

DESTRUCTION OF LEAD PIPE IN MASONRY.

ACCORDING to G. V. Krorre, in a German contemporary, the destruction of lead pipe which is set in masonry is due to the action of free lime. Besnon had previously observed that saturated lime water attacks lead, and that it was imprudent to have lead pipes in contact with cement.

If bright-lead shavings and lime water are brought together with the exclusion of air, the lead will not be attacked, and its lustre will remain unimpaired for a long time. If, however, air has access the lead will be attacked violently by the lime water. After the lapse of a short time, the presence of considerable quantities of lead may be detected in solution by means of hydrogen sulphide, and the lead will be coated with yellow oxide. If lead is placed into slacked lime, milk of lime or lime mortar, and exposed to the air, the action of the lime, a thin yellow coating of oxide will be observed on the following day. The action will always be found strongest at the surface, where the absorption of oxygen from the air takes place most readily. The hydrated oxide of lead which is formed by the action of the oxygen and moisture dissolves in the lime water and is partly precipitated upon the lead as anhydrous yellow oxide. Such a coating of yellow oxide will therefore also be formed when lead pipe is brought into contact with cement or mortar containing uncombined lime in the presence of air and moisture.

A lead pipe which had been imbedded in cement was coated with a heavy reddish-yellow coating of oxide. The analysis of the coating, dried at 110° C., gave 99.05 per cent. oxide of lead, the remainder consisting of carbon dioxide with traces of silica, ferric oxide and lime. The residue consisted essentially of pure oxide of lead. An analysis of the oxide coating of a second pipe are 98.69 per cent. oxide of lead, the remainder consisting of dioxide and water.

The mortar surrounding the lead pipe had the following composition:

	Per cent.
Sand.....	78.4
Calcium carbonate.....	7.45
Calcium oxide.....	4.15
Water.....	9.99

On a number of lead pipes of the Berlin water supply the oxide coating was white. When caustic lime is not present the oxide of lead formed through the oxidation will take up carbon dioxide from the air and form the white carbonate. If, on the contrary, caustic lime is not present the carbon dioxide will be absorbed by it, and the oxide of lead will keep its yellow or red color.

The greater part of the pipes with the white coating were not uniformly attacked, but only in spots, giving them a po-marked appearance. Very often the spots were only a mm. in diameter, but the corrosion nevertheless goes quite deep into the metal. The oxide crusts are generally found to be very porous, especially that on pipe III., and absorbed liquid with much avidity, which decidedly increases the rapidity of the corrosion. The quantitative analysis of the coating on three samples of lead gives the following results:

	I	II	III
Sand.....	0.2	0.5	1.15
Plumbic oxide.....	74.3	82.7	78.4
Carbon dioxide.....	8.8	8.3	11.4
Sulphur trioxide.....	—	1.5	1.3
Nitrogen pentoxide.....	5.1	2.0	0.3
Lead chloride.....	10.6	2.6	5.8
Water.....	1.0	1.7	1.3

The coating of another strongly corroded pipe contained still more nitrate. Lead chloride and lead nitrate appear to play a very important part in the corrosion of lead, the chemical process corresponding to the formation of white lead, with the aid of small quantities of acetic acid. In an impure soil, the destruction of lead pipe is probably often prevented by the lack of oxygen, because the decomposition of organic matters consume all the oxygen which is present.

PAINTING ON CEMENT.

ACCORDING to the *Bulletin de la Ceramique* it is known that the caustic lime which is not in a state of combination in cement, saponifies the oil used in painting. Consequently, painting on cement is only practicable when, under the influence of the air, carbonic acid has united with the caustic lime to form carbonate of lime. When it is desired to paint cement without delay, attempts are sometimes made to neutralize the lime by acids; but the above named journal recommends in preference the use of ammonia, the acid of which combines with the lime while the acid is liberated. The effect produced is, however, only artificial. Various other expedients are referred to, but the solution of the problem would seem to consist in the use of casein. Fresh white cheese and slaked fat lime are added to the color. The mixture hardens rapidly, assumes the consistency of stone and is insoluble in water, a formation of aluminates of lime taking place. It is according to this system that the mural paintings at the Berlin War Museum were executed.

To make the composition, three parts of cheese and one of slaked fat lime are stirred, the quantity of color to be added being regulated by practice. Only earth colors, or oxides of iron would be used for light red to dark brown shades; for blue, ultramarine or cobalt blue would be used; for white, oxide of zinc, or sulphate of baryta; and for black, animal black. Inorganic colors, such as those of aniline, would not be used, nor would Prussian blue, vermilion, blue ochre and white lead be employed, on account of the sulphur present in the cheese in combination with these substances.

If the painting surface is too dry it can easily be dampened. The gaseous lime should be prepared daily, and the brushes should be cleaned after the application of each coat of paint. The process thus described is recommended for its economy, the walls of a house being painted first on the scaffolding is removed. The gaseous paint does not easily take fire, and is therefore considered particularly suitable for the decoration of theatres and for application to stage carpenters' work generally.

