Scientific American

NEW-YORK, DECEMBER 18, 1852.

Award of Prizes.

In the prospectus of this volume of the Scientific American, we offered four separate prizes for the four largest lists of subscribers.—These prizes were, 1st, "An elegant silver pitcher." 2nd, "The Iconographic Encyclopedia." 3rd, "Dempsey's Machinery of the Nineteenth Century." 4th, "Naval Dry Docks of the United States." The time specified has now arrived for declaring the names of those who have gained said prizes. They are, 1st prize, John Marston, of Saratoga Springs, N. Y.; the number of names sent 125. Saratoga is an enterprizing town, but previous to this we had only three subscribers by mail in that place. 2nd prize, to L. A. Miller, Woodstock, Vt.; the number of names sent, 101. 3rd prize, to John J. Conley, of Richmond, Ind.; number of names sent, 72. 4th prize, to R. S. Titus, of Flushing, Long Island; the number of names sent 62. As we have heretofore stated, if the gentleman who has gained the silver pitcher prefers to have its value in money, viz., $60, we will forward the same to him,—his choice is our law. The books which have been awarded are illustrated works of a practical standard character, and are not merely useful for a single reading, but as works of reference for ever. We have no doubt but the gentlemen who have gained them will feel satisfied.

We take this opportunity of returning our sincere thanks to other competitors who have sentus lists, a number of which are nearly as large as that for the fourth prize. Whatever kind turn we can do foryou, we will be happy to do it, and you may be more successful on another occasion.

It would not be just or honest if we pretended otherwise, than that one great object of offering these prizes was the extension of our circulation, it was; but at the same time, we believe the Scientific American to be a useful paper, a standard work, and will return full value to every subscriber for his money. It is not so large as some papers of the same price, but the value of no paper should be estimated by its size or the amount of its mere reading matter—its quality—its real worth is the only standard. We can buy forty yards of calico at one shilling each, for one of broadcloth at five dollars, but a yard is a yard all the world over, the quality, not the quantity makes the difference. We have the means of obtaining more varied stores of useful information about science, art, and new inventions and discoveries than any other paper on our continent. We also spend more money to obtain such information, than any other paper, and our engravings are the best illustrations of mechanical subjects ever attempted in our country. Our experience, our agencies, and correspondence with qualified and able men in different parts of the Union, in France, Germany and Britain, enable us to obtain the *first and most reliable* information about everything that is new in science and art. It has taken—as it always must—a number of years to discover, arrange, and perfect the means of obtaining such information, and now we rest firm and secure on a solid basis of a primitive formation. We feel, and no doubt all our friends do the same, in commending the Scientific American to persons for subscription, a consciousness of returning them a full equivalent for the money they may subscribe. The very engravings of machinery, &c., which we present in one volume are worth more than five dollars to any mechanic, artisan, and inventor, and we confidently aver that the same number and same amount of correct reading matter accompanying such illustrations cannot be obtained in any paper or magazine in the world, and in no book for three times the same amount of money. It is also the only real inventors' advocate, friend, and paper in the United States. We publish a number of valuable and rare receipts; and communications of a most practical, scientific, and useful character, by some of the ablest men in our country, frequently appear in our columns.

Our general subscription list has greatly increased, and we are therefore enabled to expend more upon our present volume than any of the preceding seven. We return our thanks to old friends for the kind interest they have manifested in our success, and to our new friends, we say, our friendship will be much closer before the end of the present volume.

Ammonia.

This substance is placed by agricultural chemists at the head of all fertilizers. Guano derives its chief value from its presence, as it contains over 60 per cent. of it. Could it be obtained cheap in the state of a salt, like the muriate (salammoniac,) a valuable and cheap substitute for guano could be made artificially. But it is a dear substance, and farmers cannot afford to buy it. There appears, however, to be some prospect of obtaining a cheap supply, as it is stated that "Prof. Gale, of the Patent Office, has recently received some crude sal-ammonia, brought from Chincha (whether the Peruvian valley or not we cannot say,) which has recently been discovered in a vein like that of metallic ore, and in quantities sufficient to render it an article of commerce." We hope this information is true, but the quantity may be as moderate as that now found in all volcanic regions. Ammonia is a compound of two gases, viz., nitrogen and hydrogen.—They do not combine directly in their gaseous state, but if a great number of electric sparks be passed through a mixture of them, especially if acid vapors are present, a combination takes place, and a third body—ammonia—(NH^3) is formed. It is always found in the rains of thunder storms, hence it is concluded that the lightning is an active agent in its formation—it is the marryingminister. These two gases, however readily combine in a nascent state; a piece of iron rusting in the air is almost constantly giving rise to a small portion of ammonia. The moisture which covers the iron dissolves the atmospheric air; the oxygen of this air unites with the iron to form the rust—oxide—and the pellicle of oxide constitutes with the metal, a voltaic element strong enough to decompose water. The oxygen thus set at liberty unites with a new quantity of iron, and the nascent hydrogen of the water finding nitrogen in solution in the moisture, unites with it and forms ammonia.

