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Important Facts Concerning the Telegraph Cable—Letter from Professor Morse.

The New York *Observer* publishes a letter from Professor Morse, the Father of Magnetic Telegraphs, who was on board of the *Niagara* at the time the cable parted. He lays the blame of the accident directly upon the engineer, Mr. Bright, while that gentleman transfers it with equal directness to "the mechanic" who, he says, was temporarily left in charge of the brakes. Professor Morse says:—

"At 3·45 in the morning, lat. 52° 30″, long. 17° 30″, Mr. Bright, the engineer, went on deck; our ship was going at the rate of four miles two fathoms per hour, and the cable running out at a greater speed, perhaps at the rate of five miles an hour. Mr. Bright spoke to the man in charge of the brakes, asking him what strain was upon the cable, to which the answer was returned, about "3000 pounds." Mr. Bright directed him to put 100 pounds of more force upon the brakes, to check the speed of the cable. This was demurred to by the man for a moment, who expressed a fear that it would not be prudent. Mr. Bright, however, *persevered in his orders.* The brakes were applied with the additional force, which suddenly stopped the wheels of the paying-out apparatus, and of course brought the force of the unchecked speed of the ship as an addition to the strain. At this time, too, there was a moderately heavy sea, which caused the ship's stern to rise several feet, and to the same degree to fall; when the stern fell, the cable, under its immense strain, went down into the water easily and quickly, but when the stern was lifted by the irresistible power of the succeeding wave, the force exerted upon the cable, under such circumstances, would have parted a cable of four times the strength. Hence it is no wonder that our cable, subjected to such a tremendous and unnatural strain, should snap like a pack-thread. It did snap, and in an instant the whole course and plan of our future proceedings were of necessity changed. How many visions of wealth, of fame, and of pleasure were dependent for their realization on the integrity of that little nerve-thread, spinning out like a spider's web from the stern of our noble ship, and (in view of the mighty force of steam, and waves, and winds, and mechanism, brought to bear upon it,) quite as frail! Yet, with all its frailness, nothing could exceed the beauty of its quiet passage to its ocean bed, from the moment we had joined it to the shore end *until the fatal mistake of Mr. Bright,* which caused the breaking of it asunder. The effect on ship-board was very striking. It parted just before daylight. All hands rushed to the deck, but there was no confusion; the telegraph machinery had stopped; the men gathered in mournful groups, and their tones were as sad, and voices as low, as if a death had occurred on board. I believe there was not a man in the ship who did not feel really as melancholy as if a comrade had been lost overboard."

If Professor Morse's statement is correct, Mr. Bright is evidently not bright enough to lay a telegraph cable. This *fatal mistake,* taken in connection with other blunders, such as the acknowledged unsuitableness of the paying-out machinery, the wrong twisting of a portion of the cable, the first breakage of the cable soon after starting, when two miles out from shore, and the want of sufficient intelligent asssistance to pay out the wire on board the *Niagara*—these things seem justly attributable to the want of capacity in the superintending engineer. We have no doubt that Mr. Bright did the best he knew how. But he does not seem to have possessed the capacity to manage an enterprise of this magnitude. We trust he may be able to show that he was not at fault in the matter.

Professor Morse makes another most important statement in regard to the cable. He says:—

"We got an electric current through till the moment of parting, so that the electric connection was perfect; *and yet the further we paid out the feebler were the currents,* indicating a difficulty, which, however, I do not consider serious, while it is of a nature to require attentive investigation."

We believe that in all of the published official statements the company have not intimated that there was the least difficulty in the electrical transmission. On the contrary, the public have been led to understand that the whole experience gained in this attempt at laying the cable, tended to demonstrate the certainty of final success.

But Professor Morse, with a candor which all must admire, admits the existence of a difficulty of a very serious character, and one which all the glorification of the company cannot remove. If the electric current *grew weaker and weaker* during the paying out of the first 384 miles of the cable, how strong or how rapid is it probable that the transmission would have been after paying out 2,000 miles?

How to Make Oil of Vitriol.

