

doubt, but also to develop the formula for a practically correct correlation between compression and bending-strength, both at the elastic limit and at rupture. The results, we believe, will be of far-reaching importance, both to the science of wood and wood testing, and to the practice of using test data in designing structures.

"It would appear that the strength of a beam at the elastic limit—the only strength value in which the practitioner is interested when designing beams—is equal practically to the compression endwise strength of the material; that is to say, the compression strength is to be used for the factor  $f$  in the current beam formula,

$$W = \frac{2bh^2}{3l} f.$$

"We expect, finally, after further verification of the discovered correlation, that compression tests alone may suffice in future to determine all strength values of the material; that the designing of beams will be accomplished upon such data with much more confidence; that the factor of safety will be brought to a rational basis, and that greater economy in the use of wood will also be secured."

The following demonstration of Mr. Neely's formula is substantially the same as that given by him, the form being somewhat altered, and the notation changed to one that is more familiar to the members of our society.

#### RELATION OF COMPRESSION—ENDWISE STRENGTH TO BREAKING LOAD OF BEAM.

"In testing timber to obtain its various coefficients of strength, the test which is at once the simplest, most expedient, satisfactory, and reliable is the 'compression-endwise test,' which is made by crushing a specimen parallel to the fibres. All other tests are construing a specimen parallel to the fibres. All other tests are either mechanically less easily performed, or else, as in the case of cross bending, the stresses are complex, and the result coefficient can be expressed only by reliance upon a theoretical formula, the correctness of which is in doubt. It would, therefore, be of great practical value to find a relation between the cross-bending strength, the most important coefficient for the practitioner, and the compression strength, when the study of wood would not only be greatly simplified and cheapened, but the data could be applied with much greater satisfaction and safety."