

to southwest Virginia. They worked out the Paleozoic stratigraphy of the area and by means of it deciphered the folds of the middle Appalachians and the thrust faults of the southern Appalachians. They attempted to explain the structure as the result of great explosions on the southeast but, beginning with Dana, geologists have come to ascribe the structure to lateral compression.

Since the time of the Rogers brothers, many structural ideas have emerged from the study of the Appalachians, such as the geosyncline, underthrusting, erosion thrusts, the competence of strata. Prominent among the many investigators was the group of geologists headed by Willis and Hayes who, late in the nineteenth century, worked out several of the low-angle large-displacement thrust faults of the southern Appalachians and attempted to explain the mechanics of Appalachian structure.

In recent years there have been developing two schools of thought on the depth of Appalachian deformation. One school holds that all large folds and faults extend down to and are supported by the basement; the other holds that the deformed rocks have been stripped completely off the basement along one or more great bedding-plane thrust faults.

20. "Structures of Basement Rocks of Pennsylvania and Maryland and Their Effect on Overlying Structures," by *Ernst Cloos*.

The folded Appalachians are paralleled by an eastern "hinterland" of intensely dislocated and metamorphosed crystalline rocks. Fossils have not been found and the area has not been studied in as much detail as is desirable. This is due to its seemingly hopeless composition of uniformly crystalline rocks, poor exposures and the great attraction exerted by better exposures and more spectacular geologic objects farther west.

The age of the crystallines is largely undetermined and they may be either basement of the Appalachian geosyncline and its folds or their highly deformed crystalline axis. Some of the crystallines—the Baltimore gneiss and its equivalents—seem to be pre-Cambrian but most of the overlying metamorphics probably belong to the crystalline axis and the lower Paleozoics. The pressing problem is the determination of age relationship and thus the extent of what may be called a basement.

If a preliminary division of the crystalline axis into a basement and an overlying metamorphic series is accepted it is readily seen that the trends of the crystallines above deviate from those of the basement below. The gneiss appears in elongate and well defined uplifts of limited size and generally showing dominating vertical components whereas the schists seem to have moved forward and were possibly thrust over less metamorphosed Paleozoics following the general Appalachian trends.

There is no major break and no unconformity between the fossiliferous Paleozoics and the schist but a gradual southeastward increase of the intensity of metamorphism. The parallelism of structures is striking.

Appalachian folds within the crystalline axis are generally overturned northwestward but at numerous places virgation is southeastward.

The crystalline axis exerts a very strong influence on the overlying folds. Cleavage dominates, folds are overturned uniformly and this domination reaches as high as the Ordovician in some parts of the lower Paleozoic section. Farther away from the axis this influence declines and folding becomes more symmetrical, less uniform and at many places locally influenced by individual folds and their elements.

21. "Geological Factors Involved in Secondary Recovery," by *Maynard M. Stephens*.

APPALACHIAN BASIN GUIDE-BOOK

Copies of the Guide-Book to the Geology of the Northern Portion of the Appalachian Basin are now available. The book contains a detailed road log of the field trip of the Mid-Year Meeting of the A.A.P.G., October 6-9, 1948. It contains, besides 58 pages of road log, a special paper by Frank M. Swartz on the general character of the Paleozoic sediments of the area, an oil and gas map, relief map, structure sections, topographic sheets, geologic map, structure index map, six columnar sections for various parts of the region, oil and gas production curves, and eight glacial maps of New York state. Its size is 8½ × 11 inches, with leatherette cover and wire-o binding.

The price of this 121-page Guide-Book is \$5.00, and copies may be secured by writing to Geo. C. Grow, Jr., 545 William Penn Place, Pittsburgh 19, Pennsylvania. Orders should be accompanied by remittance, and checks should be made payable to Pittsburgh Geological Society.

NOTE.—A scholarly presentation of Appalachian geology; a guide to geology along the famous Pennsylvania Turnpike, the Susquehanna River, and type localities in New York; a valuable book for field students and college classes, as well as practicing geologists.