

in S. Arcot has been inaugurated by the Director of Agriculture and the Registrar of Co-operative Societies. The ryots in the district often stand in need of advances for their agricultural needs unless they dispose of their produce for any price they get at the time and at present they are often compelled to sell the stock to money lenders at a very low rate. The scheme provides for advances by a Co-operative Society to cultivators on the security of the produce purely for agricultural purposes and in return the ryots agree to sell their stock to the Co-operative Loan and Sale Society. When the produce is sold only the amount of the loan relating to the groundnut crop is deducted and the balance paid to the ryot. The Central Society has a godown at Cuddalore and an Agricultural Demonstrator specially trained for this work who helps the Central Society in its business. He also sends periodical information to the other demonstrators in the district regarding current prices at Cuddalore. With the increase of such business the Co-operative Department is expected to open sub-depots in more centres in different parts of the tract. This scheme appears to have been approved at a recent informal conference of the ryots in Villupuram when both the Director of Agriculture and the Registrar of Co-operative Societies were present. An arrangement like this for products other than groundnut wherever possible will go a great way in helping small holders in the rural areas to find a good market for their produce.

Reviews.

I

"Artificial Fertilizers" (By E. J. Russell, *Bull. No. 28 of the Ministry of Agr. & Fisheries*, London, 1932). This monograph written in a popular and readable style, is intended to summarize our present knowledge of the effects of artificial fertilizers on ordinary farm crops. Much of the information is drawn from English experiments, especially those conducted during the last 70 years at the Rothamsted Experimental Station, of which the author is the director. The pamphlet opens with a historical survey of the discovery of artificial fertilizers and their popularisation by Sir John Bennet Lawes of Rothamsted by application to various crops like, wheat, barley etc., and proceeds to deal in detail with different kinds of nitrogenous, phosphatic and potash fertilisers with special reference to their physiological effects on the plant and the optimum proportions to be applied to various crops commonly grown in England. The information relative to the manuring of individual crops is brought together, in a valuable chapter at the end under the caption "Manuring of farm crops". A short note is also appended on compound or mixed patent fertilizers. Though the brochure is mainly intended for British farmers and most of the trials reported are those carried out in Britain or on the continent, still it is written so as to appeal to a wider circle and especially the pages dealing with the physiological effects of the fertilizer ingredients on the plant metabolism will be read with interest, as they summarise recent work on the subject. A great deal of work has been done in the different provinces of India on the response of economic crop plants to application of fertilisers and manures, but the information is not at present available

in a collected form and such a publication undertaken by a central organisation like the Imperial Council of Agricultural Research would undoubtedly prove of great value to the Indian farmers, especially if accompanied by suitable soil maps of the provinces showing the deficiencies of the soil in important mineral constituents.

Though it lies within the province of an author to deal with fractional aspects of a problem, one may venture to suggest that a more comprehensive and satisfactory view of the subject of manuring would have been presented to the farmer, if the results of experiments comparing the relative advantages of natural (organic) and artificial (inorganic) manures, had also been given and a chapter on the natural manures like farm yard manure, green manures etc., been included. As it stands, the pamphlet is likely to leave an one-sided impression in the reader's mind, in favour of artificial fertilizers, whose limitations especially in tropical soils poor in humus, it will be of advantage for him to know.

(C. N).

"Laterite and Laterite Soils" (Technical Communication No. 24 of the Imperial Bureau of Soil Science : London 1932 price 2 sh. net) This pamphlet reviews the much confused literature relating to laterites and laterite soils. Though the term laterite was first applied by Buchanan in 1807, to a clay used in India for building purposes which possessed the property of setting to a hard mass on drying the word has been rather loosely extended since to various red soils, iron formations and different kinds of ferruginous deposits occurring in the tropics. The authors believe that much of the confusion is due to overlooking the important role played by weathering processes in the formation of laterite and prefer to restrict the term to the products of rock weathering formed by the leaching of igneous and metamorphic rocks whereby the bases and much of the silica are removed leaving a residue containing varying amounts of alumina uncombined with silica.

