

machinists and tool shops do not keep them, and will not get one up without the purchaser will pay for the patterns. At least such was the case two years ago, when I tried in vain to obtain one.

C. H. T.

Boston, Dec. 17, 1865.

Filthy Water Supplied to Cities.

MESSRS. EDITORS:—The Schuylkill river supplies the city of Philadelphia with nearly all the water for all domestic purposes. It takes its rise in the coal regions, in Schuylkill County, about one hundred miles from Philadelphia. All the water from the coal and other mines in that region, are either directly or indirectly emptied into the waters of this small river, which, at some seasons, has not much more capacity than to supply the city with water. The waters from these mines are all more or less acid, some so much so as to destroy the iron machinery used in working them. There are several cities and towns of considerable size and many manufactories of various kinds, some close to the city, the filth and refuse of chemicals of which are washed into this river. I ask, do these acids from the mines, the filth from the cities, towns, manufactories and chemical laboratories, that are washed into this river, impregnate the water, and will not the increase of those washings by and by make the water unhealthy? Do these acids, chemicals, and washings mix with the water, or do they leave and the water become pure before it reaches the basin for domestic use? I think this is a very important matter for the city of Philadelphia, as it depends mainly upon this source for its water. Whether it has ever been thoroughly investigated or not, I do not know. Without making any claim to a scientific knowledge, I do believe that these substances do impregnate and remain in the water, but to what extent I have no idea. That a vast amount of unhealthy matter is washed into this river there is no question; it may be so small, at present, compared with the body of water, as to be imperceptible, the same as it would be if a small portion of poison was put into a hoghead of water—the poison would be there, notwithstanding it would be so diffused that it would be comparatively harmless. What becomes of the deleterious matters? Does the water neutralize them so as to remove their unhealthy properties?

I think our public would like to see the views of some of your scientific correspondents published in your paper upon this important subject. FANNY.

Philadelphia, Dec. 15, 1865.

[Whether the filth and poison in the Schuylkill water is injurious to health, depends entirely on the quantity. If our fair correspondent is so fastidious that she is willing to take the trouble, she may obtain pure water by distilling, filtering and aerating. Get a simple still to set on a cooking stove, and distill all the water intended for drinking, then filter it through freshly-burned charcoal to remove the volatile odors that come over, and finally agitate it in the atmosphere so that it may reabsorb its supply of air to make it sparkling and palatable. A simpler process for obtaining pure water is to melt ice. This process is employed by some of the most eminent physicians in this city for their own families, to avoid the danger of lead poison from their water pipes.—Eds.]

Heating Feed for Low-pressure Boilers.

MESSRS. EDITORS:—I want to heat to the boiling point, if possible, the boiler feed of a large low-pressure boiler. The usual method, *i. e.*, taking it from the hot well, is not sufficient; nor can the exhaust, before entering the condenser, be conveniently used. I have thought of passing the feed pipe through one of the main flues or close to the crown sheet, and only the length of the fire-box. Of course the check valve would be changed, so that the pipe should remain full. This plan has been tried on Lake Erie, I think, with what results I do not know. The arrangement would, I think, be safe enough while a current of water was moving through the pipe, but with the pump at rest and the pipe exposed to heat, would it be safe? SUBSCRIBER.

Dec. 12, 1865.

[A pipe carried in the manner suggested by our correspondent is obviously in danger from being burnt so soon as water ceases passing through. Pumps often stop working, when the pipe would get red hot in a short time. A better way would be to

put a coil of pipe across the flues in the smoke box, so that the heat would act upon it without danger of burning it.—Eds.]

Gun Cotton.

MESSRS. EDITORS:—Among the earliest objections urged against the use of gun cotton was its liability to decomposition. M. Blondeau, in a recent communication to the French Academy of Sciences, recommends a compound of gun cotton and ammonia as "being more stable and less liable to spontaneous decomposition than gun cotton." He proposes the new name of "pyroxilic acid" for "pyroxiline," the present name of gun cotton. I have, at various times, prepared large quantities of gun cotton, and have never witnessed this liability to decomposition, and am inclined to think that, if properly prepared, using pure and concentrated acids, and very careful and thorough washing, it is a stable compound below 200° Fah. It is possible that, when prepared in very large masses, its formation is not so perfect or uniform throughout the mass, and the washing process may not extend to every fiber.

I send inclosed a small sample of gun cotton prepared by myself nearly twenty years since, soon after the announcement of Schonbein's discovery. You will find it on trial to be as good as new, although it has been exposed to all the vicissitudes of this climate during this long period, and for several years of this time in a very damp situation. It is a part of several pounds which I prepared for Capt. Mordecai, with which to test its comparative merits with gunpowder at the U. S. Arsenal. It will be remembered that he reported against its use in the Government service on account of its greater explosiveness, three or four superposed charges bursting muskets of the best quality. As this condition of charges cannot occur in breech-loaders this objection cannot apply, and with all the advantages possessed by this substance over gunpowder, it is to be hoped that it may receive further attention from the Government, and also from manufacturers for sporting purposes, since breech-loaders are now so much in vogue.

CHAS. G. PAGE.

