Scientific Museum.

For the Scientific American.

Tartar on the Teeth.

As much has been said respecting the tartar on the teeth, and the action of vegetable acids to remove it, a question arises, "is that substance usually found on teeth, denominated *tartar*, really so? Is it not a lime of some kind, and not tartar? And is not its action upon the teeth of an alkaline rather than an acidulous nature? Its action may only be on the albumen of the teeth, or the cause of decay in the teeth may be owing to the exclusion of the atmosphere from their roots. Where does the tartar come from? is another question, if tartar it is. It is well known that in wine growing countries, the people are not more famous for bad teeth than those of other countries, and yet our tartar is almost exclusively, if not wholly so, derived from wine, —it is itself a vegetable acid, and how has one acid such an effect upon another as to destroy it? If it is tartar, how is it that vegetable acids as is alleged, have such a wonderful property of removing this other acid, and at the same time are so destructive on the limeous formation of the teeth, too. These things are worthy of attention.

Tartar is deposited on the sides of casks during the fermentation of wine, and by looking into a wine cask, it will be found adhering to its sides in not very thin hard reddish scales. The name of it in that state is argal. All wines do not afford the same quantity of tartar; the Hungarian wines but little; the French wines much more; the Rhenish wines afford the greatest quantity and the purest, hence they are more sour to the taste. White wine gives out white argal, and the color is of the same hue as the wine in all cases. To make cream of tartar, the crude salt is dissolved in water and left to crystalize. The crystals are then boiled in another vessel with six per cent. of bone black and pipe clay, and set aside to crystalize again. (In France, white argillacious earth is used instead of pipe clay, as it is cheaper.) The crystals are dissolved a number of times and recrystalized, so as to make the salt as pure as possible. This is not the substance found on the teeth, said substance, if examined, will be found to possess the properties of the teeth themselves; in short it is a phosphate of lime, and the common opinion that it is *tartar* is a wrong one.

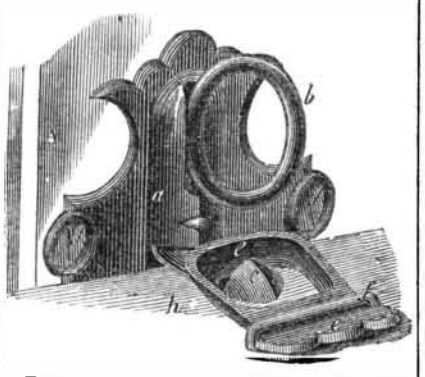
New Calculating Machine.

An extraordinary calculating machine, says the London Times, is now placed in the Russian Court. It is the invention of a Polish Jew, named Staffel, a native of Warsaw, and works addition, subtraction, multiplication and division, with a rapidity and precision that are quite astonishing. It also performs the operation of extracting the square root and the most complicated sums in fractions. The machine which the inventor calls *Arithmetica Instrumentalis*, is about the size of an ordinary toilet, being about 18 inches by 9 inches, and about 4 inches high. The external mechanism represents three rows of ciphers. The first and upper row, containing 13 figures, is immovable: the second and third, containing 7 figures each, immovable. The words addition, subtraction, multiplication and division are engraved on a semicircular ring to the right, and underneath is a hand, which must be pointed to whichever operation is to be performed. The figures being properly arranged, the simple turn of a handle is then given, and the operation is performed at once as if by magic. The most singular power of the instrument is, that if a question be wrongly stated—as, for instance, a greater number being placed for subtraction from a lesser, it detects the error, and the ringing of a small bell announces the discovery. The inventor has exhibited the powers of this wonderful calculating machine to the Queen, Prince Albert, and several persons of distinction. The inventor also exhibited a machine for ascertaining by weighing the fineness of gold or silver, but this is to be submitted to further and more severe tests. Both machines are, to say the least, extremely curious, and have been rewarded with a silver medal by the Russian Government. During the week the directors of the Bank of England visited the machine.

[This is the most extraordinary calculating machine, we ever heard of. The one of Mr Nystrom. in No. 35, Sci. Am., is indeed a remarkable one also, and is much less complex than this Russian one. We hope to hear of Mr. Nystrom's machines being in our market some of these days.

