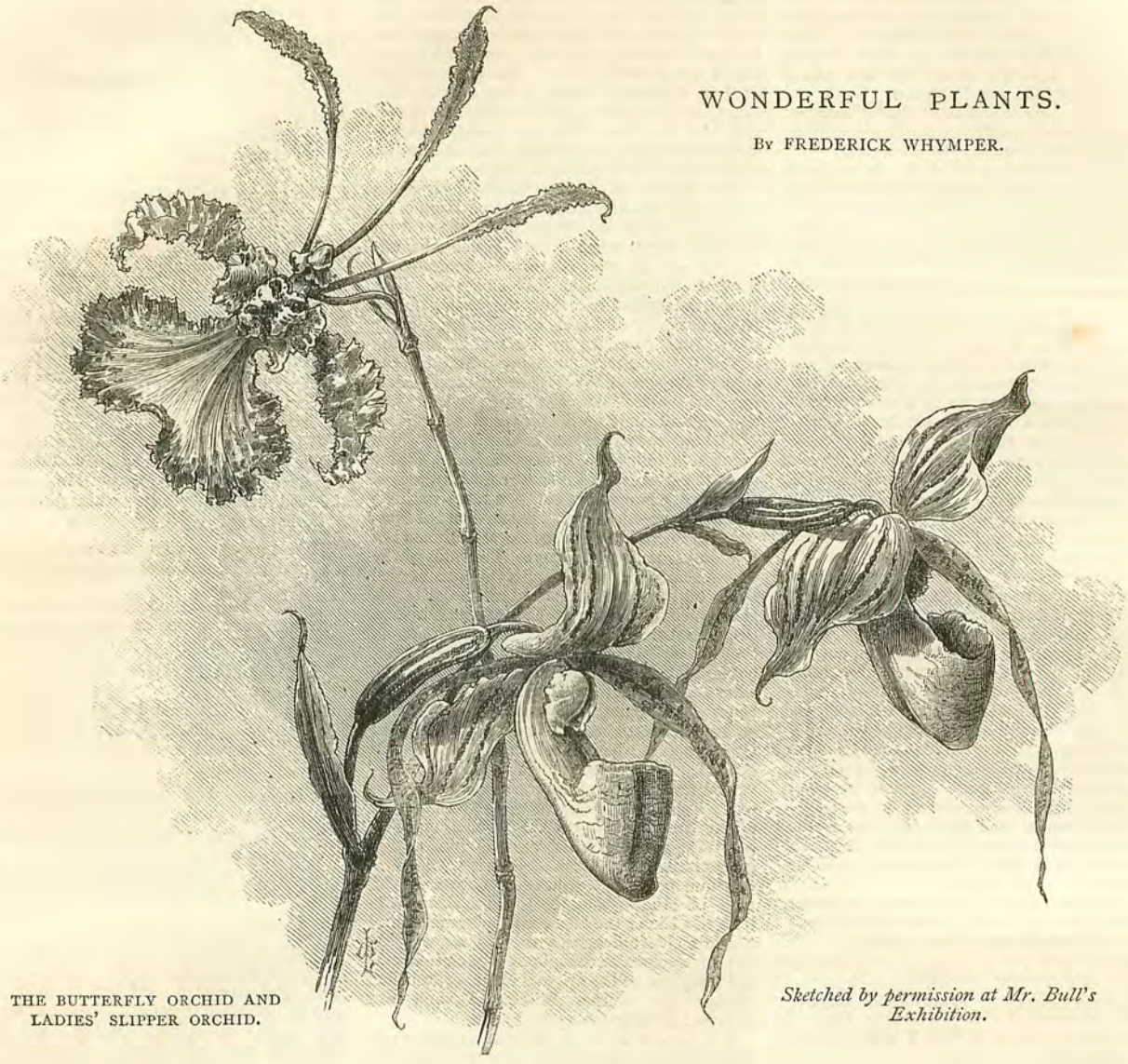
WONDERFUL PLANTS.

