heat and alkalies in the form of ammonia, is present in the limestones, marls, argillites, and sandstones of former geological periods, in qualities scarcely inferior to those in similar deposits of modern times, amounting, for most of the ancient sedimentary strata, to from one to five thousands of nitrogen ;* from which it will be seen that the amount of this element thus retained in the rocky strata of the earth's crust is very great.†

§ 33. If we attempt a chemical classification of natural waters in accordance with the principles laid down in the preceding sections, they may be considered under the following heads:

A. Atmospheric waters.
B. Waters impregnated with the soluble products of vegetable decay.
C. Waters impregnated with the salts from decomposing feldspathic rocks, and holding a portion of carbonate of soda as a characteristic ingredient.
D. Waters holding neutral salts of sodium, calcium, or magnesium from strata where they existed as solid salts, or as impregnating brines.
E. Waters holding chiefly sulphates from decomposing pyrites; copperas and alum waters.
F. Waters holding free sulphuric or hydrochloric acid.

§ 34. The name of mineral waters is popularly applied only to such as contain sufficient foreign matters to give them a decided taste; and hence the waters of the divisions A and B, and many of the feebler ones of C and D, are excluded. Those of E and F have peculiar local sources; but those of C and D are often associated in adjacent geological formations, and their commingling in various proportions gives rise to mineral waters intermediate in composition. In accordance with these considerations, a classification of mineral waters for technical purposes was adopted by me in the *Geology of Canada*, p. 531, including only those of C, D, and F, which were arranged in six classes.

I. Saline waters containing chlorid of sodium, often with large portions of chlorids of calcium and magnesium, with or

* *Ann. des Mines* [5], xviii, 151–523.

† For an exposition of the views put forward in the four preceding sections, see my paper in the Canadian Journal for 1858, p. 206.