Scientific American.

NEW YORK, AUGUST 28, 1858.

Progression.

Grand are the achievements of mankind, and noble are the deeds of mental heroism that adorn our race. Looking back upon what are called the triumphs of genius, we find them to be almost innumerable, and as great in the past as they are to-day; yet they go on still increasing in number as in usefulness, in magnitude as in permanent good.

An all-wise Providence has so constituted man's mental faculties that they know no rest, but are ever watchful and at work. The same great cause has also made man's wants—his necessities increase, so that the governing principle of both demand and supply is progression. This is illustrated in the newspapers of to-day. We have just made a glorious conquest over natural difficulties; the rising Orient has by human ingenuity been made to kiss the setting Occident, and the name of Cyrus W. Field is more elevated than was ever that of Cyrus the conqueror, Persia's king. The world gives him laudation, and mankind regards the success of the Atlantic cable with mingled reverence and heart-joy; but in the midst of all this due praise and earnest thankfulness, there comes from the daily newspapers a small suggestion, which we may briefly state as follows:

One cable will not be enough—we shall shortly want another

The daily press is the actual reflex of the national mind, and this, even in its moments of natural exultation, cannot forget the God-inspired principle of progression. The throbbing genius of human nature cannot be idle, but must let its pulse beat on some material substance, and it continues to improve, and shall continue to invent, until there is perfection—but there is no perfection yet. Many years ago, when Fitch's first steamboat steamed through the waters of the Delaware, or Fulton's *Claremont* passed between the beauteous shores of the Hudson, everybody was surprised, astonished! and some thought that they were indeed perfect; but we know their deficiencies, and there are now thousands of mechanics who could make a better steam engine than had then been seen. Let but the same period of time elapse, and the thousands of fire-breathing machines—locomotive, stationary, and marine—that we think so perfect and complete, shall appear clumsy, unooth and imperfect; or, (who knows?) steam itself may be superseded, and some more economical motive power be used. The weekly records of the Patent Office also illustrate this progressive principle—improvement on improvement crowding on us, and yet their is room enough for all. We see one improvement crowding another in such rapid succession, that if to-day we exclaim, "how perfect," to-morrow we see an advance towards still greater perfection, so that in reference to the very best that *is*, we must also add, "but it is not the best that *can be*."

Many persons ask, almost in tones of fear, "to what is this impulsive and progressive spirit carrying us, and where are we going?" Our answer is the axiom—If the principle be good, then must its results be also! That which is honestly conceived, and truly carried out, must bring forth general, universal good; and he who puts into practice or forms original ideas is, in short, an inventor, whether of ideas or machinery—is a contributor to man's comfort, convenience, and elevation, and leaving the lower walks of life, he becomes raised to the dignity of a philanthropist.

Let us then carry out this idea—progression, exercising a judicious check that we do not run to extravagance; and as a community or nation, let us make use of each improvement as we originate it, and ever have for our motto—"Excelsior."

Watchmaking by Machinery.

There is no stronger evidence of the practical tendency of the minds of American inventors, than that exhibited in the constant devising and construction of machinery to fabricate articles of universal demand and use. It is not more than twenty years since clocks were exclusively furnished to us by European countries, and their manufacture here was almost unknown. Now, thanks to the inventive genius of our own mechanics, they are daily manufactured by thousands, through the instrumentality of machinery, which enables them to be constructed not only in a much superior and correct manner, but at one-twentieth the price originally demanded for them when manufactured by manual labor. The most ingenious machinery is now in operation for this purpose, in a few factories in the Eastern States, which not only supply all our own States with the most beautiful and correct household timepieces, but for upwards of twelve years past have been annually exporting them in large numbers to every corner of the world.

