[For the Scientific American.]

The Hughes Telegraph.

[Concluded from page 19.]

We will now examine the virtues of said instrument in order to ascertain if they meet the expectations, which have been caused by the many stories and puffs of the newspapers.

The instrument is described as a printing press and a telegraph combined, able to print 20,000 to 25,000 Roman letters per hour. In order to print a message from a revolving type-wheel, a great number of letters on the wheel have to be overleaped as useless. On an average only four or five letters by each rotation, can be used for the composition of words. For instance, to print the word "police," requires five rotations of the type-wheel, and the rest of the letters, 129 in number, are useless.

Suppose that each instrument will print the above number of letters (333 to 416 per minute) the type-wheel of each instrument has to make 5000 to 6000 revolutions per hour, and each spring oscillates 135,000 to 162,000 times up and down (37 to 45 times per second) and the time allowed the crank for one revolution in order to print one letter (including the whole operation) will be reduced to 1-74 or 1-90 of a second. This proves that a very great power must be applied to the clock-work in order to revolve said crank with the required velocity. Besides, the crank is hindered, at first, by the inertia, though it may sometimes operate and stop in regular intervals of 1-74 to 1-90 of a second for a series of times, as for instance, in spelling the word "Stuvesant," where the letters s—t—u—v, succeed each other in regular alphabetical order.

It is apparent that there may be great difficulty in regulating the movements of Hughes' telegraph. To make two clocks of the same kind, in one and the same locality under equal temperature and surveillance, move stroke for stroke in perfect unison for any length of time, is a matter of great difficulty. And the obstacles will of course, increase in proportion to the quickness of the oscillating pendulum, still more if located at a distance apart, by the variations of the temperature and gravity consequent upon their different places of situation. If the number of clocks are increased, these difficulties will be intensified. Now the Hughes telegraph instruments are also clock-works, and undergo the same vicissitudes. It will require a skillful person to keep them in unison. The vibrating spring of one instrument, if it oscillates 0 005 of a second in discord with springs of other instruments will create a disturbance, and a difference of 0·011 of a second will render every operation totally useless, because the contact spring of the transmitting as well as the receiving instrument will meet a similar cog wheel and a current will circulate without the will of the operator. Both instruments will thus operate at the same instant of time, and after that the springs of both will rest upon the cylinder cog wheel again, which will suspend the operation entirely.

If the reader compares the foregoing data with the statement issued by the friends of Hughes' telegraph, that "messages may be sent at the same instant of time over the same wire in opposite direction with perfect ease, regularity and certainty," he will see how groundless and foolish in point of fact, such a statement is. I venture to assert that the most favorable result that can be attained by the Hughes telegraph, provided the several clock-works are in unison, would amount to the printing of 5000 to 6000 alphabets, in their regular turn, per hour, without the aid of any operator. Should their harmony of the Hughes instrument be disturbed, one type-wheel will move in advance of the other, and cause the print of B instead of A, and so on.

Among other advantages paraded to the public relative to Hughes' machine, it was stated: "An operator will be surprised by returning to his office, to find a printed message upon his desk manufactured by his instrument during his absence." I would ask if the operator would not be just as likely to find a strip of paper full of letters all mixed up and jumbled together, and perfectly unintelligible. Certainly he would. Perhaps it is in this manner, without an operator, that the glorious feat of printing of 25,000 letters per hour is to be performed. But if we consider that the operator must always press down a key for each desired letter, the absurdity of expecting to work the instrument any faster than Morse's or House's, is clear. The conditions for speed are nearly the same in each. Hughes' may have a slight advantage derived from exchanging messages alternately upon the same wire in opposite directions, but this will hardly balance the disadvantages heretofore described.

It is further stated that Hughes' instrument "will work perfectly in very long circuits in all states of the atmosphere,—neither mist, rain, nor snow having any perceptible effect." This improvement is not alluded to in the specification; why is it not claimed? Is it kept secret? What is the reason that the operation differs from all other telegraphs? Is no conducting wire required, which would be exposed to atmospheric influences?

