Scientific Museum.

Burnt Lime as a Flux.

The study of the gases formed in blast-furnaces, with which the authors have been engaged for some years, has shown that the use of carbonate of lime as a flux is attended with great loss, and likewise that this loss may be obviated by using burnt lime instead. The gases were taken from a blast-furnace, 54 feet high, at Ougree, at thirty-two places, 1 foot apart, and the per-centage of carbonic acid determined.

It is evident from the examinations, that the carbonic acid is formed on the first introduction of atmospheric air, and within a remarkably short distance is reduced to carbonic oxyd, for the gas 8′ above the tuyers does not contain a trace of carbonic acid; however, the zone from which carbonic acid is entirely absent is of very limited extent; from 9′ to 10′ above the tuyer the gas again contains carbonic acid, and in no inconsiderable quantity.

The per-centage of carbonic acid in the gas increases at a height of 10′ or 11′ above the nose pipe, above which point a second re-action takes place between the carbon of the fuel and the carbonic acid, the per-centage of the latter decreasing up to a hight of 15′ above the tuyer, where it is 0. From this point it again increases in quantity, and rapidly, for at a hight of 30′ it amounts to 3.5 per cent. The authors ascribe this considerable increase of carbonic acid solely to the decomposition of the limestone used as a flux.

Thus after the increase of the per-centage of carbonic acid to 3.5 in consequence of the decomposition of carbonate of lime, it again diminished in proportion of the increased hight, until at a point from 37′ to 39′ above the tuyere it amounted to only 1.69 or 1.90 per cent., which may be regarded as about the quantity present in the gas before the decomposition of the carbonate of lime. Above this point the quantity of carbonic acid increases again up to the furnace-mouth, and indeed with tolerable rapidity and regularity, in consequence of the reduction of peroxyd of iron to protoxyd by the action of carbonic oxyd.

The authors are of opinion that the carbonic acid, which is disengaged from the limestone at a height of 27′ above the tuyere and again disappears almost entirely at a height of 39′, re-acts within this space upon the ignited coke, taking up part of its carbon; and an examination of the analysis confirms this view.

Although other observers who have studied the composition of the gases from the blast furnaces have not collected them at so many different heights, still their analytical results clearly indicate that in the furnaces from which they took the gas, the carbonic acid derived from the limestone was at least partially reduced to carbonic oxyd, as at Ougree. If carbonic acid is converted into carbonic oxyd by passing over ignited carbon, the action is essentially two-fold, a combination of carbon and oxygen, and a decomposition of carbonic acid into carbonic oxyd and oxygen; the former is accompanied by development of heat, the latter by absorption of heat. The practical question to be decided in the present instance is, which of these two calorific changes preponderates?

Theoretrically, from the experiments of Dulong, there should be a considerable loss of heat.

These considerations led the authors to employ burnt lime in working blast furnaces, and thus to obviate the loss of heat. The experiment was commenced at Ougree in July, 1849. During the first few days the results were unsatisfactory, the management of the furnace was difficult, and the slags black and pasty. Subsequently, when taking into account the impurities of ordinary limestone, 63 parts of burnt lime were substituted for 100 parts of limestone; the working of the furnace, until it was let out at the beginning of 1851, was continually regular and good; during these eighteen months the most satisfactory results were obtained.—The saving of coke and increase of production were, as the experimenters anticipated, very evident; moreover, the raw iron was of better qnality, and all the interior parts of the furnace, especially the tymp stone, remained in a much betterstate of preservation than when limestone was used. The following table gives the quantities of coke consumed, in the production of 100 kilogrms. raw iron, in the above-mentioned furnace, during the four months before and the four months after the alteration of the charging:—

WITH LIMESTONE.		WITH BURNT LIME.	
1849—March	150 0 kilogr.	1849—July	142 kilogr.
April	154·5 "	August	138 "
May	156·5 "	Sept.	133 "
June	151·5 "	Oct.	139 "
Average quan.	153·2 "	Average quan.	137·75 "

Average quantity consumed with limestone, . . 153·20 or 100 per cent. coke.
Average quantity consumed with burnt lime . . 137·75 or 90 per cent. coke.
Difference. . . 15 47 or 10 per cent.

