[For the Scientific American.]

The Hughes Telegraph.

In its leading features this invention is a combination of the original "Vail's Printing Telegraph," with some modifications of House's and other instruments. It consists of two clock-works, moved by springs or weights, both located in one frame, but operating independent of each other. The one moves a type-wheel, step by step; the other is for printing the letters, and operates only when called into action by an electro-magnet, in order to push the paper against the type-wheel, for printing one letter, like Bain's telegraph and others. The type-wheel is governed by the vibrations of a spring, lying in a horizontal position, and oscillating in a vertical plane; one extremity is fastened to the machine, the other suspended and provided with a compensating slide or weight, which may be shoved along the spring as required, to overcome the variations caused by the changes of the temperature, thus answering the purpose of a pendulum. An escape wheel of the first clock-work partakes of the vibration of the spring by means of a vertical connecting rod, and thus the escape wheel is caused to move in a corresponding manner, step by step, with the type wheel. The latter has on its periphery the letters of the alphabet in relief, and one blank space.

Below the type-wheel is a cylinder for closing and breaking the current; this cylinder is outside of the frame and revolves by means of cog wheels, exactly in unison with the type-wheel. This cylinder or barrel has upon its circumference pins or projections, spirally arranged at equal distances from each other; at one extremity an insulated cog wheel is fastened, and a similar cog wheel, likewise well insulated, is attached at a small distance from the first cog wheel, and in such a manner as to cause a contact spring connected with one extremity of a telegraph line, to meet alternately by the rotation of the cylinder shaft, a cog of the single cog wheel or of the cylinder cog wheel. The number of cogs and pins equals the number of letters and the blank of type-wheel, say 27.

The single cog wheel is connected by a conductor, with the helices of an electro-magnet, which is in conducting connection with the ground plate of the telegraph line; but the wheel of the cylinder has no direct connection with the ground, consequently an electric current passing the contact spring by each revolution of the cylinder will alternately pass 27 times through the helices (the cylinder being excluded,) or 27 times through the cylinder if connected with the ground (the electro-magnet being excluded.)

For this purpose a metallic bar, having a metallic connection with the ground plate, runs parallel with the cylinder; and a number of springs, horizontal, facing the periphery of the cylinder, are attached to the bar in such a manner that each of the springs may be thrown into such a position as to meet a corresponding pin of the cylinders, like the springs of a music box. A momentary connection with the ground plate is thus established at every contact of a spring with its pin. The springs are operated by means of keys arranged on a straight finger board, located in a transverse position near the one end of the cylinder. Each key is connected with its corresponding spring by means of two levers and a connecting rod. By pressing upon the key of a desired letter, its corresponding spring is thrown into a position ready to be struck by its corresponding pin. During the time the cylinder revolves, the type-wheel standing in its proper position the spring will be struck, and a current will pass from the cylinder along the spring to the ground, and influence the electro-magnets of similar instruments (in the same circuit at any distant place,) thus causing the print of the desired letter, by means of the printing clock work, of the other instrument.

The printing is done in the following manner:—Below the type-wheel, which is made to revolve continuously by means of the clock-work, is a printing press lever, and the paper which receives the impression, is fed in between the lever and the type-wheel. The printing lever is raised so as to press the paper against the type wheel at the proper instant, by means of a connecting rod which extends from the lever to a crank which is operated by another clock work. The crank is liberated by a detent which is operated by the motion of a permanent horse-shoe magnet, lying upon the poles of an electro-magnet. By the touch of a key of the key-board, the electric fluid passes through the electric magnet, and both magnets having now a similar polarity, a spring causes the permanent one (previously held by its magnetism,) to raise and to lift the detent, which liberates the crank so as to revolve and bring up the printing lever against the type wheel, and print the corresponding letter on the paper. Meanwhile the circuit is broken again, the polarity of the electro-magnet being destroyed, the permanent magnet is pulled down by a lever connected with the press, to its former position, and the detent arrests the crank again. The method of printing seen in House's and Bain's Telegraph is substantially similar to this.

Suppose, now, one instrument at New York and a corresponding one at Philadelphia, their contact springs connected with the corresponding extremities of the telegraph line, and the type-wheels of both revolving together isochronously, step by step; both will have to be so arranged that if the contact spring at New York touches a cog of the cylinder cog wheel, the contact spring at Philadelphia, will have to touch a cog of the single cog wheel and so, alternately, vice versa, telegraphing will be done.

