A New Disposal System for Municipal Wastes.

IT is universally acknowledged that much yet remains to be done to secure an adequate standard of sanitation to maintain proper health for both urban and rural populations in India. Want of funds has seriously hindered a practical solution of the problem.

A number of fermentative processes have been devised for the disposal of night-soil and town refuse with varying degrees of sanitary and economic success. Recently, great advances have been made by Dr. Gilbert Fowler and his collaborators.* The problem has been attacked lately from a different standpoint at Indore and a very simple and profitable system for sanitary disposal has now been developed on similar lines to the Indore process of composting agricultural wastes.†

The features distinguishing it from other systems known to the writers are that widely varying proportions of refuse to night-soil can directly be dealt with, and that no activation, chemicals, or antiseptics are necessary. The process is being successfully worked at the disposal grounds of both the City and Residency areas at Indore. It is free from nuisance, cheap and simple enough to be handled efficiently by the sweeper-class without supervision. It works equally well under dry and hot, or wet conditions, having withstood a continuous rainfall of 21 inches within 20 days.

The technique is equally adaptable to the needs of large and small communities, with or without a piped sewage system. The authorities at the city depot now expect to earn a handsome revenue from the disposal of waste. A larger quantity of organic manure superior to that obtained at present is manufactured within 3 to 6 weeks. Cultivators have eagerly purchased it, showing they appreciate its agricultural value.

A universally useful organic manure must approximate in composition to natural soil-organic matter, having its nitrogen in stable, yet easily available form. Mere high analysis has only a partial value in the estimation of efficiency in the field. This point has been kept well in view during the elaboration of the process.

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* "Recent Experiments on the Preparation of Organic Matter," *Agric. Jour. of India*, **25**, 369, 1930, and subsequent press announcements.

† *Waste Products of Agriculture*, Howard and Wad, Oxford University Press, 1931.

WE have been engaged for the past few years on problems connected with the utilization of town refuse and waste vegetation and our experience has shown that although sullage or sewage (raw or treated) can be sprayed, as such, on the refuse heap, night-soil will first have to be partially liquefied before it can be evenly mixed with the refuse. Under normal conditions the final product has a nitrogen content of about 1 per cent irrespective of the amount of sewage or night-soil added, the extra quantity being lost in the gaseous form. Indications have, however, been obtained to show that in presence of (1) activated sludge as the starter there is evidence of fixation of atmospheric nitrogen, (2) minute quantities of certain inorganic salts like those of copper, zinc or titanium there is not only a marked change in the composition of the active microflora, but also greater conservation of carbon and nitrogen in the heap than would otherwise be the case.

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A New Enzyme Preparation.

THE inadequacy of the form in which enzyme preparations are at present available on the market for general laboratory use, led us to the preparation of enzyme-papers which promise to offer a very convenient mode of handling enzymes quantitatively with rapidity and ease. The preparation consists either in dipping filter-papers in enzyme solutions or spraying the solution on to the filter-paper and desiccating the paper in vacuo over calcium chloride. The papers are standardized in terms of enzyme activity and expressed as units per sq. cm. The enzyme content can, therefore, be calculated directly on the area of the paper used. Filter paper preparations of diastase and emulsin have yielded successful results and have kept their activity for over a year. In

the case of hygroscopic enzyme preparation like pancreatin or pepsin, however, it is obviously not possible to extend this technique.

For commercializing the preparation, the paper can take the form of strips (10×3 cms.) divided into squares by thin lines. Among the advantages claimed for this preparation is the ready availability of a standard preparation, the employment of which for quantitative work is rendered extremely easy since one has only to cut out a measured area of the paper and directly put it into the test substrate.

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Attempts to produce Uric Acid Calculi in Albino Rats.

IT is known that rats have a high uricolytic index, but whether there is any limiting value to the uric acid excreted in their urine is not definitely known.

An attempt was accordingly made to ascertain whether the ingestion of pure uric acid, in large amount, would appreciably increase the uric acid content of the urine. It was found that it did not do so, even when it was ingested in amounts as large as 200 mg. per rat per day. The usual explanation given of the relatively low excretion of uric acid in the urine of rats is that it is converted into allantoin by uricase. It was expected, therefore, that the high ingestion of uric acid would lead to a relatively high excretion of allantoin in the urine. No such increase in its allantoin-content was, however, observed. To facilitate a better assimilation of the ingested uric acid, sodium carbonate, in amouts necessary to form sodium urate, was administered with it. Even then, there was no appreciable increase in the uric acid, allantoin or total nitrogen-content of the urine. Subcutaneous and intravenous injections of an isotonic solution of uric acid did increase the uric acid, allantoin and total nitrogen content of the urine, but the increase in uric acid was not commensurate with the amount of uric acid ingested. The subcutaneous injection of as much as 288 mg. of uric acid raised the uric acid content of the urine by barely 6 mg. The results, so far obtained, appear to indicate that there is a definite, and relatively low, limiting value to the excretion of uric acid by the albino rat above which uric acid present in the blood stream is converted into some other product, and excreted. What this product is, is not definitely known. Phenyl-cinchonic acid is known to mobilize the uric acid in the tissues of man and to get rid of it in the urine. It was observed that when this substance was administered to rats along with uric acid subcutaneously, the excretion of uric acid was increased three-fold; this increase being associated with a greatly increased excretion of urine so that the percentage urinary excretion of uric acid remained much the same as when phenyl-cinchonic acid was not administered: a result similar to that reached by Krafka in Dalmatian dogs, whose uricolytic index is low. Prolonged feeding on glandular organs rich in purine bodies, such as spleen or liver, did not lead to any great increase in the uric acid content of the urine. These results would appear to indicate that the experimental production of uric acid calculi in albino rats is not possible.

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On the Nuclear Spin Moment of the Tl Atom.

IN a recent note in *Nature** it was reported that the fine structures of the important arc lines of Tl could be explained if each of the two isotopes was assigned a nuclear spin moment of $\frac{1}{2}$ $(h/2\pi)$. The structure of the line 3776 $(6\,^2P_{\frac{1}{2}}—7\,^2S_{\frac{1}{2}})$ was studied in detail and was found to show more components than Schüler and Keyston† observed. While the value of $i=\frac{1}{2}$ was sufficient to explain the H.F.S. observed in 5351 and other arc lines, the complex structure of 3776 remained to be accounted for. Using a low current vacuum arc of an amalgam of Hg and Tl as source‡ and Quartz Lummer plate (200×30×8 mm.) and fused silica etalons, we find the line to be a group of 6 components as shown below:—

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* *Nature*, October 17, 1931.

† *Zeit. fur. Physik Band*, **70**, pp. 4–10.

‡ This lamp was kindly made for the author by Prof. Venkatesachar.