

PLANTS THAT HIDE FROM ANIMALS.

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Plants Protected by Growing under Thorn Bushes and Thistles.—C. G. Pringle, for many years a famous plant collector, especially in Mexico and the arid regions of the United States, speaks of a native grass of northern Mexico, *Muhlenbergia Texana*, as such a great favorite with all grazing animals that it is usually exterminated or nearly so, except when growing under the protection of thorny shrubs, usually mesquite bushes. In Arizona during the winter and spring, the Indians bring it long distances into the towns to sell. He adds, 'How many times I have contended with the horrid mesquite bushes to gather an armful of this grass to carry joyfully to my hungry and jaded horses.' In such cases the thorns, spines and perhaps bitter taste of the bushes not only protect the young growth and leaves of certain plants, but furnish shelter for other tender and nutritious herbage.

In arid regions, especially, similar instances of protection by thorn bushes are numerous.

Plants retire beneath the Surface of the Ground and are protected from Animals.—At the close of the growing season, large numbers of plants, especially in regions subject to protracted droughts or to severe cold, cast off their leaves, take on a condensed form and remain secure beneath the surface of the ground for months at a time in the form of bulbs, tubers and rootstocks. At such times they are nearly sure to escape destruction by animals. I only need to mention as examples Solomon's seal, Dutchman's breeches, May apple, goldenrod, artichoke.

Plants Protected from Animals by Water.—Not only the flowers of many species of plants as they project above the surface of the water are protected from most unwelcome insects, but the whole plants as well.

Mud turtles, certain fishes, water snails, larvæ of insects, eat aquatic plants, but most other animals are unable to reach them in such places.

Water-plantain, wild rice, pond lilies, arrow-head, pickerel-weed, pondweed, lizard's tail, bulrush, bur-reed, cat-tail flag, water dock, and many more of their associates, root at the bottom with leaves floating on the surface or projecting above.

Innumerable low forms, known as algae, are at home in lakes, ponds and streams or on the surface of the water, while other kinds thrive in salt or brackish water. These aquatics find protection below

the surface or by extending above it, not only from numerous animals, but they have no competition with others which can only grow on dry or moist soil.

Aquatics and marine plants and algae are also protected from extremes of cold and heat. During the winter of a cold or temperate climate the rootstocks and buds severed from the tips or branches, and even the entire plant of some species, remain safe and dormant in the mud at the bottom, ready on the approach of mild weather to begin growing again.

Some are amphibious, able to thrive when the land is flooded or when the floods have subsided. Plants with such habits have little competition.

By climbing Trees and Bushes Many Vines get beyond the Reach of Cattle.—A considerable number of plants practise economy by growing slender stems instead of producing large tree-trunks for self-support.

Great numbers of climbing plants or vines are favored above some others in their ability to reach the light and thrive, even though their stems are very weak and slender. This habit brings most of the leaves and flowers of many of them beyond the reach of cattle and other herbivores.

Plant Traps in the Water catch Fish and Worms to eat.—A few plants not only defend themselves, but are aggressive fighters because they put to good use the animals they capture.

The bladderwort is a water plant and catches much of its food. Underneath the surface of the water in which the plant floats are a number of lax, leafy branches spread out in all directions and attached to these are large numbers of little flattened sacks or bladders, sometimes one sixth of an inch long. The small end of each little bladder is surrounded by a cluster of bristles forming a sort of hollow funnel leading into the mouth below, and this is covered inside by a perfect little trap door, which fits closely, but opens with the least

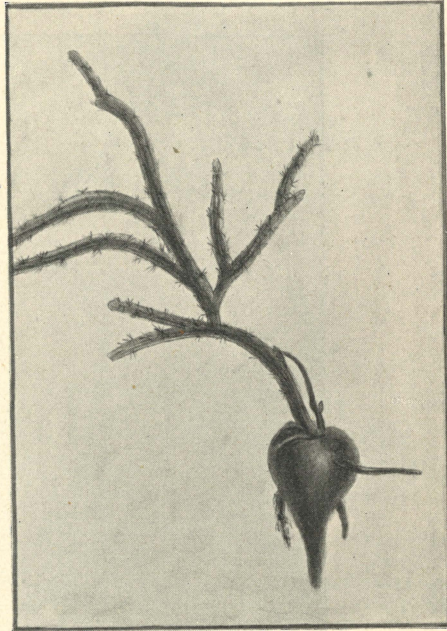


FIG. 1. A NIGHT BLOOMING CEREUS, *Cereus Greggii*, SHOWING THE LARGE SUCCULENT ROOTS WHICH SERVE AS A STOREHOUSE FOR WATER (Much reduced.)

pressure from without. A little worm or insect, or even a very small fish, can pass within, but never back again. The sack acts like an ell trap or a catch-'em-alive mouse trap. These little sacks actually allure very small animals by displaying glandular hairs about the entrance. The small animals are imprisoned and soon perish and decay to nourish the wicked plant.

