

## Scientific Museum.

### Scientific Memoranda.

**BIRTHS, MARRIAGES AND DEATHS IN BOSTON.**—A meeting of the American Statistical Association was held on the 9th instant, in Boston. Several communications were made on different subjects. One related to the births, marriages and deaths of Boston for 1850, as predicated on the valuable report of the Registrar, Artemas Limmonds, Esq.

As to births, they were 5,279, being some over the ratio, as 1 to 26 of the whole population, estimated at 138,000. Of such the births were 2,681 males and 2,598 females, showing the general excess of the former sex. Of these 53 were twins, making of course, 106 children. The number of parents to the 5,279 children, born the last year, was 10,452, of whom only 3,445 were natives of New England, and 241 of other parts of the United States. Such a computation makes the rest, who were foreigners, 6,660, of whom 5,526 were Irish. It gives the inference, that the foreign parents were to the American, as nearly two to one! A fact of this kind calls for the exercise of that wisdom which makes suitable provision for the exigency, so that, through education and government, the elements of foreign bias and character may not overmatch those of New England, but be brought under their control.

**NATURAL HISTORY.**—A number of beautiful specimens of rare and curious birds and animals, collected by Captain Stansbury, of the Topographical Engineers, during his stay in the Rocky Mountains and at the Great Salt Lake, have been skilfully stuffed and prepared at Washington city, so as to restore their original shape and appearance. They have been deposited in the National Gallery, in the Patent Office Building. Conspicuous in the collection is a Rocky Mountain Sheep or big horn, the Wolverine, a cross-fox, and several other animals which are peculiar to the far West.

**TO PREVENT SNEEZING.**—A correspondent of the London Medical Gaz., says, that to close the nostril with the thumb and finger during expiration, leaving them free during inspiration will relieve a fit of coughing in a short time. In addition to the above, we state from personal knowledge, that to press the finger on the upper lip just below the nose will make the severest premonitory symptoms of a sneeze pass off harmlessly. We have found the remedy useful many a time in creeping on game in the woods. —[Ex.]

**NEW PAPER MARK.**—A novel kind of paper is stated to have been produced at the mills of Mr. T.H. Saunders, of Darenth, in Kent, Eng. It contains a water marked portrait of the Queen, contrived, not as the ordinary water mark in mere outline hitherto used in bank note and other paper, but so as to give the gradation of light and shade of an Indian-ink drawing, such as is seen in the porcelain pictures introduced from Germany. It is the invention of Mr. Oldham, the engineer of the Bank of England.

A French officer has invented a method of applying lever power to machinery without any intermission of the action of the lever. The invention has been put to the test at Saumer, France and has been entirely successful. —[Exchange.]

[Wonderful, what is a capstan turned with a hand-spike, eh?

The new monster steamer, now being built at Bristol, for the West India Packet Company, is eight feet longer than the Great Britain. She is to be called the Demerara.

### Durability of Wood.

The piles under the London Bridge have been driven 500 years, and upon examining them in 1846 they were found to be little decayed. They are principally elm. Old Savoy Place, in the city of London, was built 950 years ago, and the wooden piles consisting of oak, elm, beech, and chestnut were found upon recent examination to be perfectly sound. Of the durability of timber in a wet state, the piles of the bridges built by Emperor Trajan,

over the Danube, afford a striking example. One of these piles was taken up, and found to be petrified to the depth of  $\frac{3}{4}$  of an inch; but the rest of the wood was not different from its former state, though it had been driven 1,600 years.

For the Scientific American.  
Hydraulics.

(Continued from page 243.)

**RE-ACTION WATER WHEELS.**—The principle of water acting by gravitation on the overshoot wheel, is so well known that we have said all that may be considered necessary on the subject without going into very long details, which can be found in almost every work on the subject, (Smeaton's, Bank's, and Robinson's are good works). The ventilated buckets, as not being universally applied among us, we have described, and those who wish to see the finest specimen of a suspension water-wheel in our country, have but to visit the Troy Nail Works, Rensselaer Co., N. Y.

The subject of Re-action Wheels is more interesting than any other, because there are 20 of such wheels used in America for one overshoot or breast wheel, we suppose. The subject has been much obscured for want of practical information. Among the first improvers, if not the first, of such wheels, were Messrs. Parker, of Ohio, two brothers, who obtained a patent in 1829. One of them is now dead. There has been a great amount of litigation about Parkers' wheels, and we did not wish to prejudice facts by presenting numerous documents sent to us on both sides of the question. When a case is in law, we desire to be silent until it is decided. The Parker patent has expired, and we can now say, without prejudging any party, that no man, perhaps, in this country, nor any other, understands the principles of what are termed Re-action Wheels better than Zebulon Parker; and the reason is obvious, he has made them a subject of study and practical experiment for thirty years, and being a practical and theoretical man, enthusiastic in the pursuit of this branch of mechanical science, his knowledge must be held to be of the first importance. We have now before us a manuscript of Mr. Parker (presented to the Franklin Institute in 1841, but never published) exhibiting his views of the theoretic action of water by centrifuge. This MS. is now revised, along with a great deal of other information, experiments, and illustrations, by Mr. Parker, which will be found exceedingly valuable, and to be obtained no where else in any printed work.

