occurrence of Paleozoic formations dipping northwestward from the northwest edge of the pre-Cambrian belt implies a normal sequence which would be highly unlikely if the pre-Cambrian rocks had been thrust from some distance to the south. 3. Drilling operations in several places in the county and nearby area have shown the pre-Cambrian-Paleozoic relationships to be incompatible with an extensive overthrust of the pre-Cambrian area as a whole.

**METADIABASE**

A fine-grained, dense, greenstone type of rock is found in float blocks in increasing abundance as one passes through Lehigh County into Berks County to the southwest. Hand specimens appear to be altered basalt and diabase. They are in general greenish to black and often give the impression of having a matted texture. This material likely represents basic dikes cutting the rocks of the district at irregular intervals.

*Mineralogic composition.—* The microscope shows this rock is composed of secondary feldspar, epidote, chlorite, magnetite, and introduced quartz. The primary minerals are interpreted to have been augite, labradorite, and magnetite. These have been changed hydrothermally to the above list of alteration minerals. It is likely that the quartz is largely introduced, although some smaller grains may have been formed from the hydrothermal breaking down of the previously existing minerals. In general, however, the quartz areas are irregular and have somewhat rounded contacts with other minerals. This has led the writer to believe the quartz was introduced because if it had been formed from the primary minerals, more intimate intergrowth relations would likely have resulted. Furthermore, the silica content of the original diabasic or basaltic material likely was too low to result in the present mineral assemblage plus the frequent areas of quartz.

The textures shown under the microscope include a trachytoid arrangement of labradorite laths in a fine-grained groundmass of augite, magnetite, and andesine-labradorite, flow-structure due to the parallel arrangement of andesine-labradorite laths and the more common diabasic and ophitic textures.

*Age relations.—* The age relations of this basic material to other rocks in Lehigh County are obscure, but its occurrence in areas of pre-Cambrian rocks and Hardyston quartzite would indicate it may be either Paleozoic or pre-Cambrian in age. A previous paper listing this material gives the reasons for considering it to be of probable Ordovician or post-Ordovician age.

**HISTORICAL GEOLOGY**

The earliest event recorded in the rocks of Lehigh County was the deposition of quartzose sands with included carbonaceous material. At approximately the same time or closely following the accumulation of the sands a series of argillaceous sands was also laid down. The accumulation of these two types of materials at this early time is indi-