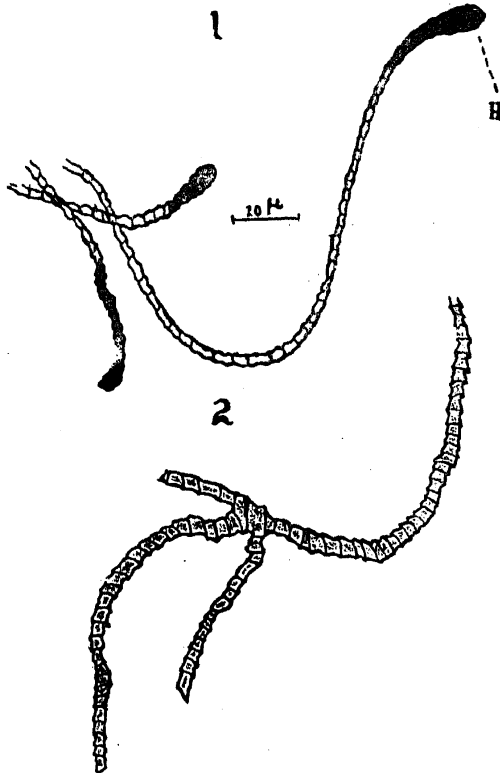


occupy less than  $1.5\mu$  in width. No segmentation or a differentiated scolex could be observed in these tangled masses. However, they appear to branch, the branches and the main stems getting lost in the meshes of the skein.

The second stage shows distinct segmentation and we have a preparation of a clump of these plerocercoids in a mass of tissue showing not only branching but also a few scolices. The club-shaped scolex measures 10 to  $20\mu$



in length and this with the neck region following immediately appear deep blue, while the other regions are stained in varying shades of blue. The maximum width of the scolex (Fig. 1 H) varies from 4 to  $7\mu$  while that of the neck varies from 1 to  $2\mu$ . No bothridial grooves were observed in any of the specimens examined. In Fig. 2 is shown the mode of branching. The main stem as well as the buds show segmentation, but the segments themselves are of variable size, ranging from 3 to  $5\mu$  in length and 3 to  $6\mu$  in width. In Giemsa stained slides the central core of parenchyma is stained more deeply than that of the cortical region.

The presence of distinct segmentation raises the question whether the specimens described above could be considered larval stages at all? The absence of any indication of developing reproductive organs and the occurrence of the specimen itself in the fatty tissue of a sand-fly leads us to believe that it is only a peculiar larval stage of some Diphyllbothrid. Presence of segmentation in larvæ does not appear to be very peculiar for, Meggit<sup>1</sup> mentions that larvæ of *Schistocephalus* and *Urocystidium* show segmentation.

This is perhaps, the first record of a *Sparaganum* from insects. The previous records are

all from fishes and other higher vertebrates and the only form showing branching is *Sparaganum proliferum* (Ijima, 1905) reported from the subcutaneous cysts of man (Ijima,<sup>2</sup> Yoshida<sup>3</sup>). The form described by us though apparently resembling *S. proliferum* differs from it (1) in its occurrence in the fatty tissue of a sand-fly and (2) by its possession of distinct segmentation. Precedent would probably justify the creation of a new genus to receive the above form, but we refrain from doing so because helminthological literature is already cluttered up with ill-defined species, which make identification a matter of considerable difficulty.

Hyderabad (Dn.),  
October 5, 1944.

M. K. SUBRAMANIAM,  
MOHAN BABU NAIDU.

1. Meggit, F. J., *The Cestodes of Mammals*, London, 1924. 2. Ijima I., *J. Coll. Sci., Imp. Univ., Tokyo*, 1905, 20, 1-7. 3. Yoshida, S., *Parasitol.*, 1914, 7, 219-225.

\* We are very thankful to the Vice-Chancellor of the Osmania University for permission to work in Dr. Mahdihassan's laboratory; to Dr. Mahdihassan for his active interest and to Prof. B. K. Das for loan of books and journals. One of us (M. K. S.) would also like to thank Messrs. The Biochemical and Synthetic Products Ltd. for their encouragement.

† This sand-fly commonly occurs in marshy places in Hyderabad and belongs to the family Psychodidæ. A permanent mount of a bunch of these plerocercoids together with a few specimens of the sand-fly will shortly be deposited in the Indian Museum.

