November 16, 1935 [Registered at the General Post Office]

THE FRUIT FLOWER & VEGETABLE TRADES' JOURNAL.

An Independent Weekly Paper for Growers, Nurserymen, Florists and WHOLESALE and RETAIL DISTRIBUTORS.

THREE PENCE WEEKLY, from all newsagents or direct from the Publishing Offices.
ANNUAL SUBSCRIPTION
(52 issues)
United Kingdom, 15/-.
Six months' Inland Subscription, 7/6 post free.
Overseas, 21/- post free.

PUBLISHED BY
LOCKWOOD PRESS, LTD.,
1, MITRE COURT, FLEET STREET,
LONDON, E.C.4.
Directors: HARVEY H. MASON & M. M. MASON.

TELEPHONE: Central 1862.
TELEGRAMS: "Journalary," Fleet, London.

SCOTTISH OFFICES:
79, WEST REGENT STREET, GLASGOW, C.2
Telephone No.: DOUGLAS 2357.

No. 20. VOL. LXVIII. SATURDAY, NOVEMBER 16, 1935 PRICE 3d.

The Manufacture of Humus by the Indore Process

It has been wisely said that "Nature knows no waste," and an endeavour to bring this fact home to growers whilst at the same time seeking to demonstrate how economies may be effected in the raising of crops was made by Sir Albert Howard, C.I.E., M.A., in a paper bearing the above title read by him before the Royal Society of Arts on Wednesday last, with Professor H. E. Armstrong, Ph.D., D.Sc., F.R.S., presiding.

After a detailed description of what humus actually is, the lecturer remarked, "Humus has one drawback—it is steadily lost," and from that dictum proceeded to show how any method such as the Indore process by which humus can be continually restored to the soil must deserve the most careful consideration.

The Indore process itself is very simple. It consists in using the fungi and bacteria which occur in Nature as agents to break down suitable mixtures of vegetable and animal wastes—the residues of the operations of the farm itself. By arranging these mixtures in the proper way and in the right proportions, and by controlling by the simplest means, namely, by watering and turning, the supply of moisture and air, these wastes are transformed in about ninety days into finely divided humus, rich in the foods required by growing crops. The process can be adapted to climate by manufacture either in shallow pits or low heaps. No buildings or expensive plant are required, nor are pure cultures of the organisms concerned necessary, as they occur everywhere.

For many centuries past the Chinese, probably by reason of necessity in view of their teeming millions of population, have been pastmasters in the science of economic food production, and it was from a scientific investigation into the cultivation system such as that practised by the Chinese throughout many thousands of years, that the Indore system was devised some few years ago. At that time the chief organic residues—farmyard manure, green manure, vegetable residues, municipal wastes, sewage sludge and crude sewage—were being studied separately and not as parts of a single subject. Much of the scientific work had been done, but the various fragments were lying round in the literature very much like the materials in a builder's yard before the building itself is erected. On the practical side difficulties were being experienced. The results of green-manuring were erratic; most of the methods of managing agricultural residues resulted in a waste of valuable nitrogen; some were elaborate and some expensive; there was no idea of examining the experience of old cultivation systems like the Chinese and illuminating them in the light of modern science.

What was needed was the welding together of the separate fragments into a single well-ordered method, elastic enough to be introduced into any system of agriculture, and this, it is claimed the Indore has succeeded in accomplishing.

In course of his paper the lecturer gave details of many experiments which had been made, and these being mostly located in India, sugar trash has been the chief source of compost, but at Nairobi, Kenya, East Africa, interesting developments have taken place at a factory erected and managed by the Express Transport Company, where the following wastes are converted into manure: coffee parchment, *boma* manure, tannery waste, hair, wool and fleshings, horn and hoof, bones, cotton seed residues, chaff, wood ashes and crude limestone. When necessary these materials are first finely ground before merchanical mixing, then moistened and composted in pits according to the technique laid down in the *Waste Products of Agriculture*. Nothing, however, is left to chance; the proportions of the various ingredients are suitably adjusted; the correct degree of acidity is maintained in the fermenting mass; everything is done to turn out an ideal fertiliser. The conversion takes ninety days, when a rich, finely divided humus of the following composition (expressed in percentages) is produced: moisture 25.0, organic matter 62.15, nitrogen 1.5, phosphoric acid 1.5, potash 1.5, lime 4.0. The content of soluble humus is 14.0 per cent.; the carbon nitrogen ratio is 15.1. The plant has a capacity of 20 tons a day; in 1934 the sales amounted to 3,500 tons; the price at the pits is 14s. a ton. In a letter, dated Nairobi, September 26, 1935, the managing director of the company retorts:—

"The results obtained on controlled experimental plots of flowers, vegetables, maize, grassland and coffee are said to have been amazing."

