

in an area which has undergone much more extensive denudation since the time of the intrusion than in the cases above mentioned, and as a consequence of this the fragmental material which fills some, although not all of the necks referred to above, has been entirely swept away.

In view of the fact, then, that Mount Johnson is a neck or pipe of comparatively small sectional area, in which the differentiation is very complete, but in which the magma did not remain at rest, but was not long prior to final consolidation,



FIG. 7. Diagrammatic cross-section of Mount Johnson, showing the relation of the several rock types.

moving upward, it seems improbable that the marked differentiation of the magma into the several varieties described in this paper took place while the magma was in the pipe itself. The evidence points rather to the differentiation of the mass having already taken place in the reservoir of molten rock beneath, which was tapped by the pipe. If this be the case, it would seem that the upper and more acid portion of the magma, represented by the lighter pulaskite, had collected in the upper portion of the reservoir, and that the essexite formed a lower, more basic, and heavier stratum or part. When the passage to the surface was opened up, the pulaskite would first rise in it and, after a more or less long-continued flow, being followed by the essexite, would be pressed toward the circumference of the pipe, the more basic rock occupying the central portion of the passage, and the most basic variety, originally lower, would be found in the central axis of the neck. The fact that, while the essexite forms the mass of the intrusion, there is a zone of pulaskite about it, would seem to indicate that there had not been at this center of volcanic activity any very protracted outpouring of the essexite, since, had this been the case, it would seem probable