#### SOME OBSERVATIONS ON *MYCOBACTERIUM LEPRAE*

Is the degree of granularity of *Mycobacterium lepræ* constant in the various nodules? Does it rise and wane? Does it attain a peak in the oldest nodules? These are questions for which we have as yet no definite answer. In the light of Hoffmann<sup>1</sup> and Manalang's<sup>2</sup> suggestion that under treatment the rod-like bacilli become granular the above questions assume an added significance. Hansen's<sup>3</sup> original description itself contains records of rods and granules and many who claim to have cultured these bacilli (Lowenstein,<sup>4</sup> Salle,<sup>5</sup> Ota and Sato<sup>6</sup>) describe rods, "seed rows" or "string of pearls" and granules. Hoffmann considers that Hansen's bacillus produces "in its evolutionary cycle great numbers of granular forms which are found both within the bacilli and as free lying bodies". In the case of the tubercle bacillus Kahn and Nonidez<sup>7</sup> conclude that granule formation "is a type of segmentation rather than direct fission in which the rate of segmentation surpasses the ability of the elements to elongate". Marchoux<sup>8</sup> states that like Hansen's bacillus "the Stefansky bacillus may break up into granules". If the suggestion that the formation of granules is an essential phase in the life-cycle is accepted, then, how are we to distinguish these from

those formed by degeneration or disintegration as a result of treatment? It will be seen, therefore, how necessary it is to have an idea of the picture presented by young and old nodules in one and the same patient.

Very recently through the kindness of Dr. A. Shama Rao, Leprosy Officer to the Government of Hyderabad, I obtained smears and biopsy specimens from a lepromatous case which presented some peculiar features which are recorded below. Dr. Shama Rao's diagnosis is as follows:—"A. K., aged 30. Lepromatous case under treatment for the last ten years. He was an L<sub>1</sub> case but has now become L<sub>2</sub>. He has nodules on the ears some of which are small and others big. A few are scattered on the body also. The face is infiltrated. There is no deformity of hands and feet and neural and acroteric symptoms are absent." On Sunday, 18-6-1944, a large nodule from the lobe of the right ear was removed and after making a few smears was fixed in Regaud's fluid. Again on Wednesday, 21-6-1944, a small nodule from the left ear was clipped and a few smears made. All the smears were stained in Ziehl-Neelsen and counterstained with Löffler's alkaline methylene blue.

In the smears made on Sunday from the large nodule, the following picture was observed. The bacilli in the globi are irregularly scattered, and those at the periphery have often a concentric arrangement. Though in most of the globi no stainable content other than the bacilli occur, yet in a few large ones where the clumped masses of bacilli occupy half or three-fourths the area of the globi only, the bacteria-free portion is stained by methylene blue and present a granular appearance. The walls of the globi are well defined and nuclei may be seen sticking to the walls. But whether these nuclei belong to the globi could not be made out from the smears. The smallest globi are less than 7  $\mu$  in size and are generally spherical. In the smear many empty spaces comparable to globi but devoid of bacilli could be seen. Since the outer limiting membrane of these clear spaces appears to be incomplete it seems as if these are globi which have got ruptured during the smearing process.

The bacilli in these globi are short rods, the longest of which is 5  $\mu$  long. But these long ones are rare as also granular forms. Very few—one in each field—of the long rods showed any beaded appearance. In one or two in each field there was just the suggestion of development of a bead at one end. In some regions the alignment of the short rods suggest as if they have separated from a beaded chain.

Typical "cigar packs" without any limiting membrane could be observed in various regions of the smear. These are always composed of long bacilli. From comparison with larger bundles all these long packs of bacilli could be arranged in a linear series. Single long bacilli lying free have lightly stained halos which do not completely envelope them. When two long rod-like bacilli lie side by side,

they appear enclosed by the halo. In some globi which present the typical 'cigar pack' arrangement, one can see gradations in long rods 7-8  $\mu$  long with a very faint suggestion of beading, to the smallest granules. Rarely single rods taper to the ends, and sometimes a beaded rod alone may be seen with a clear vacuole.

In the smallest globi measuring 5-6  $\mu$  short rods have a peculiar arrangement. They form a regular row at the periphery, with one or two lying in the middle. Denney<sup>1</sup> describes longitudinal splitting and branching but no such forms were found in the smears.

Except in the larger globi, where the centre of the globus stains deeper with methylene blue suggesting a definite membrane, the smaller forms there is no such uniform differential staining. Often bacilli observed projecting into the blue stained cytoplasmic area suggest that the membrane is a late formation. Only careful study of serial sections would clarify this question. Irrespective of the size of the globi, the bacilli seen in them differ in shape. Some are packed with small rods and others with longer ones. The majority of course belong to the former category and only one in fifty to the latter. In every hundred of these globi show arrangement of short rods suggestive of the fact that they may have belonged to chains. In others, the arrangement is very irregular.

In the smaller nodule from which the smear was made on Wednesday the appearance of bacilli is entirely different. About 90 per cent. in any field are long beaded ones, the other 10 per cent. being composed of short rods without beads, short rods and granules. Bacilli possessing from 2 to 8 beads could be observed in any field and even the alignment of the short rods and granules suggest as if they have just separated from chains. This impression is accentuated by the fact that bacilli with variable number of beads and free granules or small rods aligned in the same longitudinal plane could be seen in any field. In some of the globi are packed with these "seed rods" which if carelessly stained give the impression of a clump of grains.

