

## SCIENTIFIC MUSEUM.

## Fumigation.

In many cases fumigation is essential to promote health, by the destruction of pestilential effluvia. That this can be done is a blessing for which we all should be grateful, and especially since it can be done in a very simple manner. During the hot season it may be necessary to fumigate some buildings, and to do this the whole principle and practice should be well understood. Fumigation is an application of vapors or fumes for the purpose of getting rid of unpleasant or unwholesome smells. By the old method, vapor of hot vinegar, aromatic pastiles, and vegetable matters, the smoke of burning brown paper, burnt feathers, tobacco, &c., were supposed to be effectual; and one or other of these substances is still occasionally employed; but in all these applications little more is done than to substitute one bad smell for another, by overpowering, not displacing or destroying the bad or dangerous odor; and in the case of tobacco, its reputed purifying and antiseptic properties furnish an excellent excuse to those who have the misfortune to smoke, of rendering the house always unpleasant, and not at all more free from infection. The only efficacious kinds of fumigation are by means of gases which decompose the miasmata or fumes, and convert them into innocuous compounds; such gases are sulphurous acid, muriatic acid, nitrous acid, and chlorine; the last named, either in its free state or in combination with lime, or soda, being incomparably the most convenient, efficacious, and powerful.

Sulphurous, and the other gaseous acids, are supposed to perform, indirectly, important service in maintaining a large city in a healthy condition. The products of the combustion of coal may operate in checking the spread of malignant diseases: the manufactories of chloride of lime and other chemical works may also be of use, although the benefit derived from them is seriously counteracted by trades which deal largely in the conversion of refuse animal matters, and were it not for the sewerage, and the plentiful supply of water in New York, the effects of our large consumption of animal food, and the presence of so many slaughter houses, would be more severely felt. In times of plague and other pestilence, the vicinity of smelting furnaces was formerly resorted to as being the least liable to infection, the sulphurous and other acid fumes acting as disinfectants.

The theory of infection and contagion is very imperfect, and therefore the mode of action of disinfectants must be equally so. We are ignorant of the influence and production of malaria, of marsh miasma, and other poisonous exhalations of organic, but chiefly of vegetable, origin, which produce that extraordinary disease, the ague, or intermittent fever. One of the most remarkable properties of some forms of infectious matter is its permanency, retaining as it frequently does, its peculiar powers for a long, if not for an indefinite, period. Of this, the preservation and transmission of dried variolous and vaccine matter is a familiar example. Professor Brand states, that "the infection of scarlet fever is sometimes retained for weeks and months by articles of wearing apparel; in one instance, after a malignant form of that disease had prevailed in a house, it was fumigated with chlorine and white washed, and every article of furniture and clothing cleansed and fumigated, with the exception of a handkerchief, which had been accidentally overlooked, and to which the appearance of the disease after a period of two months, was probably attributable. Blankets and woolen goods seem especially retentive of such poisons, and in all doubtful cases should be burned."

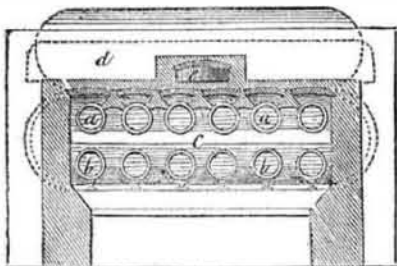
But since Brande wrote this paragraph, the invention of driving a current of hot air at 300° through infected clothes has superseded the destructive practice of burning good clothes in many hospitals. If currents of hot air at 300° could be driven through the rooms or every house before people went to live in them, and afterwards at least once per annum, the danger of infectious disease would be much lessened, and general health greatly promoted. It is to be hoped that this good

invention will yet be more extensively applied.

