Scientific American.

NEW-YORK, SEPTEMBER 13, 1856.

Our New Volume.

Eleven years have now passed away since the SCIENTIFIC AMERICAN commenced its existance, and from a very humble beginning it hasgrown up to be an institution in our country. It occupies a place and a position among our Press peculiar to itself. It is the Advocate of Industry, the Repertory of American Inventions, and the herald of new and useful information relating to Science and the Arts. Many changes for the better have taken place since it commenced its career. Previous to that period our inventors, mechanics, artisans and manufacturer possessed no "watchman on the tower" to which they could refer for that peculiar information so necessary to their interests and welfare. Many periodicals, both before and since its origin, have attempted to occupy the same field, but they did not serve the public in the same capacity. A vast range of correct information relating to science and all the arts, and extensive means to obtain the latest and most reliable information on nearly all subjects are required to conduct such a periodical; without these it would neither be profitable nor useful to the public.

Invention, Science, and Art have progressed at a most wonderful rate during the past eleven years, and it affords us much pleasure to witness the influence our journal has exercised in stimulating inventive genius, in correcting errors in science, and in disseminating useful information.

The past year, especially, has been extraordinarily prolific in useful inventions, and judging from the past, we expect that the next will exhibit a still greater increase.

It has been our object—and we have always accomplished it—to make each succeeding volume superior to its predecessor; our readers, therefore, may expect that the present one will be the best ever published.

We take this opportunity to return thanks to our subscribers for their patronage, and the many expressions of kindness received at their hands. These stimulate and encourage us to renewed efforts in the cause of science and the dissemination of knowledge.

Our Prizes.

We invite the attention of our readers to the list of Prizes which will be found on another page of this paper. From many sections of the country we have received the most gratifying evidence of the interest which they excite. Clubs are forming and a generous rivalry for the prizes offered, is springing up.

It should be understood and remembered that we employ no trav eling agents to collect subscriptions for us, but in lieu thereof, we offer handsome rewards in cash to all who will volunteer to get up clubs. This system we find to give much better satisfaction than the agency plan. The latter mode is subject to malpractice, and often occasions great confusion. But where individuals, known and residing in a community, take the matter in hand, confidence is at once secured, and the success of the canvasser rendered almost certain.

The sum of one thousand dollars is offered by us this year, for distribution among those who choose to take part in the formation of clubs. Read our advertisements,—ponder them well and then *act*.

To Our Correspondents.

Our thanks are due to our correspondents, who, from every quarter of the country, have from time to time furnished us with news of the progress of events in their localities, and with much valuable information relating to almost every subject in science, art, mechanics, practical chemistry, and agriculture. Our correspondents, generally, are men of sound sense, who endeavor to write clearly, who understand what they write about, and who are intelligent in all that relates to the really useful. They belong to every walk of life—professors in colleges, mechanics, civil and mechanical engineers, chemists, teachers, farmers, manufacturers, and merchants.

Scientific Ladies.—Experiments with Condensed Gases.

Some have not only entertained, but expressed the mean idea, that women do not possess the strength of mind necessary for scientific investigation. Owing to the nature of woman's duties, few of them have had the leisure or the opportunities to pursue science experimentally, but those of them who have had the taste and the opportunity to do so, have shown as much power and ability to investigate and observe correctly as men. We have Miss Mitchell, who has been awarded the King of Denmark's prize medal for her discoveries in astronomy; and there is Mrs. Somerville, of London, whose work on physical geography is one of the finest contributions to physical science ever published. So highly gifted is this lady, and so profoundly versed in the sciences, that the late Prof. Caldwell, of Louisville, who had an opportunity of conversing with her, and also seeing her perform some experiments, declared "she was deeply acquainted with almost every branch of physical science." Other cases might be mentioned, but these are sufficient for our purpose. Our constant readers will remember that several articles from different persons appeared in the last volume of the SCIENTIFIC AMERICAN, relating to solar heat at the surface of the earth. The question was introduced by Wm. Partridge, of Binghamton, who took the position, that density of the atmosphere, and not the angularity of the sun's rays, was the principal reason why it was warmer in valleys than on the tops of mountains. His views were opposed by other correspondents, but none of them supported their opinions with practical experiments to decide the question; this we are happy to say has been done by a lady. A paper was read before the late meeting of the Scientific Association, by Prof. Henry for Mrs. Eunice Foot, detailing her experiments to determine the effects of the sun's rays on different gases. These were made with an air pump and two glass receivers of the same size—four inches in diameter, and thirty in length. The air was exhausted from one and condensed in the other, and they were both placed in the sun light, side by side, with a thermometer in each. In a short period of time, the temperature in the receiver containing the condensed air, rose thirty degrees higher than the other; thus proving conclusively that the greater density of air on low levels is at least one cause of greater heat in valleys than on mountains. Experiments were also tried with moist air, and its temperature was elevated above dry air. Hydrogen gas was placed in one receiver and oxygen in the other, when the temperature of the former rose to 104°, but the latter to 106° Fah.; while, in carbonic acid—a more dense gas than either—it rose to 126°. It is believed and taught by geologists that during the period preceding the carboniferous era,—when the coal bed materials were forming—that the atmosphere of the earth contained immense quantities of carbonic acid, and that there was a very elevated temperature of atmosphere in existence, in comparison with that of the present day. Those who believe that this earth was once a fiery ball, attribute this ancient great atmospheric heat to the elevated temperature of the earth; but Mrs. Foot's experiments attribute it to a more rational cause, and leave the Plutonists but a small foundation to stand upon for their theory.