Laterite soils may be formed either *in situ* over the parent rock or from the eroded detrital laterite material. Studies of rock weathering in the tropics show that under conditions of intense leaching, laterisation takes place *in situ*. The rock passes directly into a weathered product in which the alumina in excess of that required to combine chemically with the silica (excluding quartz or secondary silica) is present chiefly in the form of gibbsite. The presence of free alumina is reflected in characteristically low ratios for Mol. SiO_2 /Mol. Al_2O_3 (less than 2.0) in the clay fraction. According to Martin and Doyné, soils in which the ratio is 1.33 or less are laterite soils, while ratios between 1.33 and 2.0 indicate laterite soils, and ratios above 2.0 non-laterite soils. Free aluminium and iron oxides, uncombined with silica, may be determined by means of the alizarine adsorption method.

Favourable conditions for laterite formation are:—

- (a) Intense rainfall; intermittent rainfall (alternation of wet and dry periods) opposes laterisation through resilication of the hydrated alumina formed through leaching.
- (b) A high temperature, which prevents the accumulation of humus and therefore the formation of humic acids capable of bringing iron oxides and alumina into solution. Laterisation or silica leaching may be regarded as the anti-thesis of sesquioxide leaching (podsolisation).
- (c) The presence of the more basic minerals in the parent rock. Basic rocks laterise more readily than acidic rocks, the latter tend to weather to kaolin rather than to gibbsite.

Examples are quoted from Harrison's work to illustrate the process of weathering in basic and acidic rocks resulting in laterite formation. In both

cases there was a decrease in the ratio of combined silica to sesquioxides, alumina and combined water respectively, from the parent rock to the weathered material in contact with it—a decrease which was relatively greater in the basic profile. In the basic profile gibbsite was present and kaolin absent in the layer contiguous with the rock; in the acidic profile gibbsite was absent and kaolin present. Resilication caused by capillary rise and changes in the ground-water level appears to affect the basic profiles more than the acidic profiles, tending to make the silica/alumina ratios of the two profiles similar and ultimately to produce similar soils. In laterite soils formed from detrital laterite material, undecomposed mineral fragments may undergo further laterisation and the whole may acquire a characteristic concretionary structure through cementation with iron oxides. A bibliography of 86 references is appended. (C. N.)

III

The Waste Products Of Agriculture—their utilisation as humus. by Albert Howard and Yeshwant D. Wad (*Humphrey Milford*, Oxford University Press, London 1931). The essential difference in the organic matter contents of soils of tropical and temperate zones is too apt to be overlooked in the fixing of manuring programmes for tropical soils. The greatly increased yields obtained in the humid soils of the north by application of artificial fertilizers may not be replicated with the drier and hotter soils of the south where humus may prove the limiting factor for the proper utilisation of the applied nutrients and may even render them harmful. The authors of the present volume are none too late in pointing out the fallacy of (artificial) fertilizing campaigns for a country like India, where the imperative need is for an augmentation of the organic matter and incidentally of the nitrogen content of the soil. As the authors point out, the problem cannot be satisfactorily solved by an advocacy of increase in the area under green manure crops, since the growing of green manure crops is limited to areas of good rainfall and water supply and will not be applicable to dry areas, where the green manure crop by removing the available soil water, might effectively destroy all chances of obtaining a succeeding crop.

The authors believe that the only way of improving such areas is to convert all the available organic matter of the farm e.g., cattle urine, dung, litter, straw, stubble, stalks etc., into synthetic farm yard manure outside the field and after the compost has decomposed to the proper stage to apply it to the land. A detailed method is described for the preparation of the manure, which is called the Indore method, and has been successfully tried at the Institute of Plant Industry, Indore. The underlying principle of the method is to start with mixed organic refuse of a carbon-nitrogen ratio of about 33:1 and subject the mixture to regulated decomposition by bacteria and fungi (added through urine, dung and manure from old compost heaps) under aerobic conditions, in presence of the optimum water supply (50 to 60 %) the internal temperature falling gradually from about 55° C to 40° C. At the end of 3 months, the compost has crumbled to a fine condition, which is better than that obtained by the use of Adco, and can be intimately incorporated in the soil and made to give good yields with wheat, barley etc.

