

leprosy so that no experiments could have been undertaken to show a connection between its nutritive and infective factors. But rats suffer from a leprosy of their own upon which again no experiments have been reported to show a nutritive basis of predisposition or a regional factor leading to infection.

About half a dozen rats were obtained through the kindness of Dr. Lowe in Calcutta which had been infected with rat leprosy over seven months previously. One of these rats was used for infecting a batch of white rats kept in the animal house of the Osmania Medical College in Hyderabad. The rats were given a very simple diet; Bengal gram soaked overnight in water and fresh lucern; of those two items they got as much as they could eat. Along with the rats some rabbits and Belgian hares were also kept and given the same diet. The food and the climate did not prove congenial at least to the rabbits, for within eighteen months these animals developed a very infectious skin disease and had to be destroyed on that account. The rats, on the contrary, did not show any sign of skin trouble.

Twenty rats were selected, all about a year in age. Ten of them got an emulsion of rat leprosy tumour where each drop was teaming with germs; of a total dose of one c.c., half a c.c. was injected intraperitoneally and the rest subcutaneously. Another ten rats got a total dose of half c.c. again injected intraperitoneally and subcutaneously. Of these twenty rats, six died within ten days and the rest that survived got one and all tumours on the skin at the site where they were injected subcutaneously after seven months. Internal organs were also affected whenever they were examined. This experiment gave results typical of rat leprosy and needs no further comment.

As I also work for some months at the Indian Institute of Science, Bangalore, I took two rats originally sent by Dr. Lowe and they were sacrificed to give an emulsion with which 14 rats were infected. Ten of them got a total dose of 1 c.c. injected, as in the case of Hyderabad batch of rats, in two places, intraperitoneally and subcutaneously and the rest, namely, four rats, got a total dose of only half a c.c. The actual operation of injection was done by my friend, Dr. Naidu, of the Serum Institute, and was carried out in his laboratory at Hebbal. After the animals were injected they were brought over to the Animal House of the Biochemical Department of the Indian Institute of Science, where they were kept on the well-known MacCarison diet, comprising of wheat flour, fat and salts. It is the diet used at the Nutrition Research Institute, Coonoor, and is rich in vitamins and has proved the best for breeding rats. Even after eighteen months the rats kept at Bangalore showed no sign of any disease and fortunately none had died. Subsequently they were used by other workers for a different experiment as though they had been perfectly healthy. It is very difficult to interpret this finding. The animals were infected from material that was microscopically controlled and found to be

highly infective; the actual operation was carried out by an expert veterinary surgeon; and they were kept in an animal house of an all-India famous Institute.

Dr. De, the pharmacologist at the Indian Institute of Science, kindly infected another batch of rats and Prof. V. Subrahmanyam had been good enough to allow me to repeat the experiment. This experiment also gave similar results so that it is evident there is a great difference in the food and climate as effecting leprosy rats in Hyderabad and those kept at Bangalore. Judging from the health of the rabbits upon the same diet as given to the rats there is no doubt that the animals at Hyderabad were very badly off.

A preliminary report is a very dangerous one in so far as it appears exciting and even promising but has no value unless it is confirmed and it is here that the co-operation of others is required. I have taken all care to claim nothing which is not due to me and as the experiments take a long time to carry out it is advisable that others interested in leprosy might try to confirm or contradict the above finding. The findings above do not allow of any other interpretation than that mentioned above, so that if confirmed, would only bear out what has been believed but not proved so far, namely, that good food and favourable climate both acting together make man immune to leprosy.

The Osmania University had kindly sanctioned some funds for research on leprosy and I beg to thank the authorities for their kindness. It is hoped that these experiments would be extended.

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ESTROGEN THERAPY OF THE INDIAN CRESS OIL

INDIAN cress (*Lepidium sativum* Linn.), a familiar shrub belonging to the N.O. cruciferae, figures very prominently in the Indian materia medica. Among the various medicinal virtues ascribed to this seed, the chief are its galactagogue and enenagogue properties. In certain parts of India sweet balls prepared from these seeds are still used as a special tonic after delivery.

A detailed study of the pharmacological action of the active principles of the seed has been undertaken by us. The proximate analysis of the seed gives moisture 5.69 per cent., ash 5.7 per cent., crude protein 23.5 per cent., crude fat 15.91 per cent., P₂O₅ 1.65 per cent., calcium 0.31 per cent., and sulphur 0.9 per cent.

