

series of closely-related modifications which could be optically distinguished.

In addition to the service rendered by microscopic methods in facilitating the accurate mineralogical identification of the chief constituents of rocks, these methods disclosed the existence of a considerable number of subordinate mineral constituents which had either been wholly overlooked by macroscopic research or had been supposed to be extremely rare.

To mention one example, augite was found to be present in granite, porphyry, rhyolite, phonolite, etc. This discovery was a direct contradiction to previous teaching that certain minerals could not exist in association with each other in the same rock; amongst other couples quartz and augite, orthoclase and augite, leucite and plagioclase, had been said to be mutually exclusive.

Microscopical research made it possible for the first time to attain a clear conception of the different kinds of rock-structure. The composition and structure of the ground-mass in hemicrystalline rocks was revealed, and new light was thrown upon characteristic structures of glassy rocks, fluxion structure, spherulitic and perlitic structure. Hence with the aid of the microscope the origin of the crystalline rocks began to be better understood, and their relations to the group of apparently homogeneous rocks.

The indifference with which the large body of geologists had long viewed the microscopic study of rocks now gave place to zealous interest, and from the year 1870 the very large number of special papers that were devoted to petrological subjects not only filled Mineralogical Journals, but occupied a large share of the space in the Journals of Geological Societies. The sudden influx of new literature was unprecedented, and it would be hopeless to attempt to mention individual papers in the present work. Between 1870 and 1880, two-thirds of the publications on microscopic petrography belonged to Germany and Austria. Amongst British workers Allport, Rutley, Houghton, Bonney, Archibald Geikie, Teall, Harker, may be named; in North America some of the pioneers were A. Hague, Whitman Cross, Iddings, G. H. Williams, Wadsworth, Lawson.

The results of these researches necessitated many changes in the systematic arrangement of the rocks, and in no group was