D. of M.	D. of W.	ANNIVERSARIES, FESTIVALS, OCCURRENCES, &c.	SUN. Rises.	SUN. Souths after Noon.	SUN. Sets.	MOON. Rises. Morn.	MOON. Sets. After.
1875		AUGUST.	H. M.	M. S.	H. M.	H. M.	H. M.
1	S	10th Sunday after Trinity.	4 25	6 2	7 40	3 37	3 16
2	M	[● New Moon, 1h. 28m. after.	4 26	6 1	7 44	5 5	3 36
3	Tu	Bank of England founded, 1732.	4 28	5 57	7 42	6 30	3 51
4	W	Length of day, 15h. 11m.	4 30	5 52	7 40	7 50	4 9
5	Th	Lord Howe died, 1790.	4 31	5 47	7 40	9 6	4 14
6	F	Duke of Edinburgh born, 1844.	4 33	5 41	7 38	10 21	3 35
7	S	Queen Caroline died, 1821.	4 35	5 34	7 36	11 34	2 36

HIGH WATER AT London Bridge. Morn.	Aftern.	Liverpool Dock. Morn.	Aftern.	M. temp. at 9 in. deep at Chiswick.
H. M.	H. M.	H. M.	H. M.	
1 22	1 49	10 38	11 6	62·2
2 15	2 38	11 31	11 54	62·2
3 0	3 21		0 16	63·2
3 42	4 2	0 37	0 56	62·2
4 23	4 41	1 13	1 33	62·1
5 0	5 16	1 37	2 16	61·1
5 32	5 50	2 32	2 46	61·0

CHOICE ORCHIDS IN BLOOM. 1, Indian House; M, Mexican House; G, Greenhouse.

		D. of Yr.
Cycnoches Loddigesii, I	Surinam.	1875
,, ventricosum, &c., I	Gn., Bra.	213
Epidendrum aloifolium, M	Guatema.	214
Cymbidium pendulum, I	Sylhet.	215
Epidendrum rhizophorum	Guatema.	216
Cypripedium barbatum, I	India.	217
,, Farrieanum & Lowi	Borneo.	218
		219

The Gardener's Magazine.

SATURDAY, JULY 31, 1875.

COMMUNICATIONS FOR THE EDITOR must be post paid, and addressed to the Editor of the GARDENER'S MAGAZINE, care of W. H. and L. Collingridge, 117 to 120, Aldersgate Street, London, E.C.

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Exhibitions and Meetings for the ensuing Week.

MONDAY, AUGUST 2.—PETERBOROUGH HORTICULTURAL SOCIETY.—Annual Summer Exhibition.

WEDNESDAY, AUGUST 4.—ROYAL HORTICULTURAL SOCIETY.—Meeting of Fruit and Floral Committees.

WEDNESDAY, AUGUST 4.—WESTON-SUPER-MARE HORTICULTURAL SOCIETY.—Annual Exhibition.

THURSDAY, AUGUST 5.—NEWPORT AND COUNTY HORTICULTURAL SOCIETY.—Annual Exhibition.

FRIDAY, AUGUST 6.—HILLMORTON HORTICULTURAL SOCIETY.—Annual Exhibition.

FRIDAY, AUGUST 6, AND SATURDAY, AUGUST 7.—CHEADLE HORTICULTURAL SOCIETY.—Annual Exhibition.

SATURDAY, AUGUST 7.—ROSENDALE HORTICULTURAL SOCIETY.—Annual Exhibition.

THE FUNCTIONS OF THE LEAF are far more complex and have a deeper relation to the life of the entire plant than the vegetable physiologists have hitherto imagined. It is one of the curiosities of scientific opinion that observant men, who have had abundant opportunities for the performance of delicate experiments, have stoutly held that the leaf is simply a medium of transpiration, incapable altogether of directly contributing to the sustenance of the fabric of which it forms, apparently, a very important part. When Dr. Hooker called attention to the meat-eating propensities of certain plants, we invited our readers to consider in what degree those interesting revelations reflected a new light on the functions of leaves in general; for if one leaf can trap and kill and cook and digest a fly, another leaf with no machinery at all for fly-catching may nevertheless have and exercise the power of absorbing water, carbonic-acid gas, ammonia, and even more ponderable substances. It is well known that leaf-action, whatever it may be, is of the utmost importance to the health of plants. We recognize the fact in what is called the "extension system" of grape-vine culture; and it would be well if fruit-trees in general were encouraged to extend instead of being, as they too frequently are, restricted by the use of the knife, and thus robbed of leaves that contribute in an eminent degree both to the power of fruit production and the health of the tree, root and branch. Mr. Darwin has not built on Dr. Hooker's foundations, for his inquiries and experiments date from the year 1860; but he has worked in the same field, quite independently, with the skill and patience and conscientiousness for which he has long been conspicuous amongst the great philosophers; and in his new work on *Insectivorous Plants* he piles up an immense body of evidence tending to show that the functions of the leaf comprise elective and assimilative processes of a most elaborate kind, and essential in the first degree to the sustenance of the plant. In the work before us the common Sundew is the principal subject of consideration; but some half-dozen other plants —notably the Venus's Fly-trap, the Bog Butterwort, the Bladderwort, and the Aldrovanda—are adduced as examples of the vegetable carnivora, and the mode of their capturing and digesting their prey is explained by the aid of a special and peculiar series of experiments.

