## 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.

solution, which quickly flocculates, is diluted to volume and filtered.

To 1 to 5 ml is added 1 ml of 2,4-dinitrophenylhydrazine, half-saturated in N. HCl. After 10 minutes 10 ml of 2 N. NaOH are added and the solution diluted to 25 ml and read in the Klett-Summerson[4] photoelectric colorimeter using the green filter number 52. The blank value (zero time of incubation) is subtracted and the amount of keto acid is read from a calibration curve in order to calculate the content of d-amino acid.

With the more slowly reacting amino acids longer time of incubation or decreasing amounts of the unknown solution have made it possible to obtain maximum values, as shown by the following recoveries. With 10 micro mols of d-alanine 98 per cent. was recovered as pyruvic acid in one hour and with 10 micro mols of d-phenylalanine 85 and 98 per cent. were recovered in 3 and 4 hours, respectively. Using only 5 micro mols of the latter a value of 103 per cent. was obtained in 3 hours of incubation.

The method described has proven particularly useful in determining the unnatural amino acids in various biological materials such as tissue hydrolysates and urine even in the presence of large amounts of members of the levo series. The acyl derivatives in urine have also been readily determined after submitting the samples to a preliminary hydrolysis. Its successful use in other instances and with other amino acids is dependent only on the formation of a stable keto acid and the ability of this keto acid to yield a colored 2,4-dinitrophenylhydrazone in alkaline solution. Other aspects of the use of this method and the results obtained will be described in detail elsewhere.

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## A NEW METHOD OF PLANT PROPAGATION[1]

A NEW method of rooting plant cuttings without sand, peat, soil or other solid media has been under investigation since early January of this year. Based on the principle that cut stems suspended in the very moist atmosphere of a specially constructed box can develop perfectly normal roots, the method has already given promising results.

The experimental boxes are approximately 3 feet tall, 2 feet wide and 1 foot deep. Each box has a glass front and back; the former is set in grooves so that it can be opened to permit air circulation, and the latter is kept closed but enables observation of root development and of the moisture content in the back of the box. One-inch square removable shelves, made of ordinary builder's lath, are placed in a horizontal position about half-way in the box. A half-inch opening is left between shelves, and vertical wooden strips are nailed on the sides of the box in front of the shelves to hold the shelves in place. A large piece of sheet rubber, with holes of the size of the cuttings to be inserted, is fitted securely immediately behind the shelves. The rubber functions to confine the moisture in the back of the box where it is most needed and to keep the cuttings in place. A water trough in the upper back part of the box from which strips of absorbent cloth are suspended, supplies the moisture necessary to maintain the high humidity.

Successful rooting of a number of popular ornamentals, including Achyranthes, begonia, chrysanthemum, coleus, geranium, perennial phlox, ivy and Philodendron was achieved by this method in less than three weeks. Such plants were then successfully transplanted to soil in pots and have continued to develop normally. Dormant hardwood cuttings were placed in similar boxes in late January and early February. Vigorous roots developed in 6 to 8 weeks on *Hydrangea grandiflora, Deutzia crenata* and *Philadelphus coronarius*. These plants were also successfully transplanted to soil and have continued to grow normally.

In all the experimental boxes thus far used, root development was greatest in the vicinity of high moisture content and was either poor or entirely absent in those parts of the boxes where the atmosphere was relatively dry. With improvements in methods of maintaining a saturated atmosphere in the vicinity of the cut stems in the back of the box, this new method promises to be useful not only to commercial growers but also to the amateur propagator. The special type of box in which the present investigations were conducted is tentatively called the "Rutgers Aero-propagator."

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[4] The author is indebted to Mr. R. J. Bott of the Will Corporation for the loan of an extra Klett-Summerson photoelectric colorimeter for the purpose of working out this method.

[1] Journal Series paper of the New Jersey Agricultural Experiment Station, Rutgers University, department of plant pathology.

## BOOKS RECEIVED

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