Scientific American

NEW-YORK, NOVEMBER 29, 1851.

Chemistry.

There is no science to which the public is so much indebted as chemistry, and there is none respecting which so little is understood by the great mass of mankind. Although chemistry is a lofty science, demanding the highest range of intellect and industry to investigate and explore, it is also a very humble science; and there are none so lowly or limited in mental grasp, who may not acquire a great deal of useful and profitable information by its study. It enters into the operations of the kitchen, and there is no one who boils a pot or a pan but would do so in a superior manner by a knowledge of it. It enters the laundry, and should preside at the wash tub, for it can tell how to save soap, by rendering hard water soft; and it can tell how to extract the most inveterate stain that soils the snowy cambric. Chemistry can take up the sand on the sea shore and make it into the crystalline globe, or it may be to sparkle on the finger of the fair, as a false but still beautiful gem of the diamond, the ruby, or emerald hue.

Chemistry is truly a magical science, and to show how simple, useful, and beautiful its principles are, we will refer to an article in common use and well known to all. We all know how common and how useful an article soap is; it cleanses our clothes, and renovates the whole outward man. If we inquire—"What is this substance?" we are answered by chemistry telling us that one of its principle ingredients is oil or grease—a substance which we always wish to get removed from our clothes and our persons as soon as possible. If oil is thrown into water it will not mix with it, but will swim on its surface; but here chemistry steps in and says, "look at this piece of crystal, almost like glass,—it is a metal named potassium (or it may be sodium), combined with the air we breathe, and which we cannot see; if you take this crystal and put it into warm water, unlike glass, it will melt and disappear, and you cannot distinguish it from the water with which it unites; now take your oil can and pour it into the water and stir it well; the oil no longer floats; it mixes with the water, and, if it is olive oil, you may taste of it without fear, and scarcely be able to challenge the liquid from sweet milk. If this substance is boiled up it becomes soap, and when moulded into cakes and laid past to dry, it forms the choicest kind for the toilet." More common soaps are made out of tallow and soda, and a poorer kind out of palm oil or grease, and potash. Here we find two substances, the soda (or the potash), called an alkali, and oil or grease, totally different in their uses and natures, uncombined, but which, when united, form a substance entirely different in its nature and uses from the single qualities of either. Here we have a starting point for chemical investigation; and although we might have chosen a higher text, we could not have selected a more suitable one for the object we have in view. But chemistry does not stop with its investigations at the soap; it goes further. It is well known that soap will remove grease and dirt freely when used with rain and what is termed "soft water," but when used with some kinds of water, the soap curdles and is precipitated in flakes, and an extra amount of it is required; chemistry has found out that the water which we call "hard," so beautiful and pelucid, is not pure. It contains, unseen, chemical matter which decomposes the soap, and separates the two substances of which it is composed, and not until there is soap enough dissolved in that water to satisfy the hard claims of matter in the water, will the soap be allowed to act upon the grease in clothes.

Chemistry is a science altogether of experiment,—no one can tell how two newly discovered substances would act until an experiment was made. Well, by experiment, it has been found—we wish particular attention to this point—that the substance which enters so largely into the most of our hard waters, rendering them very unfit for washing, causing great expense to the dyer, calico printer, and soap-maker, is carbonate of lime (chalk). Hard waters, although held by many to be pleasing to drink, yet they are very expensive to those cities, and many kinds of public works which are supplied by them. The waters which supply the city of London, it is asserted, deliver every day twenty-eight tons of lime to its inhabitants. Streams which flow through chalk and lime formations, contain a great deal of the carbonate of lime (chalk) in their waters; this is the case with the Saquoit Creek, the hardest wrought manufacturing stream, we suppose, in the State of New York. Iron and alumina (in the form of clay) also render water hard, but, excepting after freshets, these are not found in any considerable quantities in streams. A few years ago it was discovered by Dr. Clark, that (like oil used for removing oil in a soap) lime removed lime from hard water, and rendered it soft. All waters impregnated with lime absorb carbonic acid from the atmosphere; limestone is the carbonate of lime, and by burning it in a kiln, the carbonic acid is driven off, and we have quicklime, or oxide of calcium; this quicklime—decarbonized limestone—when stirred into water containing carbonate of lime, unites with the carbonate and other impurities also, in the water, precipitating them to the bottom, purifying and rendering the water soft. Nine ounces of pure fresh lime, dissolved in 40 gallons of water, will purify 560 gallons of hard water—the precipitate is chalk. It takes sixteen hours for the water to settle and all the impurities to fall to the bottom of the vessel which contains the water. This is a useful fact in chemistry, and is not very extensively known. The quicklime is dissolved in water and added to the hard water, and when we consider that nine ounces of the hydrate, or quicklime, will combine with the bicarbonate of lime in hard water, and purify 600 gallons of it, we consider this one of the most useful and valuable discoveries in chemistry. It is one valuable to our calico printers, bleachers, dyers, soap-makers; in fact it is valuable to every family in our land.

