

PH. D.

CHEMISTRY

RAIMBAULT DE MONTIGNY

## PENETRATION IN SULPHITE COOKING.

The physico-chemical factors influencing the course of the sulphite process for making paper pulp have been studied. An experimental technique, making possible accurate control of conditions, has been further developed. The inter-relation of pressure, temperature, cooking liquor composition, hydrogen ion concentration, relative reaction velocities, wood structure, etc. have been investigated, leading to data of practical and of theoretical interest. Particular emphasis has been laid on the importance of the penetration of the reagents into the wood. Means of accelerating this penetration have been found, and, on the basis of this discovery, a new and more advantageous procedure for cooking wood has been developed. Evidence has been advanced in support of a penetration hypothesis to explain "burning" in the sulphite cook. Additional information on the penetration of liquids into wood has been obtained and theoretical explanations of the mechanisms involved have been given.

PH. D.

GEOLOGY

ROBERT ALFRED FRANS HALET

THE GEOLOGY AND MINERAL DEPOSITS OF THE  
BEATTIE-GALATEA AREA, QUEBEC.

The Beattie-Galatea area is in Duparquet and Destor townships, northwestern Quebec. The main points of interest are: recent gold discoveries, and a long-standing controversy over the age of some porphyry intrusions. The geological features of the area include an east-west band of Timiskaming sedimentary rocks, with Keewatin volcanic rocks to the north and south of it. It is believed that these formations are closely folded into a synclinorium. Intrusive rocks fall into three groups: earlier basic rocks, later acidic porphyries, and still later diabase. The age of the earlier group is not precisely known. The relation of the porphyry intrusions to the structure is established beyond all reasonable doubt. The porphyries are younger than the Timiskaming series, and their intrusion was closely controlled by the regional structure, particularly in the case of the older quartz porphyry, and less so in the case of the younger bostonite porphyry. The "porphyry conglomerates" are studied in detail, and a logical explanation of their origin is offered.

The ore deposits are associated with porphyry intrusives. The Beattie ore is a siliceous replacement of bostonite porphyry with disseminated pyrite and arsenopyrite. The gold mineralization is low-grade, but this is compensated by the large size of the ore bodies. The geological and mineralogical features are studied, in an attempt to determine the physical conditions which controlled ore-formation.

PH. D.

BOTANY

E. MARIE HEARNE

CHROMOSOME STUDIES ON THE MECHANISM OF MEIOSIS  
IN MELANOPLUS FEMUR-RUBRUM.

Chromosome configurations in *Melanoplus femur-rubrum* were studied in relation to different hypothesis concerning the interpretation of chiasmata and the mechanism of chromosome pairing. By means of differential staining it was possible to trace the individual chromatid structure in these configurations throughout the first division of meiosis. A ratio of 71 compensating to 35 non-compensating chiasmata was found. An explanation for the preponderance of the former type is given. Chiasma frequencies were determined and cytological interference was demonstrated. From the determination of terminalisation coefficients and configurations at metaphase the movement of chiasmata was found, in some cases, to be toward the spindle attachment. Chromosome contraction at the metaphase of spermatogonial divisions was found greater than at metaphase of the first division. A chiasma formed in a heteromorphic bivalent was demonstrated to be the result of crossing over. The interpretation of certain configurations was found impossible on the "classical" hypothesis.

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CHEMISTRY

GEORGE RUSSELL LUSBY

## ALKALI COOKING STUDIES.

A study has been made of several problems related to the soda-cooking process. The sorption of sodium hydroxide and the nature of diffusion of sodium hydroxide, sodium chloride and hydrochloric acid into pre-soaked chips of different lengths, were measured at 20°, 50° and 75° C. The rate of cooking of black spruce wood at 160° with lithium, sodium and potassium hydroxides were found to increase with the atomic weight of the metal. In concentrated solutions at 160° C., potassium hydroxide reacted three