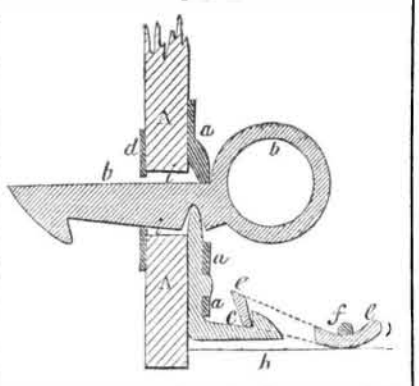
Self-Acting Lock for Blinds and Window Shutters.

Fig. 1.



This is a very neat and useful improvement by W. Race & Co., extensive manufacturers of stoves, &c., at Seneca Falls, N. Y. Figure 1 is a perspective view, and figure 2 is a vertical transverse section of the blind or window shutter closed, with the lock in its catch. A is the blind or window shutter. The lock is composed of a vibrating latch or sneck, *b b*, to catch on the outside of the wall to retain the blind when it is open. This sneck passes through the blind, A, at *i i*, and is retained in its place by metal pieces, *a*, *d*, above —*a*, *a*, *c*, below the sneck, represent the catch of the lock for the inside. This catch is secured to the blind inside, and *c* is the catch or sneck of the same form as the reverse catch, *b*, above. On the bottom board, *h*, (fig. 1) of the window sash, is secured a vibrating metal loop, *e*; it rocks slightly on the curve at *f* (fig. 2). It is now represented in both figures, as being hooked over the catch, *c*. By pressing with the finger on the sole, *e*, inside of *f*, the loop at the outside, *e*, will be thrown up and the blind or shutter can be thrown open;

Fig. 2.



the loop then drops down by its own weight, as the distance from the sneck, *e*, to the axis, *f*, is much greater than from, *f*, to the sole, *e*. The blind locks itself as follows: it will be seen, in figure 1, that the point of the catch, *c* is an inclined plane; the bottom of the loop, *e*, is a reverse incline, therefore when the blind is drawn in, the point, *c*, slides under the loop, *e*, until it passes the notch of the catch, when the loop drops down by its own gravity, and the blind is locked as now represented in the above figure. This is a very cheap and neat blind lock. They are sold for 75 cents per dozen pair, for wood, or 87½ cents for brick.

Chloroform and Etherization in Child-Birth.

The Half-Yearly Abstract of Medical Sciences, No. 13, 1851, besides many valuable articles to the profession, contains one of very general interest on the use of chloroform or etherization in cases of child-birth. Dr. Murphy gives 540 cases in which chloroform was used with the happiest effects and no accidents. Dr. Simpson gives 1,519 cases of females subjected to anæsthetic agents, without any accidents occurring. Other physicians have contrasted the natural labor with those under the influence of chloroform, with results entirely in favor of anæsthesia.

Hydraulics.

Maximum Velocity and Power of Water on Different Wheels.

[Continued from page 384.]

Of Undershot Wheels.—The term undershot is applied to a wheel when the water strikes at or below the centre. And the greatest effect is produced when the periphery of the wheels moves with a velocity of ·57 that of the water;—hence, to find the velocity of the water, multiply the square root of the perpendicular height of the fall in feet by 8, and the product is the velocity in feet per second.

Example—Required the maximum velocity of an undershot wheel, when propelled by a fall of water six feet in height.

$\sqrt{6}=2{\cdot}45\times8=19{\cdot}6$ feet velocity of water; and $19{\cdot}6\times{\cdot}57=11{\cdot}17$ feet per second for the wheel.

Of Breast and Overshot Wheels.—Wheels that have the water applied between the centre and the vertex are styled breast wheels, and overshot when the water is brought over the wheel and laid on the opposite side; however, in either case, the maximum velocity is two-thirds that of the water; hence, to find the head of water proper for a wheel at any velocity, say—As the square of 16·083, or 258·67, is to 4, so is the square of the velocity of the wheel in feet per second to the head of water required.

Example.—Required the head of water necessary for a wheel of 24 feet diameter, moving with a velocity of 5 feet per second.

$\frac{5\times3}{2}=7{\cdot}5$ feet velocity of the water.

And 258·67 : 4 :: $7{\cdot}5^2$: ·87 feet, head of water required.

