not suppose that the old gneiss is an ordinary sediment, but that all regard it as formed in exceptional circumstances, these circumstances being the absence of land and of subaërial decay of rock, and the presence wholly or principally of the material of the upper surface of the recently hardened crust. This being granted, the question arises, Ought we not to combine the several theories as to the origin of gneiss, and to believe that the cooling crust has hardened in successive layers from without inward; that at the same time fissures were locally discharging igneous matter to the surface; that matter held in supension in the ocean and matter held in solution by heated waters rising from beneath the outer crust were mingling their materials in the deposits of the primitive ocean?[1] It would seem that the combination of all these agencies may safely be evoked as causes of the pre-Atlantic deposits. This is the eclectic position I have maintained in a previous chapter, and which I hold to be in every way the most probable.

Let us suppose, then, the floor of old ocean covered with a flat pavement of gneiss, or of that material which is now gneiss, the next question is, How and when did this original bed become converted into sea and land? Here we have some things certain, others most debateable. That the cooling mass, especially ·if it was sending out volumes of softened rocky material, either in the form of volcanic ejections or in that of matter dissolved in heated water, and piling this on the surface, must soon become too small for its shell, is apparent; but when and where would the collapse, crushing and wrinkling inevitable from this cause begin? The date is indicated by the lines of old mountain chains which traverse the Laurentian districts; but the reason why is less apparent. The more or less unequal cooling, hardening and conductive power of the outer crust we may readily assume. The driftage unequally of ·water-borne detritus to the south-west by the

[1] Hunt, *Transactions Royal Society of Canada,* 1885.