

large quantity of a sticky substance, which leads to the belief that each minute portion of the plant becomes a new and independent exemplar. When one considers the great rise of the water in autumn and winter and the unavoidable inundations that take place in consequence, it is clear that all these different movements must greatly contribute to the spread of this aquatic plant over the whole country in a very short space of time. During the summer months, and especially under the influence of bright sunshine, oxygen gas is generated in the *Elodea* and rises in bubbles to the surface. Mr. Bisdom has analysed its component parts and given a description of the result, which is published in G. J. Mulder's "Chemical Reports and Transactions," vol. III., pp. 97—112.—I am your obedient servant.

[We presume the object of our correspondent is to ascertain if any and what means exist to check the spreading of this extraordinary aquatic plant, and perhaps some of our naturalist correspondents may be able to give a satisfactory answer. We are aware that a prolific water-creeper said to have come from America, succeeded in completely choking several of the natural drains in the neighborhood of Hull, entailing a heavy outlay in clearing them by manual labor; and that the same or a similar creeper had nearly filled up the canal in the neighborhood of Lincoln in the summer of 1860, and great fears were entertained of these waters ever becoming free again from this vegetable parasite. The extreme severity of the succeeding winter having, however, brought with it flocks of wild swans from across the North Sea, it was found on their leaving that they had completely cleared the canal of the obnoxious plant, so much so that no traces of it are now to be found. What says Professor Miquel to an importation of wild swans to clear out the Dutch canals?—ED. C. N.]

### Farm-Yard Manure.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The relation of vegetable and animal life is the theme of a very interesting lecture at the Central Farmers' Club, by Mr. J. G. Hobson, of Long Sutton.

It is hardly necessary for my readers to look beyond their own noble homesteads to discern the importance of such an inquiry. That both these great divisions of organic beings subsist upon each other, is evident to the most careless observer. The farmer is ever acting upon this knowledge, even in foreign countries, where the tiller of the soil is obliged by hard work to accomplish what science has long enabled the English farmer to perform with far greater facility. Thus the listless, idle Spaniard has a proverb that the sheep treads on the land with a golden foot. The hard-working Belgian, as

he rests on his trenching-fork, tells you that "there is no manure without stock, no stock without green crops, no green food without manure;" and on these truths he bases his mode of cultivation. The Flemish farmer, therefore, devotes his attention to the preparation of his manure with the most untiring energy and success. He is not content with securing requisite bulk of manure, either liquid or solid; he well knows that the quality of his manure is of even greater importance. The Dutch farmers, therefore enrich their liquid-manure by fermenting, and by adding to it rape-cake and other fertilizing matters. They would be surprised to hear a quantity, of dirty—merely discoloured—water dignified by the name of liquid manure.

The skilful English farmer proceeds very commonly on a different road to the same end; he passes his oil-cake through the bodies of his live stock, and by thus enriching their excreta increases the fertilizing power of his farm-yard dung; and, as I have in another place had occasion to remark, the improvement of this staple fertilizer by feeding stock with cake has been so long and so increasingly practised, that, at length, the advanced price of the cake has rendered it almost necessary to abandon its use. Other oilcakes have been suggested as substitutes for linseed, in stock-feeding; and a still more simple mode has been again advocated, that of applying the cake itself as a manure, without its having previously passed through the body of an animal. An experiment with mangel-wurzel was in this way made by Mr. Corenwinder, in April, 1855 ("Quar. Jour. Ag." 1857, p. 668). Seven portions of a field which had borne a crop of oats were set apart for the experiment; each plot contained  $3\frac{1}{2}$  poles, and was manured with 220lbs. of one or the other of the following substances. The result I give in a tabular form—

CAKE.	Cost.		Produce
	s.	d.	in lbs.
Arachis, or earth nut.....	9	6	3194
Sesamum (from Indian, &c.)...	12	2	3324
Touloucanna (Sennegambia)...	10	8	2904
Poppy .....	15	0	3487
Cametine.....	14	7	2917
Rape.....	14	3	2811
Hemp .....	14	3	2640

It can hardly fail to be used if, at this season of the year, we remember a few of the scientific facts which bear upon the improvement of the quality of our farm-compost.

The effect of food in varying the power of the excreta of animals is partially known to every one. The more concentrated the food, the more nitrogenous its composition, the richer is the dung of the animal. Take the case of the flesh-subsisting animals: mark the excreta of the fish-consuming wild-fowl of the islands of the Pacific Ocean; note how in their excreta, guano, we find the most powerful of our readily available manures. In this the chemist shows us an