By FREDERICK WHYMPER.



THE BUTTERFLY ORCHID AND LADIES' SLIPPER ORCHID.

Sketched by permission at Mr. Bull's Exhibition.

To thoroughly describe the wonders of plant life by the aid of the pen would be to write an encyclopædia of botany, and all that can be attempted in this article is to depict a few of the more curious, valuable, or least known forms of the vegetable kingdom. Indeed, all plant life is wonderful, though our familiarity with many of its developments deadens, rather than quickens, our proper appreciation of the fact.

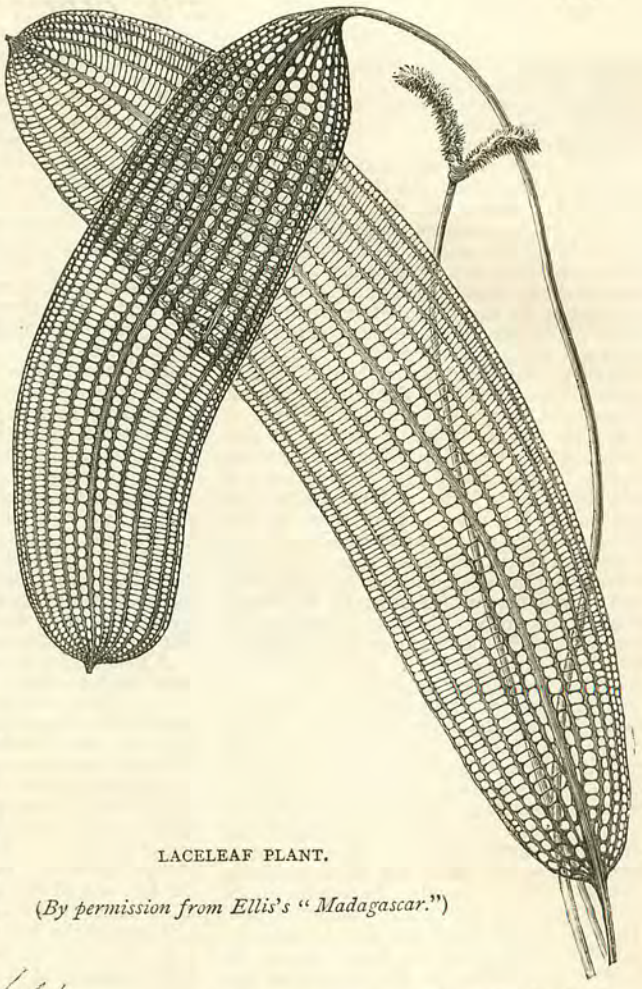
When a seed is committed to the ground every child knows what happens; it will, if healthy, and the soil adapted to its particular form of existence, soon "sprout," as we say in ordinary language, one part ascending to the air, another descending and branching out in search of moisture and nourishment. But all roots do not require soil for their development; there are, as we all know, aquatic plants, the roots of which hang in the water, and never touch the earth; while parasitical plants like the mistletoe live and thrive by attaching themselves to the trunks of trees. Some plants, again, like the fragrant vanilla, which gracefully twines round and among the trees in tropical forests, put out "aerial roots," as they are termed, which hang down in long streamers. These benefit the plant itself by drinking in the moisture of the humid atmosphere, and often reach the soil itself, where they take root. A striking example of something similar to this is to be found on a grand scale in that wonderful tree, the banyan, which throws down long slender roots from a height of sixty or more feet, which, after reaching the soil, in their turn become great trees; and the process being constantly repeated, a whole group, a veritable forest of connected trees grown from one single seed, may be the result. One well-known and oft-described East-Indian example has three hundred large and ten times as many small trunks. It will shelter 3,000 persons at one time.