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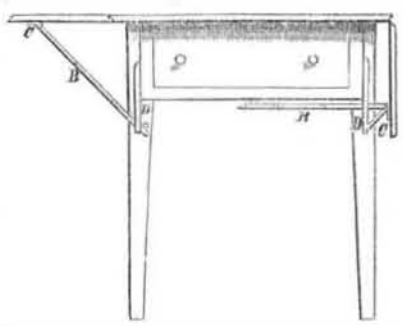
Lowering Ship's Boats.

The annexed engraving represents a plan which has been illustrated and described in the "Glasgow Practical Mechanic's Journal," for lowering ships boats, as proposed by G. F. Russel, London. By this arrangement, although the boat possesses the great advantage of resting her whole weight upon the keel cranes, A, yet the very act of lowering at once disengages her from them without hoisting, at the same time projecting the boat several additional feet from the ship's side, as the link, B, straightens out, and as both the pendants, after passing over the heads of the cranes, lead to one barrel of the winch, both ends of the boat must be lowered together. When near the water, one mau can disengage the boat fore and aft, by a single hand lever. The winch is placed flush with the staunchions inside the bulwark, and is fitted with a brake. One man on board can lower the boat when full; or by a lanyard fastened to the brake handle, a man in the boat can lower it by himself. The same tackle is always ready for hoisting the boat, and the winch being placed at a distance from the cranes, which turn inboard the boat can easily be brought on deck.

Supporting Table Leaves.



This engraving is a transverse section with the front legs removed, of an improved plan for supporting the leaves of tables, by Charles Phelps, of Salem Mass. It consists of three pieces of iron or any other suitable material, a brace in the form of a bent lever, a plate attached to the brace by which it is secured to the leaf of the table, and a rail plate upon which the lower end of the brace rests, to support the leaf when it is raised. In the figure B, is the brace, the upper end of which enters a slot in the plate, C, through which (and the end of the brace) a pin, or rivet passes making a hinge joint. On the upper part of the lower end of the brace, are two projections, and on the underside a spring, X, which is a stripof steel riveted to the brace. The rail plate is a piece of iron firmly secured to the rail of the table, and projecting about 2½ inches below it, through which at its lower end, there is an oblong opening wide enough for the brace to play through easily; across this opening there is a pin near its upper end.

The operation is as follows:—In raising the leaf from a perpendicular to a horizontal position, the brace B, is drawn through the aperture in the rail plate, till the spring and the end of the brace are compressed together by the projection upon the upper side of the brace passing under the pin which crosses the oblong opening or slot. (The other projection on the end of the brace is to strike the cross pin and prevent the brace from being drawn entirely out), after having passed under the pin, it is thrown up by the action of the spring directly in front of the pin, the projection leans back against the pin forming a firm rest for the brace which supports the leaf. When the leaf is up a pull at the short arm of the lever releases it by depressing the lower end of the brace and bringing the projection upon the side below the pin, to slide under it, and through the rail plate to a position parallel with the bottom of the table drawer.

A patent was granted for this improvement on the 20th of last Nov. (1853). The cost, we believe, is 30 cents per each table.

More information may be obtained by letters addressed to Mr. Phelps.

Project of an Iron Tunnel Under the Bed of the Ohio River.

Mr. Hitchcock, of Chicago, has senta communication to the city authorities ot Cincinnati, with the design of an iron tunnel forthe tunneling of the Chicago river. The dimensions are sixteen feet wide, eighteen feet high—footage eight feet wide. The tunnel to be entirely constructed of cast or wrought iron. He says:

"Permit me to call your attention to my plan for building a tunnel under the Ohio river, opposite your city. It is proposed to use either cast or wrought iron. I propose to build a tube of iron of any desired dimensions, and sink it in the bed of the river, in sections, as low as may be found practicable, by first dredging a channel, deep enough to admit of the top being sunk below, or even with the bed of the river, entirely avoiding the use of coffer dams.—There is no question about the practicability and superiority of iron tunnels over all other materials, besides being about 100 per cent, cheaper. By my design, accompanying this, it will be seen that I put the foot-way at the top of my arch, the arch being as near a parabolic curve as practicable, combining strength and cheapness.