We would like to impress upon the minds of young persons in the families where the Scientific American is read, the value and necessity of acquiring chemical knowledge. We know that our children are taught some chemistry—worse than none to them—in the schools, but the lesson we wish to inculcate, is reading, study, and personal experiments in leisure hours. We have good works for the uninitiated to commence the study, in Youman's Chart, and Elementary Chemistry, and there are other works for more intricate and extended information afterwards. Every new fact which a person becomes acquainted with in science, is an addition to his stock of knowledge.

To the farmer, a knowledge of chemistry is invaluable for it teaches him the substances which are contained in and are necessary to the composition and usefulness of the bread of man, to one of which chemists give the name of the phosphate of lime. This material the growing wheat extracts from the soil; without its presence in sufficient abundance in the earth through which its roots spread, the plant flourishes poorly, the ear is ill-filled, and the produce of grain scanty. The bones of animals contain this phosphate of lime; but chemistry established the fact that certain stones and rocky masses, which occur in various parts of the earth, also contain it, and with these the farmer may renovate his soil and make the desert blossom like the rose.

Our subject is one which we might elaborate into a volume, but we trust we have said enough upon it at present to present its claims to many of our readers, so as to point a moral rather than adorn a tale.

And, to conclude this article, we do certify that, within a week from this date, we were shown a patent, granted for a chemical composition, and for which the assignees paid $8,000 for the State of New York alone, which had they been as well versed in qualitative chemistry as the writer of this, they would not have paid eight cents for, as the composition is worse than useless for the purposes intended, and this the assignees have truly felt to their loss and sorrow.

The study of chemistry, like any other branch of natural philosophy, is one which always rewards every student of it.

The Hillotype.

Our readers will remember that we have twice alluded to an invention in the Daguerreotype Art, by a Mr. Hill, in this State, who, either himself, or his friends for him, claimed to have made the discovery of forming his daguerreotypes with all the natural colors of wood and wild. A beautiful landscape of Mr. Hill's residence was said to have been done, and exhibited at Albany. It was stated that a number of persons had seen several beautiful colored pictures by Mr. Hill, one of which was that of his own child, or some other child, painted by the sun in all its rosy colors, and displaying a pearly tear on its cheek. We thought it very wonderful how those pictures were so slow in finding their way into Gotham—the city for all such wonders; but then Mr. Hill stated that there was always some little bit yet to be discovered, some perfective touch to be given to one color, and that color was yellow; he never could color a yellow. Prof. Morse, we believe, wrote a letter about this great discovery, its value, and its reality; but after all, it is asserted by the daguerreotype artists of this city, that all this alleged discovery has been a delusion. "The Daguerrean Association," of this city, appointed a committee to wait on Mr. Hill, find out about his alleged discovery, and report. They have done so; they waited on Mr. Hill, at his residence, on the 13th inst., and stated their business, and the result is, that they conclude their report to the Association in the following language:—"Mr. Hill has deluded himself, thoroughly and completely—the origin of the discovery was a delusion, and the only thought about it, in which there can be no delusion, is for every one to abandon faith in Mr. Hill's abilities to produce natural colors in daguerreotypes—the whole history of which has been a delusion."

Well now, this appears to be pretty hard for poor Mr. Hill; but, if he is not deluded, he can easily open the eyes of a wonder-waiting world by producing the pictures. It is really too bad; but this will not end delusions while Dr. Roback lives.

Improvement in Railroads.

"Under this head we published a description of a new invention, which has been copied and criticised in the Scientific American. The criticism shows a complete misunderstanding of the principle of the invention, and supposing a want of clearness on our part, we will repeat it briefly. Two parallel lines of rails three feet apart, and elevated from two to six feet above the ground, are maintained by appropriate contrivances against the sides of wooden posts, in such a manner as to leave the space free above, under, and between them. Cars and a locomotive of a light frame being placed upon the rails, each car is then firmly united by braces and stays with beams running cross-way under it, one under each extremity. These beams are lower than the rail, and long enough to have their extremities under them; to these extremities are attached artificial magnets—or, if it will make it any clearer, natural loadstones—which by their tendency toward the rails above, will counterbalance as large a part of the weight of the cars as the constructor thinks desirable, the remainder of the weight being left to act on the wheels. In this way a locomotive of small power, and consequently light, will prove sufficient to draw the train with great velocity."—[N. Y. Tribune.