The Nairobi enterprise started as a simple commercial proposition suggested by the results which followed the adoption of the Indore method on the coffee estates in Kenya, and the results of this Nairobi experiment are of unusual interest, because they indicate very clearly the solution of the manurial problem in all parts of the Occident: how a successful working compromise between the rival claims of inorganic and organic manures can be achieved.

Coming nearer home, the lecturer referred to a recent visit to Cornwall, where Mr. F. A. Secrett is treating old clover leys so as to convert crude vegetable matter in the turf into

humus, and paid tribute to Mr. Secrett's technique in the following terms :—" He is saving time and is also making his farmyard manure do double duty : first, by converting the crude vegetable matter in the clover ley into humus; secondly, by providing his vegetables and flowers with humus of animal origin, which is so essential for high quality."

After treating in detail with various applications of the Indore process in plantations, Sir Albert Howard, in seeking to explain the place that the Indore process seeks to take in the scheme of agricultural progress, spoke trenchantly as follows :—

" Nature's round—the wheel of life—consists of two processes : the process of growth and the process of delay. Both are integral to her activity; both are equally important; neither can be omitted. Man is accustomed, however, to devote most attention to growth because of its obvious usefulness; far less heed is paid to decay.

" When in the eighteen-forties Liebig, followed by the Rothamsted experiments, set in motion a train of thought which rapidly led to the stimulation, by means of artificial manures, of Nature's growth activities, the pace at which agriculture could be carried on noticeably quickened. Nothing, however, was done to speed up decay. In the Orient, however, the new ideas have had no influence; at least one thousand million cultivators have never heard of artificial manures. It is a most fortunate circumstance that their agriculture preserves intact the essential balance between growth and decay.

" In pursuing their one-sided chase after quantity, the experiment station workers are not only misleading practice, but are unconsciously doing the greatest possible disservice to the true cause of agricultural research. They have failed to insist on the effective return to the soil of the waste products contributed by the plant, by the animal, and by the community. They have speeded up the wheel of life over one-half of its revolution without due thought of the other half. The steering is thus bound to be erratic; the sense of direction is certain to be lost.

" If we speed up growth, we must also accelerate decay. The object of the Indore process is to assist decay and to make the most of all our waste products. But the moment we begin to deal with our wastes in a rational and common-sense way we shall once again balance the wheel of life; the essential processes which are complementary to an increased tempo in growth will have been initiated. Mother Earth's increase will then take care of itself. There is no need to trouble so greatly about yield. It is surely unnecessary to lumber up still further the world's congested markets with produce which none can buy.

" Freed from our preoccupation about quantity, we can devote our attention to the study of quality—the one subject in agricultural research which really matters at the present day. The study of quality; the determination of the factors which go to produce it or to prevent its development; the effect of high quality on the diseases of plants, of animals and of mankind, must be investigated. We can then add quality to quantity."

A Discussion on Potatoes

In Lancashire Producers' Sub-Committees fix the price of potatoes on the farm. This is not altogether to the liking of quite a number of growers, who tabled a resolution at a recent meeting of the Lancashire County Branch of the National Farmers' Union held at Preston. Actually the resolution was tabled by the St. Helens Branch, but it has supporters all over the county. The resolution asks that in any scheme put forward with regard to potato marketing, production costs should be the basis of price determination.

In speaking to the resolution, Mr. A. M. Hamilton stated that he thought the Board was starting at the wrong end when they fixed retail prices and merchants' profits before fixing actually what potatoes cost to grow. The general feeling was that the resolution raised a very big question. Before it could be carried into effect, the Board would have to take over the crop, and Mr. Almond, one of the speakers, was doubtful whether that would be for the best.