How little nourishment some plants require for their sustenance is illustrated among the orchids, which have been known to grow luxuriantly on a heap of cinders, and by some of the cactuses, which often flourish on barren and burning hot rocks in utterly rainless seasons. Yet at the old missions of California, and round the estates of settlers, these very plants formed dense hedges, six feet high and five to ten feet wide, covered with thorns and great leaves, the horror of all large animals and the place of safety and refuge for many small ones. The most striking examples, however, of plants "seeming to live on nothing," or next door to it, are to be found among the many thousand forms of fungi, ranging from mere dust and mould to great puff-balls, one kind of which is said to attain the diameter of a foot or so in a single night. All of us are familiar with them on palings or damp masonry, and naturalists have made merry over examples of them found flourishing, with nothing, apparently, but zinc or iron to nourish them, "as though ironmongery were succulent and sappy." There is a familiar story of some monks who left a mighty cask of wine to mature in their cellar. When, at the end of three years, they went to draw it off, an unpleasant surprise awaited them. They had overlooked a leak, and the whole of the wine had turned into great funguses which almost completely choked up the cellar, and had lifted the empty tun, as if in triumph, to the ceiling! An almost identical story is told of some wine left in a cellar by the once-famous scientist, Sir Joseph Banks. "In Basingstoke," says a popular writer, "not long ago, toadstools heaved up the pavement of the street, as if they were uneasy ghosts, and kitchen hearthstones have been known to get solemnly up on an end, while spectral funguses

thrust their heads out of the aperture." There is a gigantic and rapid-growing fungus known as *Polyporus squamosus* which increases at the rate of nine pounds a week, and may in a month measure eight feet in circumference. What, asks the writer just briefly quoted, if this parasitical plant were to take to growing on the backs of books or in our jam-pots and cruets, like many smaller varieties of its kind? "What would the cook say to a hundredweight of this turbulent toadstool in the larder when she came back to town, or the master of the house, at finding his study occupied by furlongs of this umbrageous fungus?"

But while a large proportion of the fungi are objectionable, or directly harmful, others are much esteemed as luxuries. If on the one hand we find them the causes of the potato and vine diseases, of smut in wheat and dry rot in timber, on the other they yield highly appreciated food in the form of mushrooms and truffles, some of the former of which are familiar to us all, while the latter are consumed principally in France and other parts of the Continent. Hogs, specially trained for the search, are employed in France; as a rule, they are allowed simply to indicate the whereabouts of the truffles, which are then dug up by field labourers. In Burgundy, the sheep-dog, and in Italy the water-spaniel, are employed for the same purpose. Figuier tells us that while dogs only seem to hunt the truffle in obedience to man, the hog loves it for its own sake. A trained hog, when it has discovered a truffle bed, is immovable, with snout over the spot, until the savoury fungi are extracted from the soil, when it will rush forward to secure the prizes for itself, unless prevented. In Upper Provence a hog trained to truffle-hunting is worth the equivalent of eight pounds sterling, or even more. A fungus of the truffle kind attains to a weight of more than a couple of pounds in Australia, and was known by the aborigines as native bread. There is no doubt that many edible varieties exist in England, but, except to the practised naturalist, who can positively distinguish between those which may be safely eaten and those which are dangerously poisonous, the search for them as food is not recommended.

Some brief mention has been made of the orchids, the principal of which are natives of hot or tropical climates, where they generally attach themselves to rocks, stones, or the branches of trees, by means of long fleshy roots. The flowers of many of them are peculiar and even grotesque in form, often resembling something in the animal, far more than anything else in the vegetable world. Thus we have the bee, fly, lizard, and even man orchis. One example gets its name from a supposed likeness to a frog. In the flower of the *Spirito santo* of Panama, the resemblance to a descending dove is tolerably well marked, while in another case the flower has the form of a swan. The butterfly orchis flower resembles a gaudy butterfly; another has a supposed likeness to the head of a cuttle-fish; while a third reminds one of a large spider.



LACELEAF PLANT.

