ON THE MANAGEMENT OF TELEGRAPHS.

On page 217 of our last volume we published an article on the "Management of Telegraphs," which had reference to an important suit growing out of what was deemed a laxity on the part of the American Telegraph Company in the delivery of a message. That article has attracted considerable attention and has at last elicited a reply from Hon. J. D. Caton, Chief Justice of Illinois, who has had much experience in connection with the management of telegraphs.

The following is Judge Caton's reply to us :—

You say : "The truth is that the present system of telegraphing is just as plain and simple as any of the arts which men practice. There is no more difficulty in writing messages correctly than there is in penning an account or copying a letter properly. If the message is written correctly by the operator at the start it cannot possibly go wrong over the wires. The skill required in telegraphing is of a very ordinary nature —it is a labor analogous to writing with a common pen."

Admitting for the present that, theoretically and in the laboratory, every one of these statements may be true, yet practically on long telegraph lines every one is incorrect, as every practical telegrapher will testify. This you will appreciate by a little reflection upon well-established facts with which you are familiar. The telegraphic alphabet is formed of dots, lines and spaces. If from any cause two or more of these dots are run together a line is made, or, if one is omitted, a space is left and a different letter is formed than the one intended. For instance, the letter *s* consists of three dots. If two of these dots are run together an *a* or an *n* is made, or if one is omitted, we have an *i* or an *o*, and so I might illustrate throughout the alphabet. Now, it is liable to occur and does often happen, that one letter may be substituted for another, which will still make sense in a message but of an entirely different meaning. Hence, I say with the Kentucky Judge, whose ignorance you reprove, but for whom I am inclined to break a lance, that there is no absolute security against mistakes but to repeat the message back. In his defence allow me to say that I understand that charge was founded upon the testimony of a great many of the most experienced and intelligent telegraphers. He should be excused, then, for telling the jury that safety requires that the message should be repeated back to guard against all chance of mistakes. And I submit that you were a little hasty and a little harsh when you said : —"This repetition business has always appeared to us like a dodge to extort money on the one hand ; while on the other it seems intended to serve as a screen behind which the company may run to hide itself from the consequences of its own gross neglect." Now, it seems to me that good faith to the public and justice to the telegraph companies, demand the truth on this as on all other subjects. I will therefore state, in as few words as I may, how it is that such errors must inevitably sometimes occur.

You are aware that upon the accurate operations of the relay magnet, and. especially that portion of it where the connection is made in the local circuit, everything depends. This connection is formed by two blunt platinum points being brought together by the influence of the magnet, and again separated by the force of an opposing spring. Every time these points are separated a particle of the metal is fused or is burned by the electricity with which it is charged. When a particle of platinum is simply fused it is liable to span the space separating the two points and prevent the circuit from being broken. This would necessarily run two or more dots into a line. When however, the intensity of the current exceeds the fusing point, which is usually the case, the metal is burned, leaving a residuum, which is an insulating substance, and this may, and frequently does, accumulate in such a quantity as to prevent the circuit from being closed when the points are brought together, in which case a dot is lost and a space left, making another wrong letter. If this does not often occur, it is liable to occur, and thus materially change the sense of a message.

But there are other and much more serious difficulties in the way of attaining that degree of perfection which you state does actually exist. No line is or can be perfectly insulated unless indeed the whole length of the wire is covered with an insulating substance. On a damp day, not only does more or less electricity find its way to the ground at every pole even with the best insulation, but as the humid atmosphere is itself a conductor, from every yard of the wire some portion of the electricity is discharged to the earth, thus forming a ground circuit stronger and stronger as you recede from the main battery. Hence, if the circuit is broken at a distant office, your magnet remains partially charged, and when the circuit is again closed the magnet attains its full strength quicker than if it had been entirely neutral ; hence, the necessity that your adjusting spring be drawn further back when working with a distant office on a damp day than with one near. This could be at least partially remedied by careful adjustment if the loss of electricity were uniform ; but it is not. As the humidity and temperature of the atmosphere are constantly changing so is the amount of electricity conducted to the ground in the mode stated constantly changing, and hence the constant variation of the strength of this ground circuit, and as this controls the strength of the magnet dots may be run into lines or they may be omitted by these instantaneous changes in this inevitable ground circuit.

But there is another practical difficulty which you will readily appreciate as its cause must be familiar to you : That is the electrical currents which are constantly coursing their way through the atmosphere. These act through the wire and operate upon the magnets precisely the same as the electricity, generated in the battery. Ordinarily, these are so slight as to occasion no practical inconvenience to the telegrapher ; but sometimes they are so strong and constant as to work the telegraph wire without any battery. These atmospheric currents, when flowing in the same direction as the battery currents, increase it, or if in an opposite direction neutralize it in proportion to their strength, again rendering it possible to change one letter to another as above described.

I have thus pointed out some of the most prominent and patent difficulties with which the telegrapher has to contend in order to avoid errors. They are all well established facts attested to by the experience of every practical telegrapher. Necessarily they must sometimes lead to mistakes which the highest possible care cannot avoid, and which can only be detected by repeating the message back. This with ordinary care must detect the mistake ; for it is hardly possible that the same interruption should occur from any of these causes to produce the identical error in the repetition.

