the necessary expenses in connection with the carrying out of these proposals be defrayed from the contingencies of the Department of External Affairs.

MUNICIPAL ENGINEERS AND PRIVATE PRACTICE.

An Association of Consulting Engineers was recently formed in Great Britain. At the inaugural dinner it was strongly pointed out that there was a necessity for the new departure. In order to maintain a profession at its highest level it was essential that it should have an external conscience, in addition to the individual conscience of its members, and the new society was due to have a conscience of this kind. It would draw a distinct line between the municipal engineer as he should be, and the municipal engineer when he becomes commercialized and competes with private enterprise.

One of the strong advocates for the association, Mr. J. H. Balfour-Browne, K.C., felt very keenly against the State and municipal engineers being permitted to compete with consulting engineers. They should devote all their time and attention to the work of the municipality, and be adequately paid for doing this duty. If they did devote their time and attention adequately to the work of the municipality, they ought to have no time for engaging in private practice. Apart from this, there was the danger in a municipal engineer acting in a consulting capacity, that he was liable to have a narrow outlook. The variety of the work engaged in by the consulting engineer was his strength, and was apt to give a judicious breath to his decisions, which was invaluable to his client. The Association of Consulting Engineers was doing good work, both for itself and for the public, in keeping up the standard of the profession.

These grounds for the preclusion of State and municipal engineers from acting privately in a consulting capacity are, according to the London *Times*, thin and unconvincing. "For," says the *Times*, "if variety of experience is a source of strength to the everyday consulting engineer it is reasonable to suppose that the municipal engineer would also acquire strength and develop the judicial attitude of mind from occasional indulgence in that class of work. The truth is that the most weighty objections to the acceptance by qualified engineers of private consulting work are based not upon their lack of knowledge, experience, of powers of judgment, but upon ordinary considerations of what is expedient for public servants. In this respect members of the engineering profession holding State or municipal appointments are even more restricted than members of the legal profession in like circumstances. The essential requirement in private consulting work is that when advice is sought upon an engineering matter the engineer selected should be a qualified specialist upon the subject in question; and what the public have to avoid is the employment of a person who poses as a consulting engineer upon every engineering subject that presents itself. In cases of doubt regarding qualifications, an appeal can always be made to the councils of the great engineering societies and institutions."

Some difficulty was encountered during the formation of the new association in discovering exactly what the term "consulting engineer" constituted, as applied in England. The definition proved hard to deduce, although of considerable import, as the association rules are to be applicable only to consulting engineers—professional men to work along professional lines and to advise clients to the best of their ability irrespective of their own pockets.

SURFACE INSULATION OF PIPES.

An investigation of the subject of surface insulation of pipes as a means of preventing damage to underground metallic structures by stray currents from electric railways has recently been completed by the U.S. Bureau of Standards, by Burton McCollum and O. S. Peters. Tests were made of the various substances available for the purpose of insulation of underground structures, including paints, pitch and asphalt dips, pitch and paper and asphalt and felt wrappings, and so forth. Test specimens were made by lining shallow sheet-iron cones with the material to be tested. Before being subjected to the final test each cone was filled nearly full of ten per cent. salt (NaCl) solution and an alternating difference of potential of 80 volts (effective) applied across the coating for 30 seconds, in order to be sure that it was continuous and without flaws. A milliammeter in series with the specimen indicated a defective coating by a kick of the needle. The electrical resistances of the perfect specimens were then approximately determined with a Wheatstone bridge. In the case of the paints these resistances were found to be of the orders of from 10^5 to 10^{11} ohms per square centimetre, while for the wrappings they were much higher.

The final test of the specimens which survived the preliminary test consisted in allowing water and air alternately to come in contact with the coating while a direct potential difference of either four or fifteen volts was applied across the coating. The value of the voltage applied depended on the thickness and other characteristics of the coating. In some of the specimens made up from each material the iron of the cone was made negative and in others positive, while in the case of the paints some of the specimens were subjected to the alternate action of air and water with no potential difference applied, in order to check up the effect of the electric stress.

The alternating contact with the coating of air and water was obtained by filling the cone and allowing the water to evaporate, which took about a week. Readings of the current flow were made at suitable intervals. The first appearance of current flow was taken as indicating the end of the useful life of the specimen as an insulating coating.

The average life of the paints was about 116 days, the maximum life obtained from any specimen being but little more than a year. No conclusive evidence was obtained that the low potential differences applied had any effect in hastening the initial failure of the coatings. The wrappings lasted longer than the paints and dips, but none of them much more than 400 days. It seems from the results that the failure of the coatings must be caused by absorption by them of water, which in time penetrates to the iron, allowing current to flow and destroy the coating by electrolysis. After the first appearance of current flow the destruction of the coating was observed to proceed very rapidly.

The conclusion drawn from the results of the laboratory tests, as recently published in Technologic Paper No. 15, of the Bureau, to the effect that the protection against electrolysis which is obtained by wrapping or painting pipes or other metallic bodies for use underground is only temporary, is borne out by tests on insulated pipes buried in the ground under practical conditions, and also by correspondence with gas and water companies whose experiences lead to the same conclusion.