(*By permission from Ellis's "Madagascar."*)

PITCHER PLANT FROM KEW.

It is hardly a digression at this juncture to record the enormous value attached to rare and curious orchids at the present day, almost rivalling those of the "tulip mania" in the seventeenth century. Fifty to a hundred guineas is no uncommon price for a scarce or specially beautiful—or ugly—example. Through the kindness of Mr. Thomas Searle Jerrold, a practical botanist, the writer is enabled to record a few of the prices obtained at one of the most celebrated auction marts in the neighbourhood of Covent Garden, where collections of rare plants and bulbs are periodically and frequently offered for sale. The list includes several examples, ranging from £120 to £140 a piece. Two examples of *Cattleya Trianæ* brought respectively £185 and £215. The highest price as yet paid seems to have been £235 for a specimen of *Arides Lawrenciæ*. Yet, after all, these are as nothing to the rates obtained in Holland and elsewhere for tulips in the middle of the seventeenth century, when shares were held in a single bulb, and speculation in bulbs was as rife as in mining or railway stocks to-day. The highest recorded price paid for a single example amounted to the equivalent of £1,200. The Government of the Netherlands was forced in the end to limit the price to 200 francs (£8). Such transactions were of course mainly confined to wealthy amateurs, and as in the case of the orchids, rarity and not unfrequently oddity entered more into their calculations than beauty. But perhaps the most remarkable financial results which can be credited to a single—and common—plant are derived from

a near relative of our field poppy. The opium poppy of India yields opium to the value of eight million pounds sterling, an amount about equal to the entire sum raised by income-tax in Great Britain.

One, at least, of the most remarkable flowering plants in the world, the *Rafflesia Arnoldi*, is found in Sumatra and the Sunda Islands. It is a gigantic parasitical plant, which may be said to be in fact almost all flower. It very much resembles, roughly speaking, a mass of the so-called "brain" coral, and is often found growing at the base of great trees, from which in part it derives its subsistence. It has been seen nine feet in circumference. Much better known is that grand water-lily, the *Victoria regia*, to be seen at Kew Gardens, the Crystal Palace, and many other places. The leaf of this plant may reach five or six feet in diameter, and the flower forty inches in circumference. The leaf is of light green above, and of a vivid crimson below, and has a salver-like rim round the margin, from three to five inches in height; even the ribs, radiating from a common centre, project an inch high. The flowers vary from pure white to rose and pink, and are very fragrant. Almost all our young readers are familiar with its beautiful appearance, which is doubtless greatly enhanced when seen fringing grand river-banks, covered with luxuriant tropical vegetation.

Nothing can be much more varied than the forms assumed by leaves. Some are nearly circular, others heart-shaped, others again display different modifications of the oval form. Some are long and thin, others stout and thick; many have smooth edges, as many more are serrated like a saw. One group, *Sagittaria*, derives its name from its arrow or spear-headed leaves; in others the leaves resemble so many spikes or swords. In another series the leaves are long and trumpet-shaped. There are leaves which can only be seen by aid of the microscope, and leaves five or six yards long. Among the most curious are undoubtedly those of the pitcher plants. In these curiosities of the vegetable world the leaves terminate in a kind of pitcher or vase, which is connected to them by a tendril. The pitcher is even provided with a cover, not greatly unlike in form that of a hot-water jug. Travellers have sometimes welcomed the sight of them on a hot and thirsty journey, for in a state of nature they may hold a certain quantity of liquid. One tells us that, while in Madagascar, he lost his way during a short excursion into the interior, and what with fatigue and what with thirst, was fast giving way to despair, when he perceived some small vases hanging among the foliage. "I began," says he, "to think that I was under one of those hallucinations by which the sick are visited in fever, when the refreshing draught seems to fly from their parched lips. I approached, however, with some hesitation; I threw a rapid glance into the pitchers. Judge of my happiness when I found them filled with a pure and transparent liquid." The draught of which he partook seemed to him a veritable nectar.

