

intrusions established for the thesis area compares very well for that established for other parts of the mountain.

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M. Sc.

GEOLOGY

LIONEL R. SIMARD

PYRRHOTITE IN ROCKS AND MINERAL DEPOSITS.

Although pyrrhotite is a mineral of common occurrence in nature its distribution has never been systematically investigated. This thesis represents the first attack on the problem. The polished surfaces of some 174 rock specimens were examined and the opaque minerals identified. Pyrrhotite was found to occur in basic igneous rocks and in metamorphic rocks. The results indicate that it occurs more commonly in rocks which contain nepheline. Pyrrhotite is most common in rocks of the Monteregian province. As pyrrhotite was found in only 14 of the 174 sections examined it would seem that this mineral does not occur as commonly in igneous and metamorphic rocks as it is usually considered to do.

Polished sections of a number of specimens of ore from pegmatites, high temperature and magmatic deposits were examined. Texture and mineral associations were determined.

Information was sought as to the constitution and the chemical, physical and mineralogical characteristics of pyrrhotite. This entailed a search and careful consideration of the literature on the subject. Pyrrhotite is a solid solution, probably of S in FeS. The most favored formula is  $Fe_nS_{n+1}$ , n having any value up to 18. The composition and various properties are found to depend on the conditions of formation. There are two modifications of pyrrhotite, a high temperature orthorhombic and a lower temperature hexagonal. X-ray analysis of pyrrhotite gave a holohedral hexagonal structure of space  $D_{6h}^2$  with two molecules in the cell of unit dimensions.

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M. Sc.

AGRONOMY

PETER CORNELIUS STOBBE

THE EFFECT OF SOME COMMERCIAL FERTILIZERS ON  
THE CHEMICAL COMPOSITION OF PASTURE HERBAGE  
IN THE EASTERN TOWNSHIPS OF QUEBEC.

This paper reports the results of chemical analyses made on samples of mixed pasture herbage collected from fertilized and unfertilized plots in 1931 and 1932 and of distinct species in 1932 only.

The % nitrogen in the mixed herbage was significantly increased by an application of superphosphate by lime and during the first year of the experiment by potash.

The calcium and phosphorus contents in the mixed herbage were significantly increased only by superphosphate. The calcium: phosphorus ratio was decreased by superphosphate in 1931 and increased by lime in 1932.

Nitrogen and calcium in the mixed herbage were closely related to the percentage of clover present in the pasture, while no such relation existed in the case of the phosphorus.

The percentages of nitrogen, phosphorus and calcium in the different species were greatly increased by an application of superphosphate and potash.

The clovers were very much higher in nitrogen and calcium than the grasses, but they differed only slightly in their phosphorus content.

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M. Sc.

CHEMISTRY

H. V. STOVEL

THE EFFECT OF CHEMICAL TREATMENTS  
ON THE STRUCTURE OF CELLULOSE FIBRES.

The work described in this thesis was undertaken with a view to determining the factors which influence the physical properties of various wood pulp fibres. A microscopic examination of fibres was carried out, and the influence of different agents on their structure noted. The tearing of sheets made from different pulps was also examined critically, to establish the mechanism of this tearing. Various factors influencing the characteristic stain reactions of different pulps were investigated. The observations made in the course of this work were recorded by photo-micrographs.