until it amounted to 40,000 lbs., when the beam failed by the crippling of the fibres on the compression side in the neighbourhood of a small knot 1¼ in. above the compression face, Figs. 34, 35, 36. The crippling extended about 4 ins. above this face. The load was still gradually increased until it amounted to 49,600 lbs., when the beam again failed by the tearing apart of the fibres on the tension face.

The maximum skin stress corresponding to the load of 40,000 lbs., and disregarding the compression of the timber, is 6559 lbs., and the skin stress corresponding to the load of 49,600 lbs., is 8127 lbs. per square inch.

The total compression of the timber was .345-ins., so that taking the effective depth under this load to be 11.655 ins., the maximum skin compressive stress would be 6710 lbs. per square inch, the corresponding skin tension stress being 7125 lbs. per square inch.

Assuming the ordinary law to hold good for the whole of the effective depth, the maximum skin stress would be 6936 lbs. per square inch.

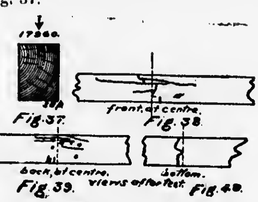
The co-efficient of elasticity, as deduced from a change in the deflection of .22-in. between the loads 4000 lbs. and 12,000 lbs., both forwards and while being relieved from load in the first reading, and also during the second loading, is 1,571,150 lbs.

Table G shows the several readings.

The weight of this beam when shipped from Vancouver, April 21st, was 349 lbs, or 41.16 lbs. per cubic foot; when delivered at the laboratory on June 9th, it weighed 329 lbs., or 36.70 lbs. per cubic foot, and on Nov. 3rd it weighed 311 lbs. 6½ ozs., or 34.92 lbs. per cubic foot, showing a loss of weight between Vancouver and the laboratory at the rate of .091-lb. per cubic foot per day, and a loss while in the laboratory at the rate of .0121-lb. per cubic foot per day.

The time occupied by the test was 26 mins.

Beam XXI. This beam was tested Nov. 3rd, 1894, with the annular rings as in Fig. 37.



The load upon the beam was gradually increased until it amounted to 6000 lbs., when it was gradually relieved of load, at the rate of 1000 lbs. for each observation, and the beam returned to its initial condition without showing any sign of set. The load was again gradually increased until it amounted to 17,960 lbs., when a sharp fracture took place by the tearing apart of the fibres on the tension side, and this was accompanied by a simultaneous crippling of the fibres on the compression side, Figs. 38, 39, 40.

The maximum skin stress corresponding to the load of 17,960 lbs. is 7787 lbs. per square inch.

The total compression of the timber at the centre was .16 in., so that taking the effective depth at the centre to be 8.82 ins., the maximum skin compressive stress at the point of fracture is 7901 lbs. per square inch, the corresponding skin tensile stress being 8221 lbs. per sq. in.

Assuming the ordinary law to hold good for the whole of the effective depth, the max. skin stress would be 8100 lbs. per sq. in.

The co-efficient of elasticity, as deduced by a change in the deflection of .48-in. between the loads of 1000-lbs. and 6000 lbs., during the first loading, and while being relieved of load, is 1,588,400 lbs.

Table G shows the several readings.

The weight of this beam when shipped from Vancouver, April 21st, was 164 lbs., or 38.86 lbs. per cubic foot; when received at the laboratory on June 9th, the weight was 151 lbs. 4 ozs., or 33.02 lbs. per cubic foot, and on Nov. 13th, the date of test, the weight was 139 lbs. 10½