In 1825 Dr. Faraday was employed to fumigate the Penitentiary at Millbank, London. The space requiring fumigation amounted to nearly 2,000,000 cubic feet, and the surface of the walls, floors, ceilings, &c., was about 1,200,000 square feet. This surface was principally stone and brick, most of which had been lime-washed. The fumigation was performed by means of chlorine generated in the following manner:—A quantity of salt in powder was mixed with an equal weight of black oxide of manganese, and upon this mixture was poured a cold solution of 2 parts of sulphuric acid and 1 part water. The acid and water were mixed in a wooden tub, the water being first put in, and it being more convenient to measure than to weigh the water and acid, 10 measures of water and 9 of acid were used; half the acid was added first, the remainder being added when the mixture was cold. 3 1-8 lbs. of the mixture of salt and manganese were put into a common red earthen pan, of the capacity of about a gallon, to which a measure equal to 4 1/2 lbs. of the dilute acid was added; the mixture was then well stirred and left to itself. A number of these pans, each containing a similar dose, being thus arranged, all the apertures were closed, and as the action did not commence immediately, the operator could pass from pan to pan without inconvenience from the suffocating fumes of chlorine. On entering a gallery 150 feet in length, a few minutes after the mixture had been made, the general diffusion of chlorine was evident; in half an hour it was often almost impossible to enter, and frequently on looking along the gallery, the yellowish green tint of the gaseous atmosphere could be perceived. Up to the fifth day the color of the chlorine could generally be observed in the building; after the sixth day the pans were removed, though sometimes with difficulty, and the gallery thus fumigated had its windows and doors thrown open. The charge contained in each pan was estimated to yield about 5 1/2 cubic feet of chlorine; in fumigating the space of 2,000,000 cubic feet, about 700 lbs. of common salt and the same of black oxide of manganese were employed, yielding about 1,710 cubic feet employed to disinfect this space. In ordinary cases Dr. Faraday conceives that from 1/2 to 3/4 this quantity of chlorine would suffice.

A most excellent disinfectant for sinks, &c., is the chloride of zinc. This is prepared by dissolving zinc in muriatic acid. This should be diluted with five times its weight of water, and then thrown down the sink, drain, or whatever it may be. By taking the chloride of lime, (bleaching powder), which can be purchased at all druggists, placing some of it in a bowl of stone ware, and pouring some sulphuric acid on it, the chlorine gas will raise in copious fumes; this is the most simple plan to follow, by those who are not much acquainted with chemical operations.

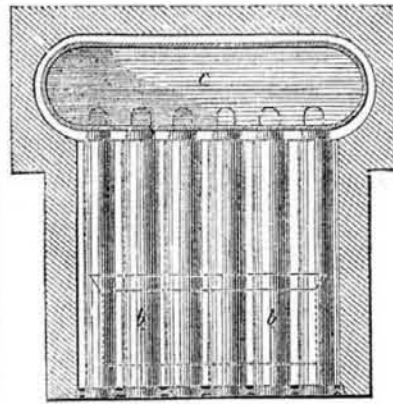
On Boilers.—No. 26.  
FIG. 33



The annexed engravings represent a boiler constructed by Messrs. Legavrian and Fari-naux, of Lisle, and for which they obtained half of a prize of 10,000 francs, offered by the Society of Encouragement, for improvements in boilers. Fig. 1 is an elevation in section, and fig. 2 a plan of this boiler. It consists of two rows of generators, *a a* and *b b*, lying immediately over the fire-bars, and communicating at their back ends with the receiver, *c*. The front ends of the generators are supported by a cast-iron frame, as shown. The brick-work over the upper row of generators is supported by cast-iron bridges laid between the generators; this system leaving the upper sides of the generators free to be acted upon by the heat. The lower receiver, *c*, is

kept full of water, and communicates with an upper receiver, *d*, which forms the steam-chest. The flame, after playing round the generators, and the receiver, *c*, passes round the lower side of the receiver, *d*, and through the flue, *e*, to the chimney. No provision appears to be made for the circulation of the water through the generators.

FIG. 54.



In the boiler awarded the prize, only one receiver of larger diameter was employed, partly filled with water, and surmounted with a vertical steam chest, to give more steam room. The dimensions and performance of that boiler were as follows:—

Length of receiver	9'84 ft.
Diameter of do.	4'19 "
Length of the four lower generators	13'77 "
Length of the four upper do.	10'66 "
Diameter of the generators	1'31 "
Volume occupied by the water	20 cb.ft.
Do. do. steam	7 "

The coal consumed during the trials was English, large, and of good quality. In the first experiment, the coal consumed per horse power per hour was 2'9 lbs., and the quantity of water evaporated by 1 lb. of coal, 8'06 lbs.

The power obtained (indicated ?) was 32 horses.

In the second experiment the consumption was reduced to 2'77 per horse power per hour. The trial lasted ten hours, the power obtained was 39 horses. It is obvious that the consumption per horse power depends upon the engine; but the water evaporated gives not a bad result.

The above information is obtained from the *Industrielle*, our worthy Parisian exchange.

It is proper for us here to state that we expected to find by careful perusal much that was valuable, interesting, and new in respect to the construction and principles of American locomotive boilers in Norris' Hand Book for Engineers; in this we have been disappointed, it is mostly a selection of foreign matter relating to English locomotives.

