The Harvard Pisgah Tract, Southwestern New Hampshire

As early as 1905 Professor R. T. Fisher, first director of the Harvard Forest, took groups of forestry students to the Pisgah Mountain area of Winchester, New Hampshire to survey the virgin forest. At that time it was estimated that 100-200 ha. of old-growth forest remained, primarily in three tracts lying to the east, north, and northwest of Pisgah Reservoir. In the 1920's a decision by the Dickinson family who owned most of the area, to cut the remaining large trees prompted Fisher to get a group of sportsmen, naturalists and friends to purchase 11 ha. of the most magnificent hemlock-white pine-hardwood forest. This tract, which was given to Harvard University, and an additional hardwood forest of approximately 20 ha. of state land are the only remants of the original virgin forest.

The hurricane of September 21, 1938 uprooted most of the Harvard Tract and severely damaged much of the surrounding forest. A. C. Cline, then director of the Harvard Forest, followed the terms of the gift to keep the area natural and spared the Harvard Tract from the post-hurricane salvage that occurred throughout New England under the Northeastern Timber Salvage Administration. In the 1960's the state of New Hampshire began to acquire land surrounding the Harvard Tract for the establishment of the undeveloped Pisgah State Park. At present the park encompasses 5,300 ha.

Continued interest and study of the Pisgah forest by researchers at the Harvard Forest provide a broad background on the nature and dynamics of the vegetation. Fisher's earliest vegetation survey, conducted in 1905, is a comparison of old-growth stands at Richmond, New Hampshire, at the Harvard Forest in Petersham, Massachusetts, and at the Pisgah forest. Information in the Harvard Forest archives from the period of acquisition of the Harvard Tract (1923-1928) provide details on the settlement history, ownership patterns, logging activity, and the vegetation of the area. In anticipation of the logging in the 1930's a comprehensive survey of old-growth stands was conducted in 1929-1930 (Branch et al. 1930). That study consisted of two major portions: the sampling of extant old-growth stands and an age-structure analysis of the forests after cutting. A total of 105 0.04 ha. plots were sampled and information was collected on disturbances such as fire scars, wind damage, and chestnut mortality. Approximately 30 photographs and a 16 mm movie taken by W. Branch, A. C. Cline and N. Hosley from 1915 to 1930 complement this historical documentation.

Following the 1938 hurricane field descriptions and photographs were taken to document the damage (Spurr, unpubl.). Post-hurricane vegetation surveys were conducted in 1942 and 1948 and later followed by a study of forest reconstruction in 1968 (Henry and Swan 1974). Ongoing studies include a survey of the present vegetation, the analysis of the structure and distribution of downed wood, a dendrochronological investigation of stand development, and the paleoecological study of pollen, macrofossils, and charcoal in small hollows and swamps.