CRUSHING STRENGTH OF SOME BUILDING MATERIALS.

At a recent meeting of the Engineers' Club of Philadelphia, Mr. Howard Murphy, secretary, presented the results of some tests of the crushing strengths of some building stones, bricks and other building material made at the Watertown Arsenal.

No. of Tests	MATERIAL.	Crushing strength in lbs. per sq. in.	
		FROM	TO
6	Lee, Mass. Marble.....	30,504	25,000
10	Potomac Red Sandstone.....	16,925	25,000
3	Connecticut Limestone.....	11,900	15,500
3	Hummelstein, Pa., Sandstone.....	12,810	15,500
6	Montgomery Co., Pa., Blue Marble.....	9,550	12,700
6	Philadelphia Pressed Bricks.....	7,510	10,900
4	Indiana Limestone.....	7,100	10,500
12	Philadelphia Hard Bricks.....	5,740	20,850
10	Ohio Sandstone.....	3,950	16,350
6	Philadelphia Brick Masonry in Cement Mortar.....	1,600	2,485
6	Philadelphia Brick Masonry in Lime Mortar.....	799	1,994

FRENCH VENEERING PROCESS.

FRENCH wood-workers are greatly interested in a so-called new process for veneering with veneers of all kinds of wood. They claim that these veneers fully preserve the appearance and qualities of the massive wood. The veneers are pasted on strongly resisting sheets of paper and in that state sold to the trade. These veneers, the suppleness of which is most extraordinary, can be handled quite as easily as tapersy paper and are useful for various purposes. They have all the qualities of the wood in full size and can be quite as easily washed or varnished. The mode of application on surfaces is very simple, but a certain amount of care is required, especially when the great thickness of work is desired. The grooves and fissures must first of all be filled up with putty of a good quality, or plaster if it should be a wall. If the wall is new it must be washed with a warm solution of glue, 12 pints of glue-paste to 14 pints of water. When the glue is dry the wall may be polished with emery paper. If the object has already been papered the old paper must be removed before the veneer is applied. In cases where the object is painted it would be necessary to rub the paint with rough emery paper first and polish it with the finest kind afterwards. No coating with glue is required on the face. A small quantity of flour-paste must then be applied to the surface prepared in this manner by means of a piece of muslin. The stuff should be applied dry and smoothed with an equally dry brush. When these operations are completed the veneer is moistened with the water to which glycerine in the proportion of one to sixteen parts is added, in order to soften the wood and give it a great suppleness when once dried. As soon as the wood has swollen uniformly enough it may be cut into different sizes as required. The surface about to be veneered is then coated with glue and the veneers are placed in proper order. They are then lightly pressed in order to expel the air. A piece of pine or cork wood may be used for that purpose. All the joint parts must be juxtaposed and not allowed to overlap, and all the paste must be carefully wiped off. As soon as the wood is dry all the stains that may have been made in these manipulations should be removed by washing with a weak solution of oxalic acid in water, one teaspoonful of acid in one and three-fourths pints of water. All these operations being completed, the wood after being well dried is rubbed by No. 1 emery paper, or No. 2 for fine woods, and afterwards thoroughly polished. For maple wood two slight coats of white shellac will be quite sufficient. Wood like oak and ash require to be filled out with wax, softened in methylated spirits and afterward polished with orange shellac or hard oil polish.

Limestone is being taken from near Madoc for building purposes in Toronto.

Mr. Charles Taylor, Drumbo, Ont., is erecting a new brick plant in mill.

The firm of Halley Bros., planing mill operators, St. John, N. B., has been dissolved.

The Blacker Brick Co., Brantford, Ont., is the name of a new organization which commences operations with a capital of \$20,000.

The Campbell Sewer Pipe Company, of Hamilton, Ont., has secured the contract of supplying Winnipeg with pipe for the current year.

Fire destroyed Mr. George Augustac's planing mill and \$1,000 worth of lumber at Port Colborne, on April 30th. Total loss, \$5,000. No insurance.

Wood pulp is rapidly being substituted for plaster of paris in the manufacture of all kind of building ornaments in France, where a new method has been devised.

About \$1,500,000 worth of property was destroyed in the United States and Canada during the month of March through fires originating in wood-working establishments.

The firm of M. J. Hayes & Bro., henn cotton manufacturers, of Toronto, has been succeeded by the Terra Terra Cotton and Brick Co., incorporated, with a capital stock of \$200,000.

Belgian capitalists are said to have requested a Montreal civil engineer to prepare a report on the cost of material and labor, with a view to establish a large mirror and plate glass factory in Montreal or vicinity.

An English electrician, Dr. Lodge, has made experiments which he says go to show that good conductivity in a lightning rod may be a drawback to its efficiency. He states that when the best conductors were used, the discharge was sudden and violent, but when poor conductors were used, up to a certain point, the violence of the discharge was lessened. Iron was shown to be a better protection than copper, on account of a lower co-efficient of self-dissipation.

