The continuous spectrum seems to owe its existence to the disintegration products of the glass set free by the erosive action of the discharge; its strength depends hardly at all on the nature of the gas in the discharge tube. The experiment is not without mechanical difficulties, for the slit of the spectroscope frequently becomes plugged up by glass dust the removal of which involves a troublesome process.

Once the conditions for producing the continuous background have been secured the best results were obtained by admitting hydrogen into the discharge tube at a pressure of about one millimeter. Upon applying the explosive condenser discharge, the first four members of the series; 1215.6; 1025.8; 972.5 and 949.7 appear on the photographic plate sharply reversed. It is not necessary to employ pure hydrogen, however, the first two members of the series have been obtained with helium containing a trace of hydrogen. The nature of the apparatus is such (*Astrophysical Journal*, LX, p. 8, 1924) that a distance of about one centimeter separates the end of the capillary from the slit of the spectroscope while the gas which fills the discharge tube is removed from the light-path by a pump whose inlet lies two centimeters on the grating side of the slit. The path length available for absorption is thus of the order of three centimeters. It seems certain that a very small quantity of hydrogen is sufficient to produce the reversal of the lines.

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THE CLEAVING OF CILIATES BY AMOEBA

MAST and Root[1] and the writer[2] record cases of Amoeba feeding on Paramecium and Frontonia by cleaving the ciliates in half. They express the opinion that Amoeba actually pinches the ciliates into two by means of pseudopodial pressure.

Schaeffer,[3] on the contrary, calls attention to the fact that ciliates not infrequently constrict themselves into two as a result of injuries received when making their way through débris. He regards it as more likely that the ciliates seized by Amoeba also tear themselves into halves when a slight injury is initiated by the mechanical pressure of the pseudopods. Chambers[4] expresses a similar view, stating that the pseudopodial pressure of the amoeba is of little or no importance in the halving of the ciliate. He is led to this conclusion by the observation that slight injuries made in the ectoplasm of Paramecium with a microneedle often result in the ciliate's pinching itself into two.

However, my observations on the cleaving of *Frontonia leucas* by Amoeba do not substantiate the view that the ciliates in all instances tear themselves into halves. In the two cases recorded[2] the frontonia was not pinched into two by the pressure exerted by apposed pseudopods, but was literally stretched into two by the pseudopods of the amoeba. In the process one half of the frontonia was enclosed in a food cup, the free edges of which produced a marked constriction in the middle of the ciliate and constituted a sort of protoplasmic collar around this narrowed region. The pseudopodial collar then streamed toward the free half of the frontonia, actual movement in this direction of the granules of the amoeboid protoplasm being observed. As the streaming progressed, the free half of the ciliate was pressed into the shape of a sphere, and the constricted region connecting the halves became much elongated. When the ciliate was finally stretched into two by this means, the free half assumed its normal shape. In one instance a frontonia was stretched in the process from a length of 0.25 mm to a length of 0.31 mm, as ascertained from camera lucida drawings.

Kepner and Whitlock[5] record a similar case of the stretching of a paramecium to nearly twice its normal length, the pressure exerted by the pseudopodial collar being sufficient to force the free half of the ciliate into a spherical shape. At this stage the amoeba began the ingestion of a specimen of Cyclidium and released the paramecium.

No doubt in some instances ciliates when captured and constricted by Amoeba actually tear themselves into halves. But the complex food reactions described by Kepner and Whitlock and by the writer are not to be accounted for on these grounds. When the cleaving of the ciliate involves a conspicuous elongation of the constricted portion and the compressing of the free half into a spherical shape, and when the actual streaming of the protoplasm in the pseudopodial collar is observed and the stretching of ciliate is demonstrated by measurements, little doubt remains that the ciliate is halved by mechanical pressure of the pseudopods of the amoeba.

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