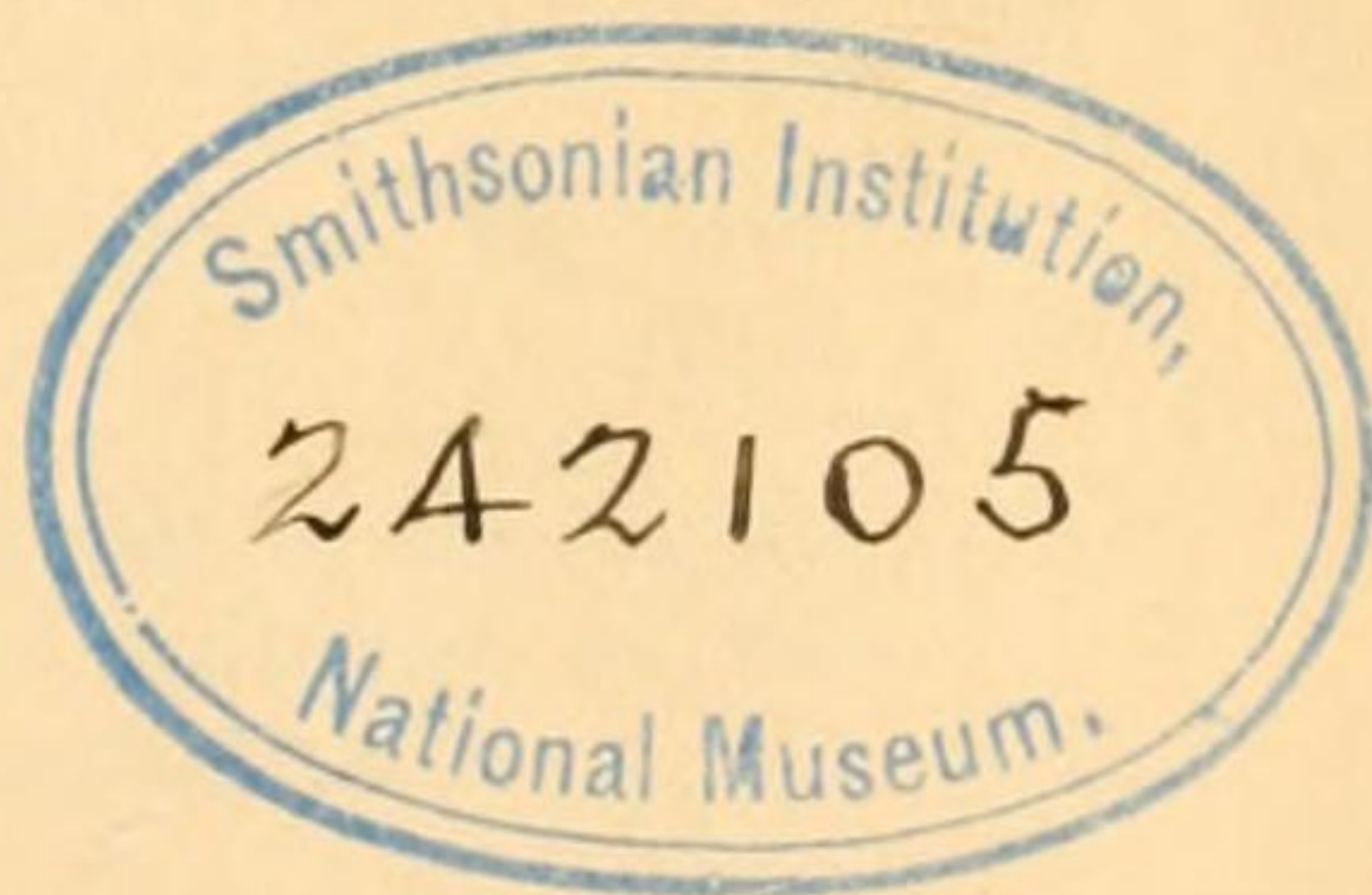


24
THE ANNALS
AND
MAGAZINE OF NATURAL HISTORY,
INCLUDING
ZOOLOGY, BOTANY, AND GEOLOGY.

(BEING A CONTINUATION OF THE 'ANNALS' COMBINED WITH LOUDON AND
CHARLESWORTH'S 'MAGAZINE OF NATURAL HISTORY.')

