

BOTANIC GARDENS.

We take the following extract from "Hasty Notes on Trees and Shrubs of Northern Europe and Asia," by Charles Gibb, Abbotsford, Quebec:

"Europe may well be proud of her Botanic Gardens. The large outlay of the European Governments seems to have been money well invested. Botany in its relations to Agriculture, Horticulture and Forestry is a science deemed too valuable to be suffered to remain untaught. Russia is in no way behind in this matter. At St. Petersburg what cannot be grown out of doors must be grown within, thence they have there the largest number of species under glass in the world. Not only in the larger cities, Moscow, Warsaw and Kioy, but in the smaller towns like Kazan, Voronezh, Orel and Penza (the last not visited by us), we find Botanic Gardens such as we might feel proud to own.

A generation or two ago, when Loudon and Lindley were at work in England, the Royal Horticultural Society imported from all parts of the world the plants likely to be useful or ornamental in England. They sent agents to China. Robert Fortune, however, spent much of his time at Canton, almost in the tropics. He was not in search of plants suited to the climate of Quebec, and yet some of our best hardy shrubs were brought to light at that time. This was probably the age of greatest Horticultural interchange the mild temperate regions have ever seen, and upon it is largely based their present advanced horticulture; and yet this work has been only of minor use to us.

In the tropics, and in the sub-tropical climates, the British Colonies have taken the lead in this matter of Botanic Gardens: wherever there is a Colony of any size there almost always is a Botanic Garden. Ceylon, India, (several), Singapore, Hong Kong, Queensland, Victoria, South Australia, New Zealand, Tasmania, Mauritius, Cape of Good Hope, and many others which I am not sure enough to note have their Botanic Gardens. Also in the West Indies, Jamaica, Trinidad and Demarara. The East and West Indies have interchanged for over 100 years! Read the reports of the Jamaica and other Botanic Gardens in the library of the Montreal Horticultural Society, and you will see that it is this botanic interchange which has built up the enormous export trade of the Tropics.

Now there are two points to which I wish to draw special attention.

I. We in the cold north have hardly begun to exchange with our like climates in the old world.

II. In Canada we have no Botanic Gardens.

As to exchange with our like climates, that will begin next fall. As to Botanic Gardens we must speak less hopefully. Our Horticultural Societies have done good work. Our Universities do not neglect the science of Botany. We have some fair collections of trees, some Horticultural Gardens; but our Government has never seen the need of expenditure upon Botanic Gardens, as have the Governments of the European powers, and the Governments of other British Colonies. That this great Dominion of Canada, which stretches from the Atlantic to the Pacific, should be without a Botanic Garden, or a series of such gardens, is a fact without parallel in British Colonial history.

On the European Forestry plantations I must say a few words. The planted districts in France we did not pass through, but we obtained some idea of their method of work by visiting the Forest School at Nancy. That work one may get some idea of by reading their reports now in the Montreal Horticultural Society's library. In Germany we were continually passing extensive plantations of Scotch Pine (*Pinus sylvestris*), bordered with Norway Spruce (*Abies excelsa*). The Germans are most economical in the use of wood, so that pine so extensively planted must ere long become an article of export. But where are the hardwoods needed for a thousand different purposes. Strange this exclusive planting of one species. So well are the forest plantations of Wurtemberg cared for, that the term "high culture" could with justice be applied to them. Evergreens are easily and cheaply propagated in the climate of Germany, and hence the method of

planting adopted is that of close crowded planting, which of course, necessitates continued thinning.

In Russia the Government controls, in fact "works," a large proportion of the forests of the Empire. Of natural and planted forest the Government held in 1878 what is equal to 351,730,000 acres, exclusive of Siberia, besides about 51,590,000 acres of scrub at the far north. In 1878 they received from these forests an income of 10,648,000 roubles, and expended on new plantations, and working expenses, 6,400,000, leaving a profit for the year of 4,248,000 roubles, or about \$2,124,000. The extent of the plantations in Russia I cannot state. I know, however, that in three of the Stoppo Governments in Southern Russia, 22,880 acres have been planted within the last eight years. There are 702 forest stations under the charge of a like number of Foresters, and as we journeyed over the prairie regions of Russia, we were continually coming across some Forestry Station with its surrounding plantations. Like the beet sugar factories they are scattered all over the otherwise treeless plains. Unlike the plantations in Germany the Russians have planted not only their native forms of the Silver pine and Norway Spruce, but largely of Pedunculata oak, ash and basswood, and somewhat of larch, birch and poplar; also in the Southern Stoppo regions, yellow locust, maple, elm, honey locust and others.

HOW FORESTS CHANGE.