The thousand and one uses to which oil of vitriol, or sulphuric acid, is put in this and all countries, cannot fail to render some account of it interesting to every one of our readers. First, then, what is sulphuric acid? Chemically it is a compound consisting of one equivalent of sulphur and three of oxygen, and is written SO^3. Some chemists, however, hold the theory that there can be no acid without the presence of hydrogen, and from all experiment this idea seems to be the correct one, and they write it HSO^4, i. e., one equivalent of SO^3 combined with one equivalent of water, which is a compound in equal proportions of hydrogen and oxygen, and is written HO.; and, moreover, as the compound SO_3 has never been obtained in any but the gaseous state, and then it exerts no acid reaction, HSO^4 or SO^3–HO is the received symbol for oil of vitriol. Its physical properties are a yellowish white, oily-looking liquid, having a strong acid taste and smell, capable of mixing with water, and has a specific gravity of 1-9. The chief uses are the solution of indigo and the manufacture of various chemical salts, and the method of manufacturing it is as follows:—In the United States, where pure sulphur is comparatively cheap, it is burnt in large kilns, and the result of this combustion is a gas called sulphurous acid, having the composition SO^2, and this is conducted into large leaden chambers, where it meets with a jet of steam and a quantity of nitric acid in the gaseous state, from which it takes up one equivalent of oxygen and falls down to the bottom of the chamber as liquid sulphuric acid, having a specific gravity of about 1-2 (having obtained the water from the steam); it has then to be concentrated by evaporation in either leaden or platina vessels to the required strength. The nitric acid gas is obtained by heating together a quantity of common nitre or nitrate of potash with sulphuric acid, and the nitrous gas is given off, while the sulphate of potash remains, which is chiefly used in medicine.

This is a brief outline of the manufacture as it is generally described; but practice has rendered some important changes necessary to produce it at a price sufficiently low for the consumer, and in England this cheapening process has been carried to a still greater extent. In the great districts of the chemical works—namely, in and around St. Helens in Lancashire, and Birmingham—the method is as follows:—In consequence of the dearness of pure sulphur, some compound which would burn easily and was cheap and in abundance, had to be obtained, and this was readily done in that class of minerals known as pyrites, which are a compound of some metal (usually iron or copper) and sulphur, and contain from 30 to 60 per cent. of the latter, and as this is very abundant in almost all parts of the world, and hitherto of no use, it proved to be the very thing required, so that by a slight modification in the construction of the kilns or furnaces, it was found to burn as well as pure sulphur, and has consequently been used ever since. Certain precautions in the regulation of the draft have to be taken to prevent it from fusing and caking into a cinder, which would of course stop the combustion. The gas which is the result of this is the same as in the case of pure sulphur, and is treated the same way. There is, however, a mass of matter left in the kiln which needs to be cleared out, viz.: the pyrites, now no longer useless compounds of sulphur with iron and copper, but oxides of those metals, ready at once for the further processes of the smelter, and in many instances the copper which is extracted from these burnt pyrites pays for the manufacture of vitriol. Another change is that nitrate of soda is used, or, as it is called, soda-niter, which is imported from South America, as it is much cheaper than the potash-niter, it being worth about $4 per cwt. in England, and the potash more than twice that sum. The result is the same, namely, nitrous gas, which is conveyed into the lead chamber with the sulphurous gas and a residue of sulphate of soda, which is used in making soda-ash. The part which nitrous gas plays in the chemical changes from sulphurous to sulphuric acid is as yet scarcely understood, but it is supposed to be but a kind of transferring action, or, in plain terms, that it is the commission agent between the moist air in the chamber which has oxygen to spare and the sulphurous acid that is in want of oxygen. The idea is that it undergoes no real change itself, but is continually giving up oxygen to the acid and taking it from the air. Experience, however, shows that this is not true, for if the continual supply of a small portion of fresh nitrous gas is not furnished, it becomes robbed of all its oxygen and the process stops; so that our opinion is that it exerts not only a transferring and carrying action, but also a very powerful chemical action when present in exactly the right quantity, which can only be understood by long experience in the manufacture.

