

EARLY NOTES ON ACADIAN GEOLOGY

By C. FRIEDLAENDER

GEOLGY has a bearing on many activities of man. Like other branches of science it has broadly two aspects: a philosophical, to understand the world we live in, a practical, to provide information on various technical problems, e.g. on foundations and building materials, on water and irrigation, on ore and oil deposits. Dana puts it concisely by saying that geology is all the sciences combined into one.

We therefore may expect to find indications of geological interest even in the accounts of the general explorer. With this in mind, I have looked through two of the early publications on Canada — by S. de Champlain and by Marc Lescarbot. I had at my disposal the re-edition of Champlain's works, prepared by C. H. Laverdière, sponsored by Laval University and published at Quebec in 1870. This edition is in four volumes and vol. 3 proved of special interest in this context.

As to Lescarbot, I had an original edition of 1611 — incidentally the copy is signed by the author and dedicated to Statalter (Statthalter = magistrate) Wolff in Zurich out of whose estate the volume must have found its way to the Public Library in Zurich. The book by Lescarbot covers a large ground. It not only relates the discoveries and exploits achieved since 1603 by the French in the vast region between Florida and Newfoundland but it goes back to remote times. We can safely disregard the narration of ancient Gaul, the more so as it has nothing to do with Canada.

In 1524 the French King François I commissioned John Verrazzano, of Florence, to investigate the West Indies north of the tropic of the Cancer, following the discovery by Christopher Columbus of the region South of it. Verrazzano followed the coast from Florida up to the 40th degree or even, according to other sources, as far as Cape Breton.

In 1534 Jacques Quartier of St. Malo has done some more exploration. His reports are incorporated in the book of Lescarbot. They do not yield, however, much that would be of interest for us here. The Huguenot de Monts was granted trade privileges in New France in 1603. When he sailed for the first time to the Canadian shores, in 1604, Champlain was in his party. Lescarbot reached Acadia with the second expedition of de Monts, in 1606; he has been in the region for two summers and one win-

ter. He draws freely on former accounts and on what he heard from other members of the expedition. Nevertheless his descriptions are worth while reading.

Lescarbot relates that the one question usually put to him by his countrymen is "are there treasures, mines of gold and silver in that region?" He is emphatic about it: yes, there certainly are mines, but they need to be disclosed by patient endeavours. The most beautiful mine, to his friend, is flour, grapes and cattle—who has got these goods is better off than many a mine owner: we do not live from mines. This attitude is laid down in different passages of his book. The atrocities committed by the Spaniards in their greed for riches and power are a shame and disgrace for the civilized world and such atrocities almost necessarily follow the lust for gold. The 3rd, 4th and 5th part of Lescarbot's book are more particularly dedicated to Canada.

The big river Canada — called Hochelaga by Quartier — was explored first. The party of de Monts sailed from the Bay of St. Laurent to the Saguenay River, passed Anticosti and Gaspé (Gachepé) and went upstream to Quebec (Kebec) and Hoche-laga. In this part we find a few geological indications. Lescarbot relates about the Quebec diamonds which, according to him, are better than those of Alençon. The "diamants d'Alençon" and hyaline quartz crystals and we need not suspect those of Quebec to be something different. *Gachepé*

But let us turn to Acadia. There are observations on a copper mine and several iron mines are mentioned. The copper deposit Lescarbot and Champlain refer to is very likely the occurrence of Cap d'Or at the Minas Channel — the location is given with the latitude of 45 degrees and a few minutes North. A green secondary mineral was observed; the name given, "vert de gris," does not appear, however, to correspond to our nomenclature. In his description of the copper occurrence Lescarbot mentions also rocks covered with diamonds. He goes on saying that they need not be real diamonds but they are nice to look at. These diamonds may be akin to the Quebec diamonds. Mention is also made of a blue transparent mineral, "not less beautiful than turquoise," specimens of which have been graciously received by the King and by the Queen. Lescarbot states that several goldsmiths in France are said to have pronounced that below the copper there well may be some gold. This leads him to his favourite tune: that mines of precious metals are no blessing. He writes (L. IV, Cn. III, p. 455) "Mais de s'amuser à la rechercher (the gold mines) ce n'est chose encore de saison. La première mine est d'avoir du pain & du

vin & du bestial, comme nous disions au commencement de cette histoire. Notre felicite ne gît point ès mines, principalement d'or & d'argent, lesquelles ne servent point au labourage de la terre, ni à l'usage des métiers. Au contraire l'abondance dicelles n'est qu'une farcine, unfardeau, qui tient l'homme en perpetuelle inquietude, & tant plus il en a, moins a-il de repos, & moins lui est la vie assuree."