It is only in what novel-writers call "the depth of the primeval forest" that a fair opportunity is afforded of studying the mixed growth of our woodlands, and of observing the changes which take place as one generation of forest trees succeeds another. Such opportunities are comparatively rare in the Eastern States at present. Much of the most valuable standing timber in New England to-day is to be found upon land that has one or more times been cleared or cut over. It is therefore generally of few varieties and nearly uniform age. But if we penetrate a virgin forest beyond the devastation of the woodman's axe and the fire which follows his track, we shall find it made up of trees in every stage of growth and of every variety indigenous to that section of the country. We will find hemlocks and spruces centuries old, their branches veiled with long pendants of gray moss, towering high above the hazel and moosewood. Rarely is there the monotony of a single growth. Evergreen trees mingle with deciduous. Sunshine and shadow alternate. Now we are in a comparatively clear spot where the leaves overhead are only thick enough to fleck the ground beneath with shadow; a moment later and hardly a ray of light can penetrate the curtain overhead. Alike on the dry, stony ridges, and in the soft, moist earth of the valleys the growth is mixed. Hemlock, spruce, pine, birch, willow, maple, poplar, oak and many other varieties are intermingled with a seeming irregularity that leads us to wonder how all these varieties, with so widely diverse requirements as to soil and other conditions, can flourish in such close proximity. Yet all is easily explainable if we but understand the un-failing care with which nature provides for the wants of all her children.

All through such a forest we will find at intervals the prostrate wrecks of what were once monarchs of the forest. Sometimes these have abdicated their sway by reason of their own weight and the decay of old age, sometimes their lofty heads have been laid low before the power of the nihilist wind. The latter catastrophe occurs most frequently where a thin layer—two or three feet—of rich vegetable mould overlies a coarse, loose gravel. The roots of the trees which spring up upon the rich soil above are repelled by the cold moisture of the gravel beneath and spread out for some distance around without striking deeply in. Then comes a tremendous storm, and the tall hemlock or pine is overthrown—literally torn up by the roots, bringing with them several square rods of the dark, rich earth with which they were covered. The gravelly sub soil is thus left exposed, and there the seeds of birch, willow and maple, carried by wind, bird, or squirrel, will flourish. The dirt carried up by the roots will sink down, as the tree decays, into a knoll that

will mark the death of the monarch for ages, and on it will spring up cherry, poplar and sumach. Thus, side by side, will be a marked variation in types. Not only this, but where the tree fell it swept down smaller trees and underbrush along with it, admitting warmth and light to soil which the sunbeams had not perhaps touched for centuries. In this manner the climate of that particular spot would be as much altered as the soil, and the final result might be an almost complete alteration of the character of the forest at that point. All this, too, would be accomplished by the orderly working of natural laws.

Again, on sandy plains, where the fire that destroyed the forest growth at the same time consumed the vegetable mould that gave the soil its fertility, it is curious to note nature's method of recuperating from the injury. The first step towards re-establishing a forest is made by the pitch pine or similar trees which require but little moisture. These send down their long roots, ten, twenty or thirty feet through the loose, barren gravel, to find and bring to the surface the potash and other soluble salts that are required. These elements are taken up by the tree for its own nutrition and then returned to the surface soil by the falling leaves. Thus the earth is gradually enriched and in the course of time becomes capable of supporting beech, poplar and oak again, and thus nature herself repairs the damage that the ignorance or carelessness of men inflicts upon her.

On the other hand equal provision is made for those trees which do not love the black, loamy soil, but prosper upon a poor and sandy home. Just as the surface of the plains is gradually enriched by the elements brought up from a depth, so is silicious sand from some distance below deposited upon the surface of bogs and swamps, and enables trees to thrive there which could not otherwise find a home. Everyone who has noticed with care the cultivated lands of New England has observed that where hemlock trees have fallen and decayed the soil is exceptionally poor—so much so that often, after several ploughings, the outline of the tree can be traced by the poorer growth of grass or grain, and the sorrel and coreopsis, which abhor a fertile soil, thrive there. If the decaying wood be pulverized it will be found gritty, and grains of sand can be detected with the naked eye. These are crystals of silicic acid taken up in solution into the circulation of the tree, and on its death reverting to their crystalline form. They are evident to workers of wood because they dull the edges of their tools. Now, just this silicious matter is what is wanted by various deciduous trees, some of which cannot live upon a wet, peaty soil. Therefore, if a hemlock, spruce or pine be uprooted from such a soil, its very trunk decaying will supply a foothold for hazel, willow, and yellow and white birch. As these grow in strength they will send down roots inside the bark of the fast decaying evergreen, which, piercing the damp mould will lay firm hold upon the sandy subsoil. Finally, the trunk of the fallen tree will waste entirely away, and there the observer will find the birches growing, on soil so wet and rich that they could never have taken root there but for the death of the tree that gave them birth.—*Lumber World*.