When zinc is dissolved in dilute nitric acid, the liquid is found to contain a marked quantity of the nitrate of ammonia. In the solution of the zinc in the dilute acid, hydrogen gas is set free and nitrate of oxide of zinc is formed, but if zinc is treated with concentrated nitric acid, the zinc is oxidated at the expense of a portion of the nitric acid, and as a mixture of hydrogen and nitrogen is separated, these two gases meeting in the liquid in a nascent state (act of evolution) unite and form ammonia. A notable quantity of ammonia is therefore found in the liquid. It is the case with other gases beside nitrogen and hydrogen, that although they do not readily combine when brought together in their distinct gaseous state, yet do so freely when simultaneously set at liberty in the same solution.

Animal matters burned under exclusion from the air, give off a considerable quantity of the carbonate of ammonia. This is dissolved in hydrochloric acid, and produces the salammoniac of commerce. Ammonia is obtained in a gaseous form by mixing powdered salammoniac with about an equal quantity of dry *slacked* lime, and heating it in a retort having a bent tube. The gas is abundantly discharged, and may be collected in the common way over mercury in a trough. Ammonia is a colorless gas of a very pungent odor, causing tears to flow freely. It is a powerful alkali, and neutralizes strong acids, such as sulphuric, &c.—In water it is very soluble, and being mixed with it, is called aqua-ammonia. Under a pressure of five atmospheres, it becomes liquid; it extinguishes the light of a candle, and does not burn under ordinary circumstances; if breathed undiluted it is fatal to life.—It is very volatile as a liquid, and is employed to give that pungent odor to what are termed smelling salts. The producing of tears which is a peculiarity of onions, is attributable to ammonia. In the destructive distillation of bituminous coal in making gas, a quantity is produced which has all to be removed, for it detracts from its illuminating properties. This is done by a water cooler—a vessel through which the gas passes before it goes into the retaining tanks and pipes for distribution. It would be well for agricultural chemists to devote their attention to the artificial production of a cheap ammoniacal salt, as the Lobos Islands are not yet free property for all the world.

Critical Dissertation on Steam, Hot Air, and Gas Engines.

One of our exchanges asserts that preparations are already in progress to contest the claim of Ericsson to the invention of the "caloric engine." It also quotes from the "London Mining Journal" of Nov. 6th, a paragraph taken from the Augsburg Gazette (a German paper,) which claims the invention for a magistrate named Prehn, of Lauenburg (Germany) who invented a caloric engine some years before Ericsson. It says:—

"By a series of costly experiments he succeeded in expanding and contracting air so rapidly by alternately heating and cooling, as to prove its capability as a motive power. He endeavored to get a patent for England, but found he should lay himself open to opposition and law suits; and although he obtained one for Berlin, and had testimonials of success from Macpherson and George Stephenson, in England, Von Humboldt and Rapsold, of Hamburg, and Schumacher, of Altona, ill-success brought him to the grave, leaving a widow and seven children."

Public journalists and mere literary men generally display a great amount of ignorance respecting the history of inventions. Some believe and assert that James Watt was the inventor of the steam engine, while steam had been applied to move machinery before he was born. Some assert that Fitch, Fulton, or Symington were the first inventors of the steamboat, while a patent was taken out for such an application in 1736 by Jonathan Hulls. There is a great difference between an improver and an original inventor. The original invention may not be much, and an improvement may be everything, and vice versa. The caloric engine, about which so much is just now said, is simply the application of heated air to propel machinery, as a substitute for steam. Now this is no new application nor invention, and neither Prehn nor Ericsson are the first inventors, and it remains to be shown yet whether as an improvement the Ericsson engine will be anything more than has already been accomplished.