One of the most curious of all plants, as regards its leaves, is the lattice plant, otherwise known as the lace leaf, to which attention was drawn some years ago by the well-known missionary traveller, the Rev. W. Ellis. In one of his visits to Madagascar, he observed it growing in the running streams of that country, and succeeded, by native aid, in obtaining some specimens, which were successfully transported to this country. In getting them there was some difficulty, as crocodiles abounded in the same streams. The large root of this plant is valuable as food; hence a third name it bears—"yam of the waters." Its leaves when grown are nine or ten inches in length, and are described by Ellis as like living fibrous skeletons rather than leaves as we understand them. Long fibres run the entire length, crossed by others at right angles, the whole forming a beautiful open lace or net work, varying in colour, according to the growth, from pale yellow to bright green, and from that again to dark olive. In spite of the apparent delicacy and fragility of this tracery of fibres, they are in reality very strong and wiry. The flower raises its head above the water, while the leaves always remain below the surface. A full-grown specimen of this plant, with its dark green leaves branching out in a circle two or three feet in diameter through the transparent water, is a beautiful and attractive sight.

The sensitiveness of plants to light—the different attitudes assumed by their leaves by day and night—were points first studied by the celebrated Linnæus, who often denied himself rest that he might observe them in the stilly hours. Among the conclusions he arrived at was one to the effect that it was the absence of light, and not cold, which made them close their leaves. Plants in hot-houses folded or rolled their leaves during night, precisely like those in the open air. But plants have movements or sensibilities other than those caused by light, some of which are very curious, and but partially understood.

A Bengalese plant, discovered by an enthusiastic Englishwoman, Lady Monson, who died on one of her botanical excursions, has on each little stalk a large leaf, and above it, nearer the main stem, two very small leaflets. These latter are almost examples of perpetual motion. They jerk together—the movements being not unlike those of the seconds hand of a watch—one, however, ascending as the other descends, and *vice versâ*. The large leaf has also its slower movement, now to the right, now to the left, and all this activity continues day and night during the life of the plant. The warmer and damper the day, the more active is it. In India the plant has been known to keep time with a watch, at the rate of sixty jerks per minute.

The fact that certain plants could easily be irritated by external means has long been known, and many of our readers doubtless have seen the sensitive plant, the lightest touch on the leaflets of which will cause them to close on their stalks, while these again close on the stem. If the extreme end of one leaflet is cut, the others will close in sympathy with it. The most curious examples, however, of sensitiveness are undoubtedly found in the Venus fly-trap or catch-fly, the sundews, and the pitcher plants just described. These have been aptly termed insectivorous or carnivorous plants. They are the sportsmen of the vegetable world, and are in the habit of catching, imprisoning, and even impaling flies, bees, and suchlike small game, which had been venturesome enough to tempt their clutches. Until a comparatively late date, these predatory habits were supposed merely to result from a certain amount of unamiable eccentricity on the part of these plants, prompting them to lay and bait traps almost, it might be said, for their own cruel amusement. It has been left, however, to modern observers first to suspect and then to prove that they are literally what true sportsmen would term "mere pot-hunters," that is to say, they trap and snare for the sake of satisfying their hunger, a depth of degradation to which no true votary of the gun or rod ever descends. Ellis, a well-known English naturalist of a century ago, was the first to guess at the truth. A friend of his in America sent him some living specimens of Venus's fly-trap, which he succeeded in flowering in his chambers. "The plant," says Ellis in a letter which he wrote to the great Linnæus, "shows that nature may have some views towards its nourishment in forming the upper joint of its leaf like a machine to catch food; upon the middle of this lies the bait for the unhappy insect that becomes its prey. Many minute red glands which cover the surface, and which perhaps discharge sweet liquor (such is now known to be the fact), tempt the animal to take them, and the instant these tender parts are irritated by the feet, the two lobes rise up, grasp it fast, lock the two rows of spines together, and squeeze it to death. Furthermore, lest the strong efforts of the creature to disengage itself should be successful, small erect spines are fixed near the middle of each lobe, that effectually put an end to its struggles." This account reminds us of those terrible instruments of torture which, in ancient days, embraced and stabbed their victims, without giving them a chance of escape.