Champlain does not differ much from this line. Iron mines — we would rather say occurrences — were noted in several places. The copper mine near the Minas Channel was also visited by Champlain. On the first attempt the party was not able to locate the occurrence but a second endeavour was successful. The description does not give very much information. Champlain holds that the mine might well be a workable one but for the fact that the ore occurs in very hard rocks and that the site is swept over by the tides twice daily.

There is little doubt that the French were in the first place interested in navigation, in fishery, in the fur trade, and most of all in the land itself and in its agricultural possibilities. Champlain came from Saintonge. Other members of de Monts party came from La Rochelle and Poitou. We can therefore safely assume that they were acquainted with marine alluvials and with the technique of diking and trenching. In their own home country, there are in fact extensive marine marshes which were being carefully cultivated, specially since Dutch engineers had been called in, during the reign of Louis XIII, to instruct the French in the art of diking the marshes. Marshes are shown on Champlain's sketch map of Port Royal (facing p. 19, that is p. 167 of vol. 3 of the Laverdière edition) and, both in the legend of this map and in the text itself, the marshes are briefly characterized as meadows that are flooded by the high tides ("prairies qui sont inondees des eaux aux grandes marées") and it is in that part of the bay that the Frenchmen planted wheat ("lieu du labourage ou on seme le ble"). In the text Champlain repeats that part of the meadows of the Port Royal bay are flooded by the great tides and he goes on to say that this locality was the most appropriate and pleasant to settle they had come across ("ce lieu était le plus propre & plaisant pour habiter que nous eussions veu").

In spite of that, after a visit to the site of the copper mine already referred to he had heard about by Prevert de St. Malo, de Monts selected another site — on the Isle de Ste Croix — for putting down a residence. The party had a nasty winter there and when, in the following year, it was decided to look for a more

appropriate spot, the bay of Port Royal was chosen. With short interruptions Port Royal was a permanent settlement — the first white settlement in Northern America North of Florida. To-days Annapolis, successor of the old Port Royal, is on the southern side of the bay, more or less opposite to the site selected 1605 by Champlain.

Also Lescarbot mentions the Acadian marshes. He tells us that they are treeless and that they are flooded mainly in spring and in fall. In the Bay of Fundy — the Baie Française of the French settlers — the tides reach inland following the rivers as far as 15 km. The strong tidal difference in the Bay of Fundy causes periodical sedimentation of very fine mud. The French recognized the enormous agricultural potentialities of these marine alluvials.

The first dikes were built 1617 near Port Royal. Systematical diking, however, was begun only in 1633 while trenching had been started already in the first years of the French settlement. Lescarbot states that below the loamy sand there is argillaceous sand which was extensively used for making bricks, and he assures that if some manure was put to the marshy land, the yield was almost unbelievably high.

According to Dawson, the principal localities of diked marshes in Nova Scotia are the Chignecto Bay and Cumberland Basin, the Cobequid Bay, the Minas Basin and the Annapolis Basin. All these regions were known to the French settlers. Dawson states that the agricultural value of the Acadian marshes can hardly be overrated. Generally speaking, they have not become unproductive even where they have been cropped without manure for more than two centuries. Neglect of diking and drainage has in many instances caused a marked drop in fertility but this could be restored by allowing the marshes to be flooded again by the sea. This, however, involves the loss of several crops.

The marshes appear to have been the only land on which extensive agricultural work has been carried out in Acadia until 1755. After that time, the British started clearing higher woodlands for cultivation but they availed themselves of the French experience in the diking technique and specially the hay exports from marshes continued to represent an important source of income. Schott states, on the authority of H. A. Innis, that in 1861 the price of one acre diked marsh in Nova Scotia was about \$62, undiked salt marsh \$26, while cleared woodland fetched \$5 to \$6. Marine alluvials are known from many parts. In the Bay of Fundy, the tidal differences may reach as much as

20 m, that is the highest observed in any place. This accounts, together with a slow general subsidence of the region, for the formation of these marine alluvial soils and also, as is worked out by Schott, for the difference between the Acadian marshes and say the North-German marshes.

The recognition of the value of the Acadian marshes appears to have been the most essential geological contribution by the French explorers and settlers. Although much valuable land has fallen into unproductiveness through neglect, the marshes still represent a potential asset for the agriculture of Nova Scotia. But since these early days, many minerals, as e.g. coal, gypsum, iron ore, have been proved to bear great possibilities in Nova Scotia: also the subsoil of Acadia has something to contribute.

THE GAME

By MYRTLE REYNOLDS ADAMS

And always to run
 With a laugh and a cry,
 Seeking the pool
 By a way unknown,
 Alone and alone
 With a handful of stars
 And a spatter of sun —

And always to find
 The water gone,
 No sunfall, the stars outblown,
 And turning back,
 The path grown dim,
 No tracks in the loam —
 To have come to the pool
 And no way home!