

showers of volcanic debris simultaneously with the other materials of the tuff, and was therefore a primary constituent of the partially consolidated magma which gave rise to these rocks. (1) The analcite almost invariably occurs in crystal fragments or sometimes in nearly perfectly preserved crystals (icositetrahedrons). (2) Though the series of specimens studied are not on the whole fresh, still it is common to find perfectly fresh orthoclase and aegirite closely associated with analcite. This we would not expect to find if analcite were secondary after leucite (as was at one time commonly supposed) because such a radical change in chemical composition could not take place without effecting the orthoclase. (3) The fact that the various minerals sometimes reach a diameter of an inch and a half shows that crystallization took place, partly at least, at considerable depths and therefore under sufficient pressure to retain the necessary water in order that analcite should form. (4) A very insignificant amount of what is undoubtedly secondary analcite does occur, sometimes partly replacing aegirite and sometimes occurring in microscopic veinlets. This material is quite clear and colorless, and differs in this respect from the primary analcite.

It is possible that leucite in very small amount also occurs in the series of rocks, for in the ground mass of a *rock fragment* in a breccia were found roundish, clear, isotropic individuals .005 mm. in diameter. The minuteness of the material made separation of these isotropic crystals impossible; micro-chemical tests, however, were made on the very fine grained ground mass containing these crystals, giving reactions for potash but not for soda, proving the absence of analcite. The potash reaction may have resulted from the orthoclase which also occurs associated with these crystals, so that it cannot be definitely stated that leucite is present.

The Rock Types Found.

There are four rock types which may be distinguished in the specimens examined. About sixty thin sections were studied under the microscope. With one exception all the sections are seen to be characterized by high per cents of soda and potash, while quartz is persistently absent in all of them.