DRF
EMG 1985

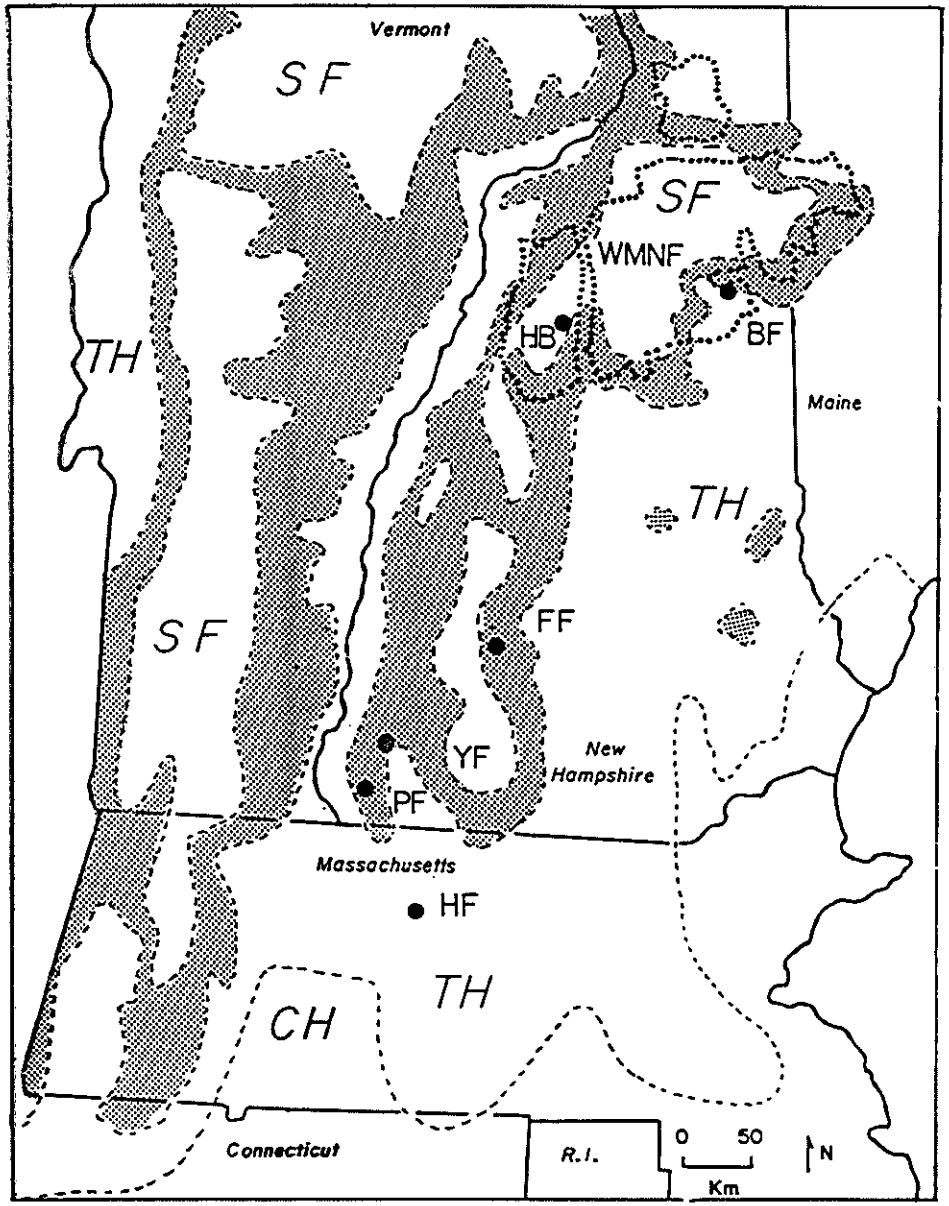

Fig. 1. Central New England showing the major vegetation zones (CH: Cen. Hdwds - Hem - WP; TH: Trans. Hdwds - Hem - WP; Shaded area: N. Hdwds - Hem - WP; SP: Spr - Fir - N Hdwds). HF - Harvard Forest, PF - Pisgah Forest, YF - Yale Forest, HB - Hubbard Brook, WMNF - White Mt. Nat. Forest.

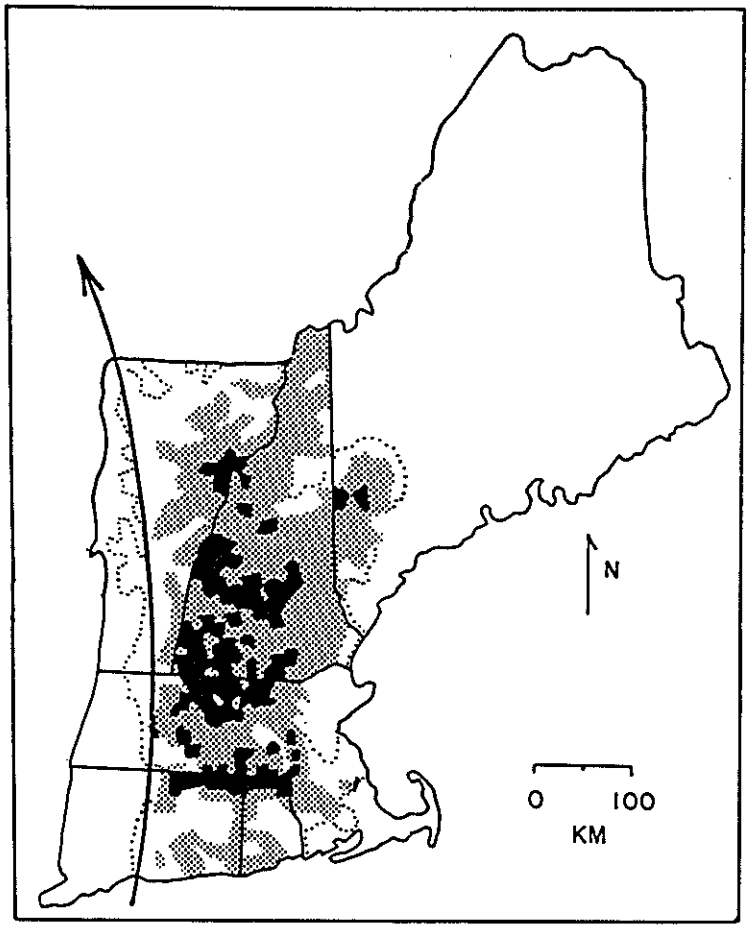

Fig. 2. Track of the 1938 hurricane (arrow) and area damaged by the storm. White area enclosed by dotted line - slight damage; stippled area - moderate damage; black areas - extreme damage (>10 million MBF of timber destroyed/town).