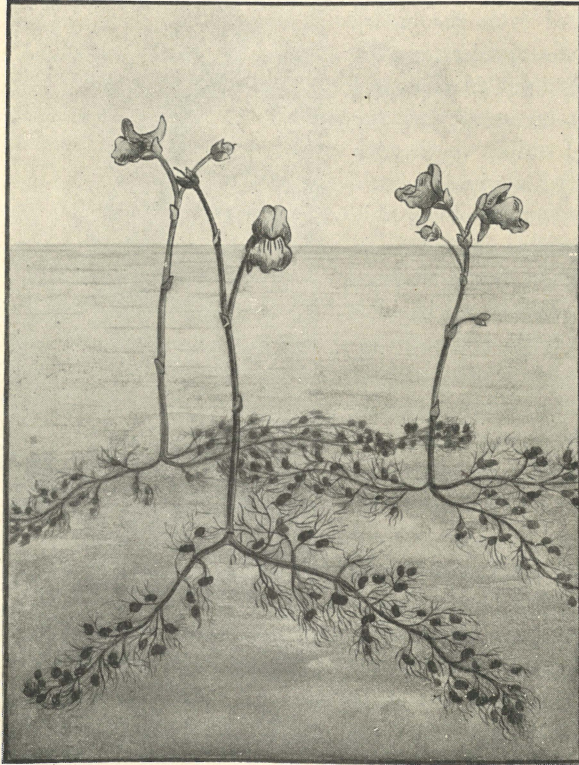


FIG. 2. BLADDERWORT, *Utricularia vulgaris*, A FLOATING AQUATIC, THE FLOWERS, AT LEAST ARE PROTECTED FROM CRAWLING INSECTS. (Slightly reduced.)

It is not the purpose of these pages to go into details regarding the methods of insectivorous plants, but to tell how plants defend or protect themselves.

When scattered by Bursting Pods, the Seeds are seldom found by Animals.—When mature, the pistils of certain plants burst quickly and with considerable force, scattering the seeds in every direction. The small size and the inconspicuous colors of the seeds make it certain that few of them will ever be found and destroyed by insects or mice. Plants of this kind are euphorbias or spurges, violets, peas, beans, witch hazel, castor-oil plants, balsams and many more.

The bearded chaff enclosing the grains of porcupine grass and wild

barley are irritating to the mouths of grazing animals, which attempt to eat them, though it is not probable that cattle avoid these plants on this account.

Gardeners often overlook some of the Weeds.—For many years the writer has had the oversight of two or three acres on which were grown some 2,000 kinds of plants. It is the exception to pass over a bed after a workman has 'dressed it up' and not find a number of weeds left among the cultivated plants. They are overlooked because of some resemblance of the weed to the plant desired. I enumerate a few examples found one day in the month of May: A few wild onions are left in the asparagus; wild seedling lilies in a plat of Solomon's seal and in a bed of turtle-head; June grass lurks in plats of several sorts of pinks, of *Phlox* and of many other plants; narrow-leaved dock is often abundant, and some of it is left in a plat of dandelions, of teasels, of rhubarb, of buttercups, of rue anemone; pig weeds



FIG. 3. LEAF AND FLOWER AND RIPENING FRUIT OF THE LOTUS, *Netumbium*, PROTRUDING ABOVE THE WATER, WHICH PROTECTS THESE PLANTS FROM MANY ANIMALS. (Much reduced.)

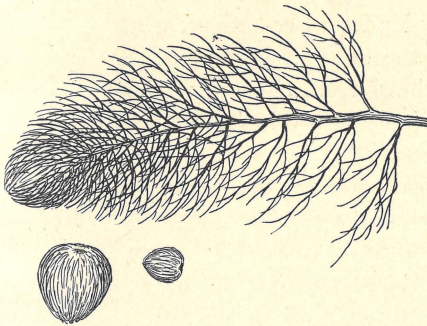


FIG. 4. BUDS OR TIPS OF BRANCHES OF BLADDERWORT SEPARATED FROM THE MAIN STEM AND ARE SOON READY TO SINK TO THE BOTTOM OF A POND AND THERE REMAIN DURING THE WINTER.

are left to go to seed among potatoes and tomatoes; the brittle joints of prickly pear are left to grow among other species which they resemble; seeds of violets in variety spring up in plats of other violets where they were shot by the mother plants; chickweeds are rarely ever all discovered in plats of speedwells; while speedwell lurks among the snapdragons; white clover is not all removed from plats

of alsike clover, red clover and black medick; young plants of climbing fumitory are left in beds of ginseng, Dutchman's breeches and yellow puccoon; seedling wild cherries are overlooked among winter berries; ground-nut escapes notice as it comes up among hog pea-nuts, vetches, or

wild peas; matrimony vine is left to grow awhile among plants of bitter-sweet, ground cherry, horse-nettle and buffalo bur; the Oswego tea