Linnæus, however, could not be brought to believe that these plants derived any benefit from their victims, seeing only in their actions a merely wonderful sensitiveness. He regarded them simply as vegetable Domitians, possessed with a lamentable love of gratuitous torture. So matters remained until 1834, when Dr. Curtis, an American botanist, made the important observation that the insects were not only caught and killed, but more or less dissolved by the secretions of the plant. Some five and thirty years later, Mr. Canby, another American observer, found that these vegetable gluttons would absorb and digest morsels of raw beef as voraciously as any blackbird, but that cheese disagreed horribly with them, turning the leaves quite black, and finally killing them.

The droseras or sundews are closely allied to the fly-traps, and are common in our English marshes. They are sufficiently knowing to distinguish between various substances presented to them. Offer them a nice scrap of tender beef, and in a couple of hours they will have concealed it from sight. Try them with a little piece of dry chalk or a tiny pebble, and they remain stolidly immovable. Wet the chalk and offer it again and the plant apparently mistakes it for the meat, the bristles gradually closing round it; then, discovering the deception, they gradually relax, and return the chalk, without thanks.

The pitcher plants have their pouches—near the rims—covered with a thick secretion, apparently as attractive to some insects as are ice creams to most young ladies. Just below this is a slippery surface covered with hairs pointing downwards, so that the more the wretched victim plunges in his efforts to escape the farther he is driven towards the bottom of the pouch, where he finds a spoonful or so of a nice acid secretion which dissolves him as effectually as if he were a lump of sugar in a hot cup of tea, though not quite so quickly. The digestive powers of these plants were fully tested by the late Charles Darwin and others, and it has been clearly proved that they appreciate poached eggs, mutton-chops, and even gristle. Dr. Francis Darwin fed a number of sundews with meat, starving others—covering them with gauze caps, so that they might not catch even the smallest midget. The result showed that the well-fed plants produced nearly two-and-a-half times the number of seeds, and were twice as heavy as the starvelings. The question as to how far the insectivorous plants are nourished on the insects which, when in a state of nature, they catch, has been determined more recently by another observer. The experimenter cultivated eighteen young plants of the sundew in a piece of peat artificially fertilised with a chemical solution. One half of these he fed diligently with aphides—the little green insects which are so often a nuisance in our gardens—while the other half he starved. Having kept them for the winter, he found that in May the fed plants were obviously very much more robust than the others, and had a greater proportion of leaves. Subsequently he observed that they

produced nearly three times as many blossoms, and five times as many seed capsules as the unfed ones; and on drying them afterwards, found that those which had luxuriated on aphides were more than three times the weight of the others. Other experiments satisfied the patient naturalist that the luxuriance of the plant's growth did not depend greatly on the liquid or soil in which they had been cultivated, but that, under fairly equal circumstances, the fed plants throve by far the best.

The castor-oil plant is not unfrequently cultivated in English gardens for its showy leaves. An intelligent French naturalist has discovered that one of these plants, raised in a pot, and placed in a room infested with flies, will clear it as though by magic. On investigating the cause, he found a large number of dead flies scattered about one of these plants, while the bodies of others were stuck under the leaves, which apparently exude a combination of oil, gum, etc. As the plant grows to a large size it might prove invaluable in many localities during the "fly season." A decoction of the leaves has been recommended as a wash for plants and fruit trees, to clear them of blight and other insects.

