

underlying Primordial shales as the greatly developed representative of the Potsdam and Calceiferous (with perhaps the Chazy), and the true base of the Silurian system.

The Quebec group with its underlying shales is no other than the Taconic system of Emmons. Distinct in their lithological characters from the Potsdam and Calceiferous formations as developed on Lake Champlain, Mr. Emmons was led to regard these strata as belonging to a lower or sub-Silurian group. We have however shown that the palæontological evidence afforded by this formation gives no support to such a view. To Mr. Emmons however is undoubtedly due the merit of having for a long time maintained that the Taconic hills are composed of strata inferior to the Trenton limestones, brought up into their present position by a great dislocation, with an upthrow on the eastern side. We would not object to the term Taconic if used as indicating a subdivision of the Lower Silurian series, but as the name of a distinct and sub-Silurian system it can no longer be maintained. The Quebec group evidently increases in thickness as we proceed towards the south, and the calcareous parts of the formation are more developed. In 1859, I visited in company with Mr. A. D. Hager the marble quarries of Rutland and Dorset, in Vermont. The latter occur in a remarkable synclinal mountain of nearly horizontal strata of marble and dolomite, capped by shales, and attaining a height of 2700 above the railway station at its base. I then identified these marbles with the limestones of the Quebec group, considering them to be beds of chemically precipitated carbonate of lime or travertine, and not limestones of organic origin.

(To be continued.)

## MISCELLANEOUS.

### Cotton Manufactures in Canada.

Projects are on foot for the establishment of Cotton Manufactories in various parts of Canada, both in the Upper and Lower Province. A proper conception of the magnitude of our importation of cotton manufactures may be gathered from the fact, that their declared value in 1849 amounted to \$4,863,444, or one-eighth of the entire importations of that year.

Table of Importations and Exportations from 1851, to 1860, inclusive.

	Importations.	Exportations.
1851.....	\$21,434,790	\$13,810,604
1852.....	20,286,492	15,307,607
1853.....	31,981,436	23,801,303
1854.....	40,529,325	23,019,190
1855.....	36,086,169	28,188,460
1856.....	43,584,387	32,047,017
1857.....	39,428,584	27,006,624
1858.....	29,978,527	23,472,609
1859.....	33,555,161	24,766,981
1860.....	34,441,621	34,631,890

From the foregoing table it appears that the year 1860 is distinguished in Canadian History by being the first year during which the exports exceeded the imports.

### Dr. Gesner F. G. S., on Artificial Guano.

Guano, so valuable a fertilizer, is chiefly composed of the excrements of sea fowls. Frequently it contains feathers, bones of fishes, humus, &c. It is very variable in composition, a circumstance that has been ascribed to the different kinds of food upon which the birds subsisted. Some Guanos contain upwards of 25 per cent of uric acid, in others that acid is almost entirely

absent, and it is the same in regard to other acids, salts and alkalies. Ammonia usually enters largely into the best qualities of this fertilizer, and the presence of its carbonate is known by its odour. The oxalate, urate and phosphate of ammonia and magnesia are almost always present with the phosphates of soda and lime, the phosphates having been derived from the bones of the fish upon which the birds feed. In the supply of ammonia and of earthly and alkaline salts, guano is of the greatest value for plants cultivated for food. The food of the birds, from which the guano had been deposited has been a certain fish that fed upon other fish, the food of which was marine plants, or animalculæ. The origin of this fertilizer is therefore found in marine plants and animals.

The writer has obtained a product analogous to the true guano, and one nearly, if not quite, equal in its value for fertilizing purposes. Chemical and mechanical means have been applied to the marine *fuci* and fishes and fish offal until an artificial guano has been obtained. The sources of the alkaline carbonate, chloride of sodium and organic matter have been found in marine plants, the phosphate and carbonates of lime and ammonia in the bones and flesh of fishes, and after many experiments carefully performed, they have been combined so as to form a cheap and portable manure. At Long Island, in the State of New York, *menhaden* are manufactured into manure: the oil, which is very offensive, being extracted from the fish and employed for common purposes.

Having visited a great number of the fishing establishments of the Provinces of New Brunswick, Nova Scotia, Newfoundland and the Islands and coasts of the Gulf of St. Lawrence and Labrador, the writer obtained a knowledge of the vast quantity of fish and flesh offal annually thrown into the sea, or otherwise lost to every useful purpose. The garbage thrown-overboard yearly from vessels fishing on the banks of Newfoundland, if properly preserved and manufactured, with the annual growth of sea weeds upon the shore, would fertilize the entire cultivated surface of the Eastern States and British Provinces; still the amount of animal matter thus referred to is far less than that produced by the inshore fisheries.

To the foregoing may be added the enormous quantities of mytili and other shellfish growing upon the shore, and which are not less applicable for the manufacture of artificial guano, than the offal of the finny tribes. At many places on the shores, fish are met with in such abundance that they are employed by the fishermen to manure the small patches of ground some of them cultivate. At the principal fishing stations, the refuse garbage and bones alone would supply a manufactory, and with good management and the use of kelp, the offal may be transported from place to place without inconvenience. Like the bones of terrestrial animals, the inorganic matter or ash of the bones of fishes consists in the greater part of the phosphates of lime, or bone phosphate, with carbonate of lime, the fertilizing properties of which are well understood. Few soils preserve their fertility for any length of time. Every crop removes from the earth certain elements, which it is the business of the farmer to restore, and for that purpose no manure is better adapted than guano, either natural or artificial.

### Apple Skins.

M. Victor Chatel, who brings forward numerous citations from the most distinguished agriculturists, asserts that wherever apple skins have been employed, either for feeding cattle, or as manure for fields, corn, rape, or young apple trees, the results have been most satisfactory. The skins are preserved by being pressed down tightly in a hole, and covered with a well beaten layer of earth. When cooked and given to pigs, the latter are quickly fattened, and kept in perfect health.