It would be seen from the above description that though the degree of granularity may be said to be constant for a single nodule it is not constant for all nodules in the same patient and neither does it reach a peak in the old nodules. One is led to agree with Cowdell that "though a single biopsy specimen may exhibit marked granularity, this may or may not be a favourable sign". When we consider that the patient has been under treatment for ten years and when different nodules show different pictures, the suggestion that under treatment the rod-like bacilli become segmented and granular and that such an appearance indicates a favourable prognosis appears to be of questionable validity.

I am very thankful to the Vice-Chancellor of the Osmania University for permission to work in Dr. S. Mahdihassan's laboratory, and to Dr. Mahdihassan and Messrs. The Biochem

and Synthetic Products, Ltd., for their encouragement.

Hyderabad (Dn.), M. K. SUBRAMANIAM.  
July 21, 1944.

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### STORAGE OF POTATOES

In your May issue (pp. 133-134) Dr. Khan A. Rahman described a method of preventing damage to stored potatoes by covering them with various materials, such as sand, chopped lantana, grass or soapnut leaves, pine needles, saw-dust or *bhusa*. The author claims that a problem which had baffled entomologists in India since 1907, yielded to his investigations and in the very first year of his work—in fact within three months, July-September—he obtained results which he describes “so striking and encouraging”, that he has shown considerable anxiety to communicate his discovery to the Indian scientists. A moment's reflection, however, will show that there is nothing very extraordinary about these results. Briefly described the experiment was that Dr. Rahman placed 43 maunds of potatoes in a room, in 56 lots. Of these he covered 48 lots with various materials and left 8 lots, weighing a little less than 5 maunds, uncovered, i.e., exposed. He then distributed 8 maunds of heavily infested potatoes, uniformly in the room, i.e., introduced the pest. The only thing that could have happened was that the moths would lay eggs on the exposed food material of the caterpillars. And this is exactly what they did. This inevitable behaviour of moths hardly necessitates any experimental proof.

The difference in the percentage of attack between different “treatments” are insignificant. The striking differences between the control and experimental potatoes, simply show that the attack got concentrated or localised, on the exposed potatoes, and these, therefore, showed unusually high percentage of infestation. Unfortunately the author cannot claim this as a striking contribution to the solution of this problem. The practice of covering potatoes with sand is an old one and a very common one. Storage under sand has also shown variable results under different conditions. The problem of storing potato safe from potato moths and fungus diseases is not so simple as the article has made it out to be. On account of the intricate nature of the prob-

lem its detailed study has been undertaken in a scheme of the Imperial Council of Agricultural Research at Sabour.

In the experiments described by Dr. Khan A. Rahman the control was not designed scientifically and this has led the author to fallacious conclusions.

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August 28, 1944.

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### NOTE ON THE SWARMING OF THE PLANKTONIC ALGÆ *TRICHODESMIUM* *ERYTHRAEUM* IN THE PAMBAN AREA AND ITS EFFECT ON THE FAUNA

ON page 404 of *Current Science*, Vol. 4, No. 10, dated October 1942, Mr. P. I. Chacko had reported an unusual phenomena of mortality of marine fauna including 750 Holothurians and 250 fishes, which occurred in the tide pool on the southern side of Krusadai Island in May 1942. He had attributed the cause to the fact that “the fishes were slowly asphyxiated by *Trichodesmium* obstruction before being washed ashore by the high tide”.

A similar phenomenon was noticed this year on the southern coast of Pamban in the same month, when the following fishes and crabs were washed ashore dead: (1) *Gerres filamentosus*, (2) *G. abbreviatus*, (3) *Chanos chanos*, (4) *Mugil* spp., (5) *Saurus indicus*, (6) *Platycephalus insidiator*, (7) *Therapon janoua*, (8) *Sphyræna obtusata*, (9) *Lutjanus bioglossus*, (10) *Neptunus* spp., (11) *Gelasimus* spp.

Besides confirming the cause referred to by Mr. Chacko for the mortality, our recent observations showed that the mortality was also due to the putrefaction and pollution caused by the dead algæ. From 22-5-1944 onwards there was bright sunshine which was responsible for the swarming of the algæ in large patches by the acceleration of the photo-synthetic activity. On 25-5-44 when it was cloudy, the absence of sunlight, the thick layer of floating algæ and increase in temperature the water had caused the death of the algæ and polluted the waters causing the liberation of the offensive smell. So long as the algæ was in living condition, no casualty was observed. On 27-5-44 with the slight showers the dead algæ had settled down to the bottom and the “balance” in the water was restored. The clogging of the gills with the consequent asphyxiation and the related hydrological disturbances should have been supplemental factors for the heavy mortality of fishes.\*

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August 15, 1944. M. MUKUNDAN UNNY.

\* With the kind permission of the Director of Industries and Commerce, Madras.