enough to be of much assistance in geologic mapping. The Martinsburg shales which flank several of the Jacksonburg areas on the northwest are quite insoluble, and form hills that rise from 100 to 300 feet above the Jacksonburg level. In some parts of the county the break in slope at the base of the shale hills indicates clearly the contact between the Jacksonburg and Martinsburg formations. In other places the slopes between the shale upland and the limestone lowland are gradual and irregular so that the topography is of little assistance in the accurate location of geologic contacts. This is especially true where glacial drift mantles much of the pre-Illinoian topography.

**Lithologic characteristics.**—The Jacksonburg limestones are normally distinctive, and separable on the basis of lithology alone from the underlying limestones of the Beekmantown and Allentown formations, and from the overlying Martinsburg shales. At a few places limestones in the lower Jacksonburg closely resemble certain phases of the Beekmantown, and may cause confusion in properly designating the beds, especially where the exposures are not extensive. Such confusion in the mind of the geologist is the exception, however, rather than the rule in Lehigh County. The upper part of the Jacksonburg is a very shaly limestone, which may resemble slate. Where any doubt exists as to the designation of these upper beds, a test with dilute acid will always show effervescence of unweathered Jacksonburg shaly limestone, whereas the Martinsburg shales are noncalcareous and do not effervesc.

In Lehigh County two facies of the Jacksonburg formation are recognizable. The lower part of the formation is known by the quarryman's term "cement limestone," whereas the upper part is designated "cement rock." These facies are distinguishable from each other in some parts of Lehigh County, but elsewhere they lose their identity. Separate mapping of the facies was not attempted because inadequate exposures, combined with extremely complex structure, promised to introduce such considerable errors as to nullify the value of the lines drawn. The following description of the two facies of the Jacksonburg is taken from the Northampton County report where they were more readily recognizable and were separately mapped.

The lower part of the formation, the cement limestone facies, is a fossiliferous high-grade, non-dolomitic limestone which varies in color from dark gray to black. It is normally crystalline, the crystals ranging in size up to about three millimeters. In places, however, the texture is so fine that the individual crystals cannot be distinguished with the unaided eye. The bedding of the cement limestone in unweathered exposures is massive, visible bedding planes being spaced from one foot to as much as fifteen feet apart. In weathered exposures, however, solution has emphasized the presence of minor or incipient bedding planes, so that the beds may be as thin as an inch. The cement limestone is relatively competent as contrasted with the overlying cement rock. Mountain-building stresses, to which the region has been subjected, have produced complex folds but unaccompanied by much flowage, shearing, or intricate, small scale distortion. The fossils in the cement limestone are normally visible only on weathered surfaces, but they are not distorted beyond recognition as they commonly are in the cement rock.

The cement limestone is readily dissolved by meteoric waters, so that very few cobbles or fragments of it are to be found in the surface soils.

---