



## SOME WONDERFUL GRASSES

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**N**EXT to the study of ferns, perhaps that of grasses has of late years been most popular. Their graceful shapes, variety of species, and abundance render them attractive objects to the young botanical student. They carpet our English meadows, and give them that characteristic greenery which is so vividly remembered when one is far away from them. The cattle upon a thousand hills browse on their succulent and nutritious foliage. The larvæ of innumerable insects find abundance of food in the wilderness where grasses grow. The geologist knows they were among the oldest flowering plants to appear on the earth; the geographer is aware of their singularly extensive distribution, and peculiar adaptation to climature. The botanist has of late years identified their method of fertilisation with one of the most singular and unlooked-for relationships between plants and other objects. No other kind of herbage contributes so largely to the support of the animal world, from the grass-feeding kangaroos of Australia to man. Our staple food is prepared from their seeds, and this has been the case since pre-historic times, so that it is impossible to tell for a certainty from what species such cultivated forms as our common wheat were originally derived. Mankind has forgotten the very sources of this primeval food-supply. Even in classic times it was found necessary to invent some such poetic fable as that of Ceres, to account for the benefits which these plants have conferred on man. How long the seeds of certain grasses have been the staple food of our race we cannot tell. Half-burnt wheat and other corn grains have been found in abundance among the débris of the Swiss Lake Dwellings, showing that it was grown and garnered for food at that early epoch. If it be true that the wild grass known as *Ægilops*, found in Western Asia, is the original of the common wheat we now so largely cultivate, then the latter may have been first reared by our early Aryan ancestors, and have accompanied their migrations from the time when the first



colony went forth into the unknown world outside their home.

The inconspicuous and uncoloured flowers of all grasses are not without a reason. Within the last six or seven years it has been proved that the cause of flowers possessing beautiful corollas and sweet perfumes, is that these qualities may attract the insect tribes. The latter carry the pollen-grains from flower to flower, and thus unconsciously benefit them by crossing. And, as a rule, the plants which bear the most attractive flowers require to be crossed in proportion to their attractiveness, whilst less showy corollas do not require crossing in the same degree. It is now known beyond doubt that this principle of cross-fertilisation in plants is one of the most important and necessary. The shapes, internal and external, of flowers are frequently designed with special reference to bringing it about. Only two agents are universally capable of crossing all kinds of flowers—insects and the wind. The former are attracted by bright colours and sweet perfumes, and the flowers which require insect aid are therefore obliged to display these attractions. The latter is an unconscious agent, on which colour and perfume would be completely thrown away. Therefore the flowers habitually crossed by the wind do not possess showy blossoms; and hence the reason why grasses, which are chief among the wind-crossed flowers, have such an unpretending and inconspicuous kind of inflorescence.

Nature has everywhere sternly forbidden the banns of intermarriage! Her decree is rigidly carried out wherever possible, from grasses up to mankind.

Grasses require to be crossed quite as much as the largest and most attractive of true flowers. Singularly enough, we find that the distinction between the showy insect-fertilised flowers and the unattractive wind-fertilised grasses is carried out even to the sizes and shapes of their pollen-grains. Those of the former are roughened over with surface projections, so as to cause them to adhere all the better to the hairy bodies of insects. Those of the latter are lighter in weight, smoother, and often flatter, so as to expose as much of their surface as possible, and thus help the wind all the better to blow the pollen about. The *anthers* or pollen-bags of grasses are usually more pendulous than those of large flowers. More pollen is also produced, considerably more than can be utilised; but as its manufacture is of the easiest, that does not exhaust the plants. In this manner the possibility of some of the discharged and blown-about pollen taking effect is rendered certain. The amount of pollen thus poured into the atmosphere during June, by the grasses in our meadows, is such as literally to surcharge it. This it is which produces on sensitive nostrils the annoying complaint known as "hay-fever." People suffering from it hurry to the sea-side or the mountains, somewhere where grasses do not grow, and where the atmosphere is freed from their pollen. We may notice in the flowers of grasses, also, how admirably the filaments which bear the anthers or pollen-bags dangle outside the glumes, ready for the slightest breeze to blow them about. The filaments have the