## A Challenge to Rifle Makers.

The undersigned inventor and patentee of "Sharp's Breech-Loading Rifle," proposes to test his rifle against any other military arms in the world, not exceeding 9 lbs. in weight upon the following terms: A target six feet in diameter, to be placed at a distance of one half mile. The gun that puts the greatest number of balls into the target in thirty minutes, shall win the wager of one thousand dollars—the sum which each party shall stake upon the test.

The trial to take place at Washington, D. C., the first week in December next.

CHRISTIAN SHARP.

Hartford, May 19th, 1852.

## Iodine Rendered Soluble by Syrup of Orange Peel and Tannin.

M. Debaque mentions in the *Journal de Pharmacie*, of Antwerp, that he has found means of keeping iodine in a state of solution when added to mixtures in the form of tincture. The author uses for that purpose, syrup of orange peel, which answers the purpose perfectly. It was suspected that tannin was mainly instrumental in this result; and this was rendered evident by putting a few grains of tannin into a quantity of water to which tincture of iodine had been added, and in which the iodine had of course been precipitated. The addition of tannin caused the iodine to be immediately re-dissolved. Thus will the syrup of orange peel be advantageously added to mixtures containing tincture of io-

dine, and tannin to injections composed of water and the same tincture.—[London Lancet.

## LITERARY NOTICES.

**THE STUDY OF WORDS**—This is the title of a little volume, by Trench, Professor of Divinity, in King's College, London, and published by Redfield, Clinton Hall, this city. We expected to find a dry but acute examination into the origin of words; we find, however, that it is acute but not dry; it is one of the most interesting books that we have read in a long time. In respect to the language of savage races, he takes the very position we have often assumed, in opposition to certain progressive but shallow philosophers, who have enunciated the doctrine that man commenced existence as a "wild man of the woods." These pseudo-philosophers put down language as one of the arts of life—an invention,—whereas it is an endowment, like the faculty of invention, without which no race of men could have progressed; they would, if this theory were true, be now like any race of brutes, the same throughout all generations. Trench, like Douglas, considers the savage not the primitive state of man, "but like a dead and withered leaf, torn violently away from the trunk of humanity." We predict for this book an extensive sale, as it throws a great deal of light upon many words of our language.

**LITTELL'S LIVING AGE**—This excellent work is for sale by Dewitt & Davenport, this city. It is published weekly, and contains the very cream of European literature. The last week's number contains a splendid scientific article from the Edinburgh New Philosophical Journal, on the Physical Constitution of the Sun, by M. Arago.

**CHRISTIAN MELODIES**—This is a neat volume, and one much required by every christian family. It is a selection of hymns and tunes designed for social and private worship, in the lecture room and the family circle, during the morning and evening hours devoted to sacred offerings. It is edited by George B. Cheever, D. D., and J. E. Sweetster. This is the second edition, and is published in a most respectable manner, and well bound, for 37 1-2 cents, by A. S. Barnes & Co., 51 John street, this city. Many of our readers, we know, will possess themselves of this volume.

**THE ANGEL OVER THE RIGHT SHOULDER**—This is the title of a beautiful work, by the author of "Sunny Side," and is published by W. F. Daper, of Andover, Mass. The book is very neatly printed, and what is of great interest and importance in its production, to us, is the announcement, "it is a specimen of printing from non-metallic types." It is an improvement which looks as if the Angel of Printing had been peeping over the shoulder of its author.

**GODEY'S LADY'S BOOK**—The June number of this old monthly serial has made its appearance, teeming with spirited original engravings, and over 100 pages letter-press. Long & Brother, agents, 43 Ann street. Published by L. Godey, Philadelphia; terms \$3 per annum.

**HINTS ON DRESS AND BEAUTY**—Fowlers & Wells have just issued another little book from the pen of Mrs. E. Oakes Smith, the title of which implies its contents. Price 25 cents.

**HARRY RACKET SCAPGRACE**—An exciting novel of 208 pages, well illustrated, recounting the fortunes and misfortunes of Henry Racket Scapgrace, has just issued from the press of H. Long & Brother, 43 Ann street; price 50 cents.

**KATE PENROSE**—By Miss Hubbard: Dewitt & Davenport publishers. This is a work of fiction, designed to inculcate sentiments of sterling morality and virtue.

"The Water Cure Journal," for June, abounds in interesting and useful information. It is a publication of genuine merit. Fowlers & Wells, N. Y. \$1 per annum.

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