



XXVI. Some hints respecting the proper mode of inuring tender plants to our climate

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advanced. And although the performance of the instrument I have described is absolutely harmless, when applied for the purpose it is intended, the experiment of Biot requires nevertheless precaution, to prevent dangers to which those who make it are exposed.

XXVI. *Some Hints respecting the proper Modè of inuring Tender Plants to our Climate. By the Right Hon. Sir JOSEPH BANKS, Bart. K.B.P.R.S. &c.**

RESPECTABLE and useful as every branch of the horticultural art certainly is, no one is more interesting to the public, or more likely to prove advantageous to those who may be so fortunate as to succeed in it, than that of inuring plants, natives of warmer climates, to bear, without covering, the ungenial springs, the chilly summers, and the rigorous winters, by which, especially for some years past, we have been perpetually visited.

Many attempts have been made in this line, and several valuable shrubs, that used to be kept in our stoves, are now to be seen in the open garden : there is, however, some reason to believe, that every one of these was originally the native of a cold climate, though introduced to us through the medium of a warm one ; as the gold tree, aucuba japonica, the moutan, pæonia frutescens, and several others have been in our times.

In the case of annuals, however, it is probable that much has been done by our ancestors, and something by the present generation ; but it must be remembered, that all that is required in the case of an annual, is to enable it to ripen its fruit in a comparatively cold summer, after which, we know that the hardest frost has no power to injure the seed, though exposed in the open air to its severest influence ; but a perennial has to encounter frosts with its buds and annual shoots, that have sometimes been so severe with us as to rend asunder the trunks of our indigenous forest trees †.

* From Transactions of the Horticultural Society of London, vol. i. part i.

† See Miller's Dictionary, article *Frost*.

It is probable that wheat, our principal food at present, did not bring its seed to perfection in this climate, till hardened to it by repeated sowings: a few years ago some spring wheat from Guzerat was sown with barley, in a well cultivated field: it rose, eared, and blossomed, with a healthy appearance; but many ears were when ripe wholly without corn, and few brought more than three or four grains to perfection.

In the year 1791, some seeds of *zizania aquatica* were procured from Canada, and sown in a pond at Spring Grove, near Hounslow: it grew, and produced strong plants, which ripened their seeds: those seeds vegetated in the succeeding spring; but the plants they produced were weak, slender, not half so tall as those of the first generation, and grew in the shallowest water only; the seeds of these plants produced others the next year sensibly stronger than their parents of the second year.

In this manner the plants proceeded, springing up every year from the seeds of the preceding one, every year becoming visibly stronger and larger, and rising from deeper parts of the pond, till the last year, 1804, when several of the plants were six feet in height, and the whole pond was in every part covered with them as thick as wheat grows on a well managed field.

Here we have an experiment which proves, that an annual plant, scarce able to endure the ungenial summer of England, has become, in fourteen generations, as strong and as vigorous as our indigenous plants are, and as perfect in all its parts as in its native climate.

Some of our most common flowering shrubs have been long introduced into the gardens; the bay-tree has been cultivated more than two centuries; it is mentioned by Tusser, in the list of garden plants inserted in his book, called *500 Points of good Husbandry*, printed in 1573.

The laurel was introduced by master Cole, a merchant, living at Hampstead, some years before 1629, when Parkinson published his *Paradisus Terrestris*, and, at that time we had in our gardens, oranges, myrtles of three sorts, laurustinus, cypress, phillyrea, alaternus, arbutus; a cac-

tus

tus brought from Bermudas, and the passion-flower, which last had flowered here, and showed a remarkable particularity, by rising from the ground near a month sooner if a seedling plant, than if it grew from roots brought from Virginia.

All these were at that time rather tender plants ; master Cole cast a blanket over the top of his laurel, in frosty weather, to protect it ; but though nearly two centuries have since elapsed, not one of them will yet bear with certainty our winter frosts.

Though some of these shrubs ripen their seeds in this climate, it never has been, I believe, the custom of gardeners to sow them ; some are propagated by suckers and cuttings, and others by imported seeds ; consequently the very identical laurel introduced by master Cole, and some others of the plants enumerated by Parkinson, are now actually growing in our gardens ; no wonder then, that these original shrubs have not become hardier, though probably they would have done so, had they passed through several generations by being raised from British seeds.

Is it not then worthy a trial, as we find that plants raised from suckers or cuttings do not grow hardier by time, and as the experiment on zizania points out the road, to sow the seeds of these and such like tender shrubs as occasionally ripen them in this climate ? Fourteen generations, in the case of the zizania, produced a complete habit of succeeding in this climate, but a considerable improvement in hardiness was evident much earlier.

In plants that require some years to arrive at puberty, fourteen generations is more than any man can hope to survive : but a much less number will in many cases be sufficient, and in all, though a complete habit of hardihood is not attained, a great progress may be made towards it in a much less time ; even one generation may work a change of no small importance : if we could make the myrtle bear the climate of Middlesex, as well as it does that of Devonshire, or exempt our laurel hedges from the danger of being cut down by severe frosts, it would be an acquisition of no small

consequence to the pleasure of the gentleman, as well as to the profit of the gardener.

Old as I am, I certainly intend this year to commence experiments on the myrtle and the laurel: I trust, therefore, it will not be thought presumptuous in me to invite those of my brethren of this most useful Society, who are younger than I am, and who of course will see the effect of more generations than I shall do, to take measures for bringing to the test of experiment the theory I have ventured to bring forward, I hope not without some prospect of success.

The settlement lately made at New Holland gives a large scope to these experiments: many plants have been brought from thence which endure our climate with very little protection; and some of these arrive at puberty at an early period; we have already three from the south point of Van Diemen's Island, where the climate cannot be wholly without frost; *mimosa verticillata*, *eucalyptus hirsuta*, and *obliqua*. The first of these appears to have produced flowers within eight years of its first introduction; but as a settlement is now made very near the spot where the seeds of these shrubs were collected, we may reasonably hope to receive further supplies, and, among them, the *Winterana aromatica*, an inhabitant of the inhospitable shore of Terra del Fuego, which Mr. Brown has discovered on the south part of Van Diemen's Island also.

XXVII. *Essay upon Machines in General.* By M. CARNOT,
Member of the French Institute, &c. &c.

[Continued from p. 36.]

Part II. [*Of Machines properly so called**.]

DEFINITIONS.

XXXI. **A**MONG the forces applied to a machine in motion, some are of such a nature that each of them forms an acute angle with the velocity of the point at which it is

* Vide p. 36 of the present volume.

applied,