These are not theoretical difficulties—they are practical. If all operators do not understand the cause, all experience the difficulties. With so much to contend with it is indeed wonderful that so few mistakes are made, and I think the telegraph companies are entitled to the highest credit for that degree of perfection to which they have trained their numerous operators.

You were in error then when you said that "this repetition business" is a dodge to extort money or excuse gross neglect. The truth is it is necessary to insure accuracy, and you can do the public no higher service than to impress this fact upon them. But this liability to mistake is slight and very few mistakes are made considering the number of messages sent. Yet it does exist and should be guarded against in all important messages.

J. D. Caton.

Ottawa, Ill., Sept. 11, 1862.

Curious Submarine Ram.

An odd relic was found not long since at the terminus of the Port Chartrain railroad near New Orleans. It was discovered and raised by Col. Charles C. G. Thornton, commanding the guard at that point, and Capt. George Wiggin, late of New London, at present Captain of the post at the lake. The relic is a submarine ram of cigar shape, made of iron, hollowed so that a number of men can inclose themselves in it. It is 24 feet long, and has a propeller which can be worked by hand. On each side of the ram there is a sort of fin made of iron 3 feet long and a foot and a half wide. By raising these wings or fins the ram rises to the surface and sinks by their depression. The bow is sharply pointed, and when run against any ordinary vessel below the water mark would be able to sink it in a very short time. This little arrangement now lies at the lake shore—a curiosity to the visitors at that place. Captain Thornton is doing good service at the lake in intercepting contraband letters and arresting spies.

RECENT FOREIGN INVENTIONS.

Preparing Flax and Hemp.—W. Lyall, of Amiens, France, has taken out a patent for improvements of a twofold character, in treating the fibrous substances above named for making yarn. First, he places an additional gil-carriage immediately above the gil-carriages now used, to economize floor space. Second, he wets the slivers of flax while passing through the gil-drawing frame. The damping of the silvers is effected by a moistened sponge, which is pressed gently on the sliver betwixt the drawing and delivery rollers while the machine is in operation, but this sponge is withdrawn when the machine stops, by a self-acting lever.

Improvement in Shawls.—To add to the ornamental usefulness of shawls, G. Smith, of North Brixton, England, adds what he terms "a leaf" or several leaves to either square or long shawls, by which he states they are rendered more warm and elegant. This leaf is united to the shawl either by weaving or careful sewing, in such a manner that when the shawl is worn, it may present at the back, two or if required, any number of leaves, each falling within the other.

Armor Plates.—R. Sholtredge, of Brighton, England, proposed to make plates for mail-clad vessels, solid in their defensive front. They are to be made with flanges all round their inner edges, whereby they are adapted to be riveted together through the flanges and form, as it were, a continuous plate.

Reviving Colors on Woolen Goods.—E. E. Pereau, of London, has taken out a patent for a composition, which he states will remove stains and revive the colors of woolen cloth. It is composed of citric acid, carbonate of potash, alum, alcohol and water, in the following proportions :—Citric acid, four parts by weight ; carbonate of potash, eight parts ; alum, one part ; alcohol, one part ; water, one hundred parts. The patentee calls it *eau écarlate*, and he adds a little cochineal to it, when it is designed for cleaning scarlet-colored woolen goods.

Rosin Soap for Sizing Paper.—An anhydrous rosin soap is prepared by H. D. Pochin, of Salford, England, as follows :—Ordinary rosin of commerce is ground into fine powder, and mixed intimately with soda ash, then heated in a pan until the two are combined. It is then cooled and ground into powder. Rosin and alkali in proper proportions ground together, and allowed to remain in a heap for several days, will combine and form an anhydrous rosin soap without artificial heat, but the heat hastens the combination. Rosin soap is used for sizing paper, and is made by Mr. Pochin from the anhydrous rosin soap as follows :—Take one hundred and fifty parts by weight of rosin, seventy-five of soda ash, such as contains forty-six per cent of alkali, and make the rosin soap by heating and grinding. Now take ten parts of such rosin soap, and eighteen of the ammoniate of alum, and form a solution of such a strength as may be required for paper of a common class. For fine paper, a rosin soap is made with one hundred and sixty-five parts of rosin, and one hundred and sixty-five parts of soda ash.

Railroad Iron-Clad Battery.

A locomotive mail-clad battery has been constructed at Jackson, Tennessee. It is constructed upon a platform car thirty feet long by eight wide. The sides and ends are of 2½-inch oak plank, upon which boiler iron is riveted. The sides lean inward sufficient to glance a ball upward ; one end is perpendicular, and the other pitched to a sharp angle. In the center of the car is the circle upon which the gun carriage revolves, and the whole arrangements of the gun are designed with reference to counteracting the recoil at the firing. A six-inch James rifle cannon is mounted so as to sweep in every direction, and it has been tested with shell. It is designed to protect trains against guerrillas.

Fifty pounds of oats are more nourishing, as food for cattle, than one hundred pounds of hay, and twenty-five pounds of peas are equal to double the weight of oats.