MANAGEMENT OF BURNED FORESTS.

At the Forestry Congress in St. Paul, a paper by B. E. Vernon was read on this subject. In the management of a burnt forest, the essayist showed it is necessary to study the influence of the fire on the soil and on the standing timber before deciding upon the treatment. The vitality of the timber left standing may be injured by the scorching flames. In hardwood forests where the reproduction is expected from the stocks, as in the coppice, the reproductive power is injured in proportion to the degree of heat developed by the fire. In pines, where reproduction can only be expected from the seed, the young seedling falls the first victim to the merciless fire. When the fire kills its original growth or causes its speedy death, the conditions of forest growth are at once changed and those alternations of species occur, which are the natural consequence of the change of their conditions. The essayist went on to show how, in the case of a destroyed pine forest, the light-

seeded species first takes the place of the old growth. Gradually, however, acorns and nuts will be deposited in the shade of the new growth, and as the light-seeded trees die off, the more valuable trees get a chance to grow and gradually occupy the lands. This new forest of hardwood trees if protected by fire will long occupy the ground, but the original pine forest will not appear again until the land, long enriched by an annual deposit of leaves, has been again stripped of its trees and mellowed by years of cultivation. The forest fire, then, which destroyed the original pine forest, also destroyed the capacity of the land to reproduce a similar crop of trees for a period which may be set down at from 50 to 100 years.

The essayist showed from this the importance of protecting the forests by dividing them into blocks, for instance, by means of avenues from two to six rods in width. Where the risk of fire is caused by the proximity of a railroad, safety belts along the endangered line are recommended. Where forests have been partially destroyed, various measures are recommended according to the character of the forest. Where the destruction of heavy timber is a total one the wisest plan is the immediate replanting of the land. Dead trees should not be allowed to remain, as they form the very best opportunities for the development of injurious insects. In forests of deciduous trees, where the heat generally is not as intense as in pine woods, it may be a cheap plan to await a new growth from the stocks and carefully nurse the more valuable species, in time filling up the bare spaces by planting shade-enduring species. In this, as in every other problem of forestry, it is impossible to prescribe any definite rules that will cover all the requirements of particular cases. A thorough elementary knowledge of the conditions of forest growth alone will enable the forester to decide what methods to adopt for the restoration of lost growths and reparation of the damage inflicted by fires on the soil and the forest.—*Lumber World*.

THE MARKET IN ENGLAND.

James Smith & Co.'s *Woods Circular and Prices Current*, dated Liverpool, 1st September, says, under the head of "Colonial woods:—"
Yellow pine is arriving freely, chiefly on timber merchants' account. The only sales reported have been of waxy board, 20 inches average at 2s 3d per foot for second quality and 2s 6d to 2s 8d per foot for first class, G. F. A. Square at 21d per foot for 50 feet average. Of Newfoundland pine a cargo has been sold at 13d per foot. Red pine, of good size and quality, is in fair demand. Oak is only in moderate request, save for long lengths: a few orders are in the market, but this wood is much interfered with by the scantlings from the States. A parcel of 65 feet average, mixed quality, is reported sold at about 2s 8d per foot ex quay. Elm is in good demand, especially for primo fresh wood; large average has been sold at 2s 3d and small at 2s per foot. Ash is wanted, and has been sold at from 2s 4d to 2s 5d per foot. Hickory is quoted at from 2s 2d to 2s 6d per foot. Black Walnut continues to arrive freely from the States, and prices are lower. Birch is in fair demand, and has been sold at 17d per foot for Dalhousie, 1½ inch average, 2s per foot for Quebec, and at auction 1128 logs from Pictou were offered, and realized from 14½d to 17½d per foot, and 594 logs from Campbelltown, realized 16 per foot. N. B. and N. S. Spruce Deals. The import has exceeded that of last year by 3353 standards, and, as there has been a smaller consumption, stocks have increased and prices have fallen, while there is a strong feeling among buyers that prices will be still lower. Sales in the early part of the month ruled at £7 2s 6d per standard for St. John, and £6 15s to £7 per standard for Miramichi, Halifax and Musquash, latterly prices have been accepted at fully 6d less per standard. By auction the cargo, ex Mark Twain, from St. John, averaged £7 3s 6d per standard, and several other cargoes were only partly sold. The cargo ex Canada, from Bathurst, averaged £6 13s 7d per standard ft. 3 inch spruce, and £6 18s 9d for 2½ inch, the scantling bringing £6 4s 1d per standard. Yesterday by auction the cargoes, ex Director from St. John, averaged £6 19s 6d; ex Moss Glen from St.