engineer of the Cobourg, Northumberland and Pacific Railway which is shortly to be built by English capitalists from Cobourg, via Campbellford, to a junction with the Central Ontario and C. P. R. systems, east of Peterboro'.—Building permits have been granted as follows: Consumers' Gas Co., two round brick towers, s. w. corner Berkeley and Front sts., cost $5,000; C. H. Green, 2 story bk. dwelling, w. side st. George st., above Sussex ave., cost $6,000, Mrs. Pirtle, 2 story bk. addition to dwelling, 70 Terauley st., cost $1,200.

## FIRES.

The general store, post-office and residence of Geo. Mitchell, at Baltimore, Ont., was destroyed by fire last week. The loss is about $6,000, partly covered by insurance.—Charles Fairbairn's residence at Verulam, Ont., with all contents, was burned last week. Loss $10,000; insurance, $4,000.—Ten buildings at Springhill, N. S., were destroyed by fire on the 21st inst. The losers are: W. E. Gilmour, J. F. Robertson, Johnson & Fraser, Frank Bird, W. Farrell and E. Langeville.

## CONTRACTS AWARDED.

MAIDSTONE, ONT.—John Wortley, of Essex, has been awarded the contract for the erection of a brick hotel in this village for James Hayes.

GUELPH, ONT. — Messrs. Feek & Phillips have secured the contract for the plumbing, etc., at St. Joseph's Hospital. It is the largest contract of the kind yet awarded in this city.

MONTREAL, QUE.—At the last meeting of the St. Henri Town Council the contract for cement required for building purposes was awarded to Robert & Chouinard.—The Harbor Commissioners have accepted the following tenders for timber and deals required during the coming year: round hemlock, hemlock face timber and hemlock deals, W. H. Kelly, Montreal; flat pine, round pine deals, coping pine and pine deals, Shearer & Brown, Montreal; pine face timber, Valleyfield Lumber Company, Valleyfield. —A Gendron, architect, has awarded contracts as follows: four houses, corner Dorchester st. and Seymour ave., for P. Gillespie; masonry, Beaucage & Vermette; brickwork, O. Degure; carpenter and joiners' work, Labrecque & Mercure; heating, plumbing and roofing, Lessard, & Harris; plastering, St. Denis & Co.; painting, M. Bouthellier; ironwork, Canadian Bridge Co. Cottage at Notre Dame de Grace; masonry, T. Dufresne; carpenter and joiners' work, H. Mayer & Son; brickwork, E. Gauthier; painting, M. Bouthillier; plastering, Decary, Decary & Beaudoin; plumbing, heating and roofing, Lessard & Harris. Stable at St. Henri, for W. Clendenning & Son; carpenter and joiners work, D. Cyr; plumbing, heating and roofing, J Giroux; plastering, D. Cyr.

## RAISING A BRIDGE.

The raising of a bridge in Switzerland upon the line of the International Railway from Paris to Vienna, has attracted considerable attention from the methods pursued. The occasion for the change was that the river crossed, the Rhine, had lost in the sectional area of the passage between the piers about twenty-five per cent. in thirteen years, owing to the deposition of gravel and sediment, while the high water level had risen to such an extent as to pile floating debris 6 ft. deep on the bridge floor in times of flood. The alterations included some re-inforcements. besides the raising of the whole structure about 5 ft.

The bridge was continuous over a central pier, and had two main vertical posts there, and four vertical end posts. To each of these posts an inclined strut was attached in a tranverse vertical plane, presenting a surface for the top of a hydraulic jack to act upon. Eight special 100 ton jacks were used, with an 8 in. stroke, and a working pressure of 400 atmospheres, the piston being nearly 0 7 in diameter. The fluid used was a mixture of water, alcohol and glycerine. Sixteen men operated the jacks, their movements being synchronized by a code of signals, designed to secure uniformity of action. The bridge was raised a foot or two by short lifts, followed by thoroughly blocking, and then building under one course of cut stone masonry. The total load was 546 tons, and the maximum load on a single jack was 87 tons. The bridge was raised in four stages during intervals between trains. The longest interval between trains was about two hours. The weight of trains was rigidly restricted during the time the bridge was undergoing repairs, and their speed was limited to three miles an hour in crossing the bridge. In addition a special block system was organized upon that section of the line upon which the bridge is located, so hat operations could be suspended, and the track restored five minutes before the arrival of a train at the site.