Messrs. Theop. McDonald & Co., proprietors of the Queen City Calcutting Works, Toronto, and manufacturers of the Walters patent metallic shingle, are making considerable additions to their works, and placing new machinery.

P. G. Close; H. V. Ellis; P. W. Ellis, W. P. Ellis; Susannah Jane Ellis and Sarah Ellen Mouldie, all of Toronto, are incorporated as the Hungford Marble Company, with a capital of \$200,000. The company will commence mining operations in Hastings County.

A by-law will be voted upon by the ratepayers of St. Thomas on the 22nd and grant a bonus of \$5,000 to Mr. Still, of Tilbury Centre, provided he removes his wood-working factory from that place to St. Thomas, and employs an average of forty hands for a period of ten years.

There is talk of a company being formed in Toronto to engage in the manufacture of scoriated brick. The promoters of the enterprise are Messrs. J. J. Davidson, J. D. Hay, and Beverley Robison. A test of these bricks for paving purposes will be made on Toronto streets.

A very fine mahogany stain is made by boiling in one gallon of water, eight ounces of madder and four ounces of fustic. The old rule is to streak the wood before it is quite dry with black stain to produce the grain of mahogany, but some kinds of wood give much better results when finished by the process recommended for the antique oak surface.

The *American Cultivator* recommends mixture of hydraulic cement and skim milk for painting farm buildings and fences. The cement is placed in a bucket and sweet skim milk stirred in until the mixture is of the consistency of cream. The proportions are about one quart of cement to a gallon of milk. Color may be added if desired. This paint is cheap and durable.

To restore mahogany, first wash well with soap and water, and then polish daily with the following oil: Take half an ounce of alkent root, cut small, and add to a pint of linseed oil, then let this stand for a week, then add half an ounce of powdered gum arabic and an ounce of shellac varnish. Keep these ingredients standing by in a bottle near a fire for a week, and then strain off. When using, rub it well in.

Perhaps the most wonderful thing that has been discovered of late is the new glass which has just been in Sweden. Our common glass contains only six substances, while the Swedish glass consists of 14, the most important elements being phosphorus and boron, which are not found in any other glass. The revolution which this new refractor is destined to make is almost inconceivable. If it is true, as positively alleged, that, while the highest power of an old-fashioned microscope lens reveals only the one four hundred-thousandth part of an inch, this new glass will enable us to distinguish one two hundred-and-four-million-seven-hundred-thousandth part of an inch.

PUBLICATIONS.

WE note with pleasure that our excellent American contemporary, the *Progressive Age*, will in future be published semi-monthly instead of monthly as heretofore. The publication offices, too, have been removed from Philadelphia to New York. The *Progressive Age* devotes itself entirely to gas topics, and is an ably conducted journal.

We have received from the author a copy of a "Manual of Engineers' Calculations," by D. McLaughlin Smith, late clerk of Steamboat Inspection Office, St. John, N. B. This work, which is designed to assist engineers desirous of passing the Board of Steamboat Inspection, contains rules for working and answering the kind of questions usually propounded to such candidates. The book contains many valuable tables and a number of illustrations: A beautifully engraved portrait of the author's father, Wm. M. Smith, M. E., forms the frontispiece to the book, and a sketch of his life is also found in its pages. Persons interested in the subjects of which this book treats will find its contents of great practical interest and value.

Our esteemed contemporary, the *Sanitary News*, has advanced its subscription price from \$2 to \$3 per year.

PERSONAL.

A. O. Wheeler, builder and contractor, of Toronto, has resigned. Mr. Smart, Minister of Public Works for Manitoba, is seriously ill. Messrs. Sneed, Dowd & Co., furnaces, Toronto, have dissolved partnership.

Mattison Bros., contractors, Spring Hill, N. S., have dissolved partnership.

Mr. B. A. Campbell, a prominent Canadian contractor, died recently at Niagara Falls.

At a recent meeting of the Toronto Master Carpenters' Association, Mr. Wm. Simpson was presented with a handsome and costly set service and an address in recognition of his efficient service as Secretary of the Association during the past three years.

The following gentlemen have been elected officers of the Council of Arts and Manufacturers of the Province of Quebec for the ensuing year:—President, Mr. S. E. Davison; Vice President, Mr. J. P. Fiches. Committee—Messrs. C. Dupont, J. Carred, Lieut.-Col. Stevenson, Dolvin and A. Lequet.

The solicitors of the Dominion Subway Company, Toronto, are seeking authority from the city to lay underground conduits for electric light and other wires.

Ald. Hanley, of Belleville, Ont., has secured the contract for the carpenter work on the new \$100,000 St. Paul's Catholic church, Toronto. He has also the contract for the carpenter work on a new Catholic church at Tweed, Ont., and is preparing plans for the new High School at Madoc.