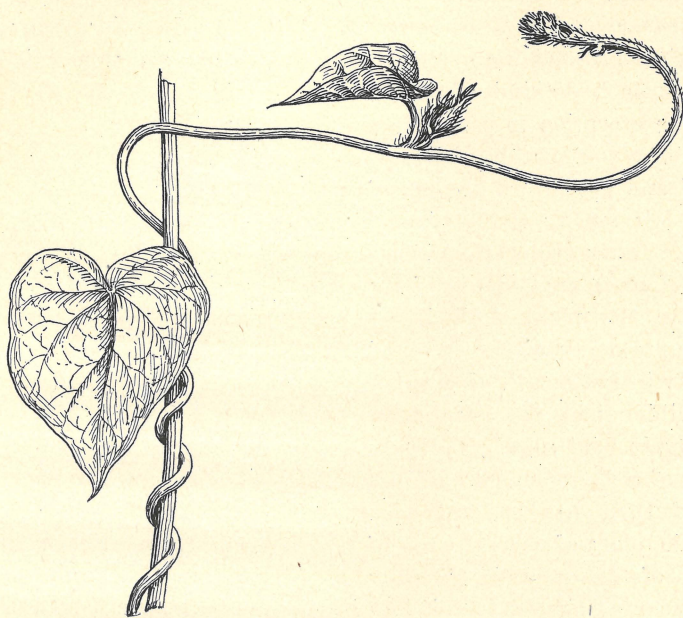


FIG. 5. TWINING PLANT, WILD MORNING-GLORY. (Reduced.)

shies its rootstocks all about and many appear and remain for a time with peppermint, spearmint, sage, origanum and motherwort; worm-wood visits ox-eye daisy and the two agree well together; Canadian golden-rod creeps into plats of low-land grasses, sedges, wild asters and artichokes; the enterprising dandelion is found in plats of hawkweed, chicory, wild lettuce sow-thistle, and is often overlooked; and squaw-weed finds a welcome with sweet-colt's-foot.

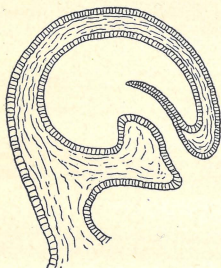


FIG. 6. A CROSS SECTION MUCH ENLARGED OF A BLADDER-LIKE TRAP WHICH CATCHES WORMS. (After Darwin.)

An Iris that imitates a Rattlesnake.—In portions of Washington rattlesnakes are very abundant, and are much dreaded by cattle and horses which graze large portions of the state.

In this region grow large quantites of *Iris Missouriensis* and when ripe the rattle of the seed in the pods closely resembles the rattle of the snake. Grazing animals invariably step back after hitting these pods, and thus the green leaves of the plants are spared to work for future crops of seeds.

For this observation I am indebted to Matt Crosby, of the U. S. Bureau of Forestry.

Seeds that mimic Pebbles.—Seeds are frequently met with that are mottled or striped or of an inconspicuous color difficult to find when dropped on the soil or among small pebbles. Seeds of this character are least liable to be destroyed. By a process of selection for many generations, no doubt, seeds have acquired their present colors, and some of them are still undergoing this process.



FIG. 7. THREE SEEDS OF CASTOR BEANS, BROWN AND MOTTLED, NOT EASILY FOUND WHEN THROWN ON THE GROUND. (Slightly enlarged.)

Certain sorts of cow peas resemble the red soil found in some regions. Caster-oil beans have been mentioned as examples of those which are mottled. Some of the cacti have an irregular shape and a dull gray color much resembling stones of the desert.

On the coast of some of the Philippine Islands, a coarse briar produces beans more or less approaching a sphere in shape.* They are about the size of the finger tips of a man and some of them, like peas crowded in the pod, have two flat surfaces. The color varies from moderately dark to light drab, some giving a faint greenish tinge, while the luster of many is exactly that of chert pebbles. Nearly all the specimens show a series of approximately parallel darker lines passing around, very suggestive of stratification. All are quite hard, cut only



FIG. 8. REPRESENTING FOUR SEEDS WHICH CLOSELY RESEMBLE PEBBLES, AMONG WHICH THEY WERE ACCIDENTALLY GATHERED.

with difficulty with a knife, and when shaken together in the hand give that clinking sound, only somewhat duller, which is characteristic of pebbles. The mimicry then is that of mixed quartz pebbles, and covers *shape, size, luster, hardness and stratification*. It is so complete and perfect that it can not be regarded as mere coincidence. Placed in water, the beans are found to be buoyant. Undoubtedly this mimicry of pebbles has saved many a seed from destruction by fish, bird or reptile.

* W. H. Sherzer, *Bot. Gaz.*, Vol. XXI.