

hand and declared them illegal, but unfortunately it is difficult to find a Government who have the courage of their own convictions sufficiently to legislate for the good of the country—they prefer to cater to the popular vote. If the plasterers keep on demanding higher wages, the effect will react upon themselves and capitalists will prefer not to build, or the architects will have to consider some substitute for plaster. Another important question which arises is, who is responsible? The contractor says he is free from responsibility of fulfilling his contract in a specified time, owing to an unforeseen strike. If there is no recourse against the strikers, and the builders are not responsible owing to the strike, then the only person who suffers is the proprietor. This seems to me wrong, that a private individual who contracts with a builder for the erection of a house which he is either to occupy himself or has leased to another, is to be at a loss, or inconvenienced, because certain trades want to force the master builder into paying wages for work which is not yet contracted for. Certainly it seems to me that the person building leases of all should be the one to suffer loss, and have no doubt in my own mind if a test came before the courts, the responsibility would fall on proper shoulders.

PERSONALS.

Mr. G. W. King has retired from the firm of King & Gouinlock, architects, Toronto, and has formed a partnership with Mr. A. R. Denison, of the same city.

Much regret has been occasioned by the death since our last issue of Mr. W. J. Hoon, one of the most widely known and respected master builders in the City of Toronto.

By the death of Mr. John G. Howard, of Toronto, the architectural profession of Canada has lost another of its pioneers. Mr. Howard was born near London, Eng., in 1823, and in 1832 came to Canada, where for many years he practised his profession with much success. He planned the present St. Lawrence Hall and market buildings, Toronto. In 1834 he gained the premium of £30 for laying out the market block; in 1836 the premium of £45 for the Toronto Gaol and Court House; in 1837 the premium of £45 for the Gaol and Court House, London, Ont.; in 1841 the premium of £25 for the new market at Kingston; in 1842 the premium of £50 for Queen's College, Kingston; in 1844 the premium of £30 for the Lunatic Asylum, Toronto. A few years ago Mr. Howard presented the City of Toronto with the beautiful property known as High Park, reserving for his own use until his death Colbourne Lodge, where he resided, and about 45 acres of land, which property now reverts to the city, together with his magnificent collection of oil and water color paintings.

PUBLICATIONS.

We have received a copy of the second volume of Mr. M. T. Richardson's "Practical Blacksmithing." This volume opens with a brief treatise on the early history of iron and steel. Artistic iron work is next considered, and the text employed to show the strength of iron are given. The book contains numerous illustrations. Mr. T. Richardson, publisher, New York.

Our English contemporary, the *Builders Reporter and Engineering Times*, comes to us refreshed to a more convenient form, improved typography, and bearing other marks of increasing prosperity, which we trust it may long enjoy.

The prospectus of the *American Architect* for the present year includes a series of papers on "Ancient Architecture for the Use of Students," by R. W. Gamblin-Bousfield, architect, Toronto, Ont. Mr. Bousfield is well fitted to write on this subject, and will no doubt succeed in presenting in condensed form, details of ancient architecture which students would otherwise have to search many volumes through to gain possession of. Such knowledge as is proposed to be given is indispensable to enable students to make intelligent use of the numerous details characteristic of the various styles and periods of architecture.

Wood fiber bath tubs are said to be coming into use, and it is claimed they have the advantage of being movable and readily cleaned, the pipes are easy of access, and they do not, like stone or metal, chill the water and the bather. These tubs are grained on the outside to imitate any desired wood, and inside to look like enamel.

A most enjoyable evening was spent by the Toronto Master Plumbers' Association on the occasion of their annual meeting and supper. The proceedings were presided over by Messrs. W. J. Guy and John Ritchie. The latter in an interesting speech reviewed the city's progress since he first came to reside in it, in 1857. Mr. John Keyser, Secretary of the New York Master Plumbers' Association, was among the invited guests. He remarked in the course of his address that the plumbing done in Canada was superior to that of the United States. The officers elected are: President, W. J. Guy; First Vice-President, D. W. Kinghorn; Second Vice-President, Thos. Cook; Secretary, H. Hogarth; Treasurer, John Ritchie; Sergeant-at-Arms, Caleb Weeks.

A correspondent writes to the *American Engineer* as follows: "We are heating four greenhouses, each 75 x 21 feet, and one potting shed 50 x 20 feet, also one propagating house 50 feet long; using the 'over-head and return under-bed' system of piping. We use two 2½-inch steam flow pipes in each house overhead and seven 1-inch return pipes. The boiler is a No. 7 Farman brick-set, and it heats all our houses on from ¼ to 1 pound of steam. The entire heating arrangement works to a charm. The boiler, especially, extracts about all the heat from the coal whether run on a small or a brisk fire. It makes steam on a run, and the effect is instantly felt in the houses. We consider it a complete success and far superior to hot water, by which we warm some of our other houses.



"CANADIAN ARCHITECT AND BUILDER" COMPETITION ESSAY ON "PLUMBING."

By "LUCIUS DRINK."