The columns of the SCIENTIFIC AMERICAN have been oftentimes graced with articles on scientific subjects, by ladies, which would do honor to men of the highest scientific reputation; and the experiments of Mrs. Foot afford abundant evidence of the ability of woman to investigate any subject with originality and precision.

Expenses of Railroads.

From the report just published of the Superintendent, D. C. McCallum, Esq., of the New York and Erie Railroad, for the month of July last, we gather some interesting facts regarding the working expenses of that road. The cost per mile for engineers and firemen is 5·22 cts.; for waste, oil, and tallow per mile, 1·50 cts.; for repairs of engines per mile 8·66 cts.; for fuel per mile, 13·38 cts. Total cost per mile, 28·76 cts. The greatest item of expense is fuel, one cord being required for every 27·67 miles, the cost of which is $3·60 cts. Our railroads will soon be compelled to employ coal as fuel. No less than 10,032 cords were consumed on this railroad in July in running 287,587 miles. The number of cords of wood consumed per annum, at this rate, amounts to 120,384, or a pile 182 miles long, 4 feet high, and 4 broad. Our forests must soon go down before such fiery dragons as our railroads, which, with but few exceptions, use wood for fuel exclusively.

The cost per mile for fuel for each tun drawn amounts only to 88-100 cts., but we find that more dead weight is carried than useful load; 14,277,440 tuns of useful load were carried per mile, and 15,007,339 tuns of dead load. The weight of the engines, cars, &c., being classed as dead weight, paying nothing. A great saving would be effected in some of this dead load could be dispensed with.

The expense for repairing engines is also very great, averaging $8·66 per 100 miles; and allowing an engine to run 100 miles per day for 300 days during the year, the cost amounts to $2,598. The price of an engine being about $10,000, it destroys itself, at this rate, in about four years. We are of opinion that a perfectly constructed railroad—one avoiding rapid curves and steep inclines, and having a solid well-laid track—could be worked for at least one half the expense incurred on our best railroads.

At present the stocks of the majority of our railroads are very low; few of them are in a paying condition, and unless they can reduce their working expenses we do not see how they can retrieve themselves, and become profitable and paying concerns.

Recent American Patents.

Grain and Grass Harvester.—By Oren Stoddard, of Busti, N. Y.—In the ordinary harvesters the cutters all act simultaneously upon the grass, and the resistance, as thus combined, is confined to one point in the stroke. The sickle bar has no work to do except at the moment of cutting, and then the resistance is sudden and great. The motion of the machine is therefore irregular or jerking, which is bad in its effects upon the animals, etc. The present improvement consists in placing the cutters all at different angles to each other, so that the operation of cutting, instead of being confined to a single part of the stroke of the sickle bar, will be continuously going on, throughout the whole stroke. This equalizes the movement of the machine very much.

Harvester.—By C. Wheeler, Jr., of Poplar Ridge, N. Y.—Consists in a peculiar method of fastening the fingers to the finger bar, so that only one bolt is required for each. Great strength is also imparted to the fingers with a small weight of metal, and the fingers may be readily removed, if broken and replaced by new ones, the perfect part being retained. The nut of the holding bolt is so arranged that its nut does not obstruct the free passage of the cut grass or grain over the finger bar.

