often passed by by those not familiar with it, because it has on its beautiful plumage only a few months in the year. In cages it is kept upon the customary food, and with proper care will breed in them.—*Translated from Brehm's Animal Life.*

BOTANICAL NOTES.

The Number of Existing Species of Plants.—Dr. Müller, of Geneva, has recently made the following calculation as to the total number of existing botanical species: We have at present, described in our books, about 130,000 species; and, if we suppose that, in round numbers, 30,000 belong to countries like Europe and North America, where there are hardly any species, excepting some cryptogamic ones, to be discovered, the remainder, or 100,000, representing exotic plants, more or less tropical and southern, we may double the latter for new species, giving 200,000 for these less known regions, and altogether 230,000 for the whole globe, with the exception of countries still quite unknown botanically. Adding only 20,000 species for the latter, we reach a minimum sum of 250,000 species of plants.

The Effect of Freezing on Plants.—When frost attacks plants to such an conten that ice is formed in their tissues, says the *Gardener Chronicle*, it has been observed that the ice does not occur within the bags or cells of which the plant is made up, but outside or between them. The reason of this is probably because the contents of the cells are thicker and denser, and do not freeze so readily as do the thinner and more watery juices in the spaces between the cells. In this manner the essential part of the cell—so far as its life actions are concerned—the thick protoplasm, is less liable to injury. Moreover, as a consequence of the low temperature, the watery part of the cell-contents exudes from the interior through the cell-walls and there freezes. The expansion which takes place when water freezes, therefore, does not, at least in slight cases, take place within the cell, where it would do mischief by bursting the cell-walls, but outside them, where there is more room to expand and less risk of tearing the tissues. When the frost is more severe the tissues do become torn, cracks and fissures occur, the protoplasm is killed, branches fall, leaves wither or rot, and death ensues. But where the injury is less, and especially where the protoplasm is uninjured, when the thaw comes the ice outside the cells becomes melted, and the water, by the power of diffusion, passes once more through the cell-wall into its cavity, there to mix again with the more dense protoplasm. It is clear, then, that the danger to plants from frost is proportionate to the water they contain. If they are in an unripe, sappy condition the danger is far greater than if they are comparatively dry and at rest. Tubers and seeds, for instance, are specially adapted to resist cold; and how well they do so has been shown in the case of wheat which germinated at home after having remained throughout the winter in the Arctic regions.

The Power of Movement in Plants.—Mr. Darwin, in his recent work under the above title, now shows, after a prolonged course of experiment and observation, that "all the parts or organs in every plant, while they continue to grow, are continually circumnutating"—that is, the point of agrowing stem, etc., is found to describe an irregular circular figure. This movement is not uniform, but consists, in some cases at least, of innumerable small oscillations. The phenomena thus produced closely resemble many of the actions performed, as is supposed unconsciously, by the simpler and lower animals. The author tells us that even among allied plants one may be highly sensitive to the slightest continued pressure, and another highly sensitive to a slight momentary touch. The author considers that the most striking resemblance between plants and animals is the localization of their sensitiveness and the transmission of any influence from the part excited to some other part, which consequently moves. It is not, of course, contended that plants possess a brain or other true nervous center, and a system of nerves by which it is connected with the whole body. But it is, to say the least, doubtful whether such structures exist in the lowest animals, and it is probable that where present they serve merely for a more perfect transmission of impressions and a more complete intercommunication of the several parts. Mr. Darwin calls attention to the wonderful character of the tip of the radicle, which is remarkably sensitive. If, says he, the tip be lightly pressed, or burnt, or cut, it transmits an influence to the upper adjoining part of the root, causing it to bend away from the affected side; and, what is yet more surprising, the tip can distinguish between a slightly harder and a softer object, by which it is simultaneously pressed on opposite sides. If, however, the radicle is pressed by a similar object a little above the tip, the pressed part does not transmit any influence to the more distant parts above, but bends abruptly toward the object. If the tip perceives the air to be moister on one side than on the other, it likewise transmits an influence to the upper adjoining part, which bends toward the source of moisture. Taking these various kinds of sensitiveness into consideration, Mr. Darwin pronounces it hardly an exaggeration to say that the tip of the radicle thus endowed, and having the power of directing the movements of the adjoining parts, acts like the brain of one of the lower animals, where the brain, seated within the anterior end of the body, receives impressions from the sense-organs and directs the several movements.