[We must say to our worthy cotemporary, that we perfectly understand the principle of the invention spoken of; there was no misunderstanding of the subject. We will quote from the other article referred to above, to show that the explanation of the invention makes it quite a different invention.

"At the two extremities of each car, and in the middle, at a sufficient distance from the wheels, are attached powerful magnets, made of an immense number of reels of wire, wound round pieces of soft iron, the poles placed directly below the rails, and as near them as practicable. The effect is easily understood. As soon as the wires are united to a pile to form a circuit, the magnets exercise a powerful attraction on the rail; but this being immovable, the magnet itself obeys the attraction, and the car attached following, the slight pressure which it still exercises on its wheels is just equal to its weight, minus the attractive power of the magnets."

Now, in the one case, he says artificial magnets and natural loadstones are used, and in the other electro-magnets. There is not the least similarity between the two: the electro-magnet requires a battery on board the car,—the natural loadstone does not. Neither of the two magnets could effect the object at all, and, besides, could the inventor operate it, (which he cannot) it would do the very thing which is desirable to be obviated. The magnet cannot act upon the rail until the rail is also magnetised, and the power of a magnet diminishes according to the square of the distance. The effect of the magnet would also be as strong upon the wheels as the rails, and it would be different from the principles of the magnets were they to be drawn to the rails; the attraction at best, too, would be lateral, not vertical. We are not surprised at the proposition of such an invention, for it requires a great deal of knowledge to know what principles of science are applicable to mechanism.

Mournful Accident.

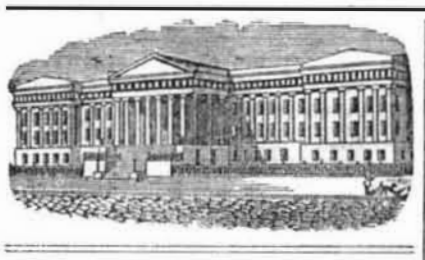
On the afternoon of Thursday last week, no less than forty-three children were killed in one of our Ward Schools. The cause of the accident was a panic occasioned by one of the teachers being struck with paralysis, and an alarm of fire being raised, which caused the children to rush out to the stairs, and crowding one another over, broke down a railing whereby, they were precipitated down below upon the flags like grain through a hopper, until they lay upon one another, heaped and pent in the struggles of death. The severity of the accident can well be imagined by the great number of little ones who lost their lives—nearly all of whom were suffocated. It was a terrible and heart-rending scene, and has thrown many happy families into the deepest grief. Only for the determination of Mr. McNally, the Principal of the Male Department, the loss of life would have been far greater. He put his back to the door and kept it shut against some larger scholars, who, had they got out, would have dashed all the smaller ones before them. About forty, also, were more or less injured. The stairs appear to have been badly constructed for ready exit from the school. We also condemn the practice of having such large schools. No less than 1300 scholars were attached to this school. In all large schools some of the smaller children are getting hurt all the time, by large scholars. Our country has a very unenviable name among the nations of the earth for murderous accidents. There are more execrable buildings erected around and in the city of New York, than in all the world beside. Many architects, masons, and carpenters, appear to care only about shamming the work out of their hands; there does not appear to be real sterling honesty in their dealing, nor a pride of producing good work, only quantity—quantity. The railing of the school stairs was weak and easily broken down; it was just like the great majority of all our buildings; there is always some miserable and inefficient piece of work left to mark the careless constructor.

Great blame is attached to the firemen for increasing the excitement of the children by their shouting and want of management. We have reason to believe this is correct, from the evidence of eyewitnesses, and some who escaped, as it were, by a miracle.

In connection with the above, we are sorry to add that a fatal accident took place last Monday, by the falling of the walls of a brewery adjoining the Blacksmith Shop of Messrs. Hoe & Co.'s establishment in Sherriff street. The number of persons killed was two, and two wounded. Everybody is to blame for this.

To Inventors.