But one-tenth of a foot of head must be added for every foot of increase in the diameter of the wheel, from 15 to 20 feet, and ·05 more for every foot of increase from 20 to 30 feet, commencing with five-tenths for a 15 feet wheel.

This additional head is intended to compensate for the friction of water in the aperture of the sluice to keep the velocity as 3 to 2 of the wheel; thus, in place of ·87 feet head for a 24 feet wheel, it will be ·87+1·2=2·07 feet head of water.

If the water flow from under the sluice, multiply the square root of the depth in feet by 5·4, and by the area of the orifice also in feet, and the product is the quantity discharged in cubic feet per second.

Again, if the water flow over the sluice, multiply the square root of the depth in feet by 5·4; and two-thirds of the product multiplied by the length and depth, also in feet, gives the number of cubic feet discharged per second nearly.

Example 1.—Required the number of cubic feet per second that will issue from the orifice of a sluice 5 feet long, 9 inches wide, and 4 feet from the surface of the water.

$\sqrt{4}\,||\,2\times5{\cdot}4=10{\cdot}8$ feet velocity,—and $5\times{\cdot}75\times10{\cdot}8=40{\cdot}5$ cubic feet per second.

Example 2.—What quantity of water per second will be expended over a weir, dam, or sluice, whose length is 10 feet, and depth six inches?

$\sqrt{{\cdot}5}={\cdot}2236\times5{\cdot}4=\frac{1{\cdot}20744\times2}{3}={\cdot}80496$ feet velocity; then, $10\times{\cdot}5=5$ feet, and ·80496 $\times5=4{\cdot}0248$ cubic feet per second nearly.

In estimating the power of water wheels, half the head must be added to the whole fall, because 1 foot of fall is equal to 2 feet of head; call this the effective perpendicular descent; multiply the weight of the water per second by the effective perpendicular descent and by 60; divide the product by 33,000, and the quotient is the effect expressed in horse-power.

Example 1.—Given 16 cubic feet of water per second, to be applied to an undershot wheel, the head being 12 feet, required the power produced.

$12-2=6$ and $\frac{6\times16\times62{\cdot}5\times60}{33000}=10{\cdot}9$ horse-power nearly.

Example 2.—Given 16 cubic feet of water per second, to be applied to a high breast or an overshot wheel, with 2 feet head and 10 feet fall; required the power.

$2-2=1$ and $\frac{1+10\times16\times62{\cdot}5\times60}{33000}=20$ horse-power Take off ½ of thisnominal power.

Quick Work.

During the last fire in San Francisco, one of the newspaper offices being in danger, a double cylinder fast press was taken down, all the small parts, screws bolts, &c., buried in a barrel under ground, and other portions removed out of danger. The press was in this situation at 5 o'clock in the afternoon, when, the danger being over, Messrs. Amerige and C. Stedman, two New York pressmen, took hold of it with their sleeves rolled up. They got it into operation again, and drove off the editions of four of the San Francisco papers, which made their appearance next morning as though nothing had occurred.

The proposition to subscribe $200,000 by the city of Lexington, Ky., to the Covington Railroad, was defeated on Monday, 4th inst., by a vote of 917 for the tax, to 1,022 against it.

LITERARY NOTICES.

The Microscripist—Or a Complete Manual on the use of the Microscope; for Physicians, Students, and all lovers of Natural Science; by Joseph H. Wythes, M. D.: Philadelphia, Pa.: Lindsay & Blakiston.—Dr. Wythes deserves credit, as he will be sure to receive the thanks of the intelligent, for preparing a manual on the use of an instrument so elegant and useful as the microscope, which is every day obtaining greater popularity. The work, which forms a small volume of near two hundred pages, is a very valuable one, containing, with all the necessary engraved illustrations, full accounts of the instrument, its adjuncts, and use—the modes of procuring and preparing objects for inspection, instruction in physiological, chemical, and other collateral matters, &c. We hail this book as a most valuable addition to our library; its publishers have our thanks. They publish some most excellent scientific works.

American Railway Guide—Compiled by Charles Cobb, and published by Curran Dinsmore, 138 Fulton street. This useful publication is issued for August —every traveller should have a copy, as it is only 12 1-2 cents.

American Railroad Journal.—We are glad to see our cotemporary push along improving. This Journal is beautifully printed and ably conducted, and contains a vast amount of useful information connected with railways.