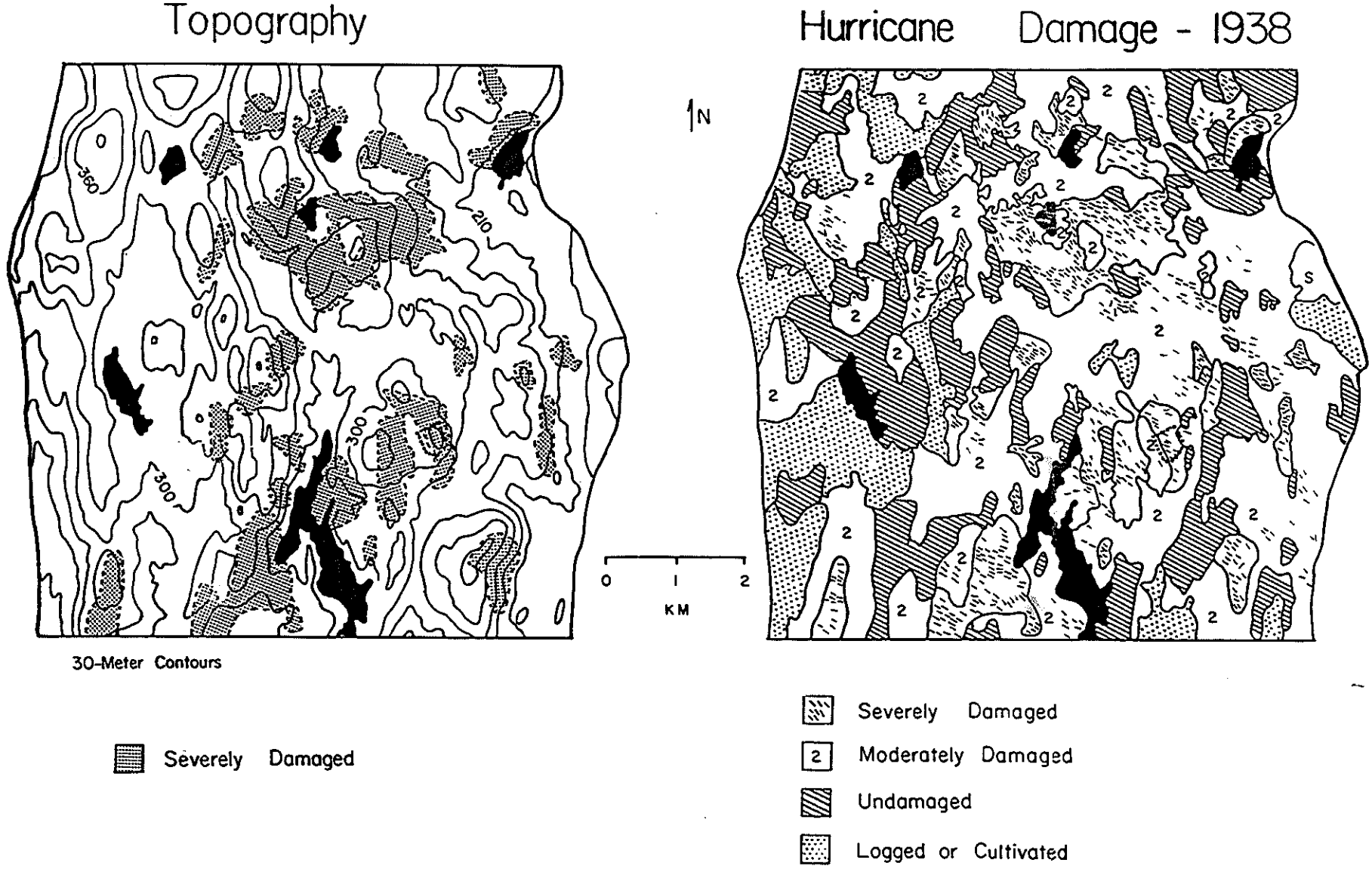

Fig. 3. Aerial photograph interpretation of the relationship between physiography and damage from the 1938 hurricane in Pisgah State Park, SW New Hampshire. Black areas are water bodies and the Harvard Tract is 1 km east of the northern tip of the long lake (Pisgah Reservoir) in the S and center of the area. Small lines in the severely damaged area indicate the position of individual windthrows on aerial photographs.