The seed on steam distillation yielded a volatile oil having a characteristic pungent smell. In 1874 Hoffman obtained this volatile oil on steam distillation. The seed also yields about 5 per cent. mucilaginous matter. In addition to the volatile oil and mucilaginous matter the seed also contains 0.19 per cent. of alkaloid.

Estrogen therapy.—A group of immature female rats (30 days) were kept on the following diet:—

Sugar 10, casein 14, butter 15, Osbourne Mandell salt mixture 5, and rice flour 56 parts. The diet was supplemented by $\frac{1}{2}$ tablet of yeast and 2-3 drops of cod-liver oil per day per rat.

The experimental rats received 3-4 drops of the cress oil in addition to the above diet, whereas the control rats received only the above diet. All the rats were killed on the 72nd day, having received the oil for six weeks. The ovary, thyroid and thymus glands were removed and weighed.

The ovaries of the experimental rats weighed consistently more than that of the control rats. The average weight of the ovaries from the experimental rats was 0.45 gm. per Kg. body weight, whereas that of the control rats was 0.25 gm. per Kg. body weight. Macroscopic examination of the ovaries of the rats receiving the oil was very significant and exhibited several hæmorrhagic follicles on the surface. No such characteristics were observed on the ovaries from control series. The uterus, thymus, thyroid and other organs did not show any abnormality. The results along with the details of histological examination will be reported later.

There was no significant difference in growth rates of the rats. The rats receiving the oil weighed comparatively less (average 83 g.) than the control ones (average 88 g.) but were significantly more active than the control series.

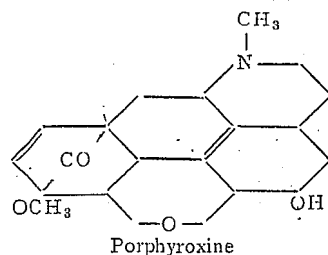
Thanks are due to Dr. V. Subrahmanyan for his keen interest.

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A SEARCH FOR PORPHYROXINE IN BENGAL OPIUM

PORPHYROXINE $C_{16}H_{19}O_4N$ was isolated¹ by Rakshit from the Indian variety of *Papaver somniferum* L. He represented² the base as a derivative of a tetrahydro codeine with the carbonyl group in a bridge position in the aromatic ring of Pschorr's codeine formula:



Later, Machiguchi³ isolated from Japanese opium, an identical product which, however, proved to be a mixture of codamine, laudanine

and meconidine. Recently⁴ the view has been expressed that the constitution proposed for porphyroxine can only be accepted with reserve. It was, therefore, considered necessary to re-investigate the occurrence of porphyroxine in Bengal opium, a specimen of which was purchased as a dry powder from the Government opium factory at Ghazipore.

Following Rakshit's method¹ the total water-soluble non-phenolic bases were isolated by ether-extraction of a lime-water extract of opium. Further treatment of the crude bases with dilute hydrochloric acid gave a sparingly soluble hydrochloride (A) in a yield of about 0.34 per cent. The same hydrochloride (m.p. 265°-269° d., after a slight darkening at 240° C.) was prepared in an yield of 2.6 per cent. by extracting the total alkaloids of opium with chloroform and subsequent treatment of the alcoholic solution of the bases with dilute hydrochloric acid. On recrystallisation from alcohol the hydrochloride (A) in colourless needles melted at 276°-277° c.d. after sintering at 270° C. The free base corresponding to this was crystallised from alcohol in colourless rectangular rods. (M.P. = 152°-153° C., unchanged on mixing with a genuine specimen of codeine for which the author is deeply indebted to Prof. B. B. Dey.)

The above yield of codeine from Bengal opium is much higher than Rakshit's estimate,⁵ but agrees well with that of Annet⁶ and Dunicliff.⁷

Attempts to isolate porphyroxine from the mother-liquors of codeine hydrochloride have so far proved fruitless. Only a more intensive search can finally settle the possibility that Rakshit's porphyroxine might be an impure specimen of codeine.

As the author is at present unable to continue this work, owing to other preoccupations, he leaves this question to be settled by others interested in the subject.

The author is highly grateful to Prof. L. F. Small for suggesting this problem, and to Mr. J. N. Rakshit and Col. S. S. Sokhey for their kind interest.

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PROTOGYNY IN UGANDA SPONTANEUM

THE wild species of *Saccharum spontaneum* has been of particular importance and use at the Imperial Sugarcane Station X CBE. Most of the Co. canes found useful in cultivation have in them the blood of some form of *Saccharum spontaneum* and sometimes of two