CONDUCTED BY
ALBERT C. L. G. GÜNTHER, M.A., M.D., Ph.D., F.R.S.,
WILLIAM CARRUTHERS, F.R.S., F.L.S., F.G.S.,
AND
WILLIAM FRANCIS, Ph.D., F.L.S.

~~~~~  
VOL. XVI.—SIXTH SERIES.  
~~~~~



LONDON:
PRINTED AND PUBLISHED BY TAYLOR AND FRANCIS.

SOLD BY SIMPKIN, MARSHALL, HAMILTON, KENT, AND CO., LD.;
WHITTAKER AND CO.: BAILLIÈRE, PARIS:
MACLACHLAN AND STEWART, EDINBURGH:
HODGES, FIGGIS, AND CO., DUBLIN: AND ASHER, BERLIN.

1895.

the opposite animal, about the region of the twenty-first somite. Each is filled with a mass of sperm that issues from the vas deferens.

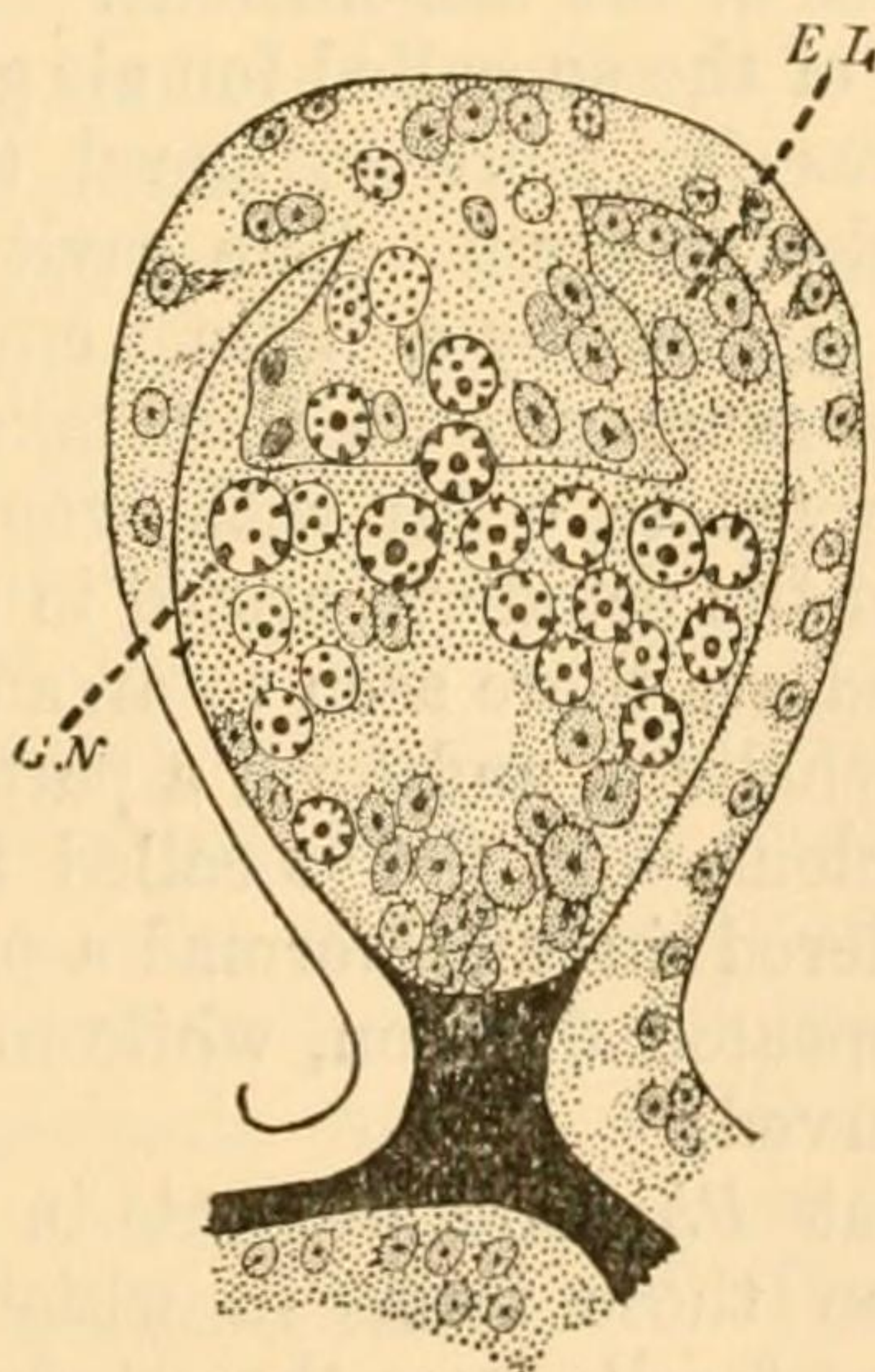
The idea advanced by Vejdovsky—that the spermatophores in *Lumbricus* are formed from the sperm-receptacles—does not hold in *Allolobophora*. A renewed study of *Lumbricus terrestris* by the above method of hardening *in situ* with boiling water and Perenyi's liquid shows that here also the spermatophores are opposite the vasa deferentia.