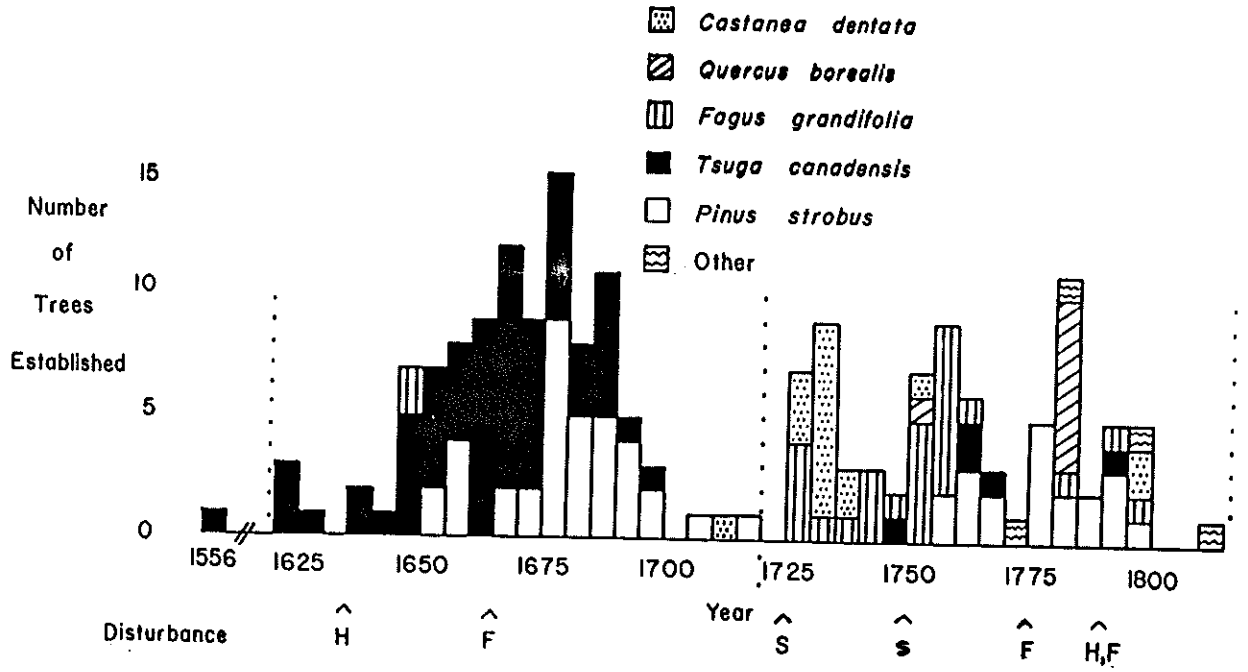

Fig. 4. Age-structure of the pre-hurricane and old-growth forest at Pisgah. Data collected in 1928-29. Disturbance: H - hurricane, F - fire, S - windstorm.

