

## FLOWERS AND THE WEATHER.

The vegetable kingdom opens up a curious field of investigation, in which the meteorologist will learn much regarding the mutual interdependence of all departments of creation. If light and electricity be, as well known, influential in exciting the movements of animals breathing the vital air, plants are equally subject to the same potent agencies, and testify to their influence so visibly as to attract the notice alike of the scientific botanist and of the illiterate rustic. In some parts of England the peasants mark the blooming of the large water lily, and think that the number of its blossoms on a stem indicates the price of wheat per bushel for the ensuing year—each blossom being equivalent to a shilling. We smile at this as superstitious folly; but even philosophers have not deigned to despise the weather indications afforded by the shutting of the flowers of certain plants.

Lord Bacon, for example, who was remarkably attentive to all the appearances and changes of natural objects, is the author of some of the observations which follow:

The Pimpernel (*Anagallis arvensis*).—"When the flower of this plant," says Bacon, "expands boldly and fully, no rain will happen for four hours or upward; if it continues in that open state, no rain will disturb the summer's day; when it half conceals its miniature flower, the day is generally showery; but if it entirely shuts up or veils the flower with its green mantle, let the traveler put on his great-coat, and the plowman, with his beasts of draught, expects rest from his labor." This little plant, from its peculiar susceptibility, has long been known as the "Poor Man's Weather Glass."

"The Siberian sow thistle (*Sonchus*).—If the flowers of this plant keep open all night, rain will certainly fall the next day."

"The African marigold (*Tagetes erecta*).—If this plant opens not its flowers in the morning about seven o'clock, you may be sure it will rain that day unless it thunders."

"The trefoil (*Hedysarum*).—The different species of trefoil always contract their leaves at the approach of a storm; hence these plants have been termed the 'Husbandman's Barometer.'"

"White thorns and dog-rose bushes.—Wet summers are generally attended with an uncommon quantity of seeds on these shrubs, whence their unusual fruitfulness is a sign of severe winter."

Besides the above there are several plants, especially those with compound yellow flowers, which nod, and during the whole day turn their flowers toward the sun. Such flowers are designated as "heliotropes," and the movement which they thus exhibit is called their "nutiation." This is particularly observable in the common sow thistle (*Sonchus arvensis*); and it is a well known fact that a great part of the plants in a serene sky expand their flowers, but before rain they shut them up, as the tulip, for instance. The flowers of chick-wintergreen (*Trientalis Americana*) droop in the night, lest rain or moisture should injure the fertilizing pollen. One species of wood sorrel (*Oxalis*) shuts up or doubles its leaves before storms and tempests, but in a serene sky expands or unfolds them, so that husbandmen can foretell tempests from it. It is also well known that the sensitive plants and other species of *Cassia* observe the same rule. The flowers of the bindweed (*Convolvulus arvensis*), the wood anemone, and the common daisy (*Bellis*), even if already open, will shut up on the approach of rain. The last named flower appears to have derived its name—day's eye—from its sensitiveness to light. Such phenomena as these are probably determined by the action of light; and the flowers of such plants being shut at ten or eleven o'clock in the morning tell of clouds and gloom, and so predict rain.

Besides affording prognostics, many plants also fold themselves up at particular hours, with such regularity as to have acquired particular names from this property. Linnæus has enumerated forty-six flowers which possess this kind of sensibility. From an arrangement of such flowers it has been ingeniously proposed to form a floral timepiece. The flowers of the goat's beard (*Tragopogon*) open in the morning at the approach of the sun, and, regardless of the weather, shut about noon, and hence its common name of "go-to-bed-at-noon." The star of Bethlehem expands its flowers about eleven, and closes them at three in the afternoon. The evening primrose (*Oenothera*) is well known from its remarkable properties of regularly shutting with a loud popping noise about sunrise and opening at sunset. After six o'clock, these flowers regularly report the approach of night. The flowers of the garden lettuce open at seven o'clock and shut at ten. That light is the chief agent of these changes seems to be proved by the experiments of De Candolle, made at the Jardin des Plantes, in an underground cellar, illuminated by lamps giving a light equal to fifty-four ordinary wax candles. By lighting these he could cause the flowers of the star of Bethlehem to open at pleasure, and also those of the sea camomile, which keeps its flowers closely shut during the night; but he could produce no artificial effect with the strongest light upon several species of wood sorrel, whose flowers and leaves are both folded up at night. With the sensitive plant he succeeded in so completely changing the hour of closure that on the third day from being placed in the lighted cellar it began to fold its leaves in the morning and open them in the evening. One of the most singular cases of the action of light on plants is that of the *Lotus* of the Euphrates, as described by Theophrastus, and which he represents as rearing and expanding its blossom by day, closing and sinking beneath the surface of the water by

night, so as to be beyond the grasp of the hand, and again rising up in the morning to present its expanded blossom to the sun. The same phenomenon is also related by Pliny.

