

of wood, paper and dried cowdung on an artificial platform. The material was completely eaten up by the termites every night. The soil on the platform was broken up, collected and fresh material put on it. This way, the soil brought in by the termites on each kind of material was collected till the amount was sufficient for detailed analysis. On analysis, the following results were obtained.

Constituents	Adjacent soil	Soil brought by the termites feeding on		
		Paper	Wood	Fried cowdung
pH	7.5	8.6	8.1	8.1
Sands	76.91	70.36	67.58	69.38
Silt	12.76	13.14	15.04	14.20
Clay	10.33	16.50	17.38	16.42
Carbon	.126	.450	.220	.562
Nitrogen	.012	.030	.034	.082
CaO	.31	.49	.74	.69
P ₂ O ₅	.03	.08	.07	.09
K ₂ O	.57	.93	.77	1.00

This showed that there was difference between the composition of termite soils growing on different feeds. The soil on cowdung was particularly rich in general plant food nutrients.

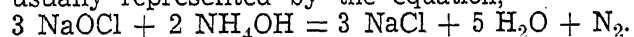
My thanks are due to Dr. S. V. Desai for encouragement and many valuable suggestions.

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1. Nigeran Forrester, I, 8 from *Nature*, 1940, 148, 3750. 2. Engle. H., *Manual of Agricultural Chemistry*, 1912, p. 50.

A FAST REACTION WITH SODIUM HYPOCHLORITE AND AMMONIUM HYDROXIDE

THE reaction between sodium hypochlorite and ammonium hydroxide is well known, being usually represented by the equation,



According to this equation, a reaction, in which the molar ratio of NaOCl and NH₄OH was 1.5 at the start, should go to completion. We, however, found that such a reaction did not go to completion. When the ratio was increased slightly, the reaction apparently continued even after all the NH₄OH was exhausted, according to the equation. This was seen from the fact that when the reaction stopped, the observed decomposition of NaOCl was always more than that calculated from the equation. The reactions were also abnormally fast. When the molar ratio of reactants was 1 or 0.5, the time for half-reaction varied from 100 to 400 minutes depending upon the concentration. With the previous reactions, however, a major part was over in the first few minutes as the following table will show.

No.	NaOCl	NH ₄ OH	Ratio	Time for half-reaction
1	0.0225M	0.015M	1.5	14 min.
2	0.0375M	0.025M	1.5	8 min.
3	0.06 M	0.04 M	1.5	4 min.
4	0.15 M	0.1 M	1.5	1 min.
5	0.2 M	0.125M	1.6	about 1 min.
6	0.3 M	0.125M	2.4	about 1 min.
7	0.4 M	0.125M	3.2	about 1 min.

The reaction solution frequently became acid in the end and developed a strong smell of some nitrogen halide. Further work to elucidate the mechanism of this reaction is in progress.

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EFFECT OF CERTAIN VAT DYES ON THE STABILITY OF SODIUM HYPOCHLORITE SOLUTIONS

THE vat dyestuffs as a class are characterised by their general all-round fastness properties. But, there are a few exceptions to this generalisation. For example, Indanthrene Green B, Indanthrene Blue R and a few of the substituted Indigoid vat dyes possess poor fastness to the action of hypochlorite solutions.

During the course of an investigation on the oxidation of vat-dyed cotton cellulose by hypochlorite solutions, the following interesting observation has been made.

Cotton dyed with Ciba Blue 2B was kept in contact with suitably buffered sodium hypochlorite solutions containing approximately 2.5 gm. of available chlorine per litre, the material liquor ratio being 1:50. After keeping it in contact with this solution for ten minutes, the dyeing was removed. It appeared to have faded considerably due to oxidation of the dyestuff. The hypochlorite solution was examined for loss in strength. Blank was kept side by side to determine the self-decomposition. It was interesting to observe that the rate at which the blank solution decomposed was very much lower than the rate at which the solution used for the oxidation of the dyeing decomposed. For example, during the first twenty minutes after the dyeing was removed, the hypochlorite solution buffered at pH 7 lost in strength equivalent to 4 per cent. of the total oxygen available per litre. On the other hand during the same period, the blank showed a loss of 1 per cent. This rapid rate of decomposition of the former solution was continued for about two hours and after this period, the rates of decomposition of the two solutions were nearly the same. This behaviour has been shown to exist with hypochlorite solutions having both alkaline and acidic pH values. The increased rate of decomposition in presence of the dye is found to depend on the pH of the solution, and also on the amount of dyestuff present on the fibre. It appears

that the products of oxidation of Ciba Blue 2B enter the hypochlorite solution and catalyse it even after the dyed cotton has been removed from the solution. Experiments are in progress to investigate this interesting observation.