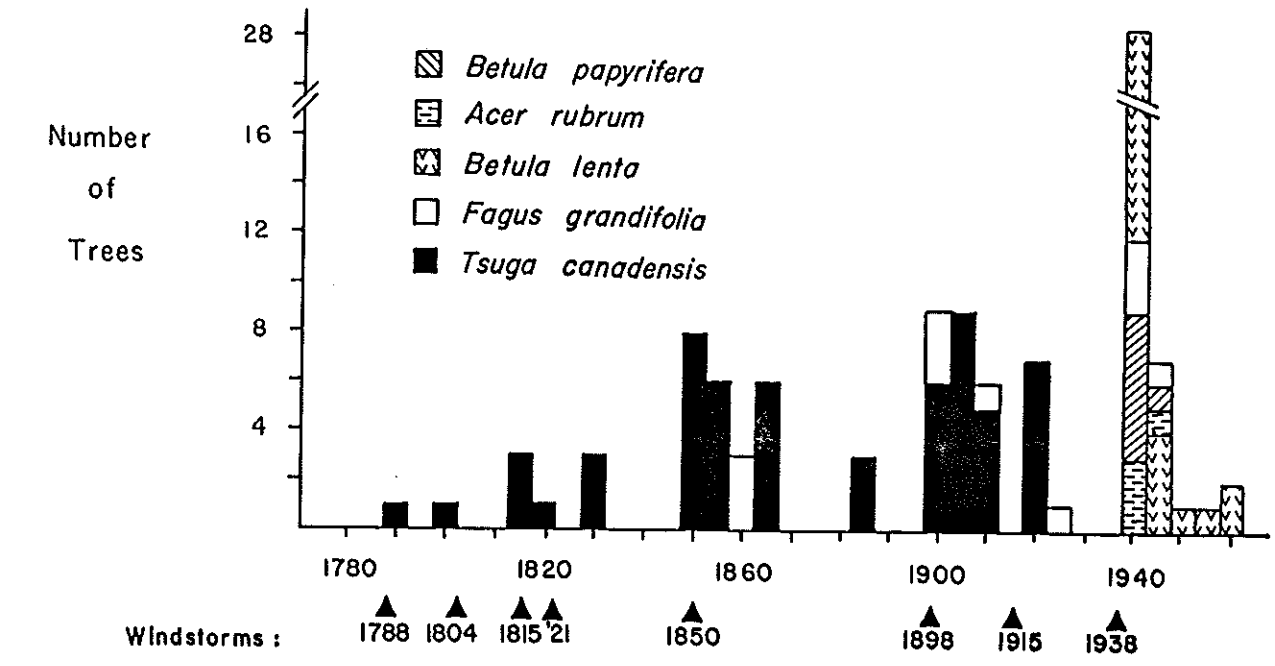

Fig. 5. Age-structure of the post-hurricane forest at Pisgah. Data collected in 1984. Trees less than 5 cm basal diameter were not sampled, however, a later sample demonstrated that most of these were hemlock 35-45 years old.

