SCIENTIFIC MUSEUM.

To Know Good Guano.

As this substance is beginning to be extensively used by our farmers, and as there are many indifferent kinds of it, and perhaps considerable adulteration practiced, it will no doubt be a benefit to farmers to be able to judge correctly of its quality.

Common guano is a mixture of ammoniacal salts and earthy phosphates, and is composed of the excresences of sea fowl, deposited on islands in the sea, in latitudes where no rains fall. It is brought to the United States and Europe from two different parts of the world, viz., Africa and Peru; the former kind contains a larger amount of phosphates but less ammonia than the latter, and is therefore inferior. Guano contains water, ammonia, ulmic, uric, and humic acids, which are classified as volatile and organic matter, separable at a low red heat; also alkaline salts, such as sulphate of soda, chloride of sodium, and alkaline phosphates which are separable by boiling water from the aforesaid ash; also earthy salts, consisting of the carbonates and phosphates separable by hydrochloric acid from the residue aforesaid; also sand which is insoluble.

To analyse guano:—1st, calcine 100 grains in a capsule at a low red heat, until all black particles are burnt away and a white ash is left. Good guano should lose about from 60 to 70 per cent, of volatile matter. 2nd, digest the above ash salts, filter them, then dry the residue and weigh it. Good guano should lose from 4 to 6 per cent. of these alkaline salts. (The phosphoric acid can be separated from this solution by adding sulphate of magnesia and ammonia, which precipitate it as ammoniac phosphate of magnesia.) 3rd, The residue of the above is then digested in hot hydrochloric acid, then filtered and well washed; then weighed, the loss is carbonate and phosphate of lime and magnesia, which are precipitated by ammonia, this, on being dried and submitted to heat should amount to 15 or 20 per cent. of the whole guano. 4th The residue is sand and should never exceed four or five per cent. in good guano.

One sign of good guano is, that from fifty to seventy per cent. should dissolve in a hot solution of caustic potash with a strong smell of ammonia; from thirty to forty-seven per cent. of good guano is soluble in water. It would be well if every planter and farmer had a small laboratory for experiments, always taking care to be as economical of time for out-door business as possible. We advise our young farmers to cultivate a taste for chemistry and experiment; it is a science founded altogether on experiment. We can tell why two and two makes four in mathematics, but we cannot tell why oxygen and hydrogen combine in certain definite proportions and no others, to form water; we know that it is so by experiment, and the fact is an important one. There are many facts yet to be discovered, and agricultural chemistry offers a wide field for investigation.

Motion of Water.

The smallest inclination capable of maintaining the mobility of water is 1-1000000, but it is barely perceptible at twice that inclination. At 1-9288, the mean velocity is six inches per second; at 1-2700, seven inches per second. The aqueducts of the ancients were inclined from 1-432 to 1-648. The minimum velocity necessary to maintain the salubrity of water is 13 3-4 English inches per second.

