TACONIC ALLOCHTHONE AND THE MARTIC THRUST

THE significance of the stratigraphic contrasts in the Ordovician sediments of the Taconic Allochthone and the autochthone of the Champlain Belt in western New England and eastern New York long has been appreciated.[1] The fauna of the "Martinsburg shale" at Harrisburg, Pennsylvania, as listed by Stose,[2] includes "Deepkill" and "Normanskill" graptolites that are known only in the allochthonous Ordovician shale facies in New York, Quebec and Newfoundland. Inasmuch as the shales in Pennsylvania lie in the Great Valley belt of lower Ordovician equivalent carbonates, just as the Taconic Allochthone lies on carbonates of the Champlain Belt, it seems probable that the lower Ordovician shales at Harrisburg are in an outlier of thrust sheet. They may be in a klippe of the Martic overthrust sheet, the sole of which forms a continuous but sinuous fault line some 30 miles southeast of Harrisburg[3]; the minimum displacement would be comparable but less than that of the Taconic Thrust in the latitude of Albany.[4] Suggestion that ultrabasic rocks in the Piedmont are comparable to those east of the Green Mountains in the Taconic Allochthone has been stated.[5]

The writer has re-examined the Arvonia slate in the Martic thrust block in Virginia. Ordovician fossils have been collected from the slate[6] and from the similar Quantico slate near Washington,[7] and both slates have been correlated with the Peach Bottom slate of Pennsylvania.[8] The Arvonia basal quartzite clearly unconformably overlies granite gneiss intrusive in the Wissahickon schist,[9] the latter in the main belt of the Glenarm series, demonstrating the pre-late Ordovician age of the Glenarm, and suggesting that it is Pre-Cambrian. The magnitude of the thrusting across the paleogeographic Quebec Axis would account for the contrast between the Paleozoic sedimentary sequence in the Martic thrust block and the contiguous autochthone.

A complementary induction is that the Manhattan schist and subjacent Inwood marble and Fordham gneiss and marble in New York, which have been uniformly correlated with the Glenarm sequence, lie above the sole of the Taconic-Martic thrust. Thus a thrust should pass north of the continuants of the New York City rocks and south of the gneisses of the Hudson Highlands, on which an autochthonous section is preserved.[10] The intense mechanical alteration of the Cambro-Ordovician carbonates of the autochthonous sequence on the south flank of the Highlands is compatible with the view that they lie below but near the sole of the thrust. The Taconic thrusting accompanied the Taconian Revolution, and is certainly pre-late Silurian, probably pre-Silurian.[11]

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE DETERMINATION OF AMINO ACIDS OF THE DEXTRO OR UNNATURAL CONFIGURATION

THE increasing interest in the occurrence of amino acids of unnatural configuration warrants the preliminary description of a simplified method for their quantitative determination. The general usefulness of the d-amino acid oxidase of Krebs[1] as a specific reagent for this purpose has been demonstrated by Lipmann, Behrens, Kabat and Burk.[2] Whereas, their procedure is dependent upon the measurement of oxygen consumption in the Warburg apparatus, the same result may be accomplished by determining with the highly sensitive reagent, 2,4-dinitrophenylhydrazine, the alpha keto acid formed in the enzyme reaction. This method which has proven extremely rapid necessitates only the use of an incubator and a colorimeter.

The enzyme oxidation is carried out by placing 1 to 2 ml of the unknown solution, adjusted to pH 8.0, in a 125 ml erlenmeyer flask. 2 ml of the d-deaminase[3] in M/60 sodium pyrophosphate at pH 8.0 are added, the flask quickly flushed out with a slow stream of oxygen and tightly stoppered. After incubation at 38° (without shaking) the mixture is transferred quantitatively with gentle suction into a 10 ml volumetric flask containing 1 ml of 20 per cent. trichloracetic acid. The

[1] Arthur Keith, SCIENCE, n. s., 35: 310, 1912.
[2] G. W. Stose, *Bull. Geol. Soc. America*, 41: 640–641, 1930.
[3] G. W. Stose and A. I. Jonas, *Pennsylvania Geol. Surv., 4th ser., Bull.*, C67: 149–158, 1939; Ernst Cloos, *Bull. Geol. Soc. America*, 51: 860–861, 1940.
[4] G. M. Kay, *Bull. Geol. Soc. America*, 48: 286, pl. 5, 1937; C. Schuchert, *ibid.*, 48: 1028, 1937.
[5] H. H. Hess, *Bull. Geol. Soc. America*, 51: 1996, 1940.
[6] N. H. Darton, *Amer. Jour. Sci., 3d ser.*, 44: 50–52, 1892.
[7] T. L. Watson and S. L. Powell, *Amer. Jour. Sci., 4th ser.*, 31: 36–41, 1911.
[8] A. I. Jonas, *Virginia Geol. Surv., Bull.* 38: 25, 1932.
[9] Stephen Taber, *Virginia Geol. Surv., Bull.* 7: 41, 1913.
[10] C. P. Berkey and Marion Rice, *New York State Museum Bull.*, 225–226: 62–64, 1921.
[11] G. M. Kay, *op. cit.*, 287–288; *Bull. Geol. Soc. America*, 51: 1932, 1940.

[1] H. A. Krebs, *Biochem. Jour.*, 29: 1620, 1935.
[2] F. Lipmann, O. K. Behrens, E. A. Kabat and D. Burk, SCIENCE, 91: 21, 1940.
[3] E. Negelein and H. Bromel, *Biochem. Zeit.*, 300: 225, 1939, Step 1.