Though the authors have successfully tried the method at Indore during the last four years, with the help of indigenous labour, and have given full and minute details regarding the sizes of pits, quantities of "urine earth" and dung to be applied to the compost for the use of other farmers, it is doubtful whether the method can be copied elsewhere according to the details given, unless each farmer carries out his own experiments and arrives at the proper procedure to be followed under his local conditions. The variable factors are (1) the carbon-nitrogen ratio of the compost (2) moisture and air supply (3) inoculation with suitable fungi, bacteria etc., through urine, dung and previously

decomposed manure. The moisture content is affected by the local rainfall, and where rainfall is heavy, the authors recommend the transfer of the compost to raised heaps. Excessive cold and heavy winds lower the temperature of fermentation and prejudicially affect the rate of decomposition.

The authors rightly lay special emphasis on obtaining a correct carbon-nitrogen ratio of the compost (33:1) to start with, but it is doubtful whether if the author's method be followed the farmer could control on the large scale this factor as effectively as the other factors. This could only be done by ensuring a good supply of leaves and leguminous crops rich in nitrogen, and even at Indore, with the extensive materials available on a big farm of over 300 acres, the authors state that they could ensure a favourable nitrogen proportion only (1) by cutting the cotton stalks soon after picking is over, so as to secure the maximum number of leaves; (2) by growing a large area of sunn-hemp, which contains when withered as much as 2.3% of nitrogen and (3) by securing as much green weeds, groundnut residues and fallen leaves as possible for the mixture. Material containing a wrong ratio does not compost properly. The authors' experiments show that composting of "single" material, e.g., cotton stalks alone, is not successful, due to too close compacting and insufficient aeration and probably also to the unsatisfactory carbon-nitrogen ratio. Obviously it will be unwise to ask a farmer of small means to adopt the method as it stands, where he has to rely on any and all available organic matter, irrespective of the carbon-nitrogen ratio existing in them and especially in dry lands where he may not find it possible to supplement the nitrogen by growing leguminous green manure crops like sunn-hemp. In such cases the small farmer may find it more advisable to bring the carbon-nitrogen ratio of the compost material to the optimum, by the addition of nitrates or ammonium salts or by adding the Adco mixture, though the use of this mixture does not seem to meet with the approval of the authors.

(C. N.)

College News & Notes.

Students' Club. A meeting was held on 4th August when student Mr. Y. V. Narayaniah of class III initiated a discussion on "The Problems and Progress of the World To-day". Rao Sahib T. V. Rajagopalachariar was in the chair. Mr. Narayaniah in the course of his long and interesting paper discussed the most vital problems, economic and monetary, confronting the world at present. The discussion was well thought out and the lecturer gave a clear picture of the present economic position. Several students took part in the discussion of whom Messrs W. Thirumal Rao, N. Srirama Reddy, M. R. Devarajan, Rangasamy Ayyangar and D. C. Hanumantha Rao may be mentioned. The president in his concluding remarks stated that the economic problem was an important one and that social problems like divorces and marriages were also equally important. After dealing in a general way the causes that have led to the present economic depression the chairman opined that in tackling such problems clear thinking and a thorough knowledge of the details were essential.

At a second meeting of the student's club, student Mr. N. Venkat Rao, initiated a discussion on "Temporary closure of the Universities as an immediate measure against unemployment" with Dr. T. R. Seshadri in the chair. Mr. Venkat Rao in the course of his speech observed that the main cause of unemployment in the middle class society was due to the Universities turning out a large