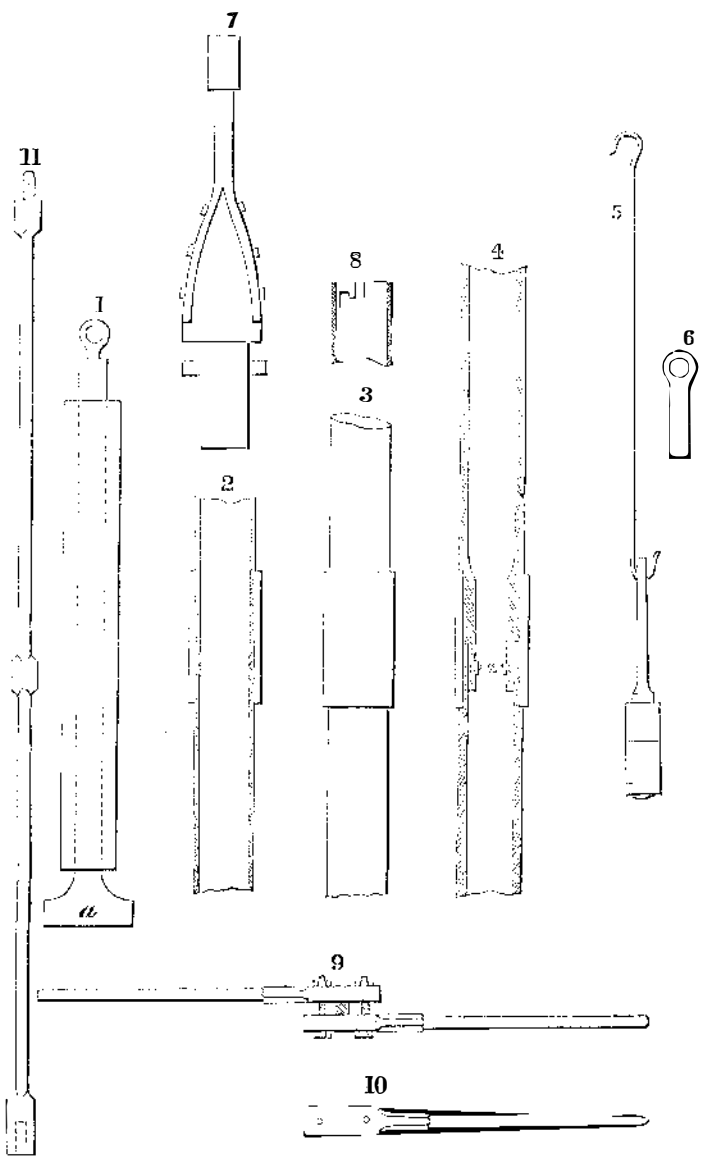
Iron Casks.

African Trade attracts much attention in English commercial circles at present. It is intended to establish one or more lines of steamers to ply between England and the African coast, to be engaged in the traffic in palm oil, etc. For this purpose it is proposed to use the newly invented iron casks as a substitute for wooden ones, by which means the necessity of having coopers with each steamer would be obviated. Iron casks will, it is said, be cheaper and more durable than wooden ones, besides being more portable as they may be taken apart and set up again by any person, and when not set up, will occupy but a small space.

Well Sinking----Artesian Wells.

(Continued from page 88)

Boring—In our last article on this subject we presented two illustrations of the geological character of a country, where the boring for water to overflow the rim of the well would be successful. We will now present an illustration of some of the tools employed. When the mouth of the spring is scooped out, it is built around with well cemented bricks to keep out surface water, or by employing iron cylinders, or any suitable method, such as a bored log of timber, as mentioned in our last article on the subject. The simplest method of boring is called the "Chinese System." All the rods ordinarily connected with the boring tool, are dispensed with; and the borer is suspended by a rope, which, when the tool is lifted vertically and let down, it imparts, by its torsion, a sufficient circular motion to it. In this engraving, *a*, in fig. 1, is a tool surrounded by an iron cylinder; the products of the excavation become collected in the circular space between the tool and the cylinder, by which means they may be brought up to the surface. With this simple machine—various tools being used for different strata—it may be asked why this plan is



not generally used? The fact is, it is liable to bore a crooked hole by the twisting action of the rope; therefore, the ordinary plan is to attach iron rods to the borer, which are in lengths from ten to twenty feet, and screw into one another; a circular motion is given to the tool by the workmen above, but the iron rods have all to be unscrewed, when the products of boring are drawn up. When an Artesian well is to be bored, a flooring is laid with the hole in the centre, and wooden trunks or iron pipes are fixed as guides for the tools. As the hole is bored, permanent pipe is inserted, which are either of wrought or cast iron; figs. 2, 3, and 4 show lengths of these pipes. The collars of the pipes are generally screwed together. Wrought-iron pipes are seldom rivetted; they have their collars soldered on them. The solder is run in and melted in the pipes by suspending an iron heater, (figs. 5 and 6) down the pipe; the small heater is made of one, and the large one of two circular pieces of iron. The pipes are slung down the well by means of a wooden plug (fig. 7), which has a pin or key passing through it; this is inserted into the end of the pipe, which is cut reversely in fig. 8, and can easily be withdrawn. The boring rods are usually turned round by the leverage of two handles (figs. 9 and 10). Where the work is too heavy for manual power by these levers, horse or steam power may be employed. The rods for boring are shown connected in fig. 11. A circular and vertical percussive motion is given to the tool; various plans have been employed to give the tool an easy rotary motion along with a vertical motion, to act upon the rock. The spring spiral motion, shown on page 40, this volume of the Scientific American, the invention of J. Thomson, of Philadelphia, is no doubt the most simple yet introduced. Various plans for giving the borer its proper motion have been brought forward; there is one of Messrs. Wightman & Vaughan, illustrated on page 132, Vol. 3, Scientific American; one on page 153, same volume, by Foster & Bailey; and there is one on page 137, Vol. 5, with improved tools—a foreign invention and well worthy of attention. We do not present these machines again, but merely refer to them as positive information already published in our columns.