We some time since gave a casual notice of an extensive establishment in Waltham, Mass., for the manufacture of watches, upon the same principle, and by somewhat analogous machinery to that employed for the manufacture of clocks. Since that period this latter trade has been increasing in such a marked degree, as to leave no doubt that it will eventually rival, if not surpass, that of clock-making by machinery. The watch-making works were commenced by men of reputation and ripe judgment, who invested a large capital in the construction of the most delicate, costly, and ingenious machinery, to form and complete the respective parts of the watch; hence they are particularly careful that all the work leaving their hands shall be of the most perfect character. At the commencement of the enterprise, they very properly possessed themselves of all the available inventive ability and skill of the best mechanics, in simplifying the works of the watch and the construction of machinery for their fabrication. Dies of the most exquisitely delicate formation are employed for cutting the various wheels, as well as the other intricate parts, and lathes and polishing wheels for reducing the pivot jewels to the proper size, and giving them the proper finish. And while the simplicity observed in the construction of the watch lessens its liability to stop or otherwise get out of order, any cause of disarrangement is more easily detected, and the expense attending the repairs of more complicated watches avoided.

It is believed that a Waltham watch is worth double the price of many of the imported watches made by hand. In the event of any part of one getting out of order—as, for example, if a wheel or other part should break—it is only necessary to enclose the broken part to the factory through the mail, and by return post a perfect duplicate can be transmitted. The original intention of the gentlemen engaged in this important undertaking was to make a perfect and cheap article, and thus to establish it upon a firm basis; and our impression is, that this marked innovation of Yankee ingenuity upon the cheap labor of Geneva and other parts of Europe, will eventually result in the entire destruction of their export trade.

Gaslight on Cars and Boats.

We are informed that the New York Car and Steamboat Gas Company have applied their gas-lighting fixtures to the trains of the New Jersey Railroad with much success, and are now engaged in putting them into the cars of other roads. We have seen a certificate from the Vice-President of the New Jersey Railroad, in which he speaks in the highest terms of the success of the apparatus. He says: "The light is cheerful, bright and uniform, rendering all parts of the car distinctly visible, and much superior to the gloomy light furnished by candles and lamps. Its management is simple and easy, and free from the objections of other modes of lighting cars; and in point of economy, there is a saving of more than two-thirds the usual expense."

The locomotive head-lights are also of gas.

The method of applying and carrying the gas is as follows: Each car is provided with a wrought iron cylinder, of a capacity of four and a half cubic feet. The cylinder is of a strength capable of sustaining 500 pounds pressure. The heads, for greater security, are made concave. The gas is compressed under a pressure of twenty atmospheres (300 pounds to the square inch), 90 cubic feet of gas being forced into each cylinder. Each car is provided with a cylinder, which is placed upon a shelf under the car floor, and coupled in the usual manner, with a pipe leading to the burners within. An improved regulating contrivance controls the delivery of the gas to the burner under all pressures, and is interposed between the cylinder and burners, so that the light is always steady. The pressure of the gas ensures the continuity of light, no matter what the concussions or roughness of the road.

The method of charging the cylinders with gas, adopted on the New Jersey road, is simple and expeditious. Near the Company's machine shop at Jersey City, a stack of the cylinders are arranged, into which the gas is forced by the rapid movements of a steam pump, to a pressure of about 450 pounds. The cylinders are connected together by small pipes, and thus form a strong and capacious reservoir. A conducting pipe leads from the stack to the large depot on the Hudson river, where all the passenger cars arrive and depart, a distance of a quarter of a mile. The conductor terminates in a horizontal pipe running beneath the depot platforms, with stop-cock openings at suitable intervals. When the car cylinders are to be charged, an attendant simply couples them to the conducting pipe, and opens a stop cock. The gas then instantly rushes into the cylinders and fills them, under the pressure of the reservoir, and they are ready for use. The filling of the cylinders for a whole train occupies only a few minutes, and the work of supplying all the trains with gas is, we are told, easily performed, from beginning to end, by one man.

As developed on the New Jersey Railroad, the lighting of cars by gas seems to be a highly practical and economical enterprise. We presume that other companies will not be backward in its adoption. It would also seem that gas companies, by providing proper pumps for filling the cylinders, might find an extensive use for gas in country churches and dwellings. It is said that the gas may remain confined within the cylinders for any length of time, unimpaired. A single cylinder of the dimensions before named, would supply a country family with gaslight for a week.

