

SCIENTIFIC MUSEUM.

Safety Fluid Lamp—Chemical Cause of Explosions.

On our advertising page, will be found the advertisement of Mr. Newell's lamp, an invention which we have examined and which we estimate highly. It is a scientific lamp, and one which no one not acquainted with chemistry, could have invented; because the improvement is founded upon a knowledge of the gases; it embraces the principle of Humphrey Davy's invention of the Safety Lamp. In the centre of the lamp, extending to the bottom, is a fixed cylinder of fine tinned wire gauze, having a mesh of 500 to the inch. A tube of like gauze screws on to the wick disc, and confines the wick; this tube slips down inside of the gauze cylinder spoken of. The can for containing the camphene, or turpentine and alcoholic mixture, which is now commonly used for lamps, is made with a disc of this wire-gauze in the spout and under the lid. We have seen the fluid in the lamp set on fire by taking out the wick, and the fluid set on fire at the spout of the can, and no explosion take place. We have also seen the fluid poured into the lamp, out of the can, while the fluid in the spout and that in the lamp were blazing, and, instead of an explosion, the flame was extinguished. It may well be asked, —how can this simple application of wire-gauze prevent explosions in fluid lamps? The question is an important one. It was discovered by Humphrey Davy, that fine wire-gauze surrounding the flame of a lamp, would prevent the ignition of an explosive gas surrounding the lamp—but why it should do so men differ in opinion—the fact is known, and Mr. Newell has ingeniously applied his knowledge of the same. The reason why any gas is explosive, that is, goes off like gunpowder, by sudden expansion and contraction, when ignited, is owing to the combustible materials of its composition being fully saturated with oxygen, and it is then in a fit state to ignite instantaneously by the first spark. The gas we employ for lighting our streets, if it were saturated with oxygen, would, when a burner was opened and touched with a match, ignite quick as the lightning flash all the gas in in every pipe and gas-tank in our city, and would tear up our streets and blow up our houses as suddenly and forcibly as if they had been mined with gunpowder. This is the chemical cause of gas and other explosions, —viz., the combustible materials being fully saturated with oxygen and then ignited. The coals in our fires do not explode, because they are not saturated with oxygen, the supporter of combustion; the oxygen gradually combines with the carbon in combustion, but if our coals were reduced to a state of gas, and the gas mixed with twice its weight of oxygen, the mixed gas would ignite instantaneously when a match was applied, and cause what is termed an explosion—which is but instantaneous combustion; a fire is slow combustion, that is all the difference between the two. Those who keep volatile hydro-carbons, such as alcohol, turpentine, or mixtures of these two fluids in stores, &c., should be very careful and not suffer them to be acted upon by heat so as to cause evaporation and saturation with the oxygen of the atmosphere, which is simply—to use a solecism—a gunpowder gas.

Fossil Remains.

In the river bank of Zanesville, Ohio, a fossil elephant has been discovered, the third of the same species, in the same gravel bank within a few years past. It is in much better condition than the former two, and may, when completely exhumed, show almost the entire bones and frame of the huge monster, much beyond, perhaps, double the size of the living Asiatic or African elephant. The molar teeth, four in number, all that the species possess, were found in the jaws sound and unbroken, and two weigh twenty pounds each. The tusks were not in as good condition, one only being sound enough to bear moving.—This one eight feet in length, measures at its base, 26½ inches in circumference, and at the point eight feet distant, where it is broken off, 16½ inches in circumference, the whole length of which was probably 12 feet more.