Until reasons for other views are given we may tentatively hold that the spermatophores in terrestrial Oligochætæ are not of the importance they assume elsewhere, but that they are to a large extent accidental results of secretions taking place during conjugation, and that they play no part in the subsequent processes leading to fertilization of the eggs.—*Johns Hopkins University Circulars*, vol. xiv. no. 119, p. 74.

Note on the Origin of the Bell-Nucleus in Physalia.

By SEITARO GOTO.

At the beginning of the present academic year Dr. Brooks kindly placed at my disposal specimens of *Physalia*, which had been collected and preserved by him some years ago, with the desire that I should make a study of them, with special reference to the nature of the so-called female gonophores (Haeckel). I also had occasion to make observations on the development of the male gonophores; and it has turned out that there is a peculiar feature in the formation of the bell-nucleus to which attention has, so far as I know, never been called. In this short preliminary note I propose to describe the process briefly. In the accompanying diagram I have



Longitudinal section of a young male gonophore.

E L, entodermal lamella; *G N*, germ-nucleus.

represented a longitudinal section of an early stage in the development of the male gonophore. In this particular specimen the

bell-nucleus forms a flattened conical mass; but in most other specimens that have come under my observation it is more elongated at this stage. The migration of the germ-nuclei have already begun. These are characterized by having their chromatic substance concentrated in a comparatively small number of large pieces, one of which usually occupies the centre of the nucleus and is larger than the rest, while the others are in most cases situated close to the nuclear membrane. The germ-nuclei are, as a rule, considerably larger than those of the ordinary entodermal cells and are spherical in form. In the accompanying diagram four germ-nuclei have already passed into the bell-nucleus, and a fifth is just passing the supporting layer.

Now the point to which I wish to call special attention is *the formation of the bell-nucleus by the wandering in of interstitial cells from the ectoderm*. This fact I believe to have satisfactorily proved, at least to myself, by a comparison of a large number of sections. I have never seen any of the definitive ectoderm-cells undergoing mitosis; but, on the contrary, the interstitial cells can be observed in all stages of migration to form the bell-nucleus. In the section from which the accompanying diagram has been drawn a stream of protoplasm could be observed around many of the migrating nuclei; and in most of the sections numerous interstitial cells with amœboid processes are everywhere present in the ectoderm of the gonophoral bud. This indicates that they are in active migration. I believe also that some of the interstitial cells divide in the gonophore, for in some sections I have observed spherical nuclei with a vesicular appearance and with a small number of large chromatin pieces. This I take to be an indication that they are undergoing reconstruction from a recent mitosis. Two such nuclei are drawn in the diagram at the entrance of the bell-nucleus.

The youngest stage of the so-called female gonophore that I have been able to obtain was far more advanced than the male gonophore represented in the diagram. The cavity of the bell-nucleus has been formed and is lined by a distinct epithelium of columnar cells. But exactly the same process that takes place in the male gonophore can be observed to occur with even greater distinctness. The interstitial cells of the ectoderm crowd in towards the entrance of the bell-nucleus, and are there seen to arrange themselves one by one into a distinct epithelium, and form a part of the lining of the cavity of the bell-nucleus. In the so-called female gonophore the cells that have wandered in and formed a part of the epithelium afterwards undergo repeated division, while in the male gonophore no such has been observed.

It seems to me that *Physalia* presents in this respect an intermediate stage between those forms in which the bell-nucleus is formed as a solid mass of cells from the ectoderm and such form as *Coryne pusilla*, in which, according to Weismann, cells migrate singly into the endoderm and there form the bell-nucleus afterwards. —*Johns Hopkins University Circulars*, vol. xiv. no. 119, p. 80.