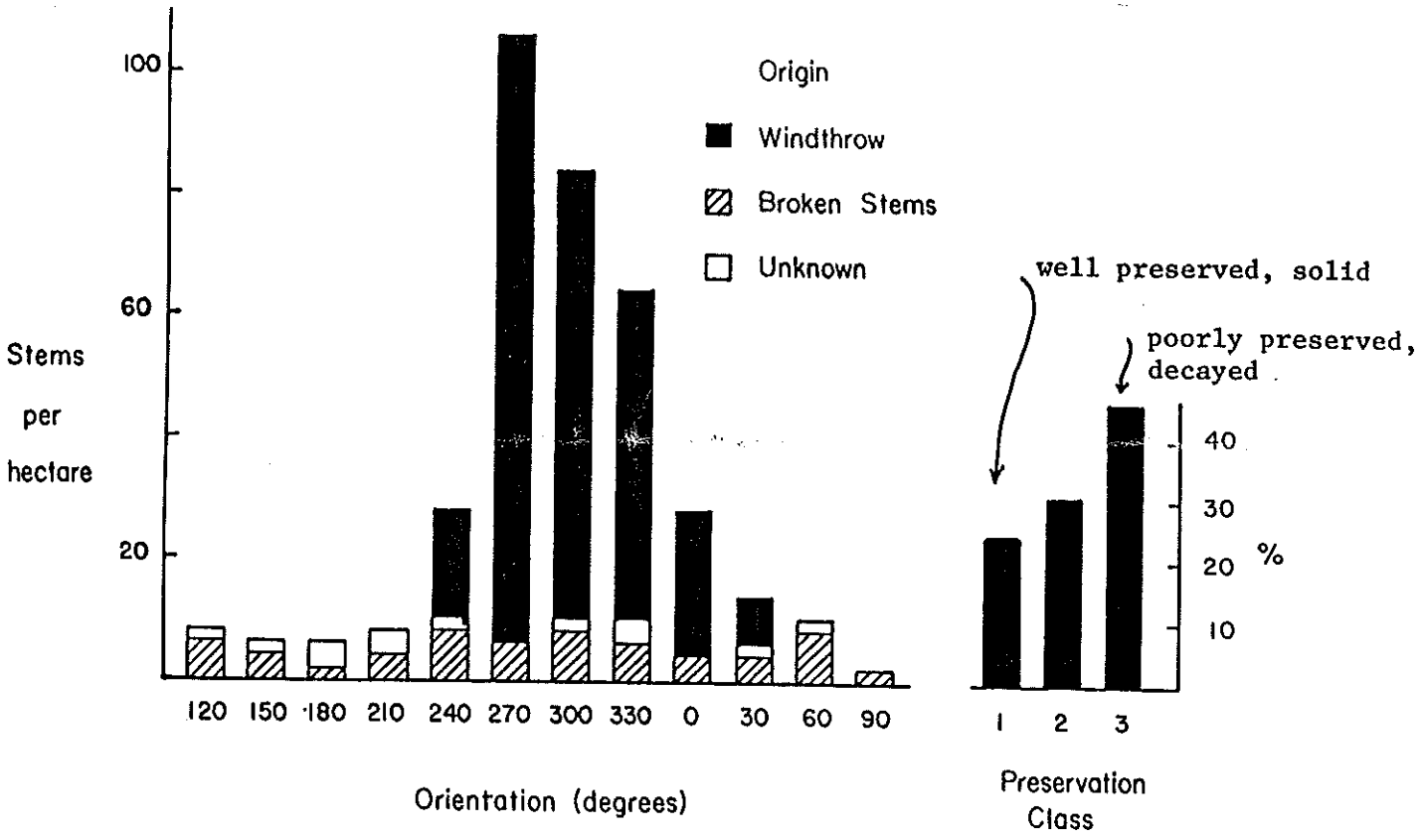

Fig. 6. Orientation, origin and preservation class of coarse dead wood.

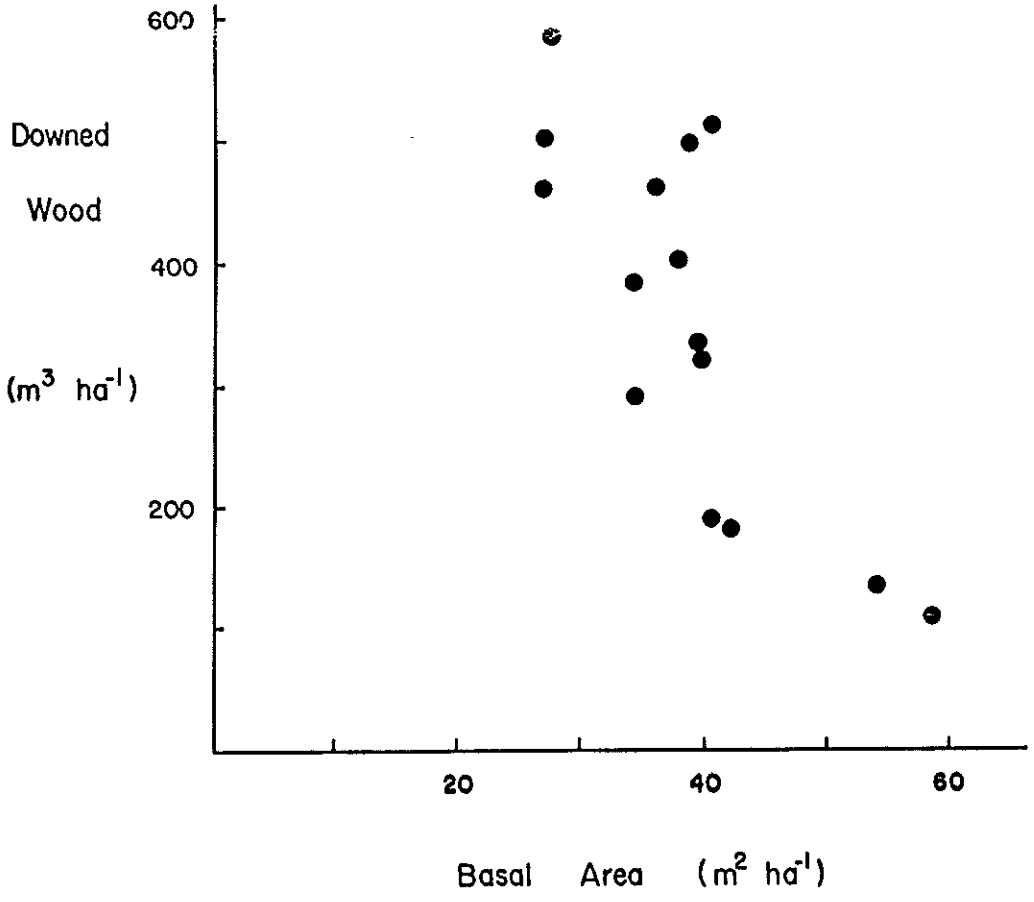

Fig. 7. Relationship between the volume of coarse downed wood and basal area in 400 m^2 plots at Pisgah.