The capture of flies by drosera and dionæa is open to common observation, but it needed such a labour as Mr. Darwin has performed to teach us that the proceeding was no accident, but was a feature associated with the very existence of the plants; for it is demonstrated that they need digesting leaves, as animals need digesting stomachs. When such substances as glass, chalk, and minute fragments of hair, paper, or wool are placed on the glands of drosera the tentacles inflect and hold them, but soon relax and reject them, having as it were discovered that they are worthless. A dog may catch a stone, but he will instantly drop it. You may deceive the drosera, but it will find you out. Always, every way, with no exception whatever, the leaves of drosera manifested a preference for nitrogenous food, and thus received with gladness and retained with advantage flies, bits of meat, drops of milk, and weak solutions of ammonia. This elective power, as we may call it, is explained by Mr. Darwin as simply the result of the quick absorption of nourishment by the leaf, which strengthens it to retain the meat until it is wholly appropriated, so far as the plant is capable of reducing it by a digestive process. We are invited, and we respond to the invitation, to feel astonished at the discovery that the leaf is not nourished by any accidental decomposition of the animal matter, but by a process of digestion with the aid of pepsin and gastric juice, in a manner strictly analogous to the process of digestion in the stomach of an animal.

The curious movements of the plants that thus conspicuously subsist on undecomposed and properly-digested animal matter suggested to Mr. Darwin to institute a search for some kind of nervous system, or even of ganglionic centres such as we find in the invertebrata. But the search has been thus far unrewarded. There is, indeed, no suspicion of consciousness, but there are reasonable grounds for a suspicion of the existence in the plant of something analogous to the nervous system of the animal. Strange to say, many substances that are notorious for their action on nerve-tissue exert no influence whatever on the glands or tentacles of drosera. The poison of the cobra seems rather to promote the movements of protoplasm in the cells than to act as a poison on them. Alcohol in a fluid form has no power to cause movement or paralysis. "The vapours of camphor, alcohol, chloroform, sulphuric and nitric ether are poisonous in moderately large doses, but in small doses serve as narcotics or anæsthetics, greatly delaying the subsequent action of meat." Carbonic acid is a narcotic, but the vapour of ammonia exerts a rapid and striking effect, the consequence doubtless of the hunger of the plant for nitrogen.

The elective power, if we may again use the term, which is ours, and not Mr. Darwin's, is exemplified in a remarkable manner by the fact that while a minute particle of hair weighing $\frac{1}{1000}$th of a grain was heavy enough to cause inflection of the tentacles of the sundew, those same tentacles are uninfluenced by wind and rain, and take no notice whatever of long-continued pattering upon them of heavy rain-drops. It is like a hymn of praise when, in directing attention to this fact, Mr. Darwin remarks that by this strange indifference the plant is saved much useless exertion, for it strikingly illustrates the completeness of the design of the structure and functions of the plant. Nay, we have not set forth the exquisite sensitiveness of these prehensile organs, for a scrap of hair measuring $\frac{1}{1000}$th of an inch in length, and weighing $\frac{1}{78125}$th of a grain, caused the transmission of a motor impulse through twenty cells, and consequent aggregation of protoplasm, the tentacle in the meantime performing a sweep through an angle of above 180 deg. Such a particle of hair could not be detected by the tongue, "and it is extremely doubtful whether any nerve in the human body, even if in an inflamed condition, would be in any way affected by such a particle supported in a dense fluid, and slowly brought into contact with the nerve. Yet," continues Mr. Darwin, "the cells of the glands of drosera are thus excited to transmit a motor impulse to a distant point including movement. It appears to me that hardly any more remarkable fact than this has been observed in the vegetable kingdom."

The relation of these facts to the subject of leaf-action in general is all-important, and may well engage the serious attention of those who are interested in plant culture, whether in the field or garden, as well as of all who can find pleasure in penetrating into the mysteries of life.

ROYTON HORTICULTURAL SOCIETY will hold its annual exhibition on Monday and Tuesday, August 9 and 10.

THE PONTYPOOL HORTICULTURAL SOCIETY will hold its annual exhibition in Pontypool Park on August 19.

THE MADRESFIELD COURT COTTAGERS' HORTICULTURAL SHOW will take place on August 17, and on the occasion of the exhibition the beautiful pleasure grounds at Madresfield Court will be open to visitors.

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