Seminal Early Literature on Work Done at the Yale Toumey Forest 1900-1942

Books written upon experience at the Yale Toumey Forest

Hawley, R.C. and Hawes, A.F., 1912. ***Forestry in New England: a handbook of eastern forest management*** J. Wiley & sons, New York.

Toumey, J.W., 1916. ***Seeding and planting: a manual for the guidance of forestry students, foresters, nurserymen, forest owners, and farmers*****.** J. Wiley & Sons, New York

Toumey, J.W., 1928. ***Foundations of silviculture upon an ecological basis*** (Vol. 1). J. Wiley & sons, New York, 450 p

Hawley, R.C., 1929. ***The practice of silviculture: with particular reference to its application in the United States of America*****.** J. Wiley & Sons, New York

Toumey, J.W. and Korstian, C.F., 1937. **Foundations of silviculture upon an ecological basis.** J. Wiley & Sons, New York, 456 p

Toumey, J.W. and Korstian, C.F., 1942. (2nd Edition) **Seeding and planting in the practice of forestry.** J. Wiley & Sons, New York, 520p.

Bulletins relevant to the research work done at the Yale-Toumey Forest

Toumey, J. W., and R. C. Hawley. 1916. The Keene Forest: A Preliminary Report. Yale School of Forestry Bulletin 4. 25 pp. + 7 illus. + map.

Summary: Toumey and Hawley emphasize managing pine over other species, with “Norway pine” (red pine) as a viable alternative to white pine given the spread of blister rust. The preference for pine over hardwood is driven by local market demand, the forests predominant soil types (coarse, sandy), and concern over spongy and brown tail moths then present in Cheshire County. At acquisition, red pine was present only incidentally in the forest, with its origin (planted or natural) not specified. Authors describe initial planting efforts on the Whitcomb lot where about 40 acres were planted with 40,000 white and red pine seedlings, including test plots at three spacings. The stock was supplied at no cost from the School in New Haven, though labor and related work from 1913 to 1916 cost $711.50 in total.

Hawley, Ralph C. 1922. A Progress Report of the Results Secured in Treating Pure White Pine Stands on Experimental Plots at Keene, New Hampshire. Yale School of Forestry Bulletin 7. 33 pp.

Summary: In October, 1905, nineteen permanent sample plots were established in the white pine type near Keene, New Hampshire, in cooperation with the Faulkner and Colony Manufacturing Company on lands owned by the latter. The plots were remeasured in 1909 and again in 1915. In September, 1920, the plots were remeasured for the third time, three additional plots were established and six of the original plots were discontinued. While the experiments are only partly completed, information of value in reference to the management of white pine has been acquired. The purpose of this publication is to make the information available for foresters and landowners engaged in managing white pine lands.

Toumey, James W., and Ernest J. Neethling. 1924. Insolation: A Factor in the Natural Regeneration of Certain Conifers. Yale School of Forestry Bulletin 11. 63 pp. + graphs

The primary objective was to learn to what extent the survival of white pine seedlings, during the season following germination in the field, is inhibited by insulation and by the drying of the surface soil and what the climatic and cover conditions are that control losses by each. The question requiring solution is: To what extent can losses be due to insulation and surface soil desiccation be controlled by the nature and density of the vegetative cover?

Li, Tsi-Tung. 1926. Soil Temperature as Influenced by Forest Cover. Yale School of Forestry Bulletin 18. 92 pp. + 21 figures.

The purpose of this investigation is to study the effect of the forest on soil temperature at definite depths, expressed in terms of daily maximum and daily minimum. By forest is meant not only the trees but the surface vegetation and litter as well. Effort was made to preserve the vegetation and litter from being disturbed over the period covered by the investigation.

Korstian, Clarence F. 1927. Factors Controlling Germination and Early Survival in Oaks. Yale School of Forestry Bulletin 19. 115 pp. + 7 plates.

