those which, from their small size, are most difficult of separation from the rest of the rock preparatory to analytical processes. The mineral apatite, for example, occurs in minute hexagonal prisms, which on cross-fracture might be mistaken for nepheline, or even sometimes for quartz. If, however, a drop of nitric acid solution of molybdate of ammonia be placed upon one of these crystals, a yellow precipitate will appear if it be apatite. Nepheline, which is another hexagonal mineral likewise abundant in some rocks, gives no yellow precipitate with the ammonia solution, while if a drop of hydrochloric acid be put over it, crystals of chloride of sodium or common salt will be obtained. These reactions can be observed even with minute crystals or fragments, by placing them on a glass slide under the microscope and using an exceedingly attenuated pipette for dropping the liquid on the slide.[47]

Two ingenious applications of chemical processes to the determination of minute fragments of minerals are now in use. In one of these, devised by Boricky,[48] hydrofluosilicic acid of extreme purity is employed. This acid decomposes most silicates, and forms from their bases hydrofluosilicates. A particle about the size of a pin's head of the mineral to be examined is fixed by its base upon a thin layer of Canada balsam spread upon a slip of glass, and a drop of the acid is placed upon it. The preparation is then set in moist air near a saucer of water under a bell-glass for twenty-four hours, after which it is inclosed in dry air, with chloride of calcium. In a few hours the hydrofluosilicates crystallize out upon the balsam and can be examined with the microscope. Those of potassium take the form of cubes, of sodium hexagonal prisms, etc.

The second process, devised by Szabo, consists in utilizing the colorations given to the flame of a Bunsen-burner by sodium and potassium. An elongated splinter of the mineral to be examined is first placed in the outer or oxidizing part of the flame near the base, and then in the re-

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[47] An excellent treatise on the chemical examination of minerals under the microscope is that by MM. Klement and Renard, "Réactions microchemiques à cristaux et leur application en analyse qualitative," Brussels, 1886. See also H. Behrens, Ann. École Polytechnique de Delft, i. 1885, p. 176; Neues Jahrb. vii. Beilage Band. p. 435; Zeitsch. f. Analyt. Chemie, xxx. ii. p. 126–174 (1891).

[48] Archiv Naturwiss. Landesdurchforschung von Böhmen, iii. fasc. 3, 1876. "Elemente einer neuen chemisch-mikroskopischen Mineral- und Gesteinsanalyse." Prag. 1877.