

represented a great variety of material in common use for structural purposes. They included wood not only from the mature parts of the stem but also from the center of the trunk, embracing in some instances the structure of the pith and primary wood zone. For these reasons they possessed special value, inasmuch as they afforded an opportunity to determine the extent and nature of those structural variations which I had some reason to believe existed, as between the earlier and later growths of the stem. In transmitting his material Dr. Fernow stated that he had selected it "with reference to representing typical wood, and it was not taken from butt logs, top logs, nor branches or knots." It therefore represented exactly the problems which would be met with in every-day practice.

The results of these tests as at first obtained were far from satisfactory. They clearly proved that the genera could be recognized with ease, but for the species they made it clear that there was need for a far more detailed diagnosis and differential key than was at first supposed to be necessary. More searching studies were made not only with respect to existing types but also as applied to fossil species from the Devonian to the Interglacial. These studies necessitated frequent recastings of diagnoses and corresponding alterations of the analytical key. They brought to light many important facts and relationships of the greatest value from a phylogenetic point of view as well as from the taxonomic, and they served to emphasize the fact that many of the more detailed structural features of the pines in particular, hitherto supposed to be of little or no value, were in reality of the greatest importance. A final application of the test specimens under the precise conditions which would obtain in ordinary practice showed a verification of 91.5 per cent for all genera and species. In this connection it may be of interest to note that the greatest sources of error were to be found in the second section of the genus *Pinus*, particularly in *P. taeda*, *P. echinata*, and *P. glabra* in the order given, whence it appears that these species stand out as the most variable of the entire Coniferales and, on the whole, the most difficult to determine. This is in precise accord with the