But both instruments will not print a letter at one and the same moment as has been alleged, but must do so, alternately, like other instruments, as for example, Siemen's Gintle's. Even if the key of the letter M, at New York, is pressed down earlier than the letter B, at Philadelphia, the letter B will be printed first, and the letter M thereafter, for the reason that in the revolutions of the type-wheel, the turn for B, will come sooner than that for M. As it is possible to make one instrument communicate with all the rest in a given circuit at once, (but only one of them will be enabled to answer at the time,) so is it impossible for them to communicate with each other during such an operation, because the whole message will only be received by the first transmitting instrument, say New York.

I shall now try to explain the contrivance by which communication may be precluded from intermediate distant offices though the drawings together with the specification are slightly at variance. A bolt attached to the frame is moved by means of a cam on the crank, towards a flange of the cog wheel which is fastened to the type-wheel shaft. The flange is provided with a slot, which corresponds with the blank on the type-wheel; another slot corresponds with any given letter, by which an office may be distinguished. The flange of the similar wheel of like machines in other offices has two slots, one corresponding with the blank, the other with the letter, by which such office is distinguished. For instance, an instrument at New York is distinguished by A, Baltimore by B, and Washington by C, and it be desired that Washington communicate with New York, excluding Baltimore, and the instruments at Baltimore and New York are ready to receive; the first closing and breaking of the circuit starts all instruments at the same time, the bolt in each, by the first revolution of the crank, moving near to the flange. The next breaking and closing of the circuit is effected if the slot of the New York instrument is opposite the bolt, and forces the bolt through the slot, not suspending the operation of the instrument, A, but no slot being opposite the corresponding, A, in the instrument at Baltimore, the corresponding bolt is forced against the flange, and instantly suspends the movement of the wheel.

Having so far been guided by Hughes' specification, I shall, in my next, turn to a closer examination of the merits of the invention, and show what this printing telegraph is, and what may be expected from it; also how far the many promising reports and puffs respecting its wonderful capabilities, can be relied upon.

CHAS KIRCHHOF.

New York, September, 1856.

What Is the Cause of Yellow Fever?

MESSRS. EDITORS—The yellow fever has been, and is now raging, to a certain extent, near this city. No one seems to have any tangible idea of what the disease really is, (other than yellow fever,) what causes it, or where it comes from.

The doctors are just "as clear as mud" on the subject, some asserting it to be contagious, while others say it is not; some prescribing one remedy, and some another. They say it is brought from infected ports, mostly from hot climates; go to those infected ports, and they say "it is brought from somewhere else."

Now the idea has sometimes occurred to me that as nitric acid stains the skin of a yellow color, and is, as you know, a certain poison, it is possible that the nitrogen and oxygen of the atmosphere, acting upon the fluids in the body, may, to some extent, generate this poison in the system, and being conveyed by the blood to all parts of the system, thus give the skin its peculiar color, while its poisonous effects causes the death of the patient. I know not how the symptoms of the yellow fever patient agree with those of a person who has swallowed some of this acid.

I think it possible, also, for this acid to be generated in low, wet, marshy places, and the heat of the sun cause its fumes to arise and impregnate the air. Would anything of this kind accord with chemical science? R.

New York, Sept., 1856.

[At one time, Ozone in the atmosphere was suggested as being the cause of cholera, and lately it has been suggested as the cause of yellow fever. This subject was brought up at the late meeting of the Scientific Association at Albany. An inquiry was made if ozone had been detected in the atmosphere of Norfolk while the yellow fever prevailed last year, also if it had been observed in any place during the prevalence of cholera. No proof of its special presence in connection with cholera or yellow fever was presented. No doubt the state of the atmosphere is the cause of many diseases—it becomes poisonous to some constitutions under certain circumstances; but how refined must be the analysis to detect what that poison is in the atmosphere. No chemist has yet been able to detect what is called *malarian poison*.

Much has been said about ozone, but very vague ideas have been presented as to what it really is. It is stated to be a condition of the atmosphere produced by passing a number of electric sparks through it, by which it acquires powerful bleaching and acidulating properties. We cannot believe it to have an identity of character without an identity of composition, and our correspondent's letter is suggestive in this respect.

We suppose that nitric acid may be produced in the atmosphere, and that it may be the cause of yellow fever, but although it is a poison, and stains the skin yellow there is no evidence of its agency or presence in cases of yellow fever. Instead of promoting vomit, this acid is used in minute quantities greatly diluted, to prevent vomiting in some cases of sickness, thus exhibiting different tendencies to that produced by the poison of yellow fever.