The Mexican Ocotilla.—The curious genus *Fouquiera* includes three described species, to which the Mexicans give the name "ocotilla." Although associated in the same natural order with the well known *Tamarix* by botanists, their relationship would scarcely be guessed from their aspect, especially as they have long, showy tubular corollas. Rev. E. Lee Greene, in a narrative of a botanizing tour in the Colorado desert, published in the *American Naturalist*, describes *Fouquiera splendens* as follows: "Extremely odd-looking, and not more odd than beautiful, is the small tree locally known by its Mexican name, ocotilla. It grows to the height of from 8 to 12 feet, and in outline is quite precisely fan-shaped. To show how this may be, let me more particularly describe its mode of growth. The proper trunk, usually 10 or 12 inches in diameter, is not more than 1½ feet high. At just a few inches above the surface of the sand this trunk abruptly separates into a dozen or more distinct and almost branchless stems. These simple stems, rising to a height of 8 or 10 feet, gradually diverge from one another, giving to the whole shrub the outline of a spread fan. Each separate stem is clothed throughout with short gray thorns and small dark-green leaves, and terminates in a spike, a foot long, of bright scarlet trumpet-shaped flowers. This splendid oddity flourishes in great abundance in many places. The stems are not so thickly armed with thorns but that a man may handle them if he will seize them circumspectly with his fingers, and being very hard and durable, as well as of a convenient size, they are much employed for fencing purposes about the stage stations and upon the ranches adjoining the desert. Give a skillful Mexican ocotilla poles and plenty of raw-hide thongs, and he requires neither nail nor hammer to construct a line of fence which, for combined strength, neatness, and durability, fairly rivals the best work of that kind done in our land of saw-mills and nail factories. As a tree or shrub of strange beauty the cultivators will vainly desire to add this to their list of varieties, unless their art can reproduce the parched and sterile gravel heaps, and the dry withering atmosphere which it finds congenial."

The Compass Plant.

The last number of Curtis's *Botanical Magazine* contains the following interesting account, by Sir J. D. Hooker, of the compass plant (*Silphium laciniatum*) of the Western prairies:

This noble plant was introduced (from America) into Europe in 1781 by M. Thouin, and flowered for the first time in the Botanic Garden of Upsala, in Sweden. It has been in cultivation in Europe ever since, though its name and fame as the compass plant of the prairies are of comparatively modern date, it having before that borne the popular names of turpentine plant and rosin weed, except among the hunters and settlers in the Western States. With regard to the history of its reputed properties as an indicator of the meridian by the position of its leaves, I am fortunate in having recourse to my friend, Professor Asa Gray, now in England, who has most kindly furnished me with the following very interesting account of this matter:

"The first announcement of the tendency of the leaves of the compass plant to direct their edges to the north and south was made by General (then Lieutenant) Alvord, of the U.S. Army, in the year 1842, and again in 1844, in communications to the American Association for the Advancement of Science. But the fact appears to have been long familiar to the hunters who traversed the prairies in which this plant abounds. The account was somewhat discredited at the time, by the observation that the plants cultivated at the Botanic Garden at Cambridge, U. S., did not distinctly exhibit this tendency. But repeated observation upon the prairies, with measurements by the compass of the directions assumed by hundreds of leaves, especially of the radical ones, have shown that, as to prevalent position, the popular belief has a certain foundation in fact. The lines in "Evangeline" (familiar to many readers, and beginning—

'Look at this delicate plant that lifts its head from the meadow,
See how its leaves are turned north as true as the magnet,' etc.)

were inspired by a personal communication made by General Alvord to the poet Longfellow. Since the leaves tend to assume a position in which the two faces are about equally illuminated by the sun, it might be suspected that their anatomical structure was conformed to this position. This has been confirmed, first by Mr. Edward Burgess, who, when a pupil of mine, observed that the stomata were about equally abundant on the two faces of the leaf; and next by Mr. Arthur, of Iowa, who has recently published in Prof. Bessey's 'Introduction to Botany' a figure of a section of a leaf showing that the arrangement of the 'palisade cells' of the upper and lower strata is nearly the same. The leaves always maintain a vertical position, except when overborne by their weight. As to their orientation, not only is this rather vague in the cultivated plant, but subject to one singular anomaly, which may be commended to Mr. Darwin's attention. I have several times met with a leaf abruptly and permanently twisted to a right angle in the middle; so that, while the lobes of the basal half pointed, say, east and west, those of the apical half pointed north and south."

To the above (says Dr. Hooker) I have little to add. I have not been able to detect any orientation of the leaves in the Kew cultivated specimens, but these not being planted in a good exposure all round, are out of count as witnesses. On the other hand, when traversing the prairies with Dr. Gray, in 1877, I watched the leaves of many hundred plants from the window of the railway car, and after some time persuaded myself that the younger, more erect leaves especially, had their faces parallel approximately to the meridian line. I may mention that I, on the same occasion, convinced myself that the flower heads of various of the great helianthoid compositæ that grew in hosts on the prairie did follow the sun's motion in the heavens to a very appreciable degree—their morning and evening positions being reversed. This observation did not, however, extend to the compass plant, the rigid stout peduncles of whose flower heads would not be expected to favor such a motion.