Extraction of Gold from Dross.

It is a singular fact that notwithstanding the large number of able mechanics that have emigrated to California, to engage in the development and extraction of its golden wealth, but few of them have produced any important inventions to assist their labors. Those who have had experience in gold digging have represented to us that miners have found great difficulties for the want of some process, by machinery or otherwise, in extracting the gold from the extraneous substances with which it is intermingled. In consequence of the neglect of inventors and mechanics to provide some quick means for the accomplishment of this object, particularly in the extracting of the gold from the heavy black sand or iron oxyd with which it is found, a large amount of the combined mass is thrown aside as a refuse substance, although known to be rich with the precious metal. The Sacramento *Union*, in a late article on this subject, notices a method of extracting gold from what is termed as the "tailings" of the quartz mills, invented by a Frenchman named J. B. Chavelier, at present residing in Sacramento. These "tailings" are the sulphates, chiefly of iron, which, after pulverizing, are rejected in the amalgamating process, and thrown out generally as worthless by the miners. He found them to contain from fifty to one hundred cents of gold to the ounce of sulphate, and succeeded in bringing his machine to such perfection as to enable him to work over a tun of the quartz waste per day, from which is yielded an average of $100 per tun—one thousand dollars being sometimes extracted from this material, which costs only thirty dollars in its almost refuse state.

In addition to the sulphates, a considerable amount of mint and assay ashes are subjected to the searching process. But a larger business still is done in the black sand procured either directly from the miners' camps, or from the bankers, who obtain it in cleansing the dust they purchase. These "blowings," as they are denominated, are sometimes very rich, yelding as much as $210 upon fifty-seven ounces of sand. The use of the sulphate does not end with the surrendering up of its golden richness, but it is sold at three cents per pound, and converted into a common article of paint, which, after passing through the mill, is of a violet color.

The Helypsometer.

On page 323 of the present volume of the Scientific American, we gave a description of this instrument, and a few days ago we had the pleasure of seeing it practically tested in the presence of Professor A. D. Bache. The tests were two observations which had been taken with this instrument by Captain Foster, on board the *Marion*, from New York to Charleston. The Captain also took observations with his sextant, and by that means obtained the latitude. This being known, the question was whether the helypsometer would give the same latitude, and on opening it (for it had been sealed up), and the necessary simple observations and calculations made, the latitude was found to differ only from two to four minutes of a degree from that formed by the Captain's sextant. This is as near as any two observers with sextants or quadrants on the deck of the same vessel could make the observation, and is a much nearer approximation to exactitude than was ever obtained by any instrument that has been used to obtain latitude when the natural horizon was obscured.

The instrument will prove very valuable in the foggy regions of Newfoundland and the coasts of Great Britain, and does much credit to the inventor, Mr. John Oakes, of this city, who has secured it by Letters Patent in this country and in Europe through the Scientific American Patent Agency.

Steam on Canals.

We observe that many of our cotemporaries are publishing the results of the application of steam power to certain canal boats on the Erie Canal, in such laudatory terms as to indicate that such a thing had never before been accomplished. We would remind all those who labor under this delusion that the practicability of steam as a motive power on canals was long since determined, and that boats propelled exclusively by steam and capable of carrying larger cargoes than those of the ordinary form have been successfully running on the Delaware and Raritan Canal for many years. The difficulties originally encountered in the washing of the banks from the waves produced by the propelling power have been entirely avoided in the methods adopted in this case, and the boats are moved with a much greater degree of speed than by horses, and at a much less expense. The practicability of steam canal navigation was therefore a fixed fact long before the late experiments were tried.

To the Postmasters of the United States.

Please to inform all the inventors in your town and vicinity, that the Editors of the Scientific American have issued an elaborate circular, giving instruction how to secure Letters Patent for new inventions, which they send free to all who may desire a copy. Their great experience for thirteen years past in procuring patents enables them to give the best possible advice upon this subject.