## PUTTY.

It is generally known that putty is a composition of whiting (carbonate of lime) and raw linseed oil; this, at least, is the commercial putty, such as house painters use. There are usually two grades of putty, one being made of a good quality of whiting and pure raw linseed oil, and the other a mixture that may contain a commercial or low grade whiting, marble dust, fish oil, resin, oil, linseed oil, these or some of these things, and is unworthy the honest name of putty. The best grade works nicely and wears well. The bogus article is short and coarse grained, making it difficult to glaze with, on account of its brittleness, and hard to putty up with, owing to its coarse texture. It does not dry well, does not work well, and does not wear well. It is lower in price than the better article, but the latter is so cheap that there is no excuse for buying marble dust and fish oil putty.

The making of putty at the factory is a very simple process. There is a "chaser." a machine consisting of a huge pan and a pair of revolving heavy iron rollers, chasing each other around the pan crushing the lumpy whiting (which is chemically known as carbonate of lime), to which linseed oil is added, after the whiting has been pulverized some, and the whole mass is rolled until perfect and free of lumps. The whiting is weighed and the oil is measured, so much of each to a batch, and when the batch is done the chaser is stopped, and the putty, a good many pounds, is taken out and thrown on a table, to "sweat" out or ripen, an operation requiring about twenty four hours.

It is difficult to get whiting quite dry as it should be, and in the common "commercial," or low grade whiting, the percentage of moisture is quite large. The result of excess moisture is to make the putty flabby and sticky. It is a sort of cousin to pulp lead, which, by the way, is very good in its place. In cheap putty, moisture is not unwelcome, as it prevents the whiting from taking up as much oil as it should, oil being the costly ingredient in putty. Whiting used in good putty is kept in a dry room, spread out, and an honest effort is made to have it as clear as possible of water.

I have said that the best putty is cheap enough, and so it is. Some manufacturers consider it utterly unprofitable to make, while others make quite a specialty of it, I infer, as a "leader" to sales of more profitable goods. I used to be amused by a very young and enthusiastic salesman who would tell of his "placing an order for ten tons of putty, to be delivered at stated periods, in lots," because his prices left a margin of profit insufficient to keep his firm from bankruptcy, if they had to depend upon such sales alone. It would pay better to sell one hundred pounds of a fancy coach color than twenty tons of putty, at his prices usual to such large sales.

Soft putty the coach and car painters tell us, is influenced by the atmosphere, which causes it to bulge out and impair a painted surface. A little litharge would harden the putty. For inside use on white work, a white lead putty must be used, as ordinary putty will show through several white coats. This is made with keg lead and whiting. Old work often requires a putty that will dry quick and sandpaper easily, and stay where it is put. Such a putty can be obtained by mixing dry white lead and brown japan together adding a little rubbing varnish to bind it, and a few drops of turpentine to harden it. Putty should always be dry, if not quite hard, before being covered over with paint, as the oil in the putty is apt to strike through.

Another hard putty might be mentioned however, and it is made from keg lead, boiled oil and spirit varnish, in due proportions. Red lead in place of white lead, will give a still harder putty, useful for brick walls, and such places. For skylights, etc., a little white lead should be added to ordinary putty, which hardens it, while the addition of a little commercial glycerine will make the putty elastic and prevent breakage of glass through contraction and expansion.

