

structure of the material, and to the conditions under which it was produced.

"We are not only concerned to know that a stick of this species of tree will bear a given load, but we want to be able to tell why this stick of the species will bear so much, and why the other stick of the same species will bear only half as much; why the timber grown in this locality is found generally superior to that of the same species grown in another locality, etc.

"When we have established such knowledge, then it will be possible for an engineer, not only to specify his timbers intelligently, but also to inspect them and to know whether or not they come up to his specifications."

And from *Circular No. 15*.

"The chief points of superiority of the data obtained in these investigations lie in: (1) Correct identification of the material, it being collected by a competent botanist in the woods; (2) Selection of representative trees with record of age, development, place and soil where grown, etc.; (3) Determination of moisture conditions and specific gravity, and record of position in the tree of the test pieces; (4) Large number of trees and of test pieces from each tree; (5) Employment of large and small sized test material from the same trees; (6) Uniformity of method for an unusually large number of tests.

"The entire work of the mechanical test series, carried on through nearly six years, intermittently, as funds were available, comprises so far 32 species, with 308 test trees, furnishing over 6,000 test pieces, supplying material for 45,336 tests in all, of which 16,767 were moisture and specific gravity determinations on the test material.

"In addition to the material for mechanical tests, about 20,000 pieces have been collected from 780 trees (including the 308 trees used in mechanical tests), for physical examination to determine structure, character of growth, specific gravity of green and dry wood, shrinkage, moisture conditions, and other properties and behavior.

"In addition to the regular series of tests, the results of which are recorded in the subjoined tables, special series to determine certain questions were planned and carried out in part, or to finish, adding 4,325 tests to the above number."