There is little information available upon the seed and seedling characteristics of the American oaks. Among the fundamental problems in American silviculture, those which relate to seed efficiency are especially important. The future productiveness of the hardwood forests in which chestnut has been an important· element rests largely upon seed and sprout efficiency. Seed efficiency is governed by (I) seed production, (2) seed distribution, and (3) the factors affecting the reproductive value of the seed, such as viability, storage of seed in the litter of the forest floor, and destruction by insects and rodents.

Hawley, Ralph C. 1927. A Second Progress Report of the Results Secured in Treating Pure White Pine Stands on Experimental Plots at Keene, New Hampshire. Yale School of Forestry Bulletin 20. 23 pp.

In October, 1905, nineteen permanent sample plots were established in the white pine type near Keene, New Hampshire, in cooperation with the Faulkner and Colony Manufacturing Company on land owned by the latter.! The plots were remeasured in 1909 and again in 1915 and turned over to the Yale School of Forestry. In 1920 the plots were remeasured for the third time, three additional plots were established and six of the original plots were discontinued. A fourth remeasurement was made in 1925. After the 1920 remeasurement a first Progress Report was published as Bulletin NO.7 of the Yale School of Forestry. The last remeasurement (1925) of the plots furnishes information covering an additional five-year period. Although twenty years have elapsed since their initiation, the experiments are only partly completed. Little definite knowledge is available as to the results of thinning's in white pine. For this reason, the results and preliminary conclusions secured in the thinning experiments at Keene have been brought up to date and are presented for the information of foresters and landowners engaged in managing white pine lands

Lutz, Harold J. 1928. Trends and Silvicultural Significance of Upland Forest Successions in Southern New England. Yale School of Forestry Bulletin 22. 68 pp.

The problems encountered in the silvicultural treatment of southern New England forests are many. They result largely from the extremely diverse and complex conditions under which the forest is developed. Due to the glaciated nature of the region the soil character changes radically within relatively short distances. With changes in soil from place to place come minor changes of forest composition. One of the chief reasons for

the problems which the silviculturalist encounters in this region is the large number of species which make up the stands. There are approximately thirty commercially important forest trees in southern New England. The complicated character of the stands makes a knowledge of their development indispensable to silvicultural practice. It is well known that forest vegetation is continually undergoing change; it is unstable. This means that it must be studied not as a static but as a dynamic entity; in other words, it must be considered from the point of view of its successional development,

Craib, Ian J. 1929. Some Aspects of Soil Moisture in the Forest. Yale School of Forestry Bulletin 25. 62 pp. + figures.

By determining the moisture content of carefully selected soil samples taken at various depths down to three feet, the moisture content of soils in the forest and in the open have been compared. The soils investigated were similar in their mechanical properties. Part I is an investigation of the effect of forest cover on the amount of water in the soil over the growing season and its availability. Part II is an investigation of the effect of root competition on the available water supply of forest soils.

Grasovsky, Amihud. 1929. Some Aspects of Light in the Forest. Yale School of Forestry Bulletin 23. 53 pp. + illustrations

Under the various light conditions the species investigated, namely, white pine, red pine, hemlock, red oak, and chestnut oak, survived for ten months under a light intensity that was not over 300 foot candles at any time during that period. Only a moderate increase over the minimum intensity requirement was necessary to maintain growth. After this increase the effect of added light intensity on growth was not proportional to the added light. Approximately 170 foot candles were required to balance the CO2 emitted in respiration and used in photosynthesis in white pine seedlings. An additional 170 foot candles appeared ample to maintain growth. The intensity of light under canopies of white pine in the Yale Forest was found in all cases to be in excess of the minimum light requirement of the seedlings under test. The study of conditions in trenched quadrats supports this conclusion.

Toumey, James W., and Raymond Kienholz. 1931. Trenched Plots Under Forest Canopies. Yale School of Forestry Bulletin 30. 31 pp. + figures.