The action denominated "Percussion and Re-action," intimates that these forces are joined in propelling the wheel. The name was adopted before the nature of the action of the water was fully understood, and is not strictly expressive of its nature.

When the wheel is running at a slower rate than the water within it, both percussion [or dynamical pressure] and centrifuge unite their forces with that of the re-action of jets from the issues. But it is obvious that the simple percussion must cease as the wheel acquires a velocity greater than the water within it. In this case, however, the amount of forces tending to propel the wheel are not lessened, because as the percussion diminishes an equivalent is produced by the centrifuge; the force from re-action remaining the same.

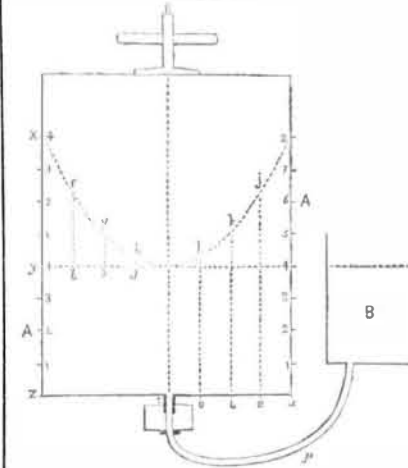
That centrifuge in this application is an equivalent for percussion will be made manifest by the following proposition, and the diagram of the experiment illustrating it.

The centrifugal force or outward pressure of a quantity of water, revolving within a cylinder of any diameter, is equal to the pressure of a head of water, which will, by the law of spouting fluids, produce a velocity equal to the circular velocity within the cylinders.

Let A A be a cylinder of any diameter, having its axis vertical; Let the pivot, P, be a tubecommunicating through the pipe, P, with a reservoir, B; let the surface of the reservoir be, say 4 feet higher than the bottom of the cylinder. Now if the water in the cylinder has no circular motion, its surface will be level at 4 4, and if an orifice be made at the bottom, at z or a, the water will discharge under a pressure of 4 feet, or with a velocity of 16 feet per second. But if the cylinder and

the water within it be made to revolve, so that the inner surface of the cylinder and the water in contact with it, have a circular velocity of 16 feet per second, the centrifuge of the water will cause it to rise at the cylinder and sink at the axis, and to fill the part of the cavity which is lower than the surface of the reservoir, the water will flow through the pipe until an equilibrium is produced. This will be when the water in contact with the cylinder has risen to the height of 4 feet above the surface of the reservoir, and to the same height at the axis. In this condition an orifice at y,

FIG. 44.



the height of the surface of the reservoir, will discharge under a pressure of 4 feet, or with 16 feet per second velocity. And any proportional height, between y and x, will have the same outward pressure, and would discharge with the same velocity that would take place between z and y without the circular motion. And any point in the concave surface of the water, f g h, will be at such a height that a body must fall to acquire a velocity equal to the circular velocity of that point. And an orifice made at a will now discharge under a pressure of a, 8, or z, y, + y, x (=8 feet=22.62 feet per second); at e, under e, i, or z, y + b f; at i, under i k, or z, y + c, g, &c.

In applying these principles to the wheel, it is evident that the pressure of z y, or the head and fall is required to project the water into the wheel; and the equal outward pressure from the centrifuge y x, is employed in producing an equal relative counter projection from the wheel, which counter projection, by its re-action, is a constant force in propelling the wheel. And as the wheel's velocity at its verge, when running at its proper speed, will have a velocity equal to the relative velocity of the water through the issues in a contrary direction, the water at the instant of its discharge, has no velocity except the radial component of its divergency from a tangent to the verge of the wheel; which is necessary to give place to the successive flow through the wheel.

Although this is undoubtedly the true theory of the action of the water in this improvement, it is not to be expected that the whole power of the water can be communicated to the wheel, on account of circumstances operating as drawbacks, the principal of which is the unavoidable obliquity of the projections from tangents to the outer circle of the wheel, and the friction caused by the curves, roughness, and capillary attraction in the inlets and in the buckets and outer surface of the wheel.

It will be observed that what is here assumed and proved to be true, goes to controvert the long received position, that "water, being a non-elastic substance, is incapable, by impinging against a moving body, of communicating more than half its force."

