Ecology of American Forest Species

Erosion and Reafforestation

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This publication is concerned with the relationship of forest trees to their environment in the light of human interference for economic purposes. It is an account of the adventures of a group of European forest-scientists in search of the real, though sometimes intangible, benefits of contact in the field with North American forest trees which have become important in European forestry.

The sections of the work dealing with the north-western coniferous forests are, naturally, the most carefully prepared and the most interesting ; though none of it is light reading. The various authors are all continental foresters and have not always succeeded in expressing their ideas in everyday English ; added to this, typographical errors are frequent, especially in technical terms and specific names of shrubs and herbage associated with the forests.

It is interesting to note how many of our garden shrubs appear in the list of species associated with the " Forest-types " studied by the team, *e.g.*, Gaultheria shallon, Acer circinatum, and Berberis nervosa, with bracken, hardfern, Polystichum and the Western American species of many of our native wild genera of shrubs and herbs in the Douglas Fir forest type.

It might be helpful to outline from a typical subject studied the approach used in this Bulletin :

" Typical Sitka spruce Forest also called Fogbelt Forest." Then follows an account of the geographical occurrence which in its distribution over the altitudinal range from sea-level to 1,700ft. corresponds with what might be stated in a report on the species in Ireland. Next comes a statement of the tree species accompanying Sitka, namely Tsuga heterophylla, Thuya plicata, Douglas Fir, Alder (spp. rubra), Acer macrophyllum, cherry, etc. Stress is laid on the tendency of Tsuga to become the dominant species due to its great shade-bearing qualities. This fact is constantly mentioned in the accounts on all the western forests, which may be a surprise here, where Tsuga has not been used very extensively as yet.

The rich shrub, grass, and moss layers are next dealt with.

Climate is then considered, and although rainfall figures given (59 ins. to 129 ins. with 90 ins. average) are higher than ours, distribution and type of rainfall correspond closely with Irish conditions, as also does temperature.

The typical soil in a spruce forest carries about 1 inch of dead needles and 2 inches of dark brown crumbly decomposed organic matter, followed by 2½ft. or more of soil depth penetrated by the root system.

There is, of course, much more detail than is given here but this may serve as sufficient illustration.

Similar surveys have been given for Douglas Fir, Black Poplar, Oregon White Oak, Silver Firs, Western Hemlock, and Sequoia, together with various subtypes and blends of types among these trees.

Pinus contorta is not treated in the same way but from an utilisation point of view as " the most agressive and hardy species of the Western region," suited to colonisation of poor sandy and peaty soils and burnt over areas. There is evidence that it is regarded with some suspicion as falling off in growth rate after about 35 years and then becoming subject to bark beetle damage.

Douglas Fir receives the most detailed attention of all on account of its wide distribution and the many forms suited to particular environments. An anology is drawn with Scots pine and the authors go to some pains to point out the extent to which the same principles of behaviour, treatment, etc., apply.

Particular stress is laid on the great volumes attained in virgin stands. These stands apparently consist of 3 to 5 Douglas fir per acre standing in a matrix of Tsuga and Thuya, which, though not much more than half the height of the Douglas, are still, by our standards, very large trees.

Considerable stress is laid upon the drier and warmer soil conditions required by this species, as compared with Sitka spruce.

For sheer spectacle the Coastal Redwood forests of California surpass all others, and, although few suggestions for the use of this species in Europe are made, the visiting party give a brief account of the ecology

of these forests, laying stress on their awe-inspiring beauty, complex nature (two tree layers, a shrub canopy and an herb layer of vegetation all contribute to the complete picture) and the immense standing volumes of 100,000 to 140,000 cubic feet per acre.

One of the most important objects of the study was the question of genetics and, in particular, of seed origin. This is, perhaps, the most important section of the work. Among the points made is the fact that good health in Sitka spruce and freedom from both disease and insect damage are closely connected with high humidity in the soil and in the atmosphere. With Douglas Fir it is stated that it is intolerant of competition for soil and light ; that it is relatively drought resistant, and that seed from certain regions where the populations are extremely heterogeneous, due to wide variations in conditions within a restricted area, are the most likely to yield selections successful in new environments. There is also the suggestion that regions similar in the duration of growing season may suit the same variety though other considerations seem unfavourable.

Another section that deserves mention is headed " Growth, Yield and Thinnings." In the comparison drawn it would appear that the fastest growing European stands have, on an age for age basis, a height and volume growth corresponding to medium to lower rates in Western America. This, it is suggested, may be due to the use in Europe of the more fertile sites for agriculture and the confinement of forests to poorer quality soils, but is also due in part to the thinning practices adopted in Europe, so that the total production over a period is nearly the same for both. It is made clear that there are few markets for thinnings in America and that this will be a major research subject there for some time to come.

A useful analysis is given comparing production in pure spruce stands and in various percentage mixtures of spruce and Tsuga of the same age and on similar sites and the conclusion drawn is that the total volume production is approximately the same in all cases, though the number of trees per acre vary widely.

Altogether this Bulletin is most interesting and informative and may be strongly recommended to anyone concerned in forestry in Ireland.

J.E.J.