The relative importance of light and soil moisture in particular is better known than that of other environmental factors. We are coming to believe that the nature and condition of the reproduction and other surface vegetation beneath living canopies are not due to any single factor such as light or soil moisture, but to a complex of factors. Trenched and untrenched plots were established in 1922 under a mature stand of white pine near Keene, N. H. Trenching severed all of the roots of the surrounding white pine, so the trenched plot was free from root competition with them in contrast with the untrenched plot. Light, needle cover, and vegetation were the same on both plots. Trenching was repeated in 1924, 1926, and 1928.

Toumey, James W. 1932. The Yale Demonstration and Research Forest near Keene, New Hampshire. Yale School of Forestry Bulletin 33. 106 pp. + plates.

Summary: By the early 1930s red pine at Keene had shifted from incidental natural occurrence to a deliberate plantation species that was considered to be a better choice than white pine on sandy, coarser soils. Toumey reports on inventory taken in 1930, noting 11 MBF of standing red pine timber (though a natural occurring stand in compartment 7 was put in reserve and presumably not included in this tabulation as well as recently planted areas too young to yield any merchantable volume). Plates note a red pine component in compartments 6, 7, 8, and 13. Red Pine in the forest included 29.9 acres in 1-20 age class; red and white pine mixture encompassing 11.9 acres in 1-20 and 36.6 acres in 21-40 age classes.

Hawley, Ralph C. 1936. Observations on Thinning and Management of Eastern White Pine (Pinus strobus Linnaeus) in Southern New Hampshire. Yale School of Forestry Bulletin 42. 16 pp. + plates.

In1905 several permanent sample plots were in the white pine type near Keene, New Hampshire. The purpose of the investigation was to study some effects of thinnings and of partial (shelterwood) cuttings for establishing natural regeneration. The plots were remeasured in 1909, 1915, 1920, 1925, 1930, and 1935. After the 1920 remeasurement a was published as Bulletin 7 of the Yale School of Forestry, and in 1927 a Second Report appeared as Bulletin· 20 of the same series. More than thirty years have now elapsed since the experiment was started, and the purpose for which it was initiated has in large measure been accomplished. Comparison was made between an unthinned control plot (No. 604) and a ·heavily thinned plot (No. 601) which has received six low thinnings described as a moderately heavy which removed chiefly the trees of the smaller diameter. Summary results show growth in height has not been stimulated significantly by the thinnings. Height of the average dominant tree in 1935 was 74.6 feet on the thinned plot and 73.2 feet on the unthinned plot. While in 1905 heights were 41.5 feet. On each plot eighty largest trees on the thinned plot were in 1935 overall 1.5 times larger than the eighty biggest on the unthinned plot. At the beginning of the experiment, these same trees were on the whole smaller than the similar group of trees on the unthinned plot.

Hawley, Ralph C. and Clapp, Robert T., 1942. Growing of White Pine on the Yale Forest near Keene, New Hampshire. Yale School of the Environment Bulletin Series. 67.

Summary: Hawley and Clap summarize damage of the 1938 hurricane, noting that 371 acres were blown down with damage acute in stands of timber over forty years of age. They note current red pine acreage to be 68.2 acres of planted origin (28.6 acres in 1-20; 39.6 in 21-40 age class). Red pine volume rose sharply from 11 MBF in 1930 to 216 MBF in 1940. Red pine was noted to outgrow white pine in diameter and height on the drier soils, reaching merchantable size sooner but its markets were comparable to those of white pine.

Papers Based on Experience of Management at Yale-Toumey Forest

Toumey, J.W., 1919. The relation of gray birch to the regeneration of white pine. *Journal of Forestry*, *17*(1), pp.15-20.

Hawley, R.C., 1923. Fifteen Years of Forestry. *Journal of Forestry*, *21*(3), pp.225-230.

Toumey, J.W., 1928. What Ails New England Forests?. *Journal of Forestry*, *26*(4), pp.464-471.