighing 400 lbs. per knot. This is equivalent to 460 grains per foot. The resistance of a wire weighing one grain is found by the table to be 0.2106, therefore the resistance of a foot of wire weighing 460 grains will be $\frac{460}{100} \times 0.2106 = 0.96876$, but the resistance of one knot will be 6,087 times that of one foot, therefore the resistance required will be $6.087 \times 0.96876 = 5.896$ ohms. If the diameter of the wire be given instead of its weight per knot, the constant is taken from the second column. Thus the resistance at 32° Fah. of a knot of pure hard drawn copper wire 0.1 inch in diameter would be $\frac{5.896}{1.000} \times 0.1 = 0.5896$. The resistance of wires is materially altered by annealing them, and a rise in temperature increases the resistance of all metals. Dr. Matthiessen found that for all pure metals the increase of resistance between 32° and 212° Fah. is sensibly the same. The resistance of alloys is much greater than the mean of the metals composing them. They are very useful in the construction of resistance coils.

The highest value which has probably been found for the conducting power of pure copper is sixty times that of pure mercury, according to Sabine. Commercial copper may be considered of good quality when its conducting power is over fifty. Different samples of copper vary greatly in their spec-

ific conductivity, as may be seen by the following table, which gives the result of careful determinations by Dr. Matthiessen, the conducting power of pure copper at 59.9° Fah. being taken as 100.

Lake Superior, native, not fused.....	98.8 at 59.9°
Burra Burra.....	88.7 at 59.9°
Best selected.....	81.3 at 57.5°
Bright copper wire.....	72.2 at 60.2°
Tough copper.....	71.0 at 63.1°
Delidoff.....	69.3 at 54.8°
Rio Tinto.....	44.2 at 58.6°

Thus Rio Tinto copper possesses no better conducting power than iron. This shows the great importance of testing the conductivity of the wire used in the manufacture of electro magnets, cables, etc.

Agassiz on Humboldt.

"Referring to Humboldt's career as an ambassador at Paris, Professor Agassiz described a personal interview he had with him:

"His official position and his rank in society, as well as his great celebrity made him everywhere a cherished guest, and Humboldt had the gift of making himself ubiquitous. He was as familiar with the gossips of the fashionable and dramatic world as with the higher walks of life and the abstruse researches of science. He had at this time two residences in Paris; his lodging at the Hotel des Princes, where he saw the great world, and his working room in the Rue de la Harpe, where he received with less formality his scientific friends. It is with the latter place I associate him; for there it was my privilege to visit him frequently. There he gave me leave to come and talk with him about my work and consult him in my difficulties. I am unwilling to speak of myself on this occasion, and yet I do not know how else I can do justice to one of the most beautiful sides of Humboldt's character. His sympathy for all young students of Nature was one of the noblest traits of his long life. It may truly be said that towards the close of his career, there was hardly one prominent or aspiring scientific man in the world who was not under some obligation to him. His sympathy touched not only the work of those in whom he was interested, but extended also to their material wants and embarrassments. At this period I was twenty-four; he was sixty-two. I had recently taken my degree as Doctor of Medicine, and was struggling not only for a scientific position, but for the mean of existence also. I have said that he gave me permission to come as often as I pleased to his room, opening to me freely the inestimable advantages which intercourse with such a man gave to a young investigator like myself. But he did far more than this. Occupied and surrounded as he was, he sought me out in my own lodging. The first visit he paid me at my narrow quarters in the Quartier Latin, where I occupied a small room in the Hotel du Jardin des Plantes, was characteristic of the man. After a cordial greeting, he walked straight to what was then my library—a small book shelf containing a few classics, the meanest editions bought for a trifle along the quays, so no works on philosophy and history, chemistry and physics, his own 'Views of Nature,' Aristotle's Zoology, 'Linnaeus' Systema Naturæ, in several editions; Cuvier's 'Règne Animal,' and quite a number of manuscript quartos, copies which with the assistance of my brother, I had made of works I was too poor to buy, though they cost but a few francs a volume. Most conspicuous of all were twelve volumes of the new German Cyclopaedia, presented to me by the publisher. I shall never forget, after his look of mingled interest and surprise at my little collection, his half sarcastic question as he pounced upon the great Encyclopædia: 'Was machen Sie den mit dieser Eselsbrücke?' What are you doing with this ass's bridge?—the somewhat contemptuous name given in Germany to similar compilations. 'I have not had time,' I said, 'to study the original sources of learning, and I need a prompt and easy answer to a thousand questions I have, as yet no other means of solving.'

"It was no doubt apparent to him that I was not over familiar with the good things of this world, for I shortly afterwards received an invitation to meet him at six o'clock in the 'Galerie Vitree' of the Palais Royal, whence he led me into one of those restaurants, the tempting windows of which I had occasionally passed by. When we were seated, he half laughingly, half inquiringly, asked me if I would order the dinner. I declined the invitation, saying that we should fare better if he would take the trouble. And for three hours, which passed like a dream, I had him all to myself. How he examined me, and how much I learned in that short time! How to work, what to do, and what to avoid; how to live, how to distribute my time; what methods of study to pursue—these were the things of which he talked to me on that delightful evening—I do not mention this trivial incident without feeling that it may seem too familiar for the occasion; nor should I give it at all, except that it shows the sweetness and kindness of Humboldt's nature. It was not enough for him to cheer and stimulate the student; he cared also to give a rare indulgence to a young man who could allow himself few luxuries."

ENGLISH TELEGRAPHS.—The Postmaster-General of England asks for £6,750,000 to buy up the electric telegraphs of the kingdom, and seems likely to get the money. In return, he not only promises cheap messages, a large increase in the number of offices, and other facilities, but after paying interest on the sum expended, he will have, in the first year, a surplus of £77,000. This surplus will of course increase with the increase in the number of messages dispatched. As regards the scientific part of the question, it is thought that the demand for improvements will be so constant, that invention will be stimulated, and that we shall see a succession of methods for applying the wondrous power of electro-magnetism exceeding all hitherto compassed.