SCIENTIFIC MUSEUM.

(For the Scientific American.)

Agricultural Science.

LIME AND ITS USES.—Lime is one of the most abundant substances in nature. As a carbonate of calcium, (limestone), it is a compound of calcium, carbon, and oxygen. Carbonic acid gas is a mixture of carbon and oxygen. When limestone is burned, the carbon and two parts of oxygen escape, forming what we call quick lime, (the oxide of calcium, Ca.O.) This quick lime, by exposure to the atmosphere, absorbs water, slacks, and falls into an apparent dry powder; it is then hydrate of lime, and is in the form in which it is generally used for agricultural purposes.

But this is not a good plan for slacking lime, for it has the property of absorbing carbonic acid from the atmosphere and coming back in a measure to its former limestone state. The best way to slack lime is to pour water on a heap of the burned limestone, about enough to slack it, and cover up the whole heap—two or three tons—with sand or earth from the field. The lime should be taken from this heap, as it is wanted to be spread upon the field. It acts upon many substances—animal and vegetable, and decomposes them, forming salts, which by the falling rains are so diluted as to make them fit to be taken up by the plants as food.

In Great Britain, from 100 to 400 bushels are applied at once, at intervals of ten, fifteen, or nineteen years—the term which leases run. In this country, the most common practice is to apply 30 or 40 bushels once in three years, which is the preferable mode. We have seen it applied with effect, however, at the rate of 800 bushels to the acre. This was upon a very stiff cold clay. Three hundred bushels would be about ten tons to the acre.

Indications of want of lime in the soil may be seen in heavy crops of straw, and light crops of grain; and in root crops where they seem to run fingers and toes. Experiments should be made by every farmer with lime, upon various crops in all his fields, to ascertain whether lime would be beneficial to him. Very few places will be found where it will not be so.

To apply lime to the soil, spread it evenly upon a crop of clover about to be plowed under, or sow it upon the surface with the wheat, and harrow thoroughly. It should never be combined with manure.

Every clay soil, every muck soil, and every soil in which vegetable fibre does not readily decay, because that is a sign that it contains some anticeptic acid, which prevents decay. This is the case in swamps. Sandy, gravelly or thin soils may be overlimed and injured; because, in causing the decay of vegetables, it sets free the ammonia, the very substance of fertility required. To prevent this, more food must be given for the lime to act upon. No farmer, who knows what the action of lime is, upon soils, will ever do without it, as an accessory to his manure. It is a component part of all crops grown by the farmer. When applied to land which have not borne wheat for many years, it has at once raised it to fertility for that crop. Where it has failed once to remunerate the farmer using it, it has proved of the greatest benefit a hundred times.

Lime mixed with swamp muck or peat, makes an excellent manure.

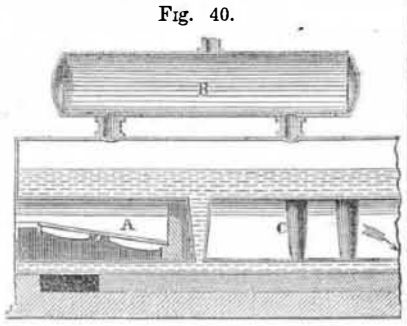
ENRICHING GARDENS AND LAWNS.—The daily and weekly waste of chamber slops, if sprinkled over the ground of small gardens would be all the enriching material required to produce good crops from year to year. Grass lawns if sprinkled with wash water and urine weekly would never require to be covered, as many now do, with a thick coat of manure, unsightly to the eye, and disagreeable to the foot when a pleasant day arrives when one wishes to look over one's shrubs and trees. Lawns so sprinkled would also be always fresh and green. Fruit has also been greatly benefitted by moderated doses during their growing season.

It is best to apply the suds and urine mixed with water. Gardeners, therefore, apply these substances during summer showers. Soap suds are excellent for grape vines, but they should never be applied while warm. The suds, well diluted with water, have just to be poured around the roots of the vines on the surface of the ground.