There are many points to be noted in the various processes, which need only be mentioned to show that we are not unmindful of them; but nothing short of practice can of course familiarize them to the inquirer: the regulation of the draft to the kilns, the depth of the fire in the kilns, the color of the gases in the lead chamber, and the specific gravity of the liquid at various stages of the process, which, by the way, is a continuous one. This is a general and cursory description of the manufacture of oil of vitriol, and of course has only given a general and popular description of the process.

The New Commissioner of Patents.

We announced in our last number that Joseph Holt, Esq., of Kentucky, was tendered the office of Commissioner of Patents, and promptly declined it. It now appears that he has reconsidered the matter, and finally accepted the appointment. He entered at once upon the discharge of his duties, and is now busy in making himself acquainted with the details of his new position. Mr. Holt is a lawyer, and for many years practised his profession in Mississippi, where he distinguished himself, and took rank with Prentiss, McNutt and others. He was at one time Prosecuting Attorney, but has never, we believe, held any other public office. He is a brother-in-law of Senators Yulee and Wright.

It is stated in one of the daily papers that Mr. Holt contemplates several removals among the Examining Corps. We think, however, that this announcement is premature, as we presume he has not had time even to consider this matter at all, and will not, until he shall have become better acquainted with the details of his office. At the proper time, no doubt, he will be called upon to inquire into the fitness of some of the examiners, as there is an urgent necessity that this should be done.

We shall probably recur to this subject again, but at present we have no desire to disturb the new Commissioner with any matters which may in any degree interfere with his expressed determination to become master of his new duties.

We cordially wish Mr. Holt success, and shall take pleasure in extending to him every possible aid in our power, in his endeavors to make the Office more and more the nursery and protector of American genius. To do this successfully, Mr. Holt must be *the* Commissioner of Patents, and not permit himself to be wheedled into the notions and whims of examiners or officious patent agents.

It was one of the peculiarities of Judge Mason that he patiently listened to suggestions from all, without permitting himself to be unduly influenced by them. If, "in the multitude of counsel there is wisdom," so also is there mischief, if visionary theorists and impracticable schemers are permitted to gain their ends.

Epidemic in the Money Market.

There seems to be just now a somewhat anxious panic in reference to money matters. The failure of a "trust company" and a few banks of a minor character has scattered dismay and confusion into business circles. The public mind is excited, and a general distrust seems to have seized upon the people, which, epidemic-like, must have its course.

Confidence being the main-spring of all business transactions, we could no more succeed without it than could an army destitute of munitions, conquer a well equipped enemy. From present appearances, the worst is over, and we hope within a few days to see the financial machinery once more in gear, and working with its accustomed steadiness. In the face of such immense crops as have been garnered, there need be no real cause for alarm or distress. It is unfortunate that the ruinous effects of these financial excitements fall most disastrously upon those who are least able to bear them, and who have had least to do in bringing them about.

We continue, as usual, to receive bills on any of the solvent banks, North, South, East and West, in payment for subscriptions. Our friends everywhere seem to be working nobly for their favorite paper, and we hope to increase our subscription list five thousand at least. We have commenced the volume with a much larger edition than usual, and hope to continue it to its close, so that all new subscribers may get the numbers from the commencement.

On the 1st of January next we shall disburse One Thousand Five Hundred Dollars in cash to the orders of the successful competitors for our premiums, as announced in our Prospectus.

Fire-proof Dresses.

Many ladies have been burnt to death by their light gauze and cambric dresses taking fire and blazing up before there was time to extinguish the flame. Actresses and *danseuses* are most liable to this, and the talented Clara Webster and others lost their lives this way. It ought, therefore, to be generally known that by steeping the dress, or material composing it, in a diluted solution of chloride of zinc, it will be rendered perfectly fire-proof. Our manufacturers should take the hint.

The Fair of the American Institute opened on the 15th inst. at the Crystal Palace. It is worth a visit from all, and we hope there will be a successful run of *quarters* into its receiving till. We shall commence our reports next week.

A submarine telegraph cable of 150 miles in length is being laid from Cagliari, on the Sardinian coast, to Bona, on the coast of Africa, thus making Europe in electrical *rapport* with the islands of the Mediterranean and the continent of Africa.

It is a common mistake to call electricity a fluid. It is not a fluid, for with that we connect the idea of matter, and as electricity is not matter, the proper term is electrical force.