TABLE I
Preparation of aliphatic amines from Ketones

	Ketone	Corresponding amine	B.P. C°/685 mm.	Yield %
1	Acetone	Isopropylamine $CH_3CH(NH_2)\cdot CH_3$	32–34	91
2	Methyl ethyl ketone	2-Aminobutane $C_2H_5CH(NH_2)\cdot CH_3$	60–62	87
3	Diethyl-ketone	3-Aminopentane $C_2H_5CH(NH_2)\cdot C_2H_5$	84–86	75
4	Methyl-*n*-propylketone	2-Aminopentane $CH_3CH(NH_2)CH_2C_2H_5$	88–89	87
5	Methyl-isobutylketone	β-Isohexylamine $CH_3CH(NH_2)\cdot CH_2\cdot CH(CH_3)_2$	99–102	80
6	Methyl-*n*-amylketone	2-Aminoheptane $CH_3\cdot CH(NH_2)\cdot (CH_2)_4\cdot CH_3$	136–138	46
7	Methyl-*n*-hexylketone	2-Aminooctane $CH_3\cdot CH(NH_2)\cdot (CH_2)_5CH_3$	164–165	60

tried later on with very encouraging results. Acetone was converted into isopropylamine in good yields by using aqueous or alcoholic ammonia in excess with hydrogen under a pressure of 100 lbs./sq. in. and at a temperature of 50-60° C. in presence of Raney's nickel as catalyst (5-10 per cent.).

A number of other aliphatic ketones were used in the synthesis of the corresponding aliphatic amines (Table I). In the case of water-immiscible ketones, solvents, higher temperature and longer period of reaction were necessary. Amines were isolated from the reaction mixture as their hydrochloride salts, regenerated with alkali and purified by repeated distillation. In all the experiments the primary amines were the main products, and only negligible amounts of secondary or tertiary amines were obtained.

The mechanism of the reaction has been explained by Loffler[6] and Magnonic.[7] The present series of experiments indicate that this method is of general applicability for converting aliphatic ketones into corresponding amines.

Details of this work will be published elsewhere.

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PHENOLPHTHALEIN AS ADSORPTION INDICATOR IN ARGENTOMETRIC TITRATIONS

IN a recent communication[1] the applicability of resorcinol-succinein as adsorption indicator has been described. I find that phenolphthalein is adsorbed to an appreciable extent by the AgCl—Ag^+ system, and can be used as an adsorption indicator for titrations of chloride ions against silver ions at a pH of 8-10. In this range it gives on adsorption a definite pink colour to the silver chloride particles.

For the practical application of the indicator, a drop of 0·2 per cent. phenolphthalein is added to 10 c.c. of potassium chloride (about N/10) solution. A drop or two of dilute ammonia is now added until the solution assumes a slight pink colour. Silver nitrate is now run in, and as soon as the equivalent amount of silver nitrate has been added, just a drop of the titrating solution in excess causes the coagulation of silver chloride which separates out as a definitely bright pink mass leaving the supernatant solution colourless.

Quantitative measurements on the adsorption of phenolphthalein by the neutral and positively charged silver chloride bodies will be published in detail elsewhere.

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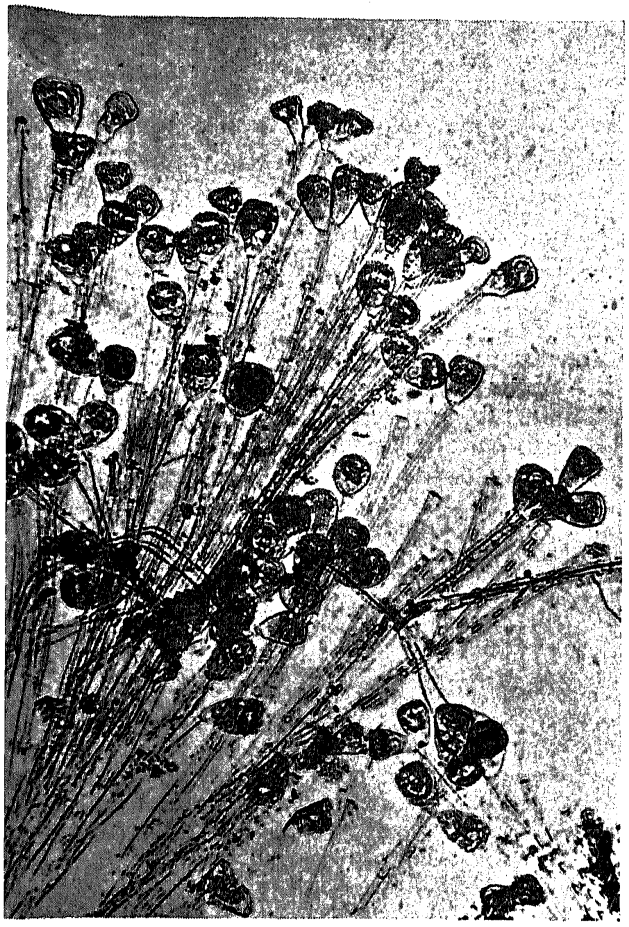
ON THE OCCURRENCE OF PROTOZOA IN LAND-FILTERED SEWAGE EFFLUENT