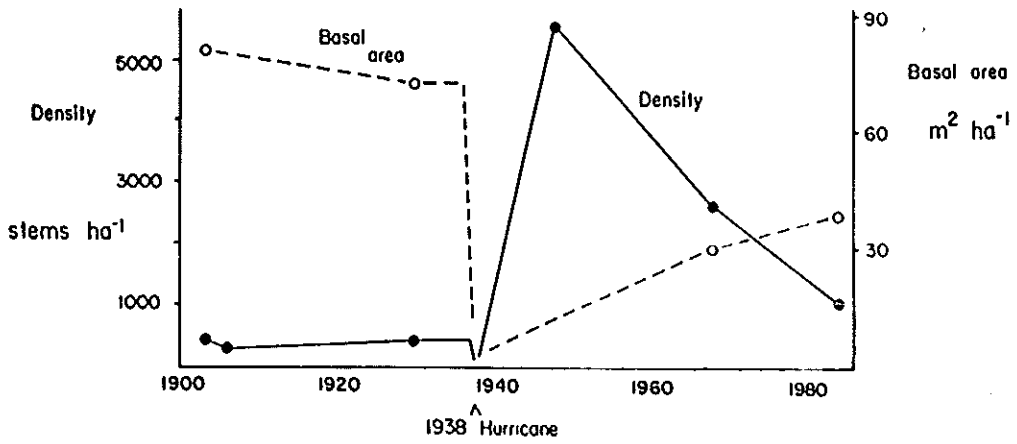

Fig. 8. Changes in density and basal area (1907-1984) at Pisgah.

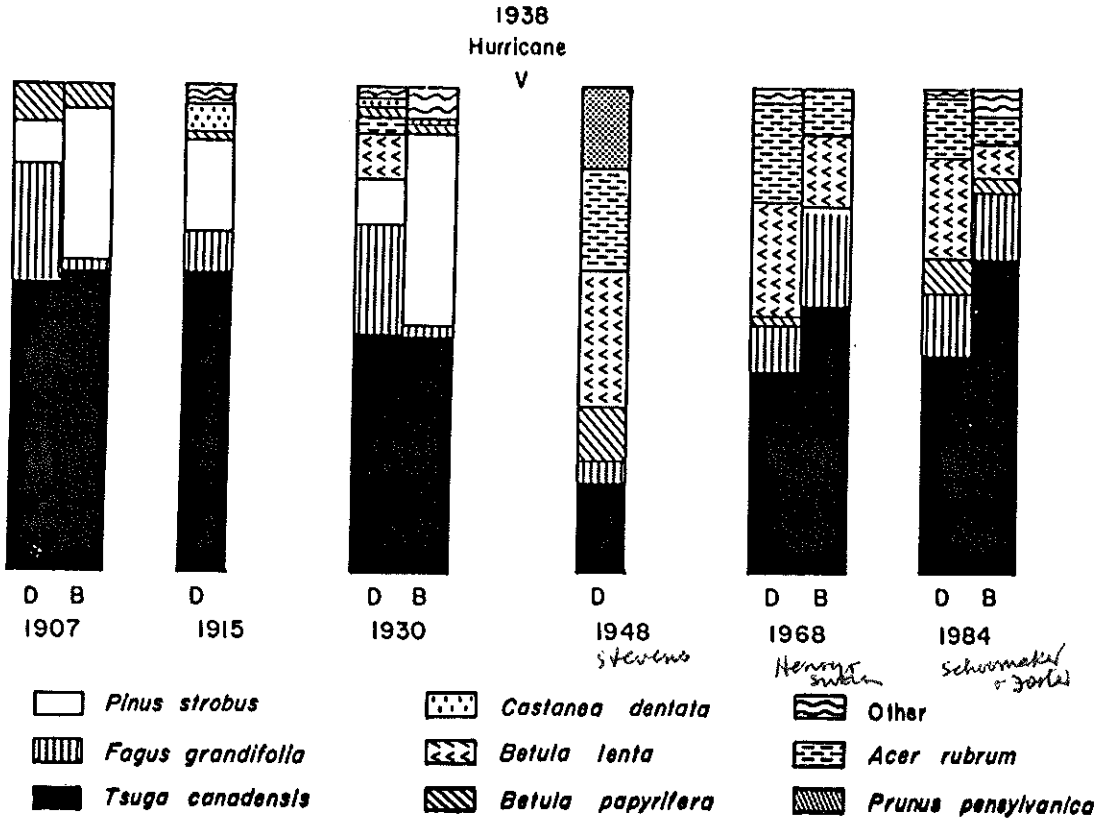

Fig. 9. Changes in relative density (D) and relative basal area (B) from 1907 to 1984 at Pisgah. Sample size varies from 0.1 acre (Henry and Swan - 1968) to 1.5 acre (1930 and 1984).