In 1827, two brothers (one a clergyman, we believe,) named Stirling, in the city of Glasgow Scotland, took out a patent for a hot air engine, which was illustrated and described in "Galloway's History of the Steam Engine" in 1832; this patent was secured for the application of the heated air to propel machinery in a particular manner 25 years ago. This engine communicated motion to a piston by alternately heating a portion of air connected with one side of the piston, and at the same time cooling that in connection with the other side. This was done by means of two air vessels, the one communicating with the upper and the other with the lower side of the piston. An air vessel was filled with thin plates of iron perforated with holes, or with pieces of brick, and the lower part of each air vessel was heated by a fire placed under it, pretty much the same as the Ericsson engine. The Stirlings, however, did not claim hot air in their patent specification, and the conclusion is—they did not believe themselves to be the first inventors; it is probable that they knew a patent had been taken out in 1824 for an atmospheric engine, by E. & J. Prentice, Baltimore, Md., or the one with two cylinders by W. Willis, of Charleston, S. C., in 1826; at any rate, the application of hot air to propel machinery is anything but a new invention. Ericsson took out his first patent in 1834, a long time ago, and the illustration of his principle, as exhibited on page 60, last volume, Scientific American, appears to embrace the very principle of Stirling's, only the arrangement is not the same. The principle of the new caloric engine, which as asserted, will make it successful and more economical than the steam engine is, that after the heated air has acted upon the piston, it is not lost—the heat is saved and applied over again. This very principle is described as belonging to the Stirling engine, which was improved and patented twelve years ago. We are thus particular because we wish to let the public know distinctly that the "hot air," alias *caloric engine*, is not a new nor untried invention, very different from what many have been led to believe by the numberless feuilletonists of our daily, weekly and monthly periodicals.

Gas Engines.—Many accounts have lately been spread before the public, about the employment of ether, chloroform, carbonic acid gas and other gas engines, as substitutes for the steam engine. As far back as 1824, a patent was taken out by Samuel Brown, of London for the United States, and Minus Ward, of Baltimore, took out one in 1827, for a gas and heated air engine. Thos. S. Brown obtained his English patent in 1823. It was called a *gas vacuum* engine, and was actuated by the inflammation of hydrogen in a vessel containing a portion of atmospheric air sufficient for combustion. This created more sensation in 1826 in London, than the caloric engine now does here; it, however, was a failure. In 1825 the celebrated Brunel obtained a patent tor employing carbonic acid gas as a motive agent after it had been reduced to a fluid by Humphrey Davy, but he did not test it, being satisfied, we suppose, that it would be more expensive than steam. Benjamin Cheverton, an English gentleman, who sometimes writes now for our London scientific cotemporaries, obtained a patent in 1826, for an improved carbonic acid gas engine, but it, like Brunel's, amounted to nothing at all. A patent was taken out the same year (1826) by a Mr. Howard, for an ether-alcohol engine, which was identical in principle to the one said to be now invented by Mons. Tremblay, of France, for working with chloroform, which is a similar chemical agent. Gunpowder, smoke, and we do not know how many more substitutes have been proposed and tried as substitutes for the steam engine, not one of which has maintained the least semblance of a decent competition. The reason why, we will endeavor to set forth next week.

Falling Houses Again.

Guilty indeed are the magistrates of New York City for the many lives which have been lost by the falling of buildings because of insufficient workmanship. Every few weeks, a building in the course of construction tumbles down, and some poor fellow is killed, leaving perhaps a widow and small family, wrecked on the cold world's bleak shore.—On Tuesday last week (7th inst.,) a large five story brick building, 50 feet front and 40 feet deep, together with two large houses on Thirty-second street, this city, in course of erection and near completion, fell with a terrible crash, and instantly killed three of the persons who were at work, and severely injured a number of others. The cause was insufficient strength of supports. When shall we be able to cease chronicling such calamities.

All Gone, All Gone.

At the commencement of the present volume, we printed 5,000 extra copies, which we concluded would be sufficient for the subsequent demand. It is now but 14 weeks since Vol. 8 was commenced, and to the disappointment of many we are obliged to announce that the entire editions of the first four numbers are all gone, and that we shall not be able to furnish the back numbers to any parties who order after this date. Of Vols. 6 and 7 we have a few, complete, left, and have reserved a few sets of Vol. 8, from the commencement to supply those who have ordered and paid for the volume, but who prefer receiving it at the end of the year.

Hydraulic Pumps.

Thirty-six sets of hydraulic pumps are in the process of construction at the Washington Navy Yard, designed for testing steamboat boilers required under the law of the last session of Congress, which was passed with a view to the safety of passengers on board of vessels propelled in whole or in part by steam.

A Large and Small Wheel.

We have been considerably edified with the discussion which the question of "a large and small wheel," has provoked throughout the country. In quite a number of our cotemporaries, long communications have appeared on the subject, and editorials two and three long columns in length have been produced.