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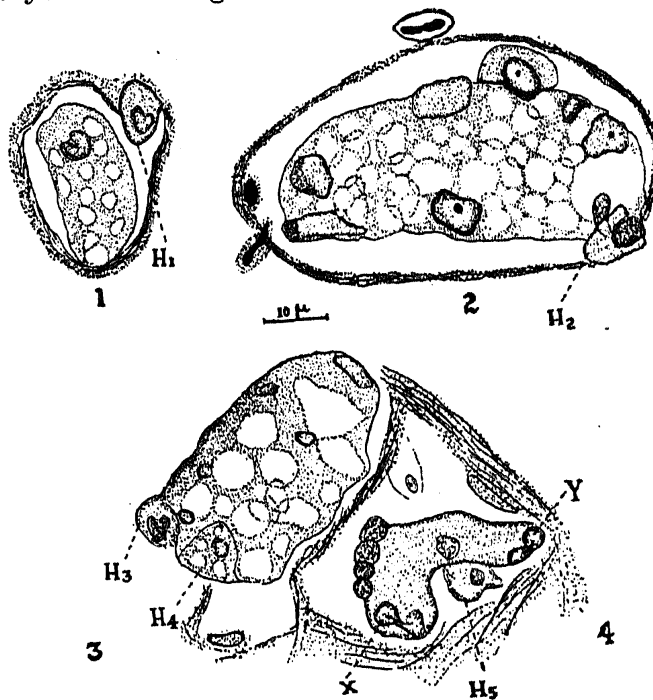
FORMATION OF MULTINUCLEAR CELLS IN LEPROUS LESIONS

ARE Langhan's giant cells described in tuberculoid leprosy comparable to multinucleated vacuolate giant cells seen in lepromata? Is the marginal arrangement of nuclei a necessary criterion for comparison? Are we seeing entirely specific types? The recent publication by Cowdry¹ of photomicrographs showing giant cells in rat leprosy attracted me to this problem. Are these giant cells the product of mere multiplication of nuclei or are they formed by fusion of discrete cells? Some interesting results obtained in this direction are described below.

The material studied was a skin clipping obtained through the kindness of Dr. Shama Rao, Leprosy Officer to the Government of Hyderabad. This is a small nodule showing in smears bacilli with "seed row" arrangement of granules (see Subramaniam²). The material was fixed in Regaud's fluid and attempts to stain the bacilli with Ziehl-Neelsen technique resulted in a thorough failure. Various modifications of the technique were employed but the pictures obtained of the bacilli lacked clarity and were, therefore, rejected. The sections were then bleached with potassium permanganate and oxalic acid and stained in iron hæmatoxylin.

The vacuolate lepra cells do occur only in the deeper layers of the dermis. In the series of sections examined by me they were never observed in the papillary layer. Other skin clippings from the same patient were fixed in various fluids and of all the fixatives only formalin gives clear pictures of the bacilli. In Zenker the bacilli take the stain but they lack clarity. The curious fact observed was that while masses of bacilli could be observed in the papillary layer in formol material, often touching the lowermost layer of the epidermis, no Virchow cells could be discovered in that layer. All gradations of vacuolation leading to the typical foamy Virchow lepra cells have been observed in the series of sections. These cells occur in spaces in the connective tissue network and always have a clear area surrounding them. In Fig. 1 is shown a lepra cell with vacuolation, but with only one nucleus. Near it and lying in the clear area surrounding it is a histiocyte (H_1). Fig. 2 is that of a giant cell showing marginal arrangement of nuclei. Such an arrangement, therefore, is not characteristic of giant cells in tuberculoid leprosy alone. Photomicrographs 9 and 10 of Cowdry¹ show a similar arrangement of nuclei in lesions of the rat. In this slide which was not counterstained, the nuclei alone are stained and the cytoplasm is

yellow. The nuclei are irregular in shape and in a few what look like nucleoli occur. At H_1 , could be seen a histiocyte lying in close contact with the giant cell. The cytoplasmic outline of the histiocyte could just be made out and in its non-vacuolate cytoplasm could be observed a few refractile granules having a yellowish tinge.



In Figs. 3 and 4 are illustrated a giant cell with vacuolation and another without any foamy appearance lying side by side. At H_3 is a histiocyte with distinct outlines lying in close contact with the giant cell. It has a cordate nucleus and its cytoplasm is light pink being stained by eosin. At H_4 is another which gives one the impression that it is just fusing with the giant cell. Its cytoplasm is vacuolated, but its outline is very clear.

Separated from the above cell by only a clear space is a non-vacuolated giant cell (Fig. 4) whose disposition and irregular outline reminds one of text-figures of connective tissue unicellular histiocytes. Most of the nuclei are at the margin and those at X and Y are suggestive of amitotic division. At H_5 is another cell which only careful examination reveals as distinct from the giant cell. Its cytoplasm and nucleus exactly simulate the staining reactions of the giant cell.

Mitsuda³ from his study of the lepra cells in various organs suggests "that in the majority of cases, the lipid substance is produced in the cell as opposed to its origin from bacilli that have entered there". Cowdry¹ describes "rosette" formation in rat leprosy but unlike in the human globi, he states, that there is no "schleim" associated with these "rosettes". We have in the literature a variety of grades. (1) Giant cells with bacilli and lipid as seen in lepromata. (2) Giant cells without schleim but with bacilli as in rat leprosy. (3) Vacuolated cells with lipid but with no bacilli as observed by Mitsuda in the mesenteric lymph glands of man and (4) Giant cells with no bacilli or lipid as seen in major leprides.

This leads one to the question whether