MANURE FOR STRAWBERRIES.—While on this subject we may as well give those of our readers who wish to cultivate a bed, only, of strawberries, the following mode of manuring them, as practiced by a cultivator in Philadelphia, and communicated to the "Friend's Review," published in that city by Friend Tatem. The writer had a very productive bed 30 by 40 feet. I applied says he, about once per week, for three times, commencing when the green leaves first began to start, and making the last application just before the plants were in full bloom, the following preparation:—Nitrate of potash (salt petre), glauber salts, and sal soda (carbonate of soda), each one pound—nitrate of ammonia, one quarter of a pound—dissolving them in 30 gallons of river or rain water. One-third of this was applied at a time; and when the weather was dry I applied clear soft water between the times of using the preparation, as the growth of the young leaves is so rapid that, unless supplied with water, the sun will scorch them. I used a common watering pot, making the application towards evening. Managed in this way, and the weeds kept out, there is never any necessity of digging over the bed, or setting it out new. Beds of ten years are not only as good, but better than those two or three years old.—[Maine Farmer.

On Boilers.---No. 21.

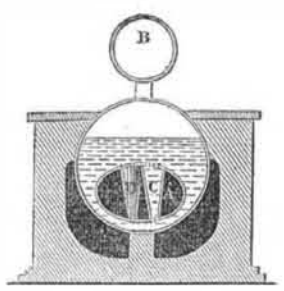
Fig. 40.



GALLOWAY'S DOUBLE FURNACE TUBULAR BOILER—The figures 40, 41, and 42, are a longitudinal, a transverse, and a horizontal section of a boiler, patented some years ago by Messrs. Galloway, of Manchester, England. It is a strong boiler, and well adapted for marine engines. The fire flue is supported and strengthened by a series of short vertical water tubes, C, which are made slightly conical, —about two inches wider at top than bottom, and among which the flame is allowed to play in its passage through the flue, the tubes being arranged in a zig-zag position, as seen in fig. 42—the horizontal section. These tubes are prop stays of the strongest possible form for resisting any collapse of the fire flue, and are therefore worthy of the attention of our steamboat engineers.

A is the frame, and B is a steam cylinder on the top of the main boiler. These tubes assist in causing the flame to envelope them and render the fuel more effective.

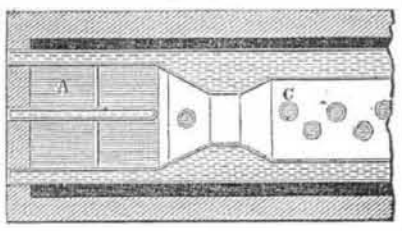
Fig. 41.



This boiler is more suitable for bituminous coal and wood than for anthracite coal. The smaller the tubes, and the greater number of them, so much the better for coke and anthracite coal, where the heated air alone acts upon the exposed surface of the boiler, but for wood and bituminous coal, which make flame, a different arrangement is preferable, and this is a good one. For western steamboats, this boiler is a good one and worthy of attention. The conical form of the tubes, with the enlarged part uppermost, is also a plausible advantage, inasmuch as the heat is most effective upon the upper surface, which over-hangs the source of the heat.

This boiler is much improved, as all other steam boilers would be, by having two furnaces. In the plan view, a division wall is exhibited, which permits two furnaces with separate doors to be used. This, for bituminous coal or wood, makes the arrangement a smoke-consuming one. By firing the furnaces alternately, and allowing the fire of the one to be strong, and the fuel fully ignited, when the fuel is fed into the other furnace, the carbonic oxide or smoke, which is always given off in volumes when the fuel is just laid on, is ignited by the clear flame of the other furnace, which has more oxygen in it, and thus the

Fig 42.



smoke is consumed and a greater heat produced by the same quantity of fuel. This boiler is one which was recommended by Armstrong, as stated in his work on steam boilers, to the Gutta Percha Works in London, and was 50 horse-power. Its length is 30 feet 3 inches, is 10 feet diameter, and its main flue at its great diameter is 4½ feet. It contained 13 conical tubes, 11 inches in diameter at top, and 9 inches at bottom. The furnace grates are 7 feet 4 inches long, by 2 feet 7 inches wide, making 37 square feet area, or at the rate of three-quarters of a square foot of grate per horse-power. The flue and shell of the boiler are alike thick, half an inch. The fire bars are in two sets, front and back; the front ribs one inch, and the back ones one inch and a quarter thick, with draught spaces between of three-eighths of an inch width. The boiler is clothed with a non-conducting covering of saw-dust and brickwork. The steam dome or cylinder is 12 feet long and 3½ feet in diameter, and covered with felt. The ends of the boiler are strengthened by wrought-iron double ribs, reaching from side to side and rivetted on them, and to which the wrought-iron stays are attached, extending the whole length of the boiler and brace the two ends together.

