the ancient Greeks. From what precedes it results that another very important feature of pre-Grecian mathematics is that it does not involve the concept of postulates, which also plays a fundamental rôle in Greek mathematics and in the connections between mathematics and the truth.

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THE DEVONO-MISSISSIPPIAN BOUNDARY IN THE SOUTHEASTERN UNITED STATES

STUDIES made in Tennessee and Virginia under a grant from the Rockefeller Fund for Research in Pure Science of the University of North Carolina have led to the following observations and conclusions.

The Chattanooga shale in the type area at Chattanooga, Tennessee, is entirely Mississippian in age. From Chattanooga it can be traced through northeastern Tennessee into southwestern Virginia where it gradually fingers out, finally disappearing near Holston, Virginia. Throughout most of this region it maintains its typical threefold division into upper Big Stone Gap black shale, middle Olinger gray shale and lower Cumberland Gap black shale members. In Virginia, in the Clinch Mountain area, the gray Olinger shale rapidly becomes black also and merges with the overlying Big Stone Gap and the *upper* part of the underlying Cumberland Gap members to form a single black shale series. At the same time the *lower* part of the Cumberland Gap shale, which has here become a black to gray-black shaly sandstone, splits into a series of wedges which intertongue with sandy shales and shaly sandstones carrying an upper Devonian (Chemung) fauna. It thus follows that the lower part of the Cumberland Gap member is Devonian in age while the upper part is Mississippian, as proved in 1927.[1] The Devono-Mississippian boundary lies, therefore, *within* the Cumberland Gap black shale member and can be represented by only a slight stratigraphic break, if indeed by any at all. Its unimportance is further emphasized by the following facts. 1. At the southern end of Clinch Mountain black shale deposition extends without interruption across the boundary, the Chemung and Chattanooga beds uniting in one continuous black shale series. 2. The overlap of the upper Devonian beds towards the southwest continues, without sign of a regression of the sea, across the boundary and on through lower Chattanoogan times. 3. Conglomerates just below the Chattanooga in the upper Chemung, which by some geologists have been regarded as marking the boundary, are all purely local and intraformational in character.

Towards the west and southwest the Devonian portion of the black shale rapidly wedges out and the Chattanooga becomes, as in the type area, entirely Mississippian in age, and probably so continues across the Mississippi River into the southwestern United States.

In view of the Mississippian age of the Chattanooga shale at Chattanooga, Tennessee, the term "Chattanooga" should be restricted to the Mississippian portion of the shale, if it becomes feasible to separate it from the underlying Chemung black shales. A distinct formational name should then be applied to the latter.

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[1] "Chattanooga Age of the Big Stone Gap Shale," *Amer. Jour. Sci.*, 14, 1927: 485–499. *Cf.* also: "Age and Stratigraphy of the Chattanooga Shale in Northeastern Tennessee and Virginia," *Amer. Jour. Sci.*, 17, 1929: 431–448.

PORTO RICAN AND DOMINICAN STRATIGRAPHY

THE following stratigraphic sequence of Porto Rican sedimentaries is a revision suggested in the light of advancing knowledge.

Pleistocene to Recent: Dune sands, Alluvials, Playas, San Juan formation. *Lower Miocene:* Ponce chalk beds, Quebradillas limestone, Aguadilla limestone. *Upper Oligocene:* Lares and San Sebastian beds, Guanica limestone, Lower Ponce beds, Juana Diaz shales. *Upper Eocene:* Rio Descalabrados and La Muda deposits. *Middle Eocene:* Rio Jueyes beds. *Upper Cretaceous* (*Maestrichtian*): San Germán deposits, Enseñada shale, Fajardo and Cape San Juan limestones. *Lower Cretaceous:* (?) Limestone south of Cidra. Doubtful, but possibly equivalent to the Fredericksburg.

Regarding Dominican Republic sedimentaries, I now refer my Gato beds to marine Pliocene, and my Caimito beds to Upper Miocene.

In 1917, I made my Cercado and Gurabo formations the types of Lower and Middle Antillean Miocene, respectively. Lately Dr. Woodring has placed the division between Lower and Middle Miocene below the Cercado, running it up into Middle Miocene. But the association of *Ostrea cahobasensis* and *Orthaulax aguadillensis* in the May Pen limestone, Jamaica, draws the Las Cahobas and equivalent Cercado relationship downward. Furthermore, the Bulla which grades into the Cercado is probably, as Dr. Vaughan thought, largely contemporaneous with the Baitoa. Therefore it seems to me a truer time relation that the Cercado should remain as type of the Lower Miocene of the Antilles.

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