ONE of the most important subjects to be dealt with in connection with modern house planning, is that which comes under the head of plumbing, that having probably more to do with the health and comfort of the inmates after the house is completed than anything else. The introduction of plumbing-work into a house is, broadly speaking, for two reasons: to bring in a good and sufficient supply of pure and wholesome water, and to afford adequate means for the disposal after use, together with human excreta and other waste matters, this refuse being generally comprehended in the term "sewage."

There can be no doubt that the simplest and most direct means possible are the best for accomplishing these objects, and in designing the plumbing system, simplicity and first principles should be continually kept in mind. In order to obtain a full inspection of the work at all times, and to prevent accumulation of dirt in dark corners and consequent pollution of the atmosphere, all pipes, etc., should be fully exposed to view, and in fact, is the only sure way of securing first-class workmanship, for there are plumbers who, knowing their work will be covered up immediately on completion, care very little about the results if only they can get their job completed. Not so very long ago, a practical illustration of this came to notice, and that too in a house where all fixtures were exposed. In the main part of the building, the work was exposed and attracted particular attention; the joints of both lead and iron pipes were everything that could be desired, and the bends of full bore throughout were so well done and symmetrically arranged, as to be an ornament rather than an eyesore to the rooms in which they were placed; but in peering about the cellar, a lead waste pipe was discovered, partly hidden by the ground floor joists, in which the bore at the two bends in it was decreased fully one third, thus forming a serious obstacle to the flow of water. This only shows that where there is the slightest chance of the work being hidden, it is apt to be neglected, and the result. The main pipes should be arranged so as to pass down in interior rooms or closets, or else in chases specially prepared for them, the last mentioned way being least commendable, as in some cases it gives a pretext for careless joinings. If objection is made to the pipes being exposed, they could be covered with wood panelling, but this should only be screwed together to allow of easy access to the pipes. All fittings should be as like as possible from view as possible; in fact, only the barest requirements of the work of casing should be conceded to. There is no earthly reason why every fitting should be shut out from sight as the custom has been for so long. If the work is well done, it is far from being an eyesore, and in the better rooms and more public places, the fittings could either be made entirely of brass, or else nickel-plated, and if sales are deemed necessary, they can be of marble, although the necessity for safes when all the fixtures are exposed is not quite apparent, for a jemmy could not run through them, and would be too dangerous to do any damage, and in this case a superfluous appendage of the plumbing system might be done away with. This principle will be found to work best all through, for the simpler and less complicated the whole thing is, not only will it be less liable to get out of order and require frequent attention, but the cheaper it will be in the first place. Of course it is not to be understood that cheapness is to be of primary importance. By no means. Let enough money be spent to secure a thorough job. There must be no stint in that, but superfluities ought to be avoided. The amount of cold metal which goes into a house now, bears an alarming proportion to the cost of the whole building, and certainly economy in this respect ought to be regarded as much as possible.

There can be no question that metal pipes only should be used inside a building. The unsuitability of cement joints in earthwork piping, and the danger arising from the pipes becoming brittle and easily broken, ought to preclude their employment in that connection altogether. The defects of other systems of house drains that have been made use of are so glaringly apparent, it is not necessary to mention them. On the whole, iron is more suitable for soil pipes than lead, at any rate in this country. In England where the wastes from baths and basins are not emptied into the soil pipe, and where the pipe itself is always outside the house, no doubt lead pipe may be suitable; from the universal use of it in that country one would gather that it is, but in this climate it is necessary to have the soil pipe not only inside the house to prevent it being choked up by freezing, but if possible against an inside wall, and the superiority of iron in a case like this can at once be appreciated. It is not only lighter and stiffer, but less liable to injury, such as by nails being driven through it, etc. These are important points inside a house, and then with all wastes running into it, a lead pipe would soon be deteriorated by the action of water, and the baths, etc. Taking all this into consideration, with the fact that iron requires the least means of support, there is no hesitancy in claiming that it is the most suitable material. It can be cast into almost any shape, and in fact, the patterns usually kept in stock will meet any ordinary requirements. For the smaller branch wastes, etc., lead pipe, which is more easily manipulated, is generally used; and for these purposes is doubtless the best.

As a rule, cast iron is used both for soil pipes and house drains, and no doubt is very efficient; but for the upright pipes, wrought iron with screw joints, which is now being extensively used, is probably better, for where there is any to be any pulling strain, occasioned by settlement or otherwise, the lead joints of cast iron pipes soon give way, and allow sewer gas to permeate the house. Then again, the heavy bolts have rather an ugly appearance when exposed to view, and take up a great deal of room. Wrought iron pipe is also made in much longer lengths than cast iron, thus necessitating fewer joints.

When cast iron is used, it should be of extra heavy quality, and the hubs should be strong enough to allow a good caulked joint to be made, as these are the only joints ordinarily used, and which can be relied upon, and the pipe should be straight and perfectly smooth inside, and to insure against all flaws and defects, should be thoroughly tested by hydraulic pressure before being coated by enamel, which is done to prevent corrosion. As the efficiency of the pipe system depends largely on the joints, great care should be taken to see that these are all well executed.

The pipes should be placed within one another in as straight a line as possible, and a grout or cement well rammed into the hub between the two pipes to prevent the lead from entering the joint and forming an obstruction. Although some consider it better to pour in the molten lead in two separate