## VALUABLE WOODS.

Many of the finest woods in existence are yet unknown, or only slightly known, to the manufacturers of wood in the civilized world. The woods of Central and South America are, perhaps, the most remarkable as well as the least known. In the yet untouched forests of this continent are many woods far finer than any of those now in use. These woods range from pure white to jet black in colour, and many of them are most beautifully marked and veined. Some of them are so hard that they turn the edges of axes, chisels, and tools, while the bandsaw cuts them only slowly. In the American Exhibition there were many displays of little known woods, and the finest of them were those from Argentine Republic, Brazil, and other South American countries. Some of these southern woods yielded to the teeth of the bandsaw, not the ordinary sawdust but fine powder, fine as the finest flour, so hard were the woods. Some of them burnt but slowly. Others possess qualities that keep them free from insects. Some of them seem to be practically indestructible by air and water. All along the eastern slopes of the Andes, up to the snow line of those great elevations, throughout all the great river valleys, and in some of the wide areas of level country in South America are great forests of fine woods that are specially fit for the finest cabinet and furniture work, and also for shipbuilding, carpentry, and other industrial arts in which wood is the "raw material." These great forests are now an unknown quantity in the commercial world but they will come rapidly into the knowledge of men and into the industrial use when once the railroad has reached them. Before many years, it is safe to predict, the South American and Central American republics will be threaded by railroads, and then those wonderful woods will be drawn upon to supply the demand for new and fine woods in all the civilized countries.

## A GERMAN DREDGER.

A pneumatic dredge, used on the lower part of the Weser river during the past summer, is described in a recent number of the *Centralblatt der Bauverwaltung*. The apparatus has two forms. In one the earth at the bottom of the river is stirred up by a kind of harrow, drawn by a boat, and is forced up from the bottom by means of jets of compressed air which emerge from a cylinder attached to the rear of the harrow and fed through a rubber pipe by a compressor in the boat. The depth to which the teeth of the harrow enter the bottom is regulated by a kind of float. In the second form of dredge, used only for removing very soft bottoms, there is no harrow, and the jets emerge from a cylinder provided at the bottom with a scraper to stir up the earth. The principle on which the apparatus works is that after fine material has been driven up from the bottom of a stream flowing with any considerable velocity it will not settle for so long a time that the current will have removed it to a place where it will cause no inconvenience. The use of air for such an apparatus has only been adopted once before, we believe, when it was successfully employed in the harbor of Algiers. Water has been applied for this end a number of times, and the cost of dredging the Tidbury docks is said to have been reduced from £100 to £27 a week by replacing three steam dredges by a pressure water excavator.

POROUS GLASS.—The latest hygienic craze in Paris is the use of porous glass for windows. This is declared to possess all the advantages of the ordinary window framing, and, while light is as freely admitted as through the medium of common glass, the "porous" further admits air, too, the minute holes with which it is intersected being too fine to permit of any draft, while they provide a healthy, continuous ventilation through the apartment.

# MUNICIPAL DEPARTMENT.

## REMOVAL OF SURFACE SOIL ON RESERVOIR SITES.

Among the important subjects covered by the last report of the Massachusetts State Board of Health, says the Engineering Record, is that of the effect of surface soil on the waters of a newly-constructed reservoir, in reference to which investigations were made by Prof. Thomas M. Drown. The conditions under which Professor Drown's work was prosecuted were not precisely the same as those which would exist in a reservoir, yet any experimental work of this character cannot fail to be of much value. Reservoir sites occasionally, or perhaps frequently, include swamp or wooded lands or other ground on which much organic matter has accumulated and it becomes a serious question just how much of such surface a good condition of the water will require to be removed. It is of course evident that the organic earth, so to speak, of the character found in such circumstances as those just named should be wholly removed, as is always done in good engineering practice, but there are other conditions under which the cost of clearing soil may be considerably reduced, if not largely eliminated, by a less thorough removal. Professor Drown made some examinations in a swampy ground in which at a depth of approximately 3 feet the organic matter was reduced to about 2 per cent., which he considers a safe limit in our present state of knowledge regarding the matter.

In the case of clean, dry meadow land, or in such hard and dry soil as is found at many reservoir sites, it is a question whether the surface soil might not safely and properly remain undisturbed except possibly in the shallow portions of the impounded water, and, indeed, as few shallows as possible ought to exist in any reservoir. The safe and proper method of procedure usually is that which involves no hazard, and on that ground it may perhaps reasonably be stated that all surface soil ought always to be removed to such a depth as may be necessary to reach all organic matter. In sparsely populated districts, however, and under circumstances which produce only such organic matter as is found in many thin, and what may be termed healthful, soils free from everything of a swampy character, it is difficult to see what pathogenic condition the water over it would suffer from its presence. It is much to be desired that the investigations of the Massachusetts State Board of Health be so extended in this special field as to cover the particular conditions which have just been considered.