### Steamship "Atlantic" Tribute to American Nautical Skill.

The "Liverpool Chronicle" says:—"This fine vessel, whose machinery, it will be remembered, got damaged on her voyage from Liverpool in January, has been removed within the last few days into the Huskisson Graving dock, where she is now dry. She has been minutely inspected by a number of scientific persons well versed in ship-building, all of whom report her to be in a most perfect and satisfactory state. Notwithstanding the fearful weather she experienced, her copper is as smooth throughout as the day it was put on; a close examination does not discover a wrinkle, much

less any signs of straining, in any part of her huge but beautifully symmetrical structure. To the uninitiated who view her sharp, wedge-like stem, it appears wonderful how with this can be combined the vast breadth that covers you like a shed when you are under her bottom amidship; whilst her lines running aft are so beautifully drawn to her stern, as to leave the water very gracefully.

On Thursday the ship was inspected by some of those acute gentlemen upon whose opinion the underwriters form their judgement, and also price of insurance, and we understand that the result was so satisfactory that a large saving will be effected in this item when the noble vessel is again ready for sea, which, we understand, will be in June next.

Captain West is taking advantage of the repair of the machinery to erect a most spacious and elegant dining saloon upon deck.

### LITERARY NOTICES.

"Rebels and Tories or the Blood of the Mohawk,"—a Revolutionary Legend, by Lawrence Labree: New York; Dewitt & Davenport, publishers; price 50 cts. We have not perused this work of Mr. Labree, but we are glad that he has seen fit to found the circumstances in America; authors generally overlook our own country and import all their materials from foreign countries, out of which fictitious works are made, something we do not think wholly necessary.

PETERSON'S LADIES' NATIONAL MAGAZINE, for May, has been sent us by Dewitt & Davenport, Tribune Buildings. It is, as usual, well illustrated, and contains contributions of merit.

THE WESTERN HORTICULTURAL REVIEW: No. 7, Dr. J. A. Warner, Editor, Cincinnati: \$3 per annum. It contains valuable information for all those engaged in the branch to which its columns are devoted.

"The Transcript," an interesting and well-conducted newspaper, published in Portland, Me., by Gould & Elwell, has just entered upon its xvth volume. It is carefully edited, and merits a large patronage.

The May number of "The Scalpel," has been sent us by the editor. It contains a common-sense and practical article on Domestic Architecture, which is worthy the attention of denizens of large cities. Dr. Dixon, the editor, works boldly in the cause of medical reform, and having no fear of man before his eyes we may look for good results from his able pen. The Scalpel is a peculiar publication, and contrasts singularly with many of the serials of the present day, on account of its originality, which, in these times, is really refreshing. This number throughout is excellent. Published quarterly at \$1. New York: E. H. Dixon.

THE PRACTICAL RECEIPT BOOK.—This is the title of a very neat book, published by Lindsay & Blakiston, Philadelphia. We have examined a great number of the receipts, some of which are excellent and worth the whole price of the book. There are others, however, which are not of much value.

## MECHANICS

### INVENTORS AND MANUFACTURERS.

### The Best Mechanical Paper IN THE WORLD! SIXTH VOLUME OF THE SCIENTIFIC AMERICAN.

The Publishers of the SCIENTIFIC AMERICAN respectfully give notice that the SIXTH VOLUME of this valuable journal, commenced on the 21st of September last. The character of the SCIENTIFIC AMERICAN is too well known throughout the country to require a detailed account of the various subjects discussed through its columns.

It enjoys a more extensive and influential circulation than any other journal of its class in America.

It is published weekly, as heretofore, in Quarto Form, on fine paper, affording, at the end of the year, an ILLUSTRATED ENCYCLOPEDIA, of over FOUR HUNDRED PAGES, with an Index, and from FIVE to SIX HUNDRED ORIGINAL ENGRAVINGS, described by letters of reference; besides a vast amount of practical information concerning the progress of SCIENTIFIC and MECHANICAL IMPROVEMENTS, CHEMISTRY, CIVIL ENGINEERING, MANUFACTURING in its various branches, ARCHITECTURE, MASONRY, BOTANY,—in short, it embraces the entire range of the Arts and Sciences.

It also possesses an original feature not found in any other weekly journal in the country, viz., an Official List of PATENT CLAIMS, prepared expressly for its columns at the Patent Office,—thus constituting it the "AMERICAN REPERTORY OF INVENTIONS."

TERMS—\$2 a year; \$1 for six months. All Letters must be Post Paid and directed to MUNN & CO., Publishers of the Scientific American, 128 Fulton street, New York.

### INDUCEMENTS FOR CLUBBING.

Any person who will send us four subscribers for six months, at our regular rates, shall be entitled to one copy for the same length of time; or we will furnish—  
10 copies for 6 mos., \$8 | 15 copies for 12 mos., \$22  
10 " 12 " \$15 | 20 " 12 " \$25  
Southern and Western Money taken at par for subscriptions; or Post Office Stamps taken at their full value.

### PREMIUM.

Any person sending us three subscribers will be entitled to a copy of the "History of Propellers and Steam Navigation," re-published in book form—having first appeared in a series of articles published in the fifth Volume of the Scientific American. It is one of the most complete works upon the subject ever issued, and contains about ninety engravings—price 75 cents.