ON *CASSYTHA FILIFORMIS* LINN.

THE descriptions given for this lauraceous parasite are very meagre and to some extent inaccurate. Some of the latter are given here:

(1) Young parts puberulous (Hooker). They are not so. On the contrary the old stems trailing on the ground are so.

(2) Stem dark-green (Duthie). The extreme tip of the stem is yellow (the first inch or so), lower down it is yellowish green. Further down it is bluish green. The very old stems either dark-green or yellowish brown, the latter colour predominates.

(3) Flowers are 1 inch long when fully formed and fruits 2 inches across (Kanjilal, De and Das). The flowers are hardly 2 mm. across and the ripe fruit including the pulp is not more than 11·0 mm. in diameter lengthwise and 9·30 mm. in diameter equatorwise.

(4) Three bracteoles are present (Duthie). The structures present below the flowers are not bracteoles since they form a part of the flower and lie just below the perianth. When the flower is separated from the inflorescence stalk, these structures also come out and hence they are the epicalyx.

(5) The perianth tube forms the succulent outer covering of the fruit (Hooker). It is not the perianth tube but the perigynous thalamus that forms the outer covering. The perianth is 6, poly-, and in two whorls. Perianth tube cannot be formed in such a case. Moreover this succulent outer covering extends below the true fruit, in between this and the inflorescence stalk, the position naturally occupied by the thalamus.

(6) Whole plants bearing fruits may be dispersed by water (Ridley). This is impossible since the ripe fruit and even flowers and unripe fruits fall down the inflorescence stalk very easily, at just the slightest touch.

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July 27, 1945.

1. Hooker, *Flora of India*, 1890. 2. Duthie, *Flora of the Upper Gangetic Plains*. 3. Kanjilal, De and Das, *Flora of Assam*. 4. Ridley, *Dispersal of Plants*.

DUAL ARTERIAL SUPPLY OF THE VERMIFORM APPENDIX

THE general impression among the anatomists[1–6] and the surgeons[7] is that the vermiform appendix is supplied by one artery, a branch of ileocæcal artery. In a series of 60 dissections on the Cadaver it was, however, found that in 30 per cent. of the bodies the appendix received more than one artery. In 20 per cent. of these, one twig each from ileocæcal and posterior cæcal arteries; in 8·3 per cent. two from the posterior cæcal artery; and in 1·6 per cent. two from the ileocæcal artery were traced. It is to be noted that whenever the twigs from the posterior cæcal arteries took a total or partial share in supplying appendix, it was always the part nearest the base. These branches, however, are not to be confused with a tiny twig almost invariably given to the base by the posterior cæcal artery.[8]

Even in those cases (70 per cent.) where there was a single appendicular artery it answered to the book description only in 31·6 per cent. In 18·1 per cent., although it was a single branch it immediately divided into two, and in 1·6 per cent. into three twigs, of not inconsiderable size, before entering the meso-appendix. In 18·3 per cent., a single appendicular artery, but a branch of posterior cæcal, was present.

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June 27, 1945.

1. Beesley and Johnston, T. B., "Quoted by Seshachalan, T., and Gorur, S. R., *Ind. Med. Gaz.*, 1939 **65**, 693. 2. Brash, J. C., and Jamieson, E. B., *Cunningham's Manual of Practical Anatomy*, 1940, 306. 3. Frazer, J. E., *Buchanan's Manual* of *Anatomy*, 1937, 160. 4. Grant, J. C. B., *A Method of Anatomy*, 1938, 160. 5. Johnston, T. B., and Willis, J. *Gray's Anatomy, Descriptive and Applied*, 1942, 766. 6. Le mc Gregor, A., *A Synopsis of Surgical Anatomy*, 1943, 46, 7. Thomson, and Miles, A., Quoted by Sheshachalan T., and Gorur, S. R., *loc. cit.*, 1930. 8. Massie, G., *Surgical Anatomy*, 1944, 235.

ON THE FOOD AND ALIMENTARY CANAL OF THE MILK-FISH *CHANOS CHANOS* (FORSKAL) *

IN the Madras Presidency, the milk-fish contributes to a fishery of moderate scale in the Gulf of Mannar, the Palk Bay and the Pulicat Lake. Its fingerlings, which enter creeks, lagoons and shallow mud flats during the five months from May to September, are collected alive and utilised for cultivation in fish-farms and in brackish and freshwater tanks and reservoirs.

For the purpose of this note, over three hundred specimens, ranging in size from 4 to 43 inches, were examined. The following analysis of the stomach-contents of the fish indicates that it is a plankton feeder: *Conscinodiscus, Fragillaria, Nitzchia, Pleurosigma, Rhizosolenia, Thalassiothrix, Trichodesmium*, Appendicularians, Copepods, fish-eggs, fish-larvæ, larval bivalves, larval gastropods, *Leucifer*, Mysids and species of *Spiratella*.