Fool's Parsley Not Poisonous.

For several centuries the common umbelliferous weed known under the common name of "fool's parsley," and botanically as *Æthusa cynopium*, has been an object of suspicion and classed by botanists and toxicologists among poisons. But now Dr. John Harley, of England, comes forward and presents a vindication of this plant, which he calls harmless and innocent. In the St. Thomas's Hospital reports he relates several facts to corroborate the truth of his assertions. Having collected the plants at two seasons of the year, just before flowering and also after the plants had set their fruit, he expressed the juices of both stem, leaves, and roots, and preserved the extracts by the addition of alcohol. Being thus provided with a supply of material which supposably represented the active principles of the plant, he exhausted his supply upon four persons, one a little girl six years old, who took the extracts in quantities ranging from two drachms to two ounces; himself, who took them in quantities ranging from two to four ounces; and two other adults, who were the subjects of spasmodic torticollis. These two took one or other of the juices, ranging from one to eight fluid ounces. Effects were carefully looked for, but none followed after any one of the doses.

Dr. Harley feels compelled to say, in conclusion, that the "fool's parsley" of Sussex, Essex, Kent, Surrey, and Hertfordshire, is not only absolutely free from the noxious properties ascribed to it, but that it is pleasant to the taste, sight, and smell, and, in the absence of the more fragrant and succulent herbs, might well be used as a pot-herb or salad. Moreover, he asserts that his conclusions are independent both of locality and season, the only influence that these conditions have on "fool's parsley," as on "hemlock" (*Conium*), being that of increasing or diminishing its succulency. Some years ago, Dr. Harley, after similar experiments, came to the same conclusion in regard to the alleged poisonous properties of hemlock (*Conium maculatum*). This weed, although for all ages it has been esteemed extremely poisonous, is nevertheless eaten as a pot-herb by northern natives—especially Russians—although the precaution is always taken to boil it in several waters.

The poisonous properties found in many plants, however, are quite volatile, and are readily dissipated by certain manipulations—especially by cooking. Those who have read Linnæus' "Flora Lapponica" must be familiar with the author's anecdote of the old Northland woman whom he saw picking the leaves of the aconite (*Aconitum napellus*). Asking her what she was going to do with them, she answered she was going to use them as food. He, thinking she had mistaken the plant for some species of geranium, warned her against its very poisonous nature; but she, smiling, assured him that she knew what she was about! He followed her to her dwelling, saw her boil the aconite leaves into a broth, and then, to his intense horror, observed the family of four persons sit down and partake of the terrible compound. But the great botanist is compelled to admit that not one of the persons seemed a bit the worse for their strange meal.

NEW INVENTIONS.

Mr. John T. Todd, of Chrisman, Ill., has patented an automatic car coupling, which consists of a concave-faced draw-bar, provided with interior upper and lower spring-actuated hooked jaws, and suitable levers for opening them. The coupling link has beveled ends, and shoulders or dogs for engaging the jaws.

A beehive, patented by Mr. David C. Cripe, of North Manchester, Ind., is so constructed that the bees are compelled to build their combs straight and of a uniform size. The comb frames are substantially supported, and there is no exposed metal within the hive to attract moisture and frost. The hive is inexpensive to construct and convenient in use.

A corset steel fastening, patented by Isador Ulman, of Santa Cruz, Cal., consists of a pair of steels, one of which is provided with a series of transverse plates, having a catch on one end and an eye on the other end, while the other steel is provided with corresponding transverse plates, having a tongue on one end to engage in the opposite catch, and an eye on the opposite end.

Mr. John N. Brown, of New London, Conn., has patented a seat pocket for vehicles, the invention consisting in a metallic frame peculiarly constructed and arranged, and designed as a substitute for the pockets usually made of enameled cloth heretofore used.

Mr. Charles McQueed, of New York city, has patented a neck ruching pressing machine, whereby the work of pressing collars, collarets, or neck ruching, is rendered more accurate and effective, and performed with a great saving of time and labor, as compared with ordinary methods.

Mr. William E. Stanton, of Ridgeville, Ohio, has patented an improved lawn mower, to which an initial movement can be given that enables it to work with the same power when starting as after it is fully in motion.

A refrigerating apparatus, patented by Mr. Kennard Knott, of London, England, comprises an air-tight or nearly air-tight non-conducting preserving chamber, and maintains a constant current of cooled, dried, and purified air through said chamber, for which, however, heated air may be substituted for certain purposes.