

compose and become available as plant-food. The phosphates range from 18 to 30 per cent, and are all insoluble.

Low-class fish guanos are substances like the preceding, but containing less nitrogenous matter, and more phosphates. They are simply fish-bone manures, with somewhat more ammonia and less phosphate than ordinary bone-meal, and having no real resemblance to a guano.

Fish guanos are usually impregnated with fish-oil, which detracts from the value of the manure. The oil should not exceed 3 per cent.

Frey-Bentos Guano.—The dried and ground residue and débris of animals after the extraction of "Liebig's Extract." It is not a guano. There are various grades of this manure. One contains much bone matter, another a good deal of horn. It is a slow manure. The best manure is derived from muscular fibre, yielding about 14 per cent ammonia and about 5 per cent phosphate. It is a strong nitrogenous manure, variously named. The manure known as native guano is prepared from sewage precipitation. It is not considered of much value.

European guano is on the other hand considered a tolerably good manure. It consists of partially decomposed wood, horn, urine etc., brought into a powdery condition.

GENERAL ITEMS.

In every 1,000 parts, potato tubers contain 750 of water, nitrogen 3.4, ash 9.5, potash 5.8, and soda .3; cauliflowers contain 904 of water, 4.0 nitrogen, 8.0 ash, 3.6 potash, and .5 soda; cucumbers: 956 water, 1.6 nitrogen, 5.8 ash, 2.4 potash, .6 soda; sugar beets: 815 water, 1.6 nitrogen, 7.1 ash, 3.8 potash, and .6 soda.

The influence of nitrogen in its various forms upon plant growth is shown by at least three striking effects. The growth of stems and leaves is greatly promoted, while that of the buds and flowers is retarded; the colour of the foliage is deepened, which is a sign of increased vegetative activity and health; the relative proportion of nitrogen in the plant is increased in a very marked degree.

To rid potting-mould of any vermin it may contain, fill the pots the day before they are used, and water the soil in them with boiling water. Earthworms, however, call for some consideration since they, for one thing, ventilate the subsoil by boring in it channels for the admission of air. They may be ejected from pots or lawns, however, when they become troublesome, by means of lime-water; and the remedy will at the same time benefit the plant.

The *Journal of Horticulture* mentions that in addition to the leaves of *Mimosa Indica* and *Dionæa muscipula*, hairs of sundew (*Drosera*), stamens of *Berberis* and *Sparmannia Africana*, the stamens of *Mimulus* and its allied genus *Diplaens*, the following plants have sensitive organs: *Oxalis sensitiva*, *O. stricta*, *Averrhoa bilimbi*, *Æschynomene Americana* and *Cassia nictitans*.

That it is easy to find microbes in the soil

capable of assimilating atmospheric nitrogen, if culture media, devoid of all combined nitrogen are employed, was pointed out by M. Winogradsky last summer, and in a recent number of the "Comptes Rendus" an account is given of important progress made by him in this most interesting subject. By progressive cultivation of a mixture of microbes derived from soil, in a nutritive liquid from which all traces of combined nitrogen were carefully excluded, Winogradsky reduced the varieties present to three bacilli, of which one was finally separated out and discovered to be endowed with this function of assimilating atmospheric nitrogen. This organism, we learn from "Nature," is strictly anaërobic, and will not grow in either broth or gelatine. It ferments glucose, producing butyric, acetic, and carbonic acid, and hydrogen. The amount of atmospheric nitrogen assimilated is proportional to the quantity of glucose contained in the culture material, and which undergoes decomposition in the presence of this bacillus. Winogradsky concludes his paper by suggesting that this phenomenon of the fixation of atmospheric nitrogen may be due to the union within the living protoplasm of the microbial cell, of atmospheric nitrogen and nascent hydrogen, resulting in the synthesis of ammonia.

