

than either Toronto or Chicago. The mode of application of their sanitary rules is both simple and effective. Before property can have the privilege of water supply, the water-works' rules must first be complied with; also before it can secure the advantage of a sewage outlet to the street sewer, the health and sanitary laws must be fully carried out, and if property is not supplied by these necessary requirements it cannot be inhabited. But no public body can interfere with the rights that have already been acquired, except by paying compensation, unless the property is or contains a public nuisance and is unfit for public habitation, and even in that case the courts of law are not often required, for if an owner declines to keep his sanitary and waterworks appliances in good order he will receive notice to have them corrected, and when the time given expires, and the request is not complied with, the public authorities send their own tradesmen to do the necessary repairs, and charge the cost in the tax bills. This can all be done without threatening letters or a dozen visits from inspectors, and at a cost of about one-tenth of what it cost Toronto, and also without dragging the respectable citizens and tradesmen into a criminal court, or scaring weak people with official letters. When engineers and inspectors are clothed with absolute authority, those tradesmen who are compelled to work under them might almost as well hand their business over to the fortunate official, or make special efforts to please him in some other way, for there can be a wide difference between an inspector being satisfied with the work done at two different places, and by two different firms. I have had a letter in my possession from a former engineer of Toronto, in answer to a plumber's complaint about an official who had been unreasonable, and demanded more than the law required, which stated that the inspector could not be wrong, and he must be obeyed or a summons would be issued. The complainant then applied to the mayor, and the council appointed a committee which never met or gave the plumber a hearing. This sort of management usually occurs where business is done in favor of or by the requests of syndicates and monopolists that have a strong financial backing.

All rules and regulations made for the government of the general public should be plain, clearly described, easy to understand and carry out in every detail, definite and pointed, and having illustrated diagrams and plans showing what is wanted. It is unfair and unjust to allow any single person or body of officials to have the power to harass a tradesman, so that his expenses are increased and business damaged, while another friendly business firm may evade the law, or its work be easily declared satisfactory, securing good profits. The best sanitary laws are so framed that the most ignorant mechanic cannot make an error or mistake that will in any way injure the public health, and every detail of the fitting inside the building can be observed at a glance.

For THE CANADIAN ENGINEER.

FOUNDATIONS.

By CHARLES BAILLAIRGE.

Allow me through the medium of your journal to call the attention of Canadian architects to the very concise and lucid illustrated article on "Foundations," which appeared in your last issue. The writer says: "The foundation of a structure is much more important than any other feature of its design, as on its security depends that of the structure itself." Our Canadian architects, I am loath to say, have not of late years been up to the mark

in respect to foundations. Hence so many failures of buildings, especially of country or parish churches in the Province of Quebec, and other places which I might name, where the foundation areas, not being proportioned to the weight to be supported, portions of the structure have settled down unequally, tearing themselves away from others in a disgraceful manner, or to the disgrace of all concerned. I noticed this at J—— some three or four years ago, where the whole front of the church had parted from the side or wing wall, and the salient tower from the remainder of the front, due to its still greater weight, it having sunk eleven inches below datum level, and entailed an expense of some \$7,000 or more in reconstruction. Other churches, I am told, as at the St. C. and St. B., have had to be, due to distortion by unequal settlement, taken down and rebuilt in toto.

Now the question arises as to at whose door the fault of such failures is to be laid. I must unhesitatingly say that, generally speaking, the architect is or should be considered the responsible party, and I cannot in saying this be open to any suspicion of partiality towards contractors, being one once myself, having practised as such for over twenty years before entering on civic service, and am still doing so. The architect should in every case plan and specify his foundations in a way that, if so executed, they may be thoroughly reliable, and then in case of the parish, through assumed poverty or otherwise, refusing to put in such foundations, the architect should execute the work under protest, so as to clear himself thereafter and saddle the blame where it belongs. The contractor should act in a similar manner, refusing to build a building under protest both to the architect and to the proprietors or wardens, in case of an improperly and inadequately designed substructure.

If the contractor carry out a plan as specified, he cannot be blamed for any failure due to settlement, as he is not supposed to form the necessary technical knowledge to allow him to judge of insufficiency and the ability of the soil to do what is expected of it in the way of supporting the structure. But the architect is supposed to possess this knowledge, and if he does not he should acquire it, or he is no architect at all worthy of the name. It is deplorable now-a-days that the engineer has to be called in to help the architect through with his foundations, for of the two the architect is the one supposed to have the more difficult problems to deal with sometimes, as in providing against the strains and thrusts to which sidewalks, piers and pillars are subjected by arched roofs or ceilings and domes of masonry, while with the engineer all these strains are conjured into submissiveness by the homogeneity of a pinned together or riveted structure, every part of which is thus tied and bound in a way not to give. What would architects of old have done had they not known how to proportion their resistance to their thrusts? There were no engineers in those days as we have them now. To what engineer did Michael Angelo apply to tell him how stout to build his piers to stand the pressure of St. Peter's dome, to load the supporting soil with weights proportional to their breadth of base? To whom did Christopher Wren address himself to study out the stresses of St. Paul's?—to whom the respective architects of the Pantheon, the Pantheon of Paris? They would have been ashamed, humiliated, to have had to rely in such matters on anyone else's knowledge than their own. It must not be argued that it is not less *infra dig.* for the engineer to call in the architect to ornament his structure, make it artistic and acceptable to the age, than for the architect to call in the engineer. No, the cases are entirely different. Art and