A study of the anatomical structure of the alimentary canal shows its adaptation to the above kind of food. The mouth is toothless. The pharynx leads into a thick-walled œsophagus, the internal epithelial lining of which is developed into 20-22 oblique plates, on each of which are arranged 15 rows of about seventy spiny papillæ. The œsophagus leads into the stomach, which is a tube developed into a thick-walled muscular gizzard at its pyloric end. Its internal wall is raised into 7 to 9 longitudinal folds. The liver is a bilobed brown structure with the gall bladder placed between the two lobes. The bile duct opens

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into the gizzard by an elliptical opening. The gizzard leads into the intestine through a sphincter muscle. The intestine is a long convoluted tube of uniform thickness. Its anterior portion, the duodenum, is closely apposed to the stomach, and is beset with 120 to 150 brownish tubular pyloric cæca, which open into it by 18 orifices arranged in three yellowish rows of six each. Three cæca are always filled with a yellowish viscid fluid. The internal epithelial lining of the intestine is developed into numerous vascular villii, thus increasing its absorptive surface. The anus is situated closely in front of the urinogenital opening.

It is evident that the structure of the digestive tract of the milk-fish is adapted to its food and feeding habit. The plates of the pharynx act as a filtering apparatus, preventing large and undesirable organisms from entering into the œsophagus. The digestion of the food takes place in the tubular stomach, and is completed in the muscular gizzard, into which the bile duct opens. It is probable that the pyloric cæca are both digestive and absorptive in function. The intestine with its numerous vascular villi is absorptive in function.

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STUDIES IN THE FORMATION OF SULPHUR AT KONA (MASULIPATAM) PART I

IN continuation of our studies[1] of the sulphur formation at Kona near Masulipatam, the soil and the subsoil water in the sulphur-bearing area were found to contain sulphuretted hydrogen, both bound and free; its presence was confirmed by (1) evolution of hydrogen sulphide on acidification of the soils; (2) strong smell of hydrogen-sulphide; and (3) the formation of a heavy black precipitate of lead sulphide on the addition of a solution of lead acetate to the subsoil water.

It was of interest to determine if the production of this sulphuretted-hydrogen was attributable to the direct or indirect activity of micro-organisms.

Samples of soils at various depths from surface up to 6 feet were collected from (*a*) sulphur area and (*b*) non-sulphur area. Weighed quantities of the samples were triturated with measured amounts of sterile water under aseptic conditions and dilutions ranging from 1:10 to 1:100,000 were effected. These dilutions were used for plating out on nutrient agar fortified with the essential inorganic salts. The plates were incubated at 300° C. both under ærobic and anærobic conditions. Plates were counted in duplicates and only those giving a colony count between 30 and 300 were used for the calculation of bacterial populations. The results are shown in Table I.

It may be observed that anærobic population is much larger (2 to 5 times) in the sulphur-bearing area than the corresponding population of the non-sulphur area.

Samples of these soils were inoculated into Van Deldens' medium (Composition KH_2PO_4 grams; Na-lactate 0·5 grams; Asparagin 0·1 gram; $MgSO_4$ 0·1 gram; $FeSO_4$ traces; Tap-water 100 ml.; and agar 2 grams). pH was adjusted to 7·2, and stab cultures were made to secure the growth of the anærobes. Only one sample—collected at 6 ft. in the sulphur-bearing area—showed distinct blackening after four days' incubation at 30° C.

TABLE I
Number of bacteria per gram of soil

Level from surface	Aerobic		Anærobic	
	Sulphur-bearing area	Sulphur non-bearing area	Sulphur-bearing area	Sulphur non-bearing area
0–1′	3,45,000 2,80,000	5,22,000 6,00,000	very few	very few
1½′	65,000 80,000	1,92,000 2,09,000	3000 2200	,,
2½–3′	72,000 79,000	2,56,000 3,14,000	2500 3100	,,
4–4½′	70,000 81,000	2,58,000 3,00,000	6000 7600	3000
6′	30,000 18,000	25,000 29,000	25000 33200	8000 6300

This culture, which apparently included the sulphate-reducing organism, was transferred to a stock medium devised to simulate the environmental conditions of its natural habitat. The composition was as follows:—

$(NH_4)_2SO_4$ 0·1 gm.; $MnSO_4.3H_2O$ 0·2 gm.; $CaSO_4$ (Gypsum) 1·5 gm.; $MgSO_4.7H_2O$ 0·2 gram; NaCl 4·0 gm.; KH_2PO_4 0·2 gm.; Fe.Am.SO_4 0·1 gm.; distilled water 100 ml.

The pH was adjusted to 7·2. After inoculation and incubation at 30° C. under anærobic condition the yellow precipitate turned black in three to four days.

A systematic study of the micro-organism responsible for the reduction of sulphates has been made and the organism characterised as *Vibrio desulphuricans.*, Konæ.

Vibrio desulphuricans., Konæ

Isolation and habitat.—Occurs in the hydrogen sulphide-forming areas at 6 feet below the surface, in ground water and in the sand, occurring at the same depth.

Morphology and staining.—The organism is a spore-bearing short curved rod with rounded ends, roughly 1-2 μ in length, sometimes forming an S-shaped curve, occurring in groups and rarely singly. It stains well with ordinary aniline dyes like Carbolfuchsin, and is decolourised by Gram's method (Gram−ve). Methylene blue stains the organism quite distinctly when kept for 3-5 minutes. The organism is actively motile and appears to possess a single terminal flagellum.

Cultural and Biological.—The organism is a strict anærobe and prefers a specialised media,