power of suddenly growing very rapidly whilst the pollen is ripening, so that the pollen-bags are thus lifted outside the chaffy scales of the flower where they have hitherto been protected. Not less admirably adapted to wind-crossing is the pistil in the flowers of all grasses. Sometimes it is a living forked net, feathered to its base, and everywhere covered with an exceedingly sticky fluid. Any stray pollen-grain blown by the wind must inevitably be arrested by this subtle contrivance. Once made prisoner, the pollen begins to bud forth a tube which ultimately reaches the base of the pistil. Fertilisation is then effected, the seed-grain begins to develop, and after this manner the world gets its "daily bread."

The perfumes of grasses are not so abundant or various as those of other plants, although they are quite as distinctive. The well-known smell of new-mown hay is evolved chiefly by the Sweet-smelling Vernal Grass, and no other. The presence of this species is quite sufficient to perfume the rest, and to produce that most delightful of summery smells, the odour of the hay-field. This perfume can now be artificially imitated from the products of gas-tar, and a regular manufacture of it is carried on for perfumery purposes. All grasses are not beneficial to animals, some species are actually poisonous, and others so mechanically irritate the stomachs of cattle that they die of inflammation. The common Couch-grass is righteously abhorred by the farmer, although both dogs and cats occasionally resort to it for medicinal purposes, and to produce nausea. The Darnel is believed by some writers to be the "tares" spoken of in the New Testament. If such should be the case, an extra force is given to the moral the illustration was intended to point, for the Darnel is unquestionably poisonous. It is still troublesome from its habit of growing in wheat-fields, where it is impossible to separate it until the harvest; when mixed up and ground with the wheat and made into bread, it produces headache and vertigo. We have known cattle which have died from partaking of Darnel grass. This poisonous habit must be defensive to the plant and protect it from enemies. Other grasses are equally protected by the large quantities of silica which enter into the structure of the leaves, so that animals find it impossible to feed upon them. In most cases, however, the liability which grasses incur to be browsed and fed upon by animals has been turned into an advantage. Thereby they have developed the habit of growing by means of shoots and trailing stems, instead of trusting to seeding alone as most of the plants do. Every farmer knows that grasses of all kinds are likely to grow all the stronger from being "fed down" at the proper time. Perhaps it is this adroit method of gaining by what at first sight appears to be an adversity, which has caused so few actually poisonous species of grasses to be developed. The bristle-like awns which cluster so thickly around the flowering-spikes of the wild barleys, and other grasses, must be capital protections of those important parts against their destruction by cattle. It should be remembered that these grasses do not usually resort to growth by underground shoots,



but are entirely dependent for the perpetuation of their kind upon their grains or seeds. If these were not protected, the barleys would soon be exterminated.

In flowering, the grasses of northern regions sometimes resort to peculiar habits. Perhaps our readers may have practised the very pretty botanical experiment which consists in placing some spikes of ripe wheat in water. After a time the grains of wheat germinate and sprout into the prettiest of minute green blades. The bunch of ears breaks forth into a tassel of attractive greenery, owing to the grains sprouting in this remarkable fashion. Any one may thus secure, even in the winter time, a most cheerful mantel-piece ornament. Some grasses naturally resort to a similar device, notably a variety of the common Sheep's Fescue grass, which is on that account called *vivipara*. It is most abundant in mountainous districts, where the habit is undoubtedly useful to it. Instead of the grains or seeds dropping out when they are ripe, as is usually the case, they remain within the glumes or flower-scales and germinate there. Hence the flower-head presents the appearance of a mass of sprouting grasses. In this respect such grasses are in the same state as those ferns which produce young fern-buds from the surfaces of their fronds, and are known as *proliferous*. When the young sprouts of the viviparous grasses have reached a certain stage, they drop to the ground and continue their growth on the soil. Within the Arctic regions several species of grass are viviparous, and retain their seeds until they germinate on the flower-head. This may have something to do with the disappearance of snow from the ground.