Looking-Glasses for Birds.

A correspondent of the Gardeners' Chronicle says:—

"The following plan is perfectly efficacious for scaring birds from fruit and other produce. One of my servants having by chance broken a looking-glass, it occurred to me that the broken pieces, suspended by a string, so as to turn freely in every direction, would give the appearance of something moving about, which would alarm the birds. I accordingly tried the plan, and found that no bird not even the most cool-hardy of them, dare come near. They had attacked my peas; on suspending a few bits of looking-glass amongst them, the marauders left the place. The tomtits attacked my seckle pears, to which they seem very partial. A bit of looking-glass suspended in front of the tree put a stop to the mischief. My grapes were then much damaged, before they were ripe by thrushes and starlings; a piece of looking-glass drove these away, and not a grape was touched, afterwards. I had before tried many plans, but never found any so effectual as the above."

Another Small Planet.

J. R. Hind writes to the Times, that on the 17th March, another small planet was discovered by Prof. de Gasparis, at the Royal Observatory at Naples. The planet is stated to be equal in brightness to a star of between the tenth and eleventh magnitude. Mr. Hind has little doubt that this planet is identical with an object which he entered upon a chart for the tenth hour of right ascension, on the 29th January last, in R. A. 10h. 32m. 40s. and north declination 8 deg. 50 min., and noted as of eleventh magnitude.

Advice to Writers for the Press.

Use black ink; clear, good paper, written on one side only, in letters large and plain enough to be read like print; and, if you suspect defects in style, grammer, or punctuation, get a friend to correct it, and do not call upon the editor to do it. He has no time, and it is not his business to do it. Be brief and clear, which you cannot be if you do not fully understand your subject, in which case, let your pen remain dry rather than write for any periodical.

Ten Hour System.

Three several reports have been made to the Massachusetts House of Representatives on the subject of restricting labor in manufacturing corporations to ten hours a day. The reports all came from the same committee—a special committee, to whom the subject was referred. One report was, that any legislation in the premises was inexpedient; a second report embraced a bill providing for gradual emancipation; in this way, until the 4th of July next, operatives may be employed twelve hours; from that time till October 1st, eleven hours; and thereafter not more than ten, except "in necessary cases," under penalty of $50 for each offence. A third report recommended ten hours, except where express contracts have been made for a longer time, and a fine for employing children, under fifteen, more than ten hours a day.

LITERARY NOTICES.

HUNT'S PHOTOGRAPHY—This work, the best ever published on this subject, is re published here by S. D. Humphrey, 297 Broadway. The author is well known for his researches on light, and his work named "The Poetry of Science." It contains an early history of Photography. We find it there recorded that the Daguerreotype was protected by a patent in England, although the French Academy of Sciences had paid highly for it, to make a present of the process to the world. No one who has a taste for optics, or any branch of philosophy, should be without this work, and certainly no photographist can be intelligent in his business, and not own it. This puts us in mind of one thing—the Hillotype. What has become of the Rev. Mr. Hill and his wonderful discovery of colored daguerreotypes?

THE MODEL CALCULATOR—This very able work, by Oliver Byne, C. E., and published by H. C. Baird, of Philadelphia, is now completed. We noticed this work as it came out in numbers, and spoke favorably of its merits. It is a work which every mechanic should possess. Its tables of logarithmic sines, etc., are far better than those in any work on Trigonometry published in our country; it contains calculations for every thing. It is unique in every respect—the Model Calculator. It is for sale by John S. Taylor, 143 Nassau st., N. Y.

LITTELL'S LIVING AGE—This is by far the best weekly magazine published in our land: it is reprint of the cream of English literature. In No. 414, of last week, there are some most able and excellent articles. Dewitt & Davenport are the agents in this city.

GRAHAM'S MAGAZINE, for May, is a gem number; the embellishments are numerous and exceedingly beautiful, and the contributions are from the best American authors. This magazine occupies a high place among the serial publications of the world. G. R. Graham, Philadelphia; Dewitt & Davenport, New York.

PETERSON'S LADIES' NATIONAL MAGAZINE has been sent us by Dewitt & Davenport: "The May Scene" is pretty, and the contributions are spirited. Good number.

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Mechanics and Manufacturers

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