L. W. BAILEY ON GEOLOGICAL CONTACTS AND ANCIENT

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strata of the most diverse character, and that, while at one point the Primordial rests upon what appear to be the most recent of these strata, at another it reposes upon beds which cannot be less than several thousands of feet lower in the series, while the conglomerates which mark its base bear further testimony, both in their composition and their thickness, to the erosive processes which preceded or accompanied the deposition of the Primordial sediments. Finally, while local unconformable contacts may be seen at many points, an equally marked discordance is observable in the two groups as a whole, the trends of the Primordial being transverse to those of the supposed Huronian, as the folds and dislocations of the one are quite independent of those of the other. The Lower Silurian, or Cambrian, formation is thus as clearly defined in its stratigraphical relations as it is in its paleontological features, and forms a readily recognizable horizon, with reference to which the position of both older and more recent groups may be directly compared.

As regards the older systems to which reference has been made, New Brunswick has been naturally looked to as likely to afford some information upon the questions which have recently awakened so much attention, regarding the number and order of succession of the pre-Cambrian rocks, and has, indeed, been frequently referred to in discussions of this subject. It can, however, I think, hardly be said that these questions, as here applied, have yet received a definite solution. That there are among the rocks referred to three, if not four, distinct groups of strata, exhibiting strong lithological contrasts, and probably representing entirely distinct periods and conditions of deposition, was early recognized and has been confirmed by all later study of the region, but the precise relations in which these stand to each other and their correlations with proposed subdivisions of Archean rocks elsewhere, are not so easily settled and have been variously regarded by different observers. Thus, while the writer, in common with Mr. G. F. Matthew, by whom the structure of the district was first studied, has described, in what he believes to be an ascending succession, a gneissic, a calcareous, a felspathic, and a schistose group,—the two former being regarded as representing the Laurentian and one at least of the latter the Huronian system,—Dr. Hunt has been disposed to question the existence of true Laurentian in this district, and to modify the above arrangement by associating the calcareous with the schistose group, regarding both as newer than Huronian and equivalents of what he has elsewhere termed Montalban. Without attempting to deny that such an arrangement is possible, and that, if sustained by further investigation, it would bring the succession in this region into remarkable parallelism with that observed elsewhere, the writer, after long and repeated study of the region, is still constrained to think that the facts of the case are such as to favour the former rather than the latter view of the actual structure. Thus, applying the test of contacts, which it is the purpose of the present paper more particularly to consider, it is not a little remarkable that while the calcareo-silicious group may be seen at many points resting upon, and in direct contact with, the coarser gneisses, following these throughout their distribution, and apparently involved in the movements by which they have been affected; nothing at all resembling the strata first named is to be found in connection with the schistose group, where the few limestones which are met with are very impure, of insignificant thickness, of different character, and of wholly unlike associations. Again, if the calcareous and associated strata are really more recent than the felsite-petrosilex group, the entire absence of the latter between the same calcareous beds and the underlying gneisses, when these are observed together,

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