That the leaves of many grasses contain sugar is well known; some species having large quantities of it in their juices. Of course, this proportion is not at all comparable to that gigantic grass better known among us as the sugar-cane. The creeping and herbaceous grasses are peculiar to the temperate regions—it is only in the tropical zones we find them attaining the magnitude of trees. The sugar-cane of commerce is only one of sixty or seventy species of the same genus. Cultivated originally in India, it has been carried thence to many other parts of the world where its growth could be profitably carried on. We are all aware how the destinies of the negro race have been historically worked in with the commercial culture of this particular grass. Perhaps no other plant in the world has so largely affected the human race generally. Sugar has always been in demand among certain Mahomedans, and there can be little question that the Saracens introduced the growth of the cane into the Mediterranean islands. The Moors afterwards cultivated it in Spain. From the latter country it was carried across the Atlantic to the West Indian islands. When sugar was first used in England, in 1466, it was as a medicine! Now it is, as Mr. Lowe remarked, "the delight of youth, and the solace of old age." The sugary juices of the grass which thus provides the greater part of the civilised world with one of its commonest necessities, have to undergo peculiar treatment before the results are commercial.

In many respects another gigantic grass, the

bamboo, is naturally associated in our minds with the sugar-cane. It does not possess either the succulence or the saccharine qualities of the latter, and its flint-cuticled stem is much stronger and more enduring. It is the most gigantic of all the grasses, as well as the most rapid in its growth. It has been known to grow forty feet in one season, so that its vegetative energy is perhaps unequalled. Every one knows the variety of purposes to which the Chinese and other Eastern nations put this most useful plant. A Chinese house is not only built of it, but every article of furniture within—including mats, screens, chairs, tables, bedsteads, and even bedding—is made of its materials. The stem is composed of joints, having a diaphragm across each. When the bamboo jungles are "fired," the heat explodes the steam which forms within the joints, and the effect of a continuous roar of artillery cannonading is thus produced. Dr. Hooker vividly describes, in his "Himalayan Journal," the circumstances attending the conflagration of a bamboo jungle.

The Prairie grass and Tussock grass are now not unknown in this country, especially the former, which is frequently grown for the sake of its tall and elegant flower-heads, not unlike those of our marsh-reeds. The Tussock grass has long been noted for its succulent and nutritious qualities, and the fondness which cattle manifest for it. The Canary grass is now not an uncommon member of our British flora, frequently growing in the neighbourhood of villages and towns, where it has undoubtedly sprung up from the refuse thrown out of bird-cages. Asia is its natural home, but its well-known seeds have been imported in such quantities and for so long a time into England, for the purpose of feeding canaries, that we cannot be surprised this grass is now usually catalogued in our English flora.

*Andropogon* is the name of a genus of exotic grasses remarkable for their perfumes. All are inhabitants of the warmer parts of the globe, and particularly of South America. The fresh leaves when bruised emit delightful fragrances, that of lemon being perhaps the most powerful. The Lemon-grass of our conservatories is a species of *Andropogon*. One kind of "grass oils" is manufactured from these plants. Among our rarest native grasses we have one called the Northern Holy Grass. It is much commoner in Germany, in the Catholic parts of which it is dedicated to the Virgin, and strewn in the aisles of churches, and around the doorways, hence its sacred name. It is also abundant in Iceland, and in Northern Europe generally. Its perfume resembles that of the Sweet-smelling Vernal Grass, already alluded to, and it is tied up in bundles and laid among the linen of the Icelandic peasantry, in order to perfume their clothes. In Sweden this grass is sold in bundles for the purpose of producing sleep, after the fashion in which we make up hop-pillows. In Great Britain it is only found in the extreme north.