## "Sheep Rot."

For some time a great mortality has prevailed among sheep, and the destruction reported is something appalling. The malady is popularly known by a very old Saxon name, "rot," and is in reality due to the presence in the liver and hepatic canals of numbers of the *Distoma hepaticum*, a trematode entozoon, as well as the *Distoma lanceolatum*, also a member of the same order. These entozoa, from their resemblance to the fish called "flukes," have received the same name, and have a particular predilection for the biliary apparatus, whose function they more or less destroy, and thus lead to the slow death of the sheep or other animals they may infest. After wet seasons, animals which have been pastured on tainted land are certain to suffer, from their having ingested with the herbage the ova of the *Distoma*. Pastures are tainted by "fluke" infested sheep, which pass the mature worms or their ova with the feces, and these lodge on or are washed into the ground. The worms, of course, die, and the ova within them are liberated; and these, together with the free ova, appear to have not only a strong vital resistance to meteorological alternations, but also the good fortune to find a ready and acceptable intermediary host in the *Limnæus minutus*, a little mud snail common everywhere, and particularly on wet land. This snail becomes possessed of a number of ova in its interior, and during damp weather it crawls from its breeding place in the ground up the stalks of grass and herbage, and is swallowed by the sheep or other herbivorous animals when they are grazing. Received at first into the stomach, the ova undergo partial development, and then find their way into the biliary canals. If their number is considerable, when they have attained their full growth they dilate and obstruct these canals, the walls of which become considerably thickened. During their development the secretion of bile becomes gradually diminished, and that fluid is viscid, like mucus, and altered in color; at the same time the parenchyma of the liver becomes atrophied from the compression the "flukes" exercise upon it, and it may even become disorganized. Hence result icterus, disturbance in nutrition, anæmia, dropsy, and a general cachectic condition.

Sheep are not the only victims which suffer from the *Distoma*, for during the present mortality hares, rabbits, deer, and horses are said to have become infested, and died. The *Distoma hepaticum* has long been known to exist in the horse and ass, when they were allowed to pasture on unclean land during wet seasons.

Salt appears to be an excellent and well known prophylactic agent, and even a curative one when the disease has not made much progress. This beneficial action of sodium chloride has been known almost from time immemorial, and the freedom from "rot" of sheep which have been pastured on salt marshes has been also recognized for centuries.

The flesh of sheep which have been affected with this venereal disease cannot be said to be positively dangerous as food, though it must be greatly reduced in nutritive properties, as well as in quality. The human being may receive and harbor the *Distoma*, a fact worthy of remembrance. The present mortality is likely to render sheep scarce and expensive in this country for some time, and still further darken the prospects of our agriculturists.—*Lancet*.

## A Deep Well.

The Continental Diamond Rock Boring Company, Limited, have lately completed for the Government of Mecklenburg-Schwerin a bore hole of exceptional depth, and the execution of which is of particular interest from the rapidity with which it has been completed. The boring, which was made for salt, is situated at Probst Jesar, near Lubtheen, and it was commenced on the 6th of July of last year, with an opening 12 inches in diameter. The first part of the bore had to be through a diluvial bed consisting mainly of drift sand and coarse gravel, and for sinking through this Kobrich's system was adopted, the diameter of the bore being maintained at 12 inches. The total depth sunk on this system was 98.05 meters, or 321 feet 8 inches, the sinking occupying 34 days of 24 hours each, of which 31 days were spent in actual boring and three days in sundry works. The average progress was thus at the rate of 3.163 meters per day, while the greatest depth bored in any one day was 7.496 meters, this being on August 11, 1879.

Below the diluvium the gypsum and rock were reached, and through this the boring was carried on with diamonds, the commencement being made on August 25, 1879, with a hole 10½ inches in diameter. Until a depth of 509 meters, or 1,670 feet, had been reached, however, no firm footing could be obtained on which to rest the tubing, and hence great annoyance was experienced from the falling in of masses of sand, the infalls being so great that sometimes when the boring rod was withdrawn the bore became filled up again to a depth of over 420 feet. The boring, however, was steadily proceeded with, and ultimately the final depth of 1207.25 meters, or 3,961 feet, was attained on the 6th of February last, the diameter of the bore at the bottom being 3 inches. The time spent in boring with diamonds was 163 days of 24 working hours.