Harvester Rake.—By M. G. Hubbard, of Penn Yan, N. Y.—Consists in having the bar to which the rake is secured, provided with a joint and attached to an upright. The inner end of the aforesaid bar is connected with a pulley near its periphery, and the parts are so arranged that, as the pulley is rotated, the rake will sweep over the platform and rake the grain therefrom, and then rise and pass to the front end of the platform, descend, and again sweep over the platform.

Candle Mold.—By John Robingson, of New Brighton, Pa.—Consists in attaching a series of molds to endless chains which have an intermittent motion. Said molds, when filled pass through a water reservoir, which cools the tallow, and also pass and rest for a suitable time, over jaws, by which the wicks are drawn through the molds, the molds opened, and the candles withdrawn from them and deposited in a proper receptacle. The ingenuity displayed in this improvement, entitles the inventor to an honorable position in the ranks of genius.

Harvester.—By Homer Adkins, of Plymouth, Ill.—Consists, first, in operating the sickle by means of a notched or scolloped rim attached to the driving wheel, and a lever provided with rollers. Second, supporting the machine by three wheels, one of which is a swivel wheel attached to a frame, and so connected with the main frame as to swivel or turn it, as described. Third, in a rake operated by means of a crank and guide blocks.

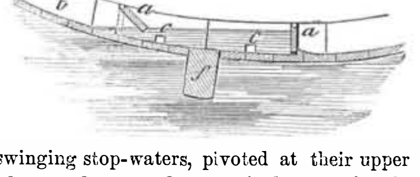
Pen and Pencil Case.—By John H. Knapp, of New York City.—Consists in having the pen slide fitted over a tube which encloses the pencil slide, the parts being peculiarly arranged so that the case may be made extremely short, and still rendered capable of being conveniently extended by means of the usual slide.

Buckle.—By Edward Parker, of Plymouth, Conn.—Consists in striking or swaging the bow and loop in one piece, from a metal plate, and securing the tongue therein by bending the center cross piece, which divides the bow and loop around the shank of the tongue.

Improvement in Stop-Waters for Vessels.—By Stephen Saunders, of South Kingston, R. I.—Stationary stop-waters have been placed in the spaces between the timbers of the hulls of vessels, of such a shape as to leave a narrow space between their lower edges and the inner surface of the planks, for the purpose of preventing the water that enters said space from rushing so rapidly downwards when the vessel is careened, as to produce what is technically called "blowing," or the forcing of a portion of the water out through the cracks of the flooring planks.

There is, however, a disadvantage attending the use of stationary stop-waters, viz., when a vessel has been for some time running on a wind, or in a careened position, the water will all accumulate below the stop-waters on the lowest side of the vessel; and when it becomes necessary to put the vessel before the wind to pump out, it will require a long time for the water to pass through the narrow openings.

The present improvement consists in rendering the stop waters vibratory, as shown in the accompanying diagram, where *a a* are the



swinging stop-waters, pivoted at their upper edges, and arranged respectively to swing in towards the center of the vessel, *b*, space between the sides and planking; *c c* limbers; *f* keel.

The advantage of the vibrating stop-waters, *a a*, are as follows: When a vessel is running on a wind, all the water which the vessel makes above the stop-waters, which are on the lowest side of the vessel, will be arrested by said stop-waters; and when it becomes necessary to pump out the vessel, and she is brought up before the wind for that purpose, the said stop waters on the side of the vessel that was depressed will swing inwards, and allow the water outside of them to readily flow inwards to the pump well.

Another advantage is that when a vessel is rolling whilst running before the wind, the water will be prevented from flowing outwards from the space above the keel. The stop-waters are suspended on pivots at their upper angles, and they are so proportioned that when in a vertical position their lower edges will be in contact with the bottom planking of the vessel. The usual lumbers or apertures, *c c*, must be made in the lower sides of the timbers, to allow the water to find its way from the ends of the vessel to the pump wells.

There are other advantages connected with the use of this improvement which will readily suggest themselves to those acquainted with marine affairs. Patented July 10th, 1856. Address the inventor as above for further information, or apply to T. L. Randlett, No. 157 South st., New York City.

Rotary Engine.—By P. D. M. Carmichael, of Leroy, N. Y.—This invention consists in a rotary engine that is applicable either as a motor, to be operated by steam or other fluid, or as a pump for raising or forcing water or other fluids. The engine is composed of a piston with an eccentric rim, whose exterior fits, at one point, to the outer wall of the