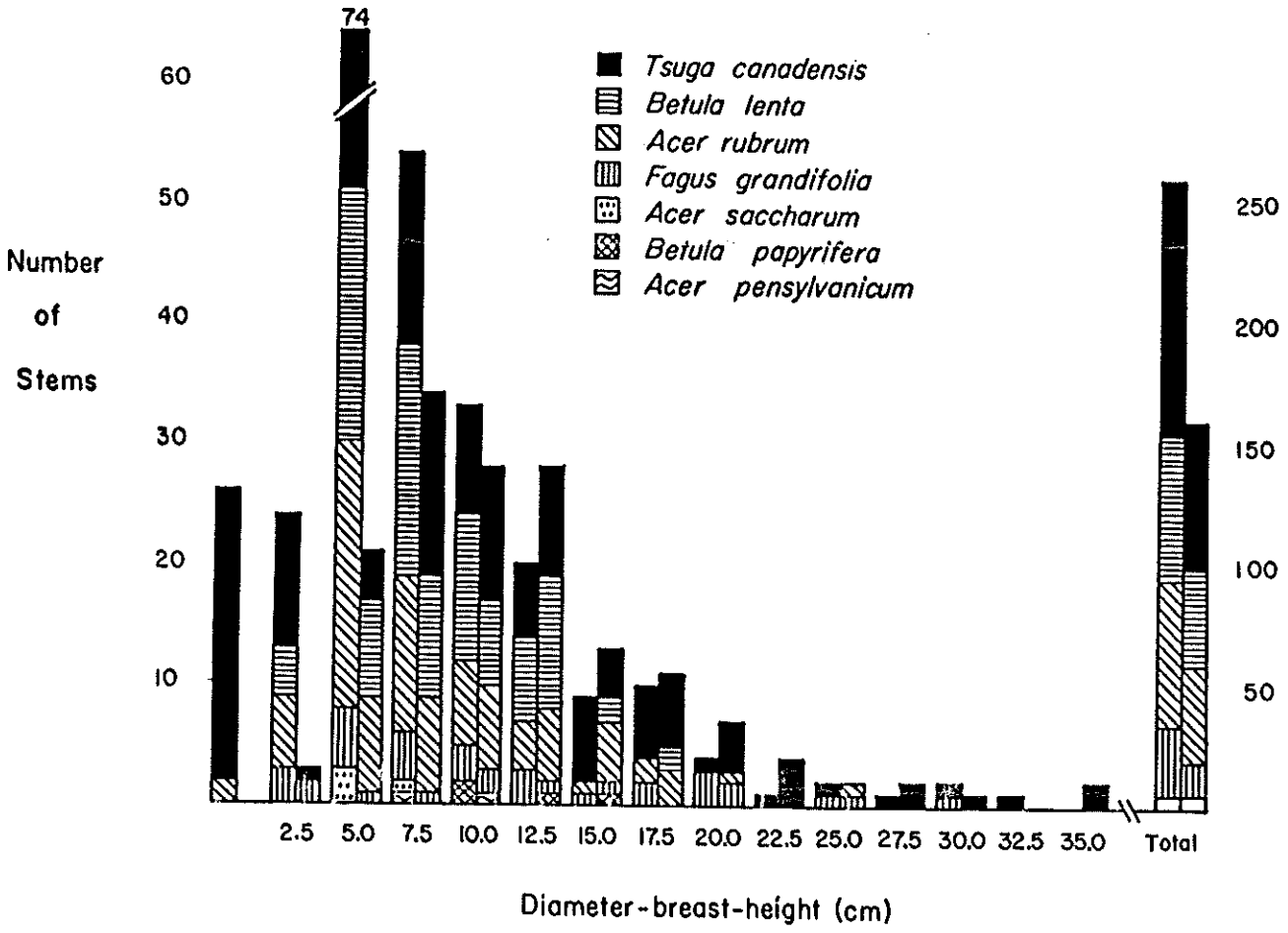

Fig. 10. Changes in size distribution and composition of the Henry and Swan plot at the Harvard Forest. Above each 2.5 cm size class the left hand bar indicates the 1968 sample and the right hand bar indicates the 1984 sample.