It has been already mentioned that the mechanism of telegraphs is just as much influenced by the change of the atmosphere of the locality, as other mechanism, but in particular they are disturbed in their operation by the indirect influence of the external atmosphere through which the telegraph line on posts is extended. This either prevents the accumulation of electric power, or prevents it from reaching the place of destination, also sometimes causing electric currents that are not wanted. Whenever an electric current has a chance to escape from a wire, it will do so, and as the electro-magnet, by which the instrument is called into action, is connected with the wire which conducts all currents, the instrument will be subject to all influences that affect the wire. Therefore it follows that Hughes' machine is just as much subject to interruption from the state of the atmosphere, as any other. It involves, indeed, a great deal of ignorance and arrogance to expect, that an enlightened reader possessed of sufficient knowledge on the subject, will believe such nonsense. Atmospheric influences cannot be frightened away by a mechanical monster, like the birds by a scarecrow.

It is further stated:—"Therefore, at seasons when the Morse and House instruments are utterly powerless, even in circuits of 50 miles, there is every reason to believe that Hughe's instrument will work reliably in circuits of 1000 or 2000 miles." The less electric force an instrument requires for its operation, the more the conducting wire can increase in length by application of the same power.

The electro-magnetic power required by Morse's receiving magnet needs not to be stronger than to attract the armature together with its vertical lever (scarcely a distance of the thickness of paper,) and to overcome the power of a very feeble withdrawing spring.

The whole power required to operate House's combined axial magnet, amounts to what is necessary to force the spring of the magnet a small distance out of its equilibrium, and to overcome the friction of the air chamber valve.

The power required to operate Hughes' combined electro permanent magnet would be such, at least, as to annihilate the magnetism of the iron cores heretofore alluded to, in withdrawing by ordinary mechanism, the detent which obstructs the motion of the crank. The resistance and friction opposed to the removal of this detent from the crank is in proportion to the power required for the quick motion of the crank.

Which of these instruments alluded to, if placed in one circuit, and the electric power decreasing gradually, will be exhausted first, and become entirely powerless, I leave for the intelligent reader to judge. To me it is clear that Hughes' would give out much the soonest.

It is further stated, "The simplicity and durability of Hughes' machine will compare favorably with the Morse, and is vastly superior in these respects to the House instrument."

Compared with Morse's instrument, which consists only of a simple clock-work with about six wheels, two rollers, two electro-magnets with their armature, lever, and a finger key, the Hughes' machine shows a very great disadvantage in point of simplicity, durability and practicability. While, by a comparison with House's instrument, after taking from it the contrivances for applying the manual power, the air-pump and the contrivance for applying the air, all the rest will be found in the Hughes' machine, viz.: finger-key board with the keys and springs, cylinder and break wheel, magnet, escapement action, type-wheel, detent, crank, connecting rod, printing press, feed-wheel, &c. The new instrument has an average of two clock-works like Morse's, a horse-shoe magnet, a break-wheel, 54 levers, 27 connecting rods, the bolt, mechanism, &c. These are a few of the proofs of its astonishing simplicity and durability!

In conclusion I would state that in thus reviewing the Hughes Telegraph, I have been influenced by no desire to ridicule the invention, but simply to correct some of the false statements that have been palmed upon the public respecting its capabilities and operation. Neither do I wish to injure the reputation of the inventor, because every inventor, even if he should fail in his attempt, deserves acknowledgment for sacrificing his health, time, labor, and money, for the benefit of the public, without knowing whether any reward will be given him.

Some of the parts of Hughes' machine display great ingenuity in their construction, and are highly creditable to the inventor. But as a telegraphic instrument, it is, in my opinion, without that practical merit which has been claimed for it.

CHAS. KIRCHHOF.

New York, September, 1856.

Silvering Metal.

MESSRS. EDITORS—I noticed in No. 2, an account of a supposed new method of silvering metal, which has lately been patented in France by B. Adville. In 1842 I silvered copper and brass for daguerreotype plates by nitrate of silver dissolved in soft water; the solution was applied by a brush or cloth, and while wet I rubbed the surface with fine powder whitening on a cloth. At times I put the whitening in the solution of the nitrate of silver, but found the first method the best. The operation is repeated to get a thicker coat on the surface. The surface of the metal to be silvered must be very clean, polished bright, and free from the perspiration of the hand. By this method I silvered my own daguerreotype plates while operating in the city of Newark in 1842.

ALFRED SPEER.

Passaic, N. J., Sept. 1856.

A Cheap Ice House.