The *Kew Bulletin* for May has the following note on the Agriculture of Jamaica:—The fruit trade, which was referred to in last year's report as being in a depressed state, has somewhat recovered its former healthy condition, and the increase there spoken of in the crops of sugar and output of rum has been fairly maintained during the year under review. The export of cocoa shows an increase of 3,010 cwt. in quantity and 8,896% in value; coffee an increase of 10,378 cwt. in quantity and 3,726% in value; bananas, 676,280 bunches and 76,843% in value; oranges, 3,806,526 in number and 11,526% in value. The area of land in the island under cane and coffee cultivation has varied very little in recent years. There were during the year under review 32,466 acres in cane and 21,450 in coffee. The cultivation of bananas has increased to 14,860 acres from 9,959 in the year 1890-91. The total area under cultivation in the island was 666,741 acres, of which 499,053 was in guinea grass, pimento, and common pasture, against a total area of 1,958,678 acres of the whole island on which the property tax was collected.

Dr. L. Gebek, of Bonn, has published an elaborate research on the subject of coconut cake and meal.—1. *Preparation.*—The meal and cake are the residue of the kernels after the oil has been pressed out. This residue may be imported as such, the best coming from Ceylon, or the oil may be extracted in Europe. What is known as "copra" consists of dried pieces of kernel.—2. *Digestibility.*—The average composition of the cake is—Water, 10.66; albuminoid, 19.06; fat, 11.05; carbo-hydrates, 41.06; fibre, 14.12; ash, 4.05. Feeding experiments show that on the average 78 per cent, 95 per cent., and 80 per cent. are respectively digested of the albuminoids, fats, and carbo-hydrates. It also appears that the fat does not retard the digestive action of the gastric juice.—*Influence on Fattening and Pro-*

duction of milk and Butter.—Cocoa-nut meal and cake compare very favourably in these respects with other concentrated foods, such as earth-nut cake, oatmeal, pea meal, cotton-seed meal, rape cake, and oil-cake.

The following are two useful suggestions for preserving eggs:—The eggs are first thoroughly cleansed, then dipped for some time in a solution of common salt, and finally packed in peat-dust and stored in ventilated wooden baskets in a dry, airy place. Of 100 eggs so packed in autumn, and used during the winter, only three were bad. The peat-dust checks the increase of the bacteria which penetrate the shell. Another method is to soap the eggs well and soak them for an hour in a solution consisting of as much permanganate of potash as will lie on the point of a knife added to half a gallon of water (or in dilute Condy's fluid). They are then thoroughly dried, wrapped in clean paper and after packing in a basket or box, kept in a dry place free from frost. Eggs so preserved will keep for six or seven months without losing their fresh taste, as is quickly the case with those packed in lime, straw, or chaff.

Few trades in this country have developed with such surprising rapidity as that in earth or ground nuts, or, as they are termed in America, pea nuts: an account of which is given in one of the "Handbooks of Commercial Products." The crop was first officially made mention of in the Madras Presidency, only as far back as 1851-52, but it now constitutes a most important item in the exports of Southern India. Earth-nuts were not introduced into Europe until 1840; but owing to the many useful purposes to which the oil is adaptable, its consumption has increased

to an enormous extent, estimated a year or two ago at little short of a million tons annually. The bulk of the nuts exported from India goes to France, mainly to that great seat of the oil-manufacturing industry, Marseilles (which port now absorbs more of this than any other oil-seed) where it is largely utilised in the preparation of salad oil; West Africa and China being the other chief sources of supply. Ground nuts afford an excellent substitute for olive oil, which they much resemble in taste, and the principal emporia of this branch of the trade are naturally, after the town mentioned, Barcelona and Genoa, because of their reputation for supplying pure Lucca oil. Eastern and western commercial morality are probably about on a par, and the produce of the earth-nut is sold largely as genuine olive oil, or mixed with the latter, in the same way that in Madras it is made to pass for gingelly oil (put through a mill, in which the latter seed has been crushed), and where it is also employed as an adulterant for ghee. The oil is also extensively used on the Continent in soap-making and for lubricating purposes, as an illuminant and for dressing cloth. There is a large local trade in earth-nut oil, in connection with which—the raw and manufactured material being alike produced and consumed in the country—the question of exchange does not arise; there is a not inconsiderable export business with the Mauritius, Burma, the Straits, &c.; the oil cake also appears to find a market in the latter settlement, London and Ceylon, and it is therefore somewhat singular that more vigorous efforts have not been made to establish large steam mills in India for the manufacture.

The *Horticultural Review* recommends the following for getting rid of ants; one pound of alum dissolved in two quarts of boiling water.





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(From a wood-engraving republished from the "Gardener's Chronicle.")