IT has been shown that certain ciliate protozoa, particularly Vorticellids, are of special significance in the Activated Sludge Process and other artificial systems of sewage purification, and that these protozoa in the sewage tanks are originally derived from soil.[1-10] Further observations carried out during the last four years at

:a (South India) have shown that these oa naturally develop in large numbers in nd-filtered sewage effluent and from an tant link in the chain of life processes medium. The practice of land-filtration vage and the soil conditions at Madura, ıode of development of the protozoa in ffluent and related aspects are briefly bed below.

lura has now a population of about three half lakhs, and the sewage from more ıalf the population is discharged into the ipal sewers. The daily discharge of e from this population is about three ı gallons, including a comparatively quantity of liquid waste from the textile About two million gallons of this volume



. Photomicrograph of a Colony of *Carchesium* r Cl. and L. occurring in the land filtered sewage : at Madura. × 75.

vage is daily filtered, without any pre- ıent, on an area of about 113 acres of sloping land in the neighbourhood of the The soil is fairly porous and the effici- ɔf the soil drainage is maintained by hav- ınderdrains and also by periodically ing the sewage matter accumulating on ɔil surface.[11] The underdrains consist of ɔn pipes loosely jointed and laid in rows lepth of 3 to 4 feet, the distance between ows of pipes being about 33 feet. The ɔf the land-filtered liquid, which is fairly flows down through these pipes into a lly constructed effluent channel. The ıt from this channel (the quality of the ıt generally conforms to the Royal Com- n Standard) is finally utilised along with irrigation water for agricultural purposes. The land filtering the raw sewage is also cultivated and the principal crop grown is guinea grass which yields very well (about 120 tons per acre per year).

On either side of the effluent channel, as also attached to certain green algæ, may be seen large whitish fluffy masses of Vorticellids which are composed of a number of species of *Carchesium* and a few species of *Epistylis*. The dominating forms are the species of *Carchesium* and one of the commoner species is *Carchesium epistylis* Cl. & L. (Figs. 1 and 2). Species of the simple *Vorticella* and other ciliate protozoa, such as *Paramœcium*, also occur in the effluent. Along with the protozoa, worms, insect larvæ, especially those of

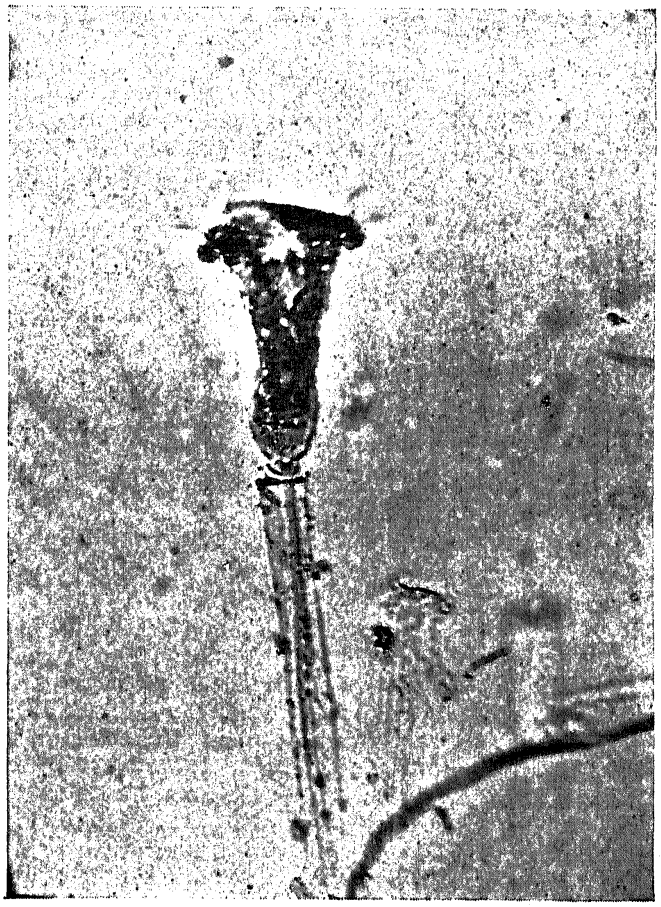


FIG. 2. An individual of *C. epistylis* Cl. and L. enlarged × 350.

Chironomus sp., prawns, crabs, gastropods, frogs, fish and other forms also flourish.[11]

The protozoa and other fauna develop in large numbers in the effluent in all seasons of the year unless sewage irrigation is stopped for unduly long periods, as under the conditions of excessive and continual rains, when they slowly disappear; but when the sewage application is resumed, the fauna also gradually develop. Thus during October-December 1946, when sewage irrigation was stopped due to unusually heavy rains, from 30th October to 20th November and again from 30th November to 19th December, the protozoal growths and other fauna, particularly the fish, were largely absent from the effluent, but reappeared when sewage irrigation was continued.