Everyone is more or less acquainted with the various forms of the cactus, all of which originally came from the American continent, and which vary so greatly in size. One of the most useful—a veritable "soap tree" or plant—is known locally as the Amole; it is found pretty generally distributed in New Mexico, Texas, etc. Its flower stalks are destitute of leaves, but have a plentiful supply of branches about eighteen inches long, from which white and yellow flowers hang in their season. The bulbous root is the valuable part of this plant, for from it a saponaceous juice is expressed, which is said to be a most excellent substitute for soap, and which also makes a capital hair-wash. The Mexicans and Indians have long been acquainted with its virtues, which do not end with soap. Cattle physic themselves in spring by eating its leaves, which, if cut up and thrown into the water of ponds, lakes, or streams, will also effectually stupefy any fish that may be there, rendering their capture easy. And lastly, from its fibrous portions, mattresses, cushions, and chair seats are woven.

One of the most poetically, and it might even be said, in some countries, one of the most practically useful plants, is that so beautifully described by Longfellow in "Evangeline":—

"Look at this delicate plant that lifts its head from the meadow,
See how its leaves all point to the north, as true as the magnet;
It is the compass-plant that the finger of God has suspended
Here on its fragile stalk, to direct the traveller's journey
O'er the sea-like, pathless, limitless waste of the desert."

Alas, alas! poetical description will not always bear the pure cold light of scientific fact. The compass plant—variously known, also, as the pilot weed, polar plant, and turpentine weed—is a vigorous perennial, from three to six feet in height, to which the terms fragility or delicacy are hardly applicable. But its main characteristic is correctly described, and was well known to the Indians and white hunters of Texas, Oregon, and other parts of the United States, long before the scientific world believed in it. It mattered little to them how dark was the night on the prairie or in the forest, for they could always find their bearings by feeling the direction of its lowermost leaves, which invariably pointed north and south. The researches of travellers and others have now put the matter beyond a doubt. The most superficial observer of the habits of plants has noticed the fact that their leaves have a tendency to turn their upper surfaces towards the light. The reason appears to be that these said upper surfaces possess a much larger number of pores then the lower ones, and it is through these pores that the plant, under the influence of the light, takes in its nourishment from the air, and performs other functions. In the compass plant, these pores are equally divided to the upper and lower sides of the leaf, and this is more especially true in the lowermost leaves, which very naturally therefore turn their surfaces east and west, so as to obtain an even amount of light and heat, while they point north and south. This is, putting it in its simplest manner, the explanation given by high scientific authorities, all theories involving magnetic or electrical influence having long been abandoned.

Most of us are familiar with the so-called ice-plant, the "ice" of which is simply a gummy alkaline substance, insoluble in water, and which in some countries is used in the manufacture of glass, and in others as an ingredient in soap-making. It is not generally known that the ice-plant is often cultivated in French kitchen gardens, where it is termed *glaciale;* it is used in soups, salads, and as a substitute for spinach.

And, in conclusion, this casual mention of vegetables may serve as an excuse for a few lines on those of some new countries, the recorded size of which would seem fabulous, but that they are well authenticated. In Manitoba cabbages of 20lbs. in weight are common, while examples weighing nearly 50lbs. have been known. Turnips of 25lbs. or so in weight are everyday occurrences; some have been known of upwards of 32lbs. Carrots and onions, beets, melons, and squashes grow to sizes which would make the largest of their respective kinds in our markets appear veritable babies by comparison. California, however, excels even these examples. Hittell, a careful writer and good authority, gives a list of the largest specimens of vegetables and fruits which had been recorded. The champion cabbage was 53lbs.; one was noted which was 7 feet wide, the leaves being 3½ feet long. The turnips and carrots did not quite come up to the Manitoba standard, but the Californians claimed a tomato 26 inches in circumference, a beet-root of 118lbs., and a squash, or soft-skin pumpkin, of 260lbs. One pumpkin vine yielded 130 squashes, aggregating a total weight of 2,604lbs. And finally, not to weary the reader with too many of these "big things," a grape vine in Montecito has a stem 15 inches in diameter, and spreads 115 feet in one direction; it has yielded as much as four *tons* of grapes in one year.

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