Deposits carrying phosphate and mica are often of quite irregular shape, the so-called "pockets." As a rule they are rather vein-like in that they follow the strike of the gneisses, or the contacts of the gneisses with crystalline limestones. A few deposits do cut across the general rock structure at an angle. Generally there are no walls, or sharp contact planes, between phosphate deposits and their surrounding rocks. The beds are extremely irregular in shape, and only rarely does anything like a true vein show. The deposits are usually made up of pyroxene, phlogopite, apatite, and calcite, named in the order of their crystallization. Many of the mica deposits are free from calcite, and some are free from apatite or phosphate, but none are free from pyroxene.

This has led to the common statement that our mica and phosphate deposits are found in "pyroxenites," and these pyroxenites have been described as intrusive, plutonic masses of coarse crystalization, which have intruded the gneisses and crystalline limestone. This is what a pyroxenite should be, but not what these actually are.

The writer got his first hint as to the explanation of the origin of these deposits while examining a contact of Algoman granite with Grenville crystalline limestone on lot 5, concession VI., of township Storrington. The contact was a clean one between these two rocks. Along the contact were developed scattered crystals of pyroxene, phlogopite, apatite, calcite, scapolite, graphite, and other minerals, showing clearly that these minerals had developed as contact metamorphic crystalization, and were the result of a siliceous magma coming in contact with a dolomitic limestone country rock. The lime and magnesia acquired from the dolomite formed with the silica of the intrusive the minerals found in these so-called "pyroxenites;" the necessary amounts of alumina, iron oxides, and alkalis, being just as easily accounted for as the more abundant constituents.

In the Kingston area Laurentian granites intruded the Grenville limestone and lime-holding sediments in great amount; and these intrusions usually produced an elongated lens-like, or plate-like shape, depending upon the perfection with which they followed the structure of the pre-existing gneisses and schists of Grenville age. It is obvious therefore that the contacts would be vein-like in shape, as a result of following the gneissic structure of the country rocks. Thus the shape of the so-called "pyroxenite dikes" or mica veins is accounted for. They are simply contact metamorphic deposits produced by the intrusion of the siliceous Laurentian granite into the basic Grenville limestone, rich in lime and magnesia.

Testing this theory the writer then traced the contacts of the main Laurentian belts with the crystalline limestone, and was astonished to find how perfectly the economic deposits of mica are strung along such contacts. In many cases the contact produced a rather compact, fine-grained, crystaline rock, composed largely of pyroxene, mica and apatite, which could very easily be taken for a pyroxenite. Its position would appear to be intrusive into the Grenville limestones and gneisses, as has been so frequently claimed. At other places, more open and spacious contacts would develop the large crystals for which this class of deposits is famous. Mica crystals measuring six feet across the base have been found in the Canadian General Electric Company's mine at Sydenham. Pyroxene crystals six inches square and eighteen inches long; apatite crystals ten inches in diameter; sphene four inches in cross section; zircon half an inch to a side and an inch and a half long, and other crystals of similar dimensions, have made these deposits famous as collecting ground for mineralogists.

The bulk of the deposits are of course along the contact in vein-like bodies, but certain fractures cross the gneiss and bedding planes of the crystaline limestone, giving rise to the so-called "cross-fissures," or dikes, which cut the structure of the country rock. It is clear that the size of the crystals, and therefore the economic value of the mica deposits, depends on the openness of the ground in which the crystals grew. Great areas, therefore, of so-called "mica rock," pyroxene and phosphate, are found which yield no marketable mica, and are readily taken for basic intrusive igneous rocks. They are too dense and compact to have given opportunity for the development of large crystals and are therefore of no economic value. The writer would, therefore, advise prospectors for mica to search out contacts of crystaline limestone with Laurentian gneisses, and following along these contacts, searching for places where sufficient openings or spaces were formed to allow for the growth of large crystals. That the granite intrusion which caused the metamorphism and mineralization, was Laurentian in age, and not Algoman, is certain, because both Algoman and Keweenawan dikes cut these mica-phosphate deposits.

It has been stated in the literature, and more frequently by mica miners, that mica is "pockety," and only "superficial" in its development, and that it will "not go deep." These statements are only partly true. There is no reason to limit the depth to which mica may be found, but it is such an easily cleavable and very fissile mineral that, at depth, mica crystals are apt to slip and be wrinkled or crumpled by pressure, which renders them useless for economic purposes. Just as one often says that certain segregated ores have a commercial wall, so one can say that mica has a commercial depth. If there has been no serious pressure to deform the mica physically, there is no reason why it should not follow indefinitely down the contacts on which it has formed.

Lead and Zinc.

In the year 1870 an outcrop of galena was found on the south half of lot 16, concession IX., of Loughborough township. It was worked in a desultory fashion, by the local inhabitants for five years. Sufficient galena was shown to attract an English company, and in 1875 the Frontenac Lead Mining and Smelting Company was formed. This company sank a shaft 250 feet deep, and ran five fifty-foot levels. In five years it took out over 2,000 tons of ore, which was reported to average 12 per cent. in lead, and five ounces of silver to the ton of galena.

This company traced the vein to the northwest for about three-quarters of a mile, and opened up two other shafts, showing a mixed ore of galena and zinc blende. The ore at the original opening, or No. 1 shaft, was entirely galena. The vein was traced, also, to the southeast into concession VIII., a distance of nearly a mile, where the large mass of Algoman granite, shown on the map, is met with, and where the vein showed no further development. At shaft No. 1 the wall rocks are gneiss, partly Laurentian in age and partly Grenville in lit-par-lit intergrowth. This country rock extends southeast to the Algoman intrusive. Following the vein northwesterly from No. 1 shaft, it passes into a small swamp, and when it emerges at the other edge, the wall rocks are Grenville crystaline limestone. The contact between the gneiss and crys-