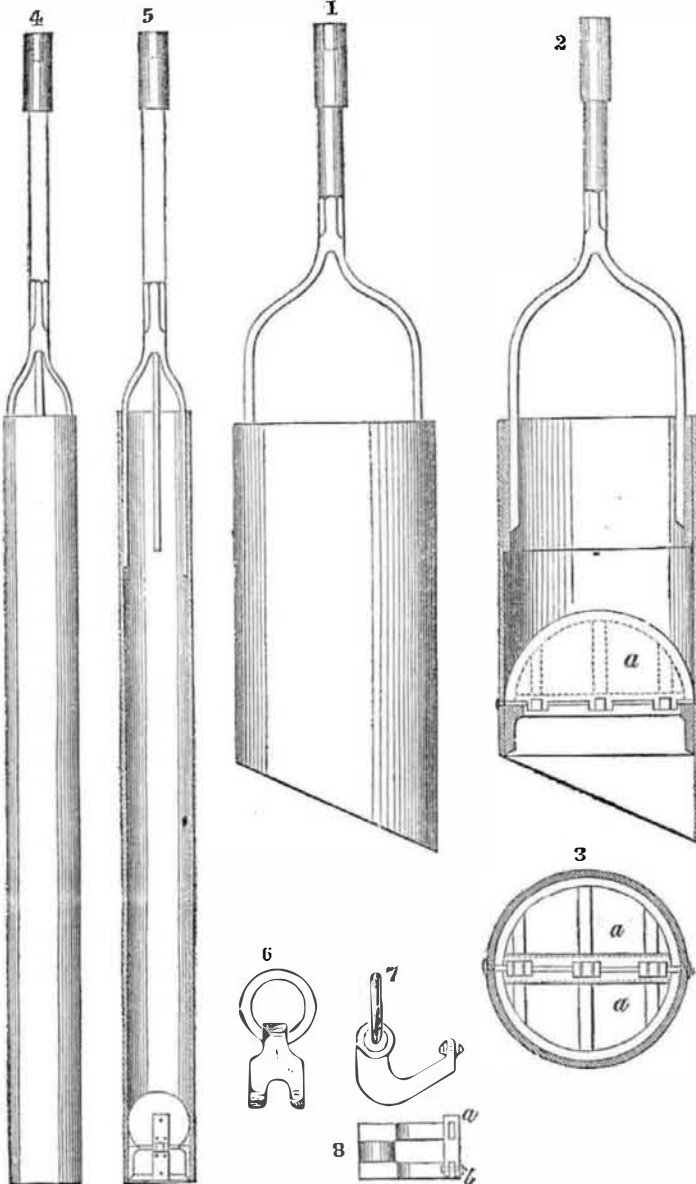
Well Sinking—Artesian Wells.

(Continued from page 104.)

Figures 1, 2, and 3 represent a large shell; a a are two valves opening upwards to admit the bored material; this tool is employed in boring through sand or hard ground after it has been loosened by other tools. Figs. 4 and 5 show a small shell similar in principle, but somewhat differing in detail, there being but one valve and the edges of the shell cut square, instead of slanting. Both of these tools are worked with a compound of circular and vertical motion. Figs. 6, 7, and 8 are dogs for suspending the rods, to which are secured the boring tools. The latch, a, which opens

on b as a hinge, allows the projecting knob of a rod to enter, and when shut secures the same in its clutches; the dogs can be suspended themselves by a rope.

Various theories have been advanced for springs, and lower strata of water. There can be no doubt but all water deposits, however deep, are obtained and furnished with water by percolation from above, derived from rains or melted snows. These descend through porous strata, and are received into rocky chambers in hills and mountains, or are retained in sand and gravelly seams, which have a firm rocky or a clay bottom, which prevents the water from passing down fur-



ther. In many situations there are boiling springs—that is, water boiling out of the ground with considerable force. This is an evidence of a pressure exerted on the water somewhere; it must be by a column of water, the head of which is above that of the spring. Have any boiling springs ever been discovered except beneath some elevations? We know of none. In very dry weather, springs which depend for a supply from a more elevated region, such as from neighboring hills, present unmistakable evidence of their rainy origin, by oftentimes drying up. This is sure to be the result in moderately elevated situations—in extensive plains it is a standing fact.

In Egypt, the land of no rain, are there any wells in situations where the water does not overspread and percolate through the earthy strata during inundations; if there be, and no mountains near or distant, that could send down an underground supply, then the strongest argument that could be produced against rain being the great source of springs, is thus presented. We have no pointed and particular information to clear up such a question. In those parts of the American continent where no rains fall, nothing but dreary wastes spread out in barren desolation. An opinion was advanced by Descartes, that the sea was the cause of springs, not rains. He asserted that it found its way into the bowels of the earth, and there, by central heat, was converted into steam, which escaped upwards and was condensed into water in the cold upper strata, and in that state was collected in internal reservoirs in the mountains, hills, and

depths of the earth. This idea of the cause of springs or fresh water being obtained in depths below the surface of the earth, has some plausibility to recommend it, but not a single experimental fact, so far as we are aware.

