The load upon the beam was gradually increased until it amounted to 13,800 lbs., when the beam failed by the crippling of the fibres on the compression face, Figs. 54, 55. The load was still further increased until complete fracture took place by the tearing apart of the fibres on the tension face under a load of 17,170 lbs. The crippling was in line with a knot running through the timber from back to front, as in the Figure.

The maximum skin stress corresponding to the load of 13,800 lbs. is 3937 lbs. per square inch.

The total compression of the timber at the centre was .2 in., so that, taking the effective depth as 13.05. the maximum skin compressive stress would be 3994 lbs. per sq. in., the corresponding skin tensile stress being 4119 lbs. per square inch.

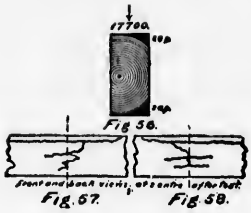
Assuming the ordinary law to hold good for the whole of the effective depth, the maximum skin stress would be 40.9 lbs. per square inch.

The co efficient of elasticity, as determined by an increment in the deflection of .885 in. between the loads 1,000 and 8,000 lbs., is 1,235,600 lbs., and as determined by an increment in the deflection of .5 in. between the loads 2,000 and 6,000 lbs., is 1,248,990 lbs.

Table K shows the several readings.

The weight of this beam, on March 10th, was 392 lbs. 2 ozs., or 37.56 lbs. per cubic foot, and on March 13th it was 379 lbs. 4 ozs., or 36.39 lbs. per cubic foot, showing a loss of weight in the laboratory at the rate of 39 lb. per cubic foot per day

Beam XXVII was tested April 4th, 1894, with the annular rings as in Fig. 56 The beam was cut from the heart of the tree, and the darkened portion in the Figure, was sapwood.



The load upon the beam, was gradually increased until it amounted to 17,700 lbs., when the beam failed by the tearing apart of the fibres on the tension face, Figs. 57, 58, at a resin pocket, the fracture showing a fine resinous surface.

The maximum skin stress corresponding to the breaking load is 5219 lbs. per square inch.

The total compression of the timber at the centre was .34 in., so that taking 12.785 ins. as the effective depth, the maximum skin compressive stress would be 5411 lbs. per square inch, the corresponding skin tensile stress being 5707 lbs. per square inch.

Assuming the ordinary law to hold good for the whole of the effective depth, the maximum skin stress would be 5501 lbs. per square inch.

The co-efficient of elasticity, as deduced from an increment in the deflection of 7 in. between the loads 1500 lbs. and 7500 lbs., is 1,418,500 lbs.

Table K gives the several readings.

The total weight of the beam on March 10th was 46 lbs. 12 ozs., or 41.51 lbs. per cubic foot ; the total weight on April 5th, the date of test, was 397 lbs. 4 ozs., or 36.50 lbs. per cubic foot, showing a loss of weight while in the laboratory, at the rate of .192 lbs. per cubic foot per day.

Beam XXVIII. This beam was cut from the heart of the tree, and was tested April 20th, 1894, with the annular rings as shown in Fig. 59.