It is presumed that the design will answer for your city unless it proposed to lay down a railway through the tunnel, when I would propose putting the track in the top of the arch, in place of the foot-way. I would not in any event recommend running locomotives through, but simply the cars, by atmospheric pressure, as has been done in other instances. This would dispense with the necessity of a foot way, as passengers could go through very expeditiously by the cars. I also propose to make the approaches all of iron, as being cheaper and safer. I think, after a fair investigation, your honorable body will find that a tunnel can be constructed with much less expense, and more convenient for the public than a bridge."

Woolen and Cotton Mixed Goods.

There are many who think when they have purchased a piece of "cheap woolen goods," they have made a great bargain. There never was a graver mistake committed. Thousands and thousands of pieces of goods are sold in the shape of narrow and broadcloths, as being all wool, while in fact, they are composed of at least twenty per cent. of cotton. The latter is mixed and carded with the wool, and all being dyed the same color, it is very difficult to detect the imposition. We presume, that many merchants sell such goods under the belief that they are genuine—composed wholly of wool.—The manufacturers know all about the deception, and no doubt the great majority of the large merchants are aware of the fact also. Any imposition practised upon the community, in the shape of an article of manufacture deserves the severestcensure. Cotton can easily be detected in any piece of goods, even when mixed in the process of carding, by submitting a small strip of the goods to the action of a little sulphuric acid, mixed with very hot water. The acid will discharge the color from the cotton, while the color of the wool will remain almost unchanged. There are very few colors, in cotton, but what are far more fugitive than those on wool; this is the reason, why the warm sulphuric acid solution is a good test for cotton in cloth.

War Steamers.

A Board of Naval Engineers and Captains has lately reported, that most of the steamers now employed in carrying the United States mail are unfit for military purposes, and could not easily be fitted out as men-of-war. It was however, admitted that the Collins' steamers might bear a small armament, and that they might all serve as transports. Captain Skiddy, one of the members of the Board, is of opinion that, with proper alterations, they might answer for war steamers of the first class. But supposing, for argument sake, that they can only be used as fast transports, would they not answer an admirable purpose in the time of war?

LITERARY NOTICES.

ROGET'S THESAURUS OF ENGLISH WORDS—So classified and arranged as to facilitate the expression of ideas and assist in literary composition. The American editionis published under the editorial supervision of Barnas Sears, D. D., Secretary of the Massachusetts Board of Education. This is a novel publication, and is the first and only one of the kind ever issued, in which words and phrases of our language are classified "not according to their sound or their orthography, but strictly according to their signification." It will become an invaluable aid in the communication of our thoughts, whether spoken or written, and hence as a means of improvement we can recommend it as a work of rare and excellent qualities, and one which should meet with an extensive sale. Published by Gould & Lincoln, Boston, Mass. For sale by Lewis Colby & Co., 122 Nassau street, New York.

ANNUAL OF SCIENTIFIC DISCOVERY FOR 1854.—This volume, published by Gould & Lincoln, of Boston, and ably edited by David A. Wells, A. M., has just been issued, and is, we think, still better than its very excellent predecessors. It is illustrated with a steel plate of Prof. Hitchcock, of Amherst College. The nature of the work is to present a clear outline of the physical discoveries and inventions of the preceding year, collating the information from a thousand various sources, and presenting much that has never before appeared in print. The editor has done his duty skillfuliy and scientifically, and has presented us with a mass of information as useful as it is varied; his notes on the progress of Science for 1853, which occupy 22 pages, are of themselves worth the price of the volume.

LITTELL'S LIVING AGE—This excellent weekly magazine, which is composed of selected articles from the ablest foreign magazines and reviews, is unequalled by any similar work in the world. Each number is embellished with a fine steel plate. The last number (514) contains an interesting article on the Works of Grav It is published by Littell, Son & Co., Boston.