All wells which boil over the surface are Artesian in effect, whether bored or not; that is, the water is forced up by head pressure. In Williamsburgh, L. I., in the lowest part of the city, these flowing springs have been obtained by excavating a very inconsiderable distance. The supply, upon the principle set down, must depend upon percolation from a higher level, and as that elevation is built upon, and a great quantity of the water which falls is conducted into cisterns for domestic use, the supply for the springs below must decrease in proportion. The boring through strata by the tools and machinery represented, is merely for the purpose of giving vent, like a valve, to the water-pressure exerted from a high column of water somewhere through the earth, like an inverted syphon.

(To be continued.)

Gum Elastic.

It is said that not only flutes are made of India rubber, but canes, violins, and guitars! Indeed, by some new process the material is made so hard, that it is difficult to find tools with which to work it.

Oliver Routh, the second engineer of the steamer St. James, which blew up last July, killing Judge Preston and others, on Lake Ponchartrain, near New Orleans, has been indicted for manslaughter, a wonder truly.

LITERARY NOTICES.

GLEASON'S PICTORIAL DRAWING ROOM COMPANION—Since the commencement of this journal its character has greatly improved, both in the quality and quantity of the illustrations. Vol. IV. commences on the 1st of January, and the publisher guarantees great improvements, besides a reduction of the price. Up to this time the literary character of the Pictorial has not corresponded with the general excellence of its illustrations. It has been altogether too light, but hereafter this apparent defect will be remedied by the addition to the regular corps of contributors, of Ann S. Stephens, Mrs. Sigourney, Mrs. Neal, Misses Cary, Hastings Weld, H. W. Herbert, T. Buchanan Read, T. S. Arthur, Ben. Perley Poore, Dr. J. V. C. Smith, Park Benjamin, etc. With such able pens, assisted by the best artistic talent our country affords, there is nothing to prevent the Pictorial from taking a high rank among the standard publications of the day. We believe the publisher has abundant means to afford the subscribers a splendid paper. The following are the terms of the paper:—One subscriber, one year, \$3; two subscribers, \$5. The paper will be for sale at all the periodical depots throughout the country, after the 1st of January, at six cents per copy. S. French, Agent, Nassau street, corner of Spruce, New York.

THE CHILDREN OF LIGHT—By Caroline Chesbro, published by Redfield: New York.—We have been highly gratified with the perusal of this work, which is a fresh production from the pen of its talented authoress. Woman's heart is the theme, and none but a woman herself could have performed the task of ably depicting that enigma. The result has been a work of uncommon interest, full of noble sentiments and liberal ideas. Plighted vows and faithlessness in man, womanly pride, and womanly tenderness form the episode. The plot is simple, almost too much so for the generality of readers who, now-a-days, are not content with anything in the shape of a novel that is not one continual scene of excitement.

CAP SHEAF—By Lewis Myrtle: Redfield, New York.—A collection of pretty unpretending tales that cannot fail to amuse its readers; they are written in a plain familiar style, which delights from its very simplicity. We are rejoiced at the appearance of such works, which are content with giving pleasure without forcing us to be always upon stilts, our modern writers are too apt to imagine that they are more entertaining as they become more obscure, and think it a feat of genius to lose themselves in a labyrinth of thoughts and expressions which it is impossible to understand. It will be enough to say that Lewis Myrtle is not one of this class of authors.

NATIONAL PORTRAIT GALLERY—Nos. 8 and 9 just received; they embrace portraits and comprehensive biographies of Timothy Dwight, Joel Barlow, John Trumbull, John Jay, John E. Howard, and Gilbert Stuart. This excellent work deserves the patronage of every person interested in the lives and character of America's dead and living great men. Price of each number 25 cents. R. E. Peterson & Co., Philadelphia; William Terry, 133 Nassau street, N. Y., agent.

THE NEW ENGLANDER—No. iv. Vol. 10, of this Quarterly completes the present volume; it contains eight able articles on different subjects, not one of which could have been written by an inferior mind; it is published by F. W. Northrop, New Haven, Conn.

We are indebted to Messrs. Dexter & Bro for the December numbers of Godey's Lady's Book and Arthur's Home Magazine; Godey has furnished a splendid number, full of fine embellishments.

Peterson's Magazine for December contains several spirited pictures and contributions of merit. For sale by Dewitt & Davenport, Tribune Buildings, New York.



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