We have grasses remarkable for their fondness for dry, sandy, and barren tracts, and others for aquatic habitats. Among the former is our Marram grass, so abundant on our east coasts, where it is



most useful in binding the easily drifted sand together by its long, creeping roots. In Holland it is actually planted for this purpose; and there is little question that it has frequently served that industrious nation in good stead, by preserving the sandbank on which it grows. In the north of England this grass is used for making table-mats, and the seats for the common "rush"-bottomed chairs. The Sea Lyme Grass (*Elymus*) is nearly as effective as the Marram for binding and holding blown sand together; and we frequently find it growing in abundance along our level coast-line. The most remarkable of our native grasses, which affects habits just the reverse of these sand-loving species, is the Manna-

grass (*Glyceria fluitans*), whose common as well as botanical names are derived from the sugary sweetness of the foliage. It may be seen on the surfaces of most pools and ditches, sometimes completely covering their surfaces; although not if cattle can get at it, for they will wade into great depths of water after it, and remain there on summer days, cooling and enjoying themselves, and feeding on perhaps the most succulent of all British herbage. It is in this enjoyable position that Sidney Cooper has drawn some of his best cattle, although few people are aware of the dainty vegetable morsels which were the primary cause of their placing themselves in such picturesque and self-complacent attitudes.

### OUR WINDOW GARDENS, AND HOW THEY THRIVED.



IT is sufficiently common-place to observe that "half a loaf is better than no bread," and it was with this philosophical reflection on the part of my good sister Maggie, that one hot afternoon we determined to make the best of things as

they were. Our case was not an uncommon one. Early years had been passed amid the innocent delights and never-wearying beauties and occupations of country life: all our associations had been with "seed time and harvest, and cold and heat, and summer and winter." But changes had come. Those who had been our support in the hour of our thoughtlessness had gone to their long home, and circumstances had driven us, for the sake of a livelihood, very considerably within the ten-miles radius from St. Paul's. With our very limited private means, a City clerkship was a necessity to maintain with any degree of "appearances" our exceedingly modest suburban villa.

"Don't you think, Tom," said Maggie, as I walked into our little patch of gravel and green—I cannot call it garden—upon my return from the City by the usual five o'clock train, on the afternoon aforesaid, "that in addition to the few flowers we have here, something might be done by us on these summer evenings in the way of floral decoration of the windows? Though we have no longer the garden of the old home, half a loaf is better than no bread."

Fortunately I was just in the good-tempered sort of mood to catch at almost any suggestion of Maggie's,

and that very evening we set to work. Recollections of the gay floral display that we had seen in the windows of Belgravia during the season, on the one hand, and of the flower shows and prizes for the London poor later on in the summer, upon the other, served greatly to stimulate our zeal in this our newly formed project of window gardening. My bed-room was immediately over our diminutive drawing-room; the aspect was nearly due south, and the size of the two windows was unusually large—out of proportion, in fact, with that of the house. All this again was in our favour. Upon either window-sill there was ample room for a good-sized long box, and Maggie's proposal was that we should have one upon each: yet we mutually decided that to go in for anything half so expensive as those ready-made handsome and ornamental ones was quite beyond our power. Besides, was it not "half the fun" to "do it ourselves?"

Impatient, however, as we immediately were for flowers, and a gay and green window display, we felt sure there was a good deal of preliminary preparation necessary. The question was, should I forthwith turn painter and carpenter myself, and knock up the boxes as well as I could, or should we call in "professional" aid? This last idea was too suggestive of a long bill; nevertheless *some* outlay was necessary. We agreed to discuss the matter on a walk, and to ask a few questions of an amiable nurseryman two miles off, who had supplied us previously with a few seeds and bulbs. On this occasion he made us a present of a box which—for we had first taken careful measurements before leaving home—I saw at a glance was the very thing for us; and the other—for I had a good many tools of my own—I was resolved to make myself, taking the good florist's present as my model, and purchasing the necessary wood at a timber yard on our way home. In two or three evenings my box was completed, and the old one which the florist had given us touched up in one or two places. Then there was some green paint to buy, and while I was working away over the ledgers in the dusty office in the City, Maggie was to be the painter, and admirably I told her afterwards she had done her work. Triumph in-