The greatest progress made in any one day was on the 27th of January last, when a depth of 29 meters (95 feet 2 inches) was bored, this being nearly double the average progress. The total length of tube inserted was 1010.55

inches, or 3,315½ feet, the greatest length inserted in one piece being 456.424 meters, or 1,497½ feet, and this consisting of 7 inch and 8 inch tubes. Throughout the whole depth of the bore cores were drawn, some of these being salt cores over 2 feet long in one piece.

With the exception of a bore hole put down to the depth of 1,275 meters, or 4,183 feet, for the Prussian Government, a few years ago, and which took four years to accomplish, the bore of which we have been giving particulars is we believe the deepest yet sunk, and the fact that it was completed in less than six months speaks well for the skill and energy with which the work was carried out.

## A Plan to Utilize Genesee Falls.

The Rochester *Democrat and Chronicle* of April 3 gives the following description of the Rochester Hydraulic Motor Company's plan for utilizing the water power of Genesee Falls:

The derrick, which is a miniature model of the one to be erected at the lower falls, stands in a room with the miniature machinery and airomotor. Water passes through small pipes and tubes into a flume at the upper part of the derrick, and has precisely the same effect, only in a smaller degree, as would the force of the falling waters of the Genesee exert in a proportionately gigantic flume. In the two perfectly gated compartments of the flume there are two metal siphons. By the time the gate has permitted sufficient flow of water to submerge the top of the siphon on either side the flow is stopped, and as soon as the water reaches the siphon's top the entire quantity within the reservoir discharges itself through the pipe of the siphon into another hydraulic process below. The two flume gates and siphons act alternately, and the double action progresses like clock-work. The water through the siphon pipe goes down into an air receptacle, the fall being five feet in the model, but twenty times as great in the motor itself, as designed to be erected, and as the five foot fall constitutes the amount of hydraulic pressure contained in the model, the proportionate force of the motor may be faintly imagined while noting the work of the small affair. Passing into the two air receptacles or cylinders (which lie in the water trough representing the river bed) the water surges down and compresses the air, which has already been admitted ahead of it into the cylinders. The water forces the volume of air forward into a drum, through another automatic closing valve. From the drum the air goes into the final air reservoir, where it remains compressed for use, and from whence it may be drawn off or distributed through the pipes to any desired point, for various uses. Even with this miniature model the air generated is very powerful, and will lift a heavy man right off the floor.

The original design of the inventor was to utilize the cataract of Niagara for running the machinery of Buffalo; but the falls and the city were too widely removed for this to be practicable at an expense of less than \$2,000,000, so that Rochester was chosen as the ground for the test, and the lower falls of the Genesee as the water power. The derrick for the motor will be erected on the east side of the falls, where there is a natural cove in the rock for the works below. The frame of the derrick will be 125 feet high, rising slightly above the edge of the falls and about 25 feet from it. The dam already placed across part of the falls directs the water to a 16 foot bulkhead, and is bolted to the solid rock with 5,000 pounds of bolts. The water going through the bulkhead enters the flume and the reservoirs and siphons in the derrick. The siphons will be nearly 100 feet long, and the air receptacles or cylinders in the river bed (four in number) will each be 500 feet long and 6 feet in diameter. The company intend to erect a suspension bridge running from the west side of the falls to the derrick. The dam was built last fall when the water was low, and work upon the rest of the machinery will be commenced as soon as the weather permits. To state it briefly, the objects to which the company propose to devote this enormous and exhaustless power are these: To supply the city of Rochester and vicinity with a motor (in lieu of steam) for mechanical and manufacturing purposes—a motor capable of working every and all portions of the machinery in the city, with force enough reserved to supply compressed air and run all our street cars, unaided by any other propelling power. Also, "to supply the city with a light (in lieu of gas) cheaper, brighter, softer, and safer than the Edison horseshoe light." In this connection mention may be made of the fact that the company already produces a light which meets the description given—and where it costs a dollar a foot to generate gas, this light can be generated for a cent a foot.

In conclusion it may be added that the Motor Company has already made partial arrangements with the street railway company, so that at the works of the former at the lower falls the air cylinders to be put upon each car can be filled, in a few seconds, with enough compressed air to run them sixteen miles. The tracks of the Rochester City and Brighton Railroad Company are already laid to the site of the company's works, so that the cars can be supplied without any additional expense in this respect. The new power can be supplied at less than one-tenth the present cost of horse power, and yet allow a very liberal margin of profit to the motor shareholders.

A CHEAP black varnish for polished iron and steel, and which is said to be very good, is made with ten parts of oil of tar and one part of sulphur. This mixture, of a deep brown color, is applied with a fine hair brush, and then let to dry at a gas flame until the varnish becomes quite black.