The color of the skin has a wonderful influence in preserving persons from being attacked with this fever; negroes, mulattos, the Chinese, and persons of a swarthy complexion are not so liable to its attacks as persons of a fair complexion. This, however, may be thought to be favorable to the nitric acid theory of our correspondent.

Nitric acid, no doubt, can be produced in the atmosphere, and by the same means exactly as ozone. Indeed, this was the very method proposed by Cavendish and executed by the Royal Society, by which nitrogen was discovered to form part of our atmosphere. For several days sparks from an electric machine were passed through a vessel containing atmospheric air, and the result was the formation of nitrous acid in the vessel. It was one of the most beautiful experiments ever made in chemistry. More than two-thirds of the atmosphere is composed of nitrogen.

Farmers and Science.

MESSRS. EDITORS—I am a subscriber to your paper, and, although a farmer, derive much instruction from it. A farmer's occupation includes a variety of trades, and particularly that of the carpenter and machinist, as well as chemistry and philosophy. I hold that an agriculturist should be a man of information, of extensive practical knowledge—not a mere clod-hopper to plow and dig. I am sorry to say many of my brother farmers think there is no necessity to cultivate their minds, hence the ironical expression of citizens, "there goes a coarse farmer."

I am a working farmer and pride myself upon it, but I cultivate my mind as well as my corn, and one great source of instruction, with other works, is the SCIENTIFIC AMERICAN.

ROBERT WILLETS.

Flushing, L. I., Sept. 1856.

Deceased Inventors.

The Cambridge (Mass.) *Chronicle* of the 6th inst. records the decease of Nathaniel Jarvis Wyeth, to whom the ice merchants of Massachusetts are deeply indebted for the great increase of the ice trade, by the invention of implements and machinery now employed for cutting and securing the ice crop with facility and rapidity. The Boston *Transcript* says of him:—

"By the mechanical skill and perseverance of Mr. Wyeth more ice of a superior quality is now secured in one good ice day than was consumed by the whole ice trade in 1832. It is not, perhaps, too much to say, that there is not a single tool or machine of real value now employed in the ice harvesting which was not originally invented by Mr. Wyeth."

The annual ice crop of Massachusetts now amounts to 200,000 tuns. Mr. Wyeth was an early explorer of the Rocky Mountains and Pacific regions, understood the Indian language, and was an accomplished scholar and writer, and a close observer of men and things. On several occasions he contributed to our columns, and furnished us with useful information.

Paul Stillman, of this city, died at Plainfield, N. J, at the age of 45 years, on the 11th inst. He was a native of Rhode Island; was a most skillful mechanic, and inventor of many useful improvements in fine instruments employed on steam machinery—guages, indicators, &c.—and had charge, for a number of years, of the important department in the Novelty Works in which such delicate instruments are constructed. He was an active member of the New York Mechanics Institute, and was highly esteemed as a man for his noble qualities of mind, intelligence, skill, and ingenuity. His foot was injured by wearing a tight boot for a few hours; this caused mortification, for which amputation was performed, alas, resulting fatally.

On the same date, Seth Cheney, distinguished as a remarkable crayon artist, departed this life at Manchester, Conn. His crayon portraits have never been surpassed, if equaled, by any other artist, and his ideal sketches evinced a fine imagination and very pure taste.

Bursting o a large Rifle.

On the 3rd inst., while Capt. Dimick, of St. Louis, Mo., was experimenting with a large rifle cannon which he had constructed, it burst into pieces. The front part of it, about five feet in length, blew away from the breech, the latter burst into eight fragments. Some of these, weighing five hundred pounds, were thrown forward from two to three hundred feet, and projected into the air from forty to fifty feet. The gun weighed 7,838 pounds, and was made of fine malleable iron.

A Large New Cotton Mill.

A cotton factory is now in the course of being erected on the Shetucket River, near Norwich, Conn., by Ex-Governor Sprague; of R. I., which, when finished, will perhaps be the largest in the world. It is to be built of stone quarried in the vicinity; its length 952 feet; width, 68 feet; hight 4 stories. A village for the operatives is also to be erected in the neighborhood.

The *Ericsson*, now employed as an American mail steamer, never arrives until her news is superseded by the arrival of the steamer which leaves three or four days after her. The *Ericsson* is an old tub so far as speed is concerned; but she is economical in fuel.