Inventors who are interested in knowing where they can find agents competent to do their business with the Patent Office Bureau, are reminded that we continue to transact it with our former success and dispatch. We refer to Thomas H. Dodge, Adam Lemmer, S. Curtis, James Hardie, Norris & Flanders, Hale R. Rose, Vine B. Starr, Frederick Fitzgerald, John Ryer, and Silas C. Herring,—whose names appear in this week's list of patents, and to others with whom we have done business.



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LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING NOVEMBER 18, 1851.

To D. R. Hendrix, of Pottstown, Pa., for improvement in Boot Trees.

I claim the set screws, M and N, and plate, in combination with the screw G, substantially in the manner and for the purpose described.

To Alonzo Bascom, of East Jaffrey, N. H., for improvement in apparatus for Sizing and Dyeing Yarns.

I claim, first, the conducting of yarn or thread, from section or warper beams, directly into and through the size or coloring liquids, to the pressure rollers, by a series of rollers more or less in number, placed as nearly in contact with each other, as the nature of the case will admit—the closer the better—sufficient space being allowed between the fixed rollers, for the passage of the yarns or threads, thus enabling the said rollers to operate as guides to each and all the threads, to prevent them from matting or clinging together, and superseding the otherwise necessary use of reeds, raddles, or other separators.

Second, I claim the taking or making of a weaver's lease or leases, at the commencement of the process of warping, or beaming of yarn, or thread, on section or warper beams, and at proper intervals on the same, to correspond with required lengths of yarns or treads, on weaving beams, and preserving the same throughout the sizing and drying, thus dispensing with the use of hacks or lease takers, in the dresser, and the otherwise necessary stoppage of the dresser or sizer, for the purpose of tying or twisting together each separate thread.

To Thos. H. Dodge, of Nashua, N. H., for improvement in Printing Presses.

I claim, first, hanging the type bed and platen upon cranks on rotating shafts, and arranged and operating in the manner substantially as described.

Second, I claim the spring presser attached to the type bed or platen, for the purpose of pressing the band communicating motion to the sheet, against the opposite surface of the platen, or bed, and causing it to be moved at precisely the same speed as the bed and platen, substantially as described.

Third, I claim the arrangement for carrying and giving motion to the inking rollers, consisting of the barrel, the bals, and the lever, springs, and band, combined together with the above type bed and platen, in the manner substantially as set forth.

[See engraving on page 329, Vol. 6, Sci. Am.]

To S. Curtis, of Newtown, Ct., for improvement in machines for Cutting Combs.

I claim the wheel with the cutters placed on its periphery, as described, said wheel having a rotary motion, and also a vertical reciprocating motion, in a transverse line with its axis, for the purpose of turning or cutting comb teeth, substantially as described, said motions being given the wheel by means of the cams, levers, pawls, or their equivalent, as set forth.

To G. W. Gardner, of Albany, N. Y., for improvement in Stove Grate Bars.

I claim the manner described of forming separate grate bars for vibrating grates, rounded at their end, secured and working in grooves of the frame, as described.

To Henry Golden, of Greensboro', Miss., for improvement in Plows.

I claim a coulter scraper, constructed as described, with a share and mould board projecting from the side of the landside opposite to that which the earth is thrown, the landside thus extending from the point of the scraper to that wing of the mould board opposite the one to which it usually extends; and the several parts being so arranged, that the landside will run deep enough to hold the implement firmly to its work, the share will pare the ground and cut off the weeds near the roots of the plants, and the mould board will conduct the same towards the middle of the space between the rows.

To James Hardie, of Victoria, Texas, for improvement in Propellers of Machinery to be used in Currents.

I do not confine myself to the exact mode of gearing described, as many modifications of the same may be used, and answer equally well; but I claim the application, for the purpose specified, of one or more levers, with the floats or blades at their lower ends, against which the current acts, said levers being attached at about their centres, to an adjustable frame, by a universal joint, as described, the upper ends of the levers being attached to cranks, by which, through any suitable gearing, motion is commnnicated to the shaft, substantially as described.

To Nehemiah Hodge, of Adams, Mass., for improvement in Railroad Car Wheels.

I claim connecting the tread or rim of a car wheel to the hub or central part thereof, by means of india rubber or other analogous elastic material, such elastic material being connected with the outer periphery of the central part of the wheel, by a groove on the latter, or its equivalent, and to the inner periphery of the rim also, by a groove thereon, or its equivalent, the india rubber holding itself in both grooves, by its elasticity, as described.

