of the substance towards acids and solvents is such that it is probably chitin; and this is confirmed by the fact that, after such treatment, it yielded, on hydrolysis with concentrated hydrochloric acid, a strongly reducing substance which is presumably glucosamine. The preliminary resistance noted towards the strong acid does not seem remarkable, when one considers the hardening the material must have undergone during and after fossilisation.

On a New Species of Cephalodiscus (C. nigrescens) *from the Antarctic Ocean.*

By E. Ray Lankester, M.A., D.Sc., LL.D., F.R.S., Director of the Natural History Departments of the British Museum.

(Received and Read June 8, 1905.)

[Plate 8.]

The material here described was dredged by the "Discovery," on January 13, 1902, in 100 fathoms, off Coulman Island, near Victoria Land, in the Antarctic Ocean, and was brought home with the rest of the collections, arriving at the Natural History Museum in September of last year. It had not been possible for the naturalists on the expedition to examine this organism in the living state, and its nature had not been determined until it came into my hands.

The colony is massive, the test nearly transparent, somewhat opalescent, and with a slight yellowish-brown tint. The largest piece in the collection measures roughly 190 by 115 mm. and has twelve branches. This piece is reproduced of natural size in Plate 8. The largest single branch is 90 mm. long and 32 mm. across. The branches are roughly cylindrical in shape, the larger ones are blunt-ended, the smaller ones taper towards their extremities.

Opening at fairly regular intervals over the surface of the colony are the tubes in which polypides dwell, and the substance of the test is sufficiently transparent to enable one to trace the tubes inwards for a moderate distance with the unaided eye, and to recognise the polypides within the tubes.

The margin of the opening of each tube is produced into a blunt lip, and the roughness of the surface of the colony is mainly due to these projecting lips. Each tube contains but one full-grown polypide and its buds, and does not communicate with the other tubes of the colony. The deep or blind end of the tube shows a number of thin septa, hemispherical or irregular, which

Cephalodiscus nigrescens, Lankester.

(Photograph of a portion of a colony of the natural size.)

being secreted in succession, serve to shorten the tube; the increase in the length of the tube is effected by additions of "test" to its free margin and over the whole surface of the colony. The tubes do not branch, and the length of the inhabited part of each is about 10 or 12 mm., and the width 1·2 or 1·3 mm.

The polypides are deeply pigmented and appear black to the naked eye. The pigmented cells are superficial, and are in reality brownish-yellow cells with one or two black spots of small size. The brownish-red patches which in *C. dodecalophus* are found around the oviducts, and the red curved line that passes across the buccal shield, are present also in the new species.

The polypide is about three times as long as that of *C. dodecalophus*. The length of the body from the front of the buccal shield to the end of the visceral mass is 4·5 mm., whereas in *C. dodecalophus* the corresponding measurement is 1·5 mm. The body is about 1 mm. wide, and fits fairly closely in the tube.

Each polypide has from two to nine buds of various sizes attached by longer or shorter stalks to the extremity of its stolon. The stolon is short and stout, and in most of the polypides is directed parallel to the long axis of the body, and away from the plumes.

There are 14 plumes in most of the individuals, but the number varies from 12 to 16. The axes of the plumes are broad and massive and of a black colour, and they do not terminate in the nearly spherical swellings that are found in the Challenger species *C. dodecalophus*. The pinnules are numerous and closely set, and they are not black, although microscopic examination shows that some of the pigmented cells are present on them.

The stomach is not dilated and globular as it is in *C. dodecalophus;* it possesses a pointed cæcum which passes up between the pharynx and the intestine and terminates between the gonads. The gonads consist either of two ovaries, of two testes or of an ovary and a testis. The three kinds of individuals are not distinguishable by any external features, and are not restricted in their distribution; the same branch of the colony may have male, female, and hermaphrodite individuals, and no distinction can be drawn as regards sex between the individuals found in the basal, middle and more terminal portions of the same branch.

The cœlom is divided, as in *C. dodecalophus,* into a pair of large abdominal cavities, a pair of collar cavities opening by collar pores close to the gill slits, and an unpaired cavity in the buccal shield opening by a pair of "proboscis pores" almost immediately above the stalk of the shield.

This new species of *Cephalodiscus* is clearly marked off from *C. dodecalophus* by the massiveness of the colony, the blackness and the large size of the

polypides, and the restriction of the polypides and their buds to separate tubes. I propose for it the name *Cephalodiscus nigrescens.*

EXPLANATION OF PLATE.

Photograph of the Natural Size of a Specimen of *Cephalodiscus nigrescens*, Lankester, from the Antarctic Ocean.

Experimental Researches in Vegetable Assimilation and Respiration. IV.—*A Quantitative Study of Carbon-Dioxide Assimilation and Leaf-Temperature in Natural Illumination.*

By F. Frost Blackman, D.Sc., Fellow of St. John's College, Reader in Botany in the University of Cambridge, and Gabrielle L. C. Matthaei, B.A., Fellow of Newnham College.

