TRIASSIC IGNEOUS ROCKS

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finding of pink-stained pebbles, which appear to be residual from weathering of the Newark conglomerate, a mile or two northwest of the northwesternmost solid outcrop. However, in Berks County, nearly thirty miles northwest of the present continuous mass of Newark rocks, there exists an erosion remnant of typical Brunswick conglomerate superposed on Ordovician shale at the summit of Hexenkopf Hill or Spitzenberg.

IGNEOUS ROCKS

Toward the close of the Triassic period molten magmas of basaltic composition arose from a deep-seated source and invaded the sediments. They solidified in part in more or less vertical fissures, forming long narrow dikes; they also cut across the beds to form irregular masses of various shapes; and they even flowed horizontally between strata, solidifying in great sheets known as sills. In Lehigh County there are three occurrences of these igneous rocks: a series of dikes south of Hosensack; a hook-shaped, cross-cutting mass farther northeast; and a large sill, the northern tip of which barely enters the county east of Coopersburg.

Cooling slowly at considerable depths below the surface, these magmas formed the rock known as diabase, colloquially termed trap rock, or again black granite. This is made up of interlacing laths of plagioclase feldspar, showing under the microscope extensive twinning, and optical properties indicating it to be a labradorite. In the interstices between the feldspars there is a large amount of augite, and minor amounts of biotite, magnetite, and rarely a few other minerals. Throughout the smaller masses, and at the margins of the larger ones, the texture is fine-grained, and the crystals are scarcely visible to the naked eye; but in the interior of the larger diabase masses the grains are so coarse as to be readily visible.

The fresh diabase as exposed in cuts and quarries is a hard, tough rock of greenish-black color. It is usually traversed, however, by numerous joints which break up the solid mass into angular blocks. In the course of time rain water penetrates along the joint cracks, and gradually decomposes the surface minerals. Such decomposition takes place most rapidly at points where the cracks intersect, and when erosion finally brings the blocks to the earth’s surface, they are bounded by curved surfaces, and are then known as boulders, niggerheads, or iron-stones. The iron set free from the augite turns into colloidal ferric hydroxide, which coats the surfaces of the boulders with a bright rust-yellow crust. These boulders accumulate in the soil above the diabase masses, and their presence may be used to map the positions of these, even in the absence of any solid outcrops.

Cooling of the diabase magmas was accompanied by the giving out of considerable amounts of heated solutions, which penetrated the sediments to distances of hundreds or locally thousands of feet, producing metamorphic changes. These included the transformation of soft red shales into hard gray hornstone, the color-change resulting from the original red hematite becoming the black mineral, magnetite. Various secondary minerals were also formed, and their crystallization in pre-existing spaces between the grains resulted in the hardening often observed. Where the original sediments were calcareous these