I also claim the grooved segments, constructed substantially as described, and interposed between the india rubber and the rim, for the purpose of facilitating the insertion of the india rubber into the space between the rim and central part of the wheel and its removal therefrom, as set forth.

To Jehu Hollingsworth, of Zanesville, O., for improvements in Mill for Grinding and Bolting.

I claim, first, the grinding of grain or other matter, by means of a revolving stone or metallic roller, and one, two, or more separately adjustable concaves, whereby high and low grinding may be performed simultaneously, and bolting the same the instant that any particles are ground fine enough, in combination with the returning on to the roller again all particles too coarse to be bolted, through the bolting concave, so that they may be ground over again and again, until they are fine enough to be discharged; and this I claim, whether it is done by means of the revolving beaters and brushes, which throw it up and through the pipe, or by any other means essentially the same.

Second, I claim the guides or partitions in the pipe, as described, to prevent meal from scattering endwise, in its transit from the bolting concave to the roller, in combination with the adjustable aprons, on which it falls, and which distribute and govern it in its passage to the discharging end, as described and set forth.

To Adam Lemmer, of Newark, N. J., for improvement in Cannon for throwing Chain-Shot.

I claim, in combination with the revolving head and the bores, diverging as described, the rack attached to the gun, and the worm wheel hung on the shaft, by which the gun is made to revolve or return to the desired position, so that the chain-shot may be thrown, either in a horizontal or vertical line.

To Gaspard Malo, of Dunkirk, France, for improved Screw Propeller.

I claim arranging two or more series of narrow blades, such as described, each series on a separate shaft and the shafts one within the other, and provided with keys or other equivalent means of securing them to each other, substantially as specified, so that the two or more shafts may be turned on each other and re-secured, to place the series of vanes directly behind each other, for sailing purposes, and at different points of the circle, for propelling.

To Isaac H. Morris & David Flanders, of Parishville, N. Y., for improvement in Desks.

We claim, first, forming the desk top in boxes, parts, or pieces, each of which may be separately raised or lowered, as required, through appropriate mechanical devices, substantially in the manner and for the purposes set forth.

Second, the employment of hinged double leaves in the front of the desk, the same, when extended, forming a rest for the hand, and being made capable of closing down or in, essentially as described.

[See Eng. on page 12, this Vol. Sci. Am.]

To David F. Phillips, of Republic, O., for improvements in Railroad Switch.

I am aware that the relative position of the switch with the main track, or turn-out, or sliding track, has been changed by the action of mechanism attached to the cars, as well as by devices attached to the locomotive in various ways, and therefore I do not claim changing the switch by apparatus, or devices, actuated by the cars or locomotive. Nor do I claim constructing and operating a switch composed of a single movable section of the main rail. But what I claim is the employment of the additional movable sections, D D, in combination with the sections C C, forming the switch, whereby the lateral movement of each is halved or divided in opposite directions, and a more regular curve is produced than that resulting from the use of the single movable section or switch, and thereby insuring safety, the weight of the train of cars on one section of the switch forming a lock to the other section, as one section cannot move without the other, till the train of cars shall have passed therefrom, as set forth.

I also claim the combination of the double central lever bars, with the central connecting rock shaft, having two cranks projecting in opposite directions, to which are attached the cross-bars for uniting the double sections, whereby the switch is adjusted, as fully set forth.

To Wm. Redick, of Uniontown, Pa., for improvement in Seed Planters.

I claim the combination of the slides with the grooves (which "drill" in the grain) and the cells, so that by moving the slats towards the centre of the hopper, to close the communition with the grooves and open it with the cells, for planting in "check rows," or by moving both the slats towards the centre of the hopper, to close the communication between said hopper and the grooves and cells, and open it with the cells for planting in "step rows," the whole being arranged in the manner and for the purpose set forth.

To Wm. W. Riley, of Columbus, O., for improvement in inserting Porcelain Teeth.

I claim the mode of inserting teeth by forming the concave base, and of inserting the platina surface of the teeth in an oblique direction, and attaching them to the gum plate without stays.

To Hale R. Rose, of Guilford, Vt., for improvement in Stoves.

I claim placing the damper between the fire and hot-air flues, so as to control the amount of opening in each, respectively, and governing the same by expansion of the rod, substantially as described, for the purpose of regulating the heat of the oven.

I do not claim the expanding rod irrespective of its connection with the damper, placed as described.

[This improvement will, no doubt, soon come into general use.]

To H. J. Ruggles, of West Poultney, Vt., for improvement in Stove Grates.

