

question; but when theories of metamorphism go so far as to suppose an actual change of one element for another, they go beyond the bounds of chemical credibility; yet such theories of metamorphism are often boldly advanced and made the basis of important conclusions. Dr. Hunt has happily given the name "metasomatosis" to this imaginary and impossible kind of metamorphism, which may be regarded as an extreme kind of evolution, akin to some of those forms of that theory employed with reference to life, but more easily detected and exposed. I would have it to be understood that, in speaking of the metamorphism of the older crystalline rocks, it is not to this metasomatosis that I refer, and that I hold that rocks which have been produced out of the materials decomposed by atmospheric erosion can never by any process of metamorphism be restored to the precise condition of the Laurentian rocks. Thus there is in the older formations a genealogy of rocks, which, in the absence of fossils, may be used with some confidence, but which does not apply to the more modern deposits. Still nothing in geology absolutely perishes, or is altogether discontinued; and it is probable that, down to the present day, the causes which produced the old Laurentian gneiss may still operate in limited localities. Then, however, they were general not exceptional. It is further to be observed that the term gneiss is sometimes of wide and even loose application. Beside the typical orthoclase and hornblende gneiss of the Laurentian, there are micaceous, quartzose, garnetiferous and many other kinds of gneiss; and even gneissose rocks, which hold labradorite or anorthite instead of orthoclase, are sometimes, though not accurately, included in the term.

The Grenville series, or Middle Laurentian is succeeded by what Logan in Canada called the Upper Laurentian, and which other geologists have called the Norite or Norian series. Here we still have our old friends the gneisses, but somewhat peculiar in type, and associated with them are great beds, rich in lime-felspar, the so-called labradorite and anorthite rocks. The precise origin of these is uncertain, but this much seems clear, namely, that they originated in circumstances in which the great limestones deposited in the Lower or Middle Laurentian were beginning to be employed in the manufacture, probably by aqueo-igneous agencies, of lime-felspars. This proves the Norian rocks to be much younger than the Laurentian, and that, as Logan supposed, con-

siderable
ing lapse

Next
talline a
elevation
others.

pebbles
must hav
sion. T

and slat
older ro
previou
former
vastly c

Still
called

the Tac
measur

of thes
around

it wou
brian r

I have
studied

mation
of the

puted
Eozoic

moder
views

Aft
that a

By so
refer

ments
series

matio
differ

man