Any person, in the country, where timber is cheap, can erect an ice house at but little expense. All that is required is to put up a strong frame for the size of house required, and board it up close, inside and outside, with a space between, all around. This space is stuffed close with straw, or dry saw dust.—The roof is made in the same manner, and the house is then complete. Straw and saw dust are cheap and good non-conductors. The house should be situated on a dry spot, and should have a drain under the floor. It should also be convenient, to be filled easily. The walls of stone and brick ice houses should be double, as well as those of wood. Great care should be exercised in packing ice; all the blocks should be clear and solid, and about the same thickness, so that they may be packed close together, and frozen into a solid mass. In favorable situations good ice houses may be excavated, like caves, in the face of a hill.

Case of Green Color of the Hair.

M. Stanislas Martin has published in the *Bulletin de Therapeutique*, Paris, the curious case of a worker in metals who has wrought in copper only for five months, and whose hair, which was lately white, is now of so decided a green, that the poor man cannot appear in the street without immediately becoming the object of general curiosity. He is perfectly well, his hair alone is affected by the copper, notwithstanding the precaution he takes to protect it from the action of the metal.

Chemical analysis has proved that his hair contains a notable quantity of acetate of copper, and that it is to this circumstance that it owes its beautiful green color, which is most singular and remarkable.

Beauties of the Deep.

If mere beauty of appearance, says the *British Quarterly Review*, is in the question, the waters need not yield the palm of loveliness to the land. The deep has its butterflies as well as the air. Fire-flies flit through its billows, as their terrestrial representatives dance and gleam amidst the foliage of a tropical forest. Little living lamps are hung in the waves, and pour out their silvery radiance from vital urns which are replenished as fast as exhausted. The transparency of some of the inhabitants of the waters gives them an appearance of fairy workmanship which is perfectly enchanting. The Globe Beroe (*Cydlippe pilius*) resembles a little sphere of the purest ice, about the size of a nutmeg. It is furnished with two long, slender, curving tentacles, each of which bears a number of filaments, twisted in a spiral form along one of its sides. Eight bands are seen to traverse the surface of this animated orb, running from pole to pole, like lines of longitude on a terrestrial globe. To these bands are attached a number of little plates, which serve the purpose of paddles, for the creature can work them so as to propel itself through the waters, and either proceed in a straight line, or, like a steamboat, turn in any direction, or, unlike that vessel, whirl round on its axis and shoot downwards with infinite grace and facility. But, not to dwell upon the mechanism, is there not something fascinating in the idea of crystalline creatures? Suppose we had transparent horses, or diaphanous dogs, or cats with a glass exterior which would permit the circulation of the blood and the working of organs to be distinctly seen."

[A glass steam engine in full operation, if exhibited at some of our mechanical fairs would be an interesting curiosity.

Curious Dwarf Deer.

The Baltimore *American* says:—"We yesterday saw two of these animals, mother and young, that were brought from the island of Java, on board the United States frigate *Macedonian*, and are probably the only ones ever seen in the United States. When full-grown they are about the size of the ordinary rabbit of our forests, and shaped like the American deer. The limbs are very delicate, and the hoof, which is cloven, is almost transparent. In color they are reddish brown, with white breast and stomach. From the nose, and extending back to the ears, is a tan-colored stripe on each side, and under the lower jaw a white stripe, forming a trident. They feed like cattle, and chew the cud, like that species of the animal creation. They are easily domesticated. The eye is large and projecting, but the ears are short and oblong. They are said to be very swift, and their appearance would indicate it, as they are formed precisely like the red deer of this country."

Jute, or Indian Hemp.

A new factory has been started in Brooklyn, N. Y., for manufacturing cord and small ropes from Jute. This fibrous material consists of the fibers of two plants of the genus *Corchorus*, which is extensively cultivated in Bengal. It is not so strong as hemp, and never can take its place for the rigging of vessels, &c., but being very cheap it can be employed economically for many purposes, and will, no doubt, come into extensive use. The machinery in this factory is of a peculiar character, specially adapted to the nature of the material. It was imported from Dundee, Scotland, the principal seat of Jute manufactures in the world; but new machines required after this, will, no doubt, be constructed at home. Jute is now employed in the manufacture of many fabrics in Dundee. It is mixed with cotton warps of cheap broad-cloths; it is also mixed with silk, and from its luster can scarcely be detected, and it is also woven into cheap carpets.

It has been employed on our rope walks for a number of years, spinning it on the hand jennies, and it makes a very beautiful cord, but hitherto it has been difficult to spin it with steam power machines. The machines in the new factory are driven with a steam-engine.

Four and a half millions of raw silk are exported annually from China. As much silk, we think, could be raised in our own country.