I claim the inclined elevator for raising the back grate and coupling it with the front grate, and in combination the connecting the front and back grates with hooks or catches, constructed and arranged substantially as specified.

To John C. Fr. Salomon, of Cincinnati, O., for improvement in Spring Saddles.

I claim the movable pommel, the spiral spring or springs connecting the pommel and cantle, and the rawhide seat, all combined substantially in the manner set forth, making a spring-seat saddle tree.

To Vine B. Starr, of East Hampton, Ct., for improvement in Gongs.

I claim making gongs of sheet or plate iron or steel, with a rim all round, strengthened by a ring or band, the whole being coated and having the crevices, interstices, and all unsound parts filled with an alloy of copper and tin, or any alloy of a similar nature, or composed of similar metals to what is called bell-metal, substantially as set forth.

To Geo. Todd, of St. Louis, Mo., for improvement in finishing and balancing Millstones.

I claim inserting the balance rine in the eye of a millstone, in the early stage of its construction, and then making use of the said balance rine, in conjunction with a chuck combined with a spindle, in completing the stone, substantially as set forth.

DESIGNS.

To Charles Muller, of Tompkinsville, N. Y., for Design for a Hat Stand.

I claim the design and configuration of a hat stand, representing a Triton, or similar figure, holding up the branches of a plant, in the manner aforesaid, with the basin lying in a bed of leaves or flowers, all arranged substantially as set forth.

To Frederick Fitzgerald, (assignor to S. C. Herring & John Ryer), of New York City, for Design for Iron Railing.

To Apollos Richmond, (assignor to A. C. Barstow & Co.), of Providence, R. I., for Design for Parlor Stove Grates,

Funnels of Steamships Affecting Compasses.

Capt. Johnson, R. N., has given considerable attention to the effect of telescopic funnels of steamships. In a letter to Col. Sabine, he says:—

"I wish you to bring under notice the following results which I obtained with reference to the effect of hollow iron cylinders upon the compass, when placed inside each other, the object being to ascertain whether the whole difference of deviation, under the two conditions of these telescopic funnels was due to the difference of their elevation and depression only, or whether a portion of the said differences was attributable to the induced magnetism of the separate parts of the funnel, when lowered, acting upon each other. As it would have required more time than could be afforded to hoist the parts of those huge funnels in and out of the ship, while the requisite succession of observations were made, I procured three hollow iron cylinders of smaller dimensions, their several diameters being such as to admit of one cylinder being placed inside of another, and leaving a space of about one-eighth of an inch between their surfaces. Having placed a standard compass on one of the pedestals in the observatory, and ascertained the magnetic meridian for the moment by the collimator, the largest or external iron cylinder (No. 1) was brought in and placed to the eastward of the compass, the principal mass of the cylinder being below the level of the needle and card, and its upper end being 2½ inches above that level. By this means a deflexion or deviation of 10° 10′ was produced, the north end of the needle being drawn that amount to the eastward of the correct magnetic north. Cylinder No. 2 was next placed inside of No. 1, when the deviation was increased to 12° 15′. Cylinder No. 3 was then placed inside of No. 2, and the deviation was again increased to 14° 15′, the north end of the needle being drawn to the eastward in each case. Hansteen's Magnetic Intensity instrument was then placed with the centre of its needle (as nearly as I could adjust it) in a similar position to that which the course of the compass had occupied, and the following results were obtained:—Time of 100 vibrations, starting from an arc of 18°—

Previous to the cylinders being brought into the observatory	6′ 57″
No. 1 cylinder in place	6′ 51″
No. 2 cylinder in place inside of No. 1	6′ 47″
No. 3 cylinder in place inside of No. 2	6′ 45″

The intensity instrument being removed, a dipping needle was then employed, and the following are the results of the observations:

	Dip.
Previous to the cylinders being brought into the observatory	68° 37′
No. 1 cylinder placed to the south of the instrument	70° 10′
No. 2 cylinder in place inside of No. 1	70° 27′
No. 3 cylinder in place inside of No. 2	70° 37′

The conclusion to be deduced from all these observations appears to be, that to the deduced magnetism of the surfaces of the cylinders acting upon each other is due a portion of the deviation; and reasoning by analogy, a similar deduction is applicable to the telescopic funnels of steamships."

It is said that a perpendicular waterfall has been discovered on the Sonomas river, Oregon, some distance above where it empties into Puget's Sound, of 260 feet.