

date than the appellation of Connecticut."

This review of the usages of names for the trias shows that the name of Connecticut was distinctly proposed by E. Hitchcock in 1833, and was constantly used by the geologists specially interested in those works before 1856: W. C. Redfield proposed the name of Newark for the terranes in 1856: that instead of accepting the name geologists universally employed the name of Connecticut when using a local designation up to 1889: that in this period there were several unmistakable formal proposals of the use of Connecticut: and that there were in this period allusions to the fact that the name of Newark was not accepted. Even Mr. Russell, in his learned paper of 1878, used the name of Triassic in preference to Newark.

Mr. Gilbert mentions three 'qualifications of a geographic name for employment in stratigraphy, (1) definite association of the geographic feature with the terrane, (2) freedom of the term from pre-occupation in stratigraphy, (3) priority.' These are acceptable with the addition of a fourth, appropriateness of application. All of these qualifications are possessed by the term Connecticut, while the term Newark cannot satisfy a single one of them.

C. H. HITCHCOCK.

DARTMOUTH COLLEGE.

LENGTH OF VESSELS IN PLANTS.

THE diameter of pitted and other vessels is easily measured upon the cross-section of any stem, but their length is less readily determined. Probably, if the question were put, a majority of botanists would say that they rarely exceed a few inches in length, especially if they still believe with Sachs that the water ascends through the walls of the vessels. As a matter of fact, the spiral and pitted vessels of plants often form open passageways of great length. Some experiments made upon woody stems by Strass-

burger (*Ueber den Bau u. die Verrichtungen der Leitungsbahnen in den Pflanzen*) seem to place this beyond dispute. His method of procedure was to fasten a glass tube to the upper end of a cut stem by a rubber band, insert a funnel into the upper end of the tube, and subject the cut surface to the pressure of a column of mercury kept at a uniform height of twenty centimeters, successively shortening the stem until mercury appeared at the lower end. Using this method, he obtained the following results:

(1.) In a branch of *Quercus rubra*, 1.5 meters long and about three centimeters thick, mercury ran out of thirty vessels on the lower cut surface almost as soon as it was poured into the funnel. When the branch was shortened to one meter fifty-four to fifty-six vessels were permeable. In a slender branch of *Quercus pedunculata*, one meter long, thirty-five vessels dropped mercury, and when this was shortened to one-half meter mercury came out of more than 100 vessels. Another branch five centimeters thick at the base and 3.6 meters long was tried, and drops of mercury fell in quick succession from eight vessels. In *Quercus Cerris* mercury came through seven vessels of a branch four meters long and six centimeters thick at the base. Shortened to 3.5 meters nine vessels dropped mercury; at three meters, twelve vessels; at 2.5 meters, numerous vessels. *Conclusion*: Vessels two meters long are quite common in the oaks, and it is probable that single vessels may be as long as the stem itself.

(2.) In *Robinia Pseudacacia*, a branch two meters long and three centimeters thick was impermeable and first let through mercury when shortened to 1.18 meters. Then it dropped from four vessels. Successively shortened mercury dropped from an increasing number of vessels as follows: One meter, nine vessels; fifty centimeters, thirty-eight vessels; twenty-five centimeters, fifty-seven vessels.

(3.) A stem of *Wistaria* 1.75 meters long and having seven internodes dropped mercury from seven vessels. Another stem three meters long and containing forty-seven internodes was first killed by heating for an hour in water at 90°, and then dried. This did not let mercury through until it had been shortened to 2.5 meters. Then it dropped pretty fast from four vessels. Reduced to two meters, nine vessels dropped mercury, and out of some it ran rapidly. Another shoot gave nearly the same results. A fresh and very long stem had to be shortened to three meters before mercury came through. Then it dropped from three vessels. Successively shortened, the number of permeable vessels was as follows: 2.5 meters, eleven vessels; two meters, eighteen vessels; 1.5 meter, twenty-seven to twenty-nine vessels. These stems were one to two centimeters thick. *Conclusion*: Some of the vessels in *Wistaria* are quite long, though scarcely more than three meters. Most of the wide vessels are about one meter long.

(4.) A cane of *Vitis Labrusca* 1.2 centimeter thick, which was previously killed by heating for an hour in water at 90° C. and then air-dried, first let mercury through (3 vessels) when shortened to 2.2 meters.

(5.) A shoot of *Aristolochia Siphon* 1.5 centimeters thick, 2.5 meters long, and having fifteen internodes was killed in the same way. This let mercury through fourteen vessels. Another shoot 2.1 meters long let the mercury through many vessels. A fresh stem five meters long, the longest he could get, dropped mercury from five vessels. When successively shortened, more and more vessels dropped mercury. At 3.5 meters twenty-five vessels let it through, and when the stem was cut down to three meters the number of vessels dropping mercury could not be determined. *Conclusion*: In this plant numerous vessels are three meters long, some are five meters long, and a few are probably longer.

In *Aristolochia* the vessels of different annual rings were equally permeable, but in the *wistaria*, the locust and the oaks the permeable vessels were mostly on the periphery. The records were made in from ten to thirty minutes from the beginning of the pressure, the time depending on the length of the stem. In general the mercury was passed through the stem in the same direction as the ascending water current, but a change of direction did not give contradictory results. These experiments were repeated, using a pressure of forty centimeters, but even this did not rupture any cross-walls. This increased pressure overcame the capillary resistance and forced the mercury through many smaller vessels, but otherwise the results were much the same.

ERWIN F. SMITH.

WASHINGTON.

SCIENTIFIC LITERATURE.

Introduction to Elementary Practical Biology.—

By Charles Wright Dodge, M. S.—Harper Bros., New York. 1894.

This book is a laboratory guide for high school and college students. The teacher of biology who is endeavoring to train his students in the best manner is in modern times, amid the abundance of laboratory guides, in very much of a quandary as to the best of two opposite methods. If, on the one hand, he puts a laboratory guide into the hands of the student, the result is apt to be that the student soon learns simply to verify the facts mentioned in the book, and thus loses all stimulus for original observation, which should be the foremost result of practical work in biological science. On the other hand, if the teacher gives to an elementary student a specimen to study without laboratory directions, he is at such complete loss to know how to proceed, what to do, and particularly what points to notice, that a large proportion of his time is wasted through sheer lack of the proper