made to enlist the co-operation of other technical societies. Otherwise the absurd statements concerning the Canadian Mining Institute would not have been made.

As our correspondent points out, the memorandum was not presented to the Premier by the Canadian Society of Civil Engineers, but by four of its members and Sir Charles Ross over a year ago (May 15, 1916). Its inaccurate statements did not therefore get wide publicity until the annual meeting of the Civil Engineers approved of it and ordered it to be printed and distributed.

The letter accompanying the copies distributed is dated April 18, 1917.

The Canadian Society of Civil Engineers in recommending the publication of this memorandum has not merely failed to co-operate with other technical societies, but has made itself responsible for the dissemination of false statements concerning these technical societies.

Mr. Leonard suggests that we publish the memorandum in this journal calling attention to the errors appearing in it. We do not feel qualified to undertake to point out all the errors. We have pointed out some of those that refer to the Canadian Mining Societies. Whether the statements referring to the other technical societies are no more accurate than those referring to mining societies we leave for others to point out. After reading the statements concerning mining men we are naturally suspicious that much of the remainder of the memorandum may also be inaccurate.

While we have pointed out some of the inaccuracies in the memorandum we are ready to agree with Mr. Leonard that it contains many good suggestions worthy of consideration by all technical men. We would be glad to publish the memorandum if it were first carefully revised. Such revision would be made easy if the Canadian Society of Civil Engineers would co-operate with the other technical societies.

ON THE ORIGIN OF SUDBURY NICKEL DEPOSITS

Editor Canadian Mining Journal:

Sir,—The recently issued Report of the Royal Ontario Nickel Commission is in the main excellent, as would be expected from the ability and high standing of the commissioners, yet a geologist reads one portion of it with some surprise. He finds that all previous students of the geology of the region have been quite wrong in their interpretation of the ore deposits as formed by magmatic segregation, since they are really due to replacement by hot waters.

The gentleman, not a member of the commission, who prepared this part of the report, had already settled this point by studying some polished sections of ore, and so had an advantage over earlier workers, who attacked the interesting problems of the region without any prearranged theory. Knowing the true source of the ores he naturally finds little to commend in former reports, except Robert Bell's description of the sedimentary basin near Sudbury, which seems innocent of any magmatic taint. When T. L. Walker encloses the basin with micropegmatite merging outwards into norite, however, there is a dangerous approach to the doctrine of magmatic segregation, which, of course, vitiates his work. But the worst offenders are Barlow and Coleman, who boldly declare the ore deposits to be magmatic segregations from the norite the latter geologist even stating that the norite-micropegmatite belt is really a sheet underlying the sediments, and that the ore settled to the lowest points by gravity. A good deal of space is devoted to refuting these heretical views, which are properly condemned whenever mentioned.

For instance, Walker's idea that micropegmatite merges into norite is shown to be quite unorthodox, since the process does not go on as rapidly or as regularly as it ought. Analyses specially made show practically no change in the composition of the norite for half a mile from the edge, so that the magmatic machinery worked badly, if it worked at all, and Walker was unwise to touch the risky subject. Again Barlow and Coleman claim that they have found blebs of ore completely enclosed in fresh norite. This error is demolished by showing that ore occurs also in weathered norite. It should perhaps be mentioned that Walker and Coleman have numerous thin sections which they believe prove their point; but it was not worth while for the writer to cross Queen's Park to see them. Talking over the matter with men who had taken the wrong road could serve no good purpose and might lead to controversy.

The fact that the ore really is found with norite seems a little embarrassing and leads to the suggestion that the norite looks like a dike. Just how this would avoid the difficulty is not shown, and the theory of a norite dike miles in width and enclosing a sedimentary basin, like a serpent biting its own tail, is not elaborated, but the idea is interesting.

The methods employed in refuting the errors of his predecessors are well shown in the account of the famous Creighton mine. Instead of a mass of ore which had settled to the bottom of the norite while liquid we are introduced to a sort of conglomerate or breccia of rock fragments cemented by sulphides brought in by water and occurring between a foot-wall of granite and a hanging wall of norite, but within the granite rather than the norite. The upper edge of the ore-body, instead of passing by gradations into the norite, has a "comparatively abrupt" contact with it; though we are informed a little later that "some of the mineralized norite near the deposit contains from 1½ to 2½ per cent. of nickel and copper combined," and that the spotted norite extends about 2,000 feet beyond the ore.

The explanation given is that hot solutions, coming from a source unknown, have removed the rock and replaced it by the millions of tons of sulphides of the ore-body. And this has all been done so deftly that the rock fragments left are perfectly fresh; no quartz or carbonate has been blunderingly introduced as a gangue; the ores themselves show no banding or crustification; and spots of ore have been neatly planted throughout 2,000 feet of the overlying norite, some of which at least is quite unweathered. Hot water accomplished the work unaided.

This account of things seems so reasonable that no evidence of the methods of replacement by "hot solutions" requires to be given, and the absurdity of the idea that the liquid ore separated from the molten norite and penetrated all the fissures and spaces of the fractured country rock beneath is manifest.

There are prejudiced geologists who still believe that micropegmatite passes downward into the heavier norite; that norite passes into pyrrhotite-norite; that cubic miles of this mixed rock overlie the great marginal deposits; that marginal deposits are always at the lowest points on the floor of country rock and never at upward bends of the contact; and that no ore is found without norite even in the longest offsets.