In putting down pipes, of course the judgment of the operators must decide, according to locality and the nature of the strata, how this can be done in the cheapest and best manner.

(To be continued.)

Guano.

A German Chemist named Von Breisach has invented a kind of artificial guano, which can be had at less cost, and is equal in quality to the natural. The government of Bavaria have determined to give Mr. Von Breisach every assistance in their power.

We have been assured by the brother of Mr. Von Breisach, who resides in New York City, that it is a most valuable discovery, and that there is a prospect of its being introduced soon into our country.

Gold Half-Dollars.

A private mint in Californiais coining half-dollars, some of which have reached this country.

The Anodonta rubens, from Senegal, a molluscous, though purely aquatic animal, will survive eight months out of water, exposed six months to a burning sun.

LITERARY NOTICES.

Nystrom's Treatise on Screw Propellers This is a very handsome and good-sized volume on a very important subject to marine engineers and those who are interested in steam navigation. The author is experienced in the construction of screw propellers. He is a patentee of the Calculating Machine illustrated on page 284, last volume of the Scientific American, and which is introduced into this work, and explained in its application to plain and abstruse calculations of every description. Figures of steam engines and propellers are presented and explained, and there is also a treatise on bodies in motion in fluids. There is an exceedingly useful table to find the pitch of propellers. Loper & Nystrom's patented propeller engine is also illustrated. The matter contained in this treatise is exceedingly valuable; new ideas and plain practical thoughts are uttered with a clearness and brevity which should make it sought after with avidity by all those whose profession or business lead them to be posted up in such information, It is published by the most eminent publisher in America of such useful works, Henry C. Baird, Philadelphia. It is for sale by Stringer & Townsend, New York.

The Analytical Chemist's Assistant.—This is a new work by F. Woeber, and published by Henry C. Baird. Philadelphia: it is translated from the German by Oscar M. Lieber, and treats of both Qualitative and Quantitative Analysis; it treats of natural, artificial, and organic compounds. It is an exceedingly able chemical work; we have quite a number of such works, and we say that this one is a favorite. To the student of chemistry it is a most excellent assistant and instructor. We are much obliged to Mr. Baird for this work. It is for sale by Stringer & Townsend, this city.

Regal Rome.—The early history of Rome is shrouded in fable and obscurity, yet it cannot be doubted but it must have been a wonderful one, to have formed the customs which moulded a people to conquer the world. This work, by Prof. Newman, of London, gathers together and presents, in a clear light, the historical details of early Rome, unravelling much of the mysterious, and forms an instructive introduction to Roman History. It is a neat volume, and the public is indebted to the spirited publisher, Redfield, this city, for its publication.

Poor and Ignorant; Rich and Educated.—This is a neat pocket volume, published by Fowlers & Wells, this city, and comprises two Lectures by Horace Mann, on Intemperance, and its effects on the "poor and ignorant," and on the "rich and educated." Although a small volume, it is "large" in importance, sound and truthful in all its teachings, and bears the impress of great knowledge and originality.

Littell's Living Age—This weekly periodical, published by Littell & Co., Boston, is the best transcript of the "living literature" of the age. it contains the very cream of the great foreign Quarterlies.

Meyer's Universum—Numbers 9 and 10; each number contains four magnificent steel engravings, illustrating views in different parts of the world, and fully described by a well-written article. This is an elegant publication and is deserving an extensive patronage. H. J. Meyer, 164 Williamstreet, publisher. Price each number 25 cents.

"A Treatise on Clock and Watch Making, Theoretical and Practical," by Thomas Reid, Edinburgh: illustrated by 20 folding plates; in 10 parts at 50 cents each Blackie & Son, Fulton street, N. Y.