(Communicated by Francis Darwin, For. Sec. R.S. Received April 11,—Read April 13, 1905.)

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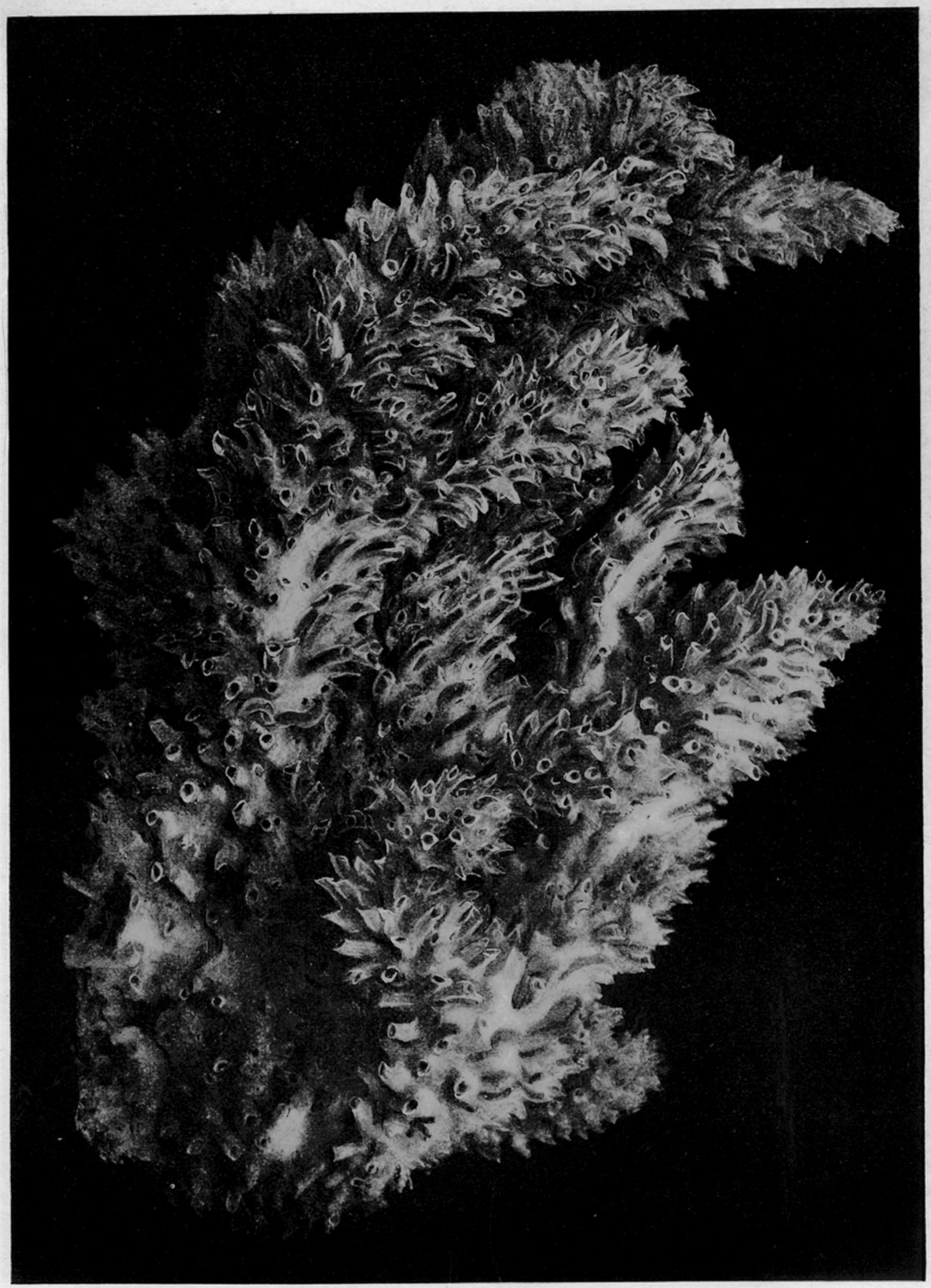
Section I.—*Introduction. Apparatus and Procedure.*

It has been made evident by the experiments recently published by one of us,* that the amount of carbon-dioxide assimilation which a leaf is actually performing, or is capable of performing, is profoundly affected by the temperature of the assimilating cells.

Neglect of this factor has been a fruitful source of confusion in attempts to estimate the effect of different intensities of light upon the process of assimilation.

* "Experimental Researches on Vegetable Assimilation and Respiration. III.—On the Effect of Temperature on Carbon-dioxide Assimilation," by G. L. C. Matthaei, 'Phil. Trans.,' B, vol. 197, 1904; to be referred to as "Assim. and Resp. III."



Cephalodiscus nigrescens, Lankester.

(Photograph of a portion of a colony of the natural size.)