Washington, D. C., Dec. 29, 1865.

A Question in Relation to Water Wheels.

MESSRS. EDITORS:—I wish your opinion respecting a proposed change in the construction of a horizontal water-wheel. I find, according to the "Mechanic's Text Book," pp. 84, 85, that "water is subjected to the same laws of gravity as those of solid bodies, and thereby accumulates velocity or effect in an equal ratio when falling through an equal space, or descending from an equal height—that its greatest effect is obtained when acting by gravity throughout its whole height."

If the above be admitted, it seems that there is a loss in the affective power due the falling column of water, from its describing an arc, from 3 o'clock of the circle to 6 o'clock, instead of falling in a perpendicular right line from 3 o'clock until it reached or intersected a parallel line from 6 o'clock. For it seems that the effective power due to a bucket at 3 o'clock is proportionately less at 4, and still less at 5, and nothing at 6, if any remained in at this point of the circle.

Now, if I am correct in the above, it seems to me that I can construct or arrange buckets in or on a wheel, so as to fall vertically from a point level with the axis instead sweeping round the arc.

But do you think it worth the doing, so that it would pay well, and be patentable? A. W. L.

North Adams, Berkshire Co., Mass., Dec. 4, 1865.

[Nothing whatever would be gained by this change. The water exerts precisely the same effect in falling around the arc that it would in descending vertically.—Eds.]

A Suggestion to Astronomers.

MESSRS. EDITORS:—A recent article in your valuable paper, in relation to tables for cutting screw threads on geared lathes, suggested the possibility of an astronomical calculation, by means of a series of cogged gearing, properly constructed, which should automatically indicate eclipses, transits, conjunctions, oppositions and all regular motions of the planetary system with mathematical exactness, thus saving the trouble of "brain-work" in such matters,

other than reading the register and taking notes. I think such an apparatus might be found quite useful in practice, and would be better, every way, for such purposes, than even the best known planetarium, besides costing far less. W. L. D.

Louisville, Ky., Dec. 4, 1865.

Solvent for Shellac.

MESSRS. EDITORS:—One of your correspondents asks if you can inform him of a solvent for shellac, and you replied, that "alcohol was the only menstruum that completely dissolves it," or some such answer. I have not the paper before me, and cannot give the exact words. It may be of some benefit to him to know that a saturated solution of borax will completely dissolve it. J. T. R.

Advantages of Advertising.

Mr. Seymour, P. M., at Hudson, St. Croix County, Wis., in sending a club of subscribers for the coming year, writes as follows:—

"Below please find list of subscribers for SCIENTIFIC AMERICAN, which I have succeeded in getting up for you. I had hard work in raising them, but thought it a shame that but one copy was taken among sixty old mechanics, and that copy my own, who am not a mechanic. I cannot do without it. Many say they cannot afford to take it.

"I saw in it the advertisement of Waits' journal turbine. Never had heard of it before, but wrote to Mr. Wait once or twice, and got a wheel. It is the best I ever saw, and does more work than he warranted it to. I save 54 inches of water by it over my old wheel—worth to me say \$200 per year, or more than the price of the wheel. So much for advertising in the right paper."

NEW AND VALUABLE SCIENTIFIC WORKS.

We have received from Mr. John Wiley, No. 535 Broadway, New York, two most valuable scientific works which he is now issuing. These works are, "Rankine's Ship-building," theoretical and practical, and "A Treatise on the Screw Propeller, Screw Vessels, and Screw Engines, as Adapted for Peace and War," by John Bourne.

Both of these works are issued in monthly parts, the first at \$1 25 per number, the second at 2s. 6d. English money. They are profusely illustrated with plates which are, in fact, working drawings, so clearly are all the parts and details given. In the work on screw propellers, the author begins at the earliest attempts, and leads the student on to the latest achievements and best practice of modern builders.

Part I. contains, in addition to the text, a large double-plate page of the engines and hull of the *Great Eastern*, exhibiting the builder's lines, coal stowage, and general arrangement of the interior.

The work will be completed in twenty-four numbers. Every reader of the SCIENTIFIC AMERICAN interested in steam machinery should subscribe.

The work on ship-building is contributed to by the most celebrated English ship-builders, Prof. Rankine of the Glasgow University being the corresponding editor. The hydraulics of ship-building, strength of materials, masts, sails and rigging, the geometry of ship-building; practical ship-building, and marine steam engineering—are all to be treated on in the progress of the work. The mere citation of the contents and the name of the presiding editor, Prof. Rankine, are sufficient guarantees of the invaluable character of the work.

LEADEN pipes were used by Archimedes to distribute water by engines in the large ship built for Hiero. The first improvement on the ancient mode of making leaden pipes was matured in England in 1539. It consisted in casting them complete in short lengths, in molds placed in a perpendicular position. After a number were cast, they were united in a separate mold by poring hot metal over the ends until they ran together.

In 1678 engines were constructed by Hautefeuille and Huyghens, which derived their motion from the explosion of small charges of gunpowder within their cylinders. In the same year Hautefeuille proposed the alternate evolution and condensation of the vapor of alcohol in such a manner that none should be wasted.