the problem of the Golgi apparatus, and especially to the origin of the 'acrosome.' He tries to find fault with me for technical, personal, and formal reasons, but that is not the point here.

With regard to Prof. Gatenby's objections to the described origin and fate of the mitotic apparatus and to the origin of the acrosome in guinea-pig, he himself did not make any progress, but slipped into new mistakes, not understanding the true signification of the components in spermatids as described in my book and summarised in the following. The spermatids form after the second maturation division. The mitotic bodies of the prespermatids, not in the shape of 'idiozomes,' but as pedunculated bodies, transform into Golgi bodies and are soon ejected from the nuclear wall into the cytoplasm, where they disappear.

Another important process takes place in the nucleus of spermatids. By special processes the chromosomes transform into basi-chromatic particles and cast away the useless products, in shape of oxychromatic granules within the abundant nuclear enchylem and a certain number of nucleoli. The increased juice projects as a vacuole and is followed by the first two nucleoli, the substance of which dissolves and stiffens the vacuolic liquid. So the body called an 'acrosome' is formed. These nuclear processes produce a complete transformation of chromatin constitution. From the chromosomes of the earlier maturation generations all oxychromatic parts are ejected; there remains but a pure basi-chromatic substance in the shape of the smallest bodies, 'chromiols,' continuing into the mature sperms with solid protecting head cap on the front pole. Prof. Gatenby neglects this important biological fact and imputes to me the statement that "the acrosome is formed as a sort of coagulum from 'Karyochyme or nuclear liquid.'"

I fear that such untenable opinions will be repeated in future, if the pitfalls are not pointed out, to which such interpretations of the origin and signification of spermatids in *Cavia* are due. Many cytologists base their works on Meves's publication, without verifying its statements of spermatid origin. I undertook this ungrateful task, and the results will be published as an appendix to my book, with many drawings of mitotic bodies transforming into Golgi bodies. Prof. Gatenby would help to smooth the way for the solution of these important questions, if he would undertake the indispensable revision not only of Meves's, but also of his own accounts on the origin of spermatid structures and of their transition into mature sperms.

F. VEJDOVSKÝ.

Prague, Czechoslovakia.

PROF. VEJDOVSKÝ writes in his criticism of my review, "The mitotic bodies of the prespermatids, not in the shape of 'idiosomes,' but as pedunculated bodies, transform into Golgi bodies and are soon ejected from the nuclear wall into the cytoplasm, where they disappear." *There is no transformation of any substance into Golgi bodies.* The latter are there in the fœtal gonad, and can be, and have been, traced right through spermatogenesis until they are sloughed off. Prof. Vejdovský is recommended to try the Kolatchev or Da Fano methods, or the neutral red method on fresh cells.

Since my review was printed in NATURE, Dr. Voinov has sent me a paper, "Le vacuome et l'appareil de Golgi dans les cellules genitales mâles de *Notonecta glauca* L." (*Arch. Zool. Expér.*, 1927), in which he shows that the acrosome bead is formed away from the nucleus and is only deposited on the latter in the late spermatid. The same thing was shown by me many years before in the spermatogenesis of *Paludina.* In Lepidoptera, each acroblast (Golgi element) secretes its own bead on the nuclear membrane. The nucleus is not directly concerned.

More recently Dr. Jan Hirschler has sent me two important papers which show that the acrosome bead may be stained bright red in neutral red *intra vitam, and can be followed during its formation away from the unstained nucleus.* The latter does not stain until the cell is moribund or dead. Hirschler has worked on a number of mammals, and his figures support Meves's interpretations (see especially his most recent paper in the *Zeit. f. Zellf. u. mikr. Anat.*, p. 205, Abb. 1, p. 205, Abb. 2, for *Cavia corbaya*).

Nothing published before Prof. Vejdovský's "Living Matter," or since, supports his views. I ask him to study Hirschler's work, which is the most recent published, and has been carried out on fresh cells stained in Janus green and neutral red. This work, and that of Monné, also demonstrates that Parat's neutral red staining vacuome is not the same structure as stains black in Da Fano, Cajal, or Golgi's methods.

With reference to the main part of Dr. Vejdovský's letter, his nomenclature, like that in some parts of "Living Matter," makes it difficult to understand exactly what he means. It is certain that he wishes to declare that the acrosome is in some way of intra-nuclear origin. If there are subsidiary parts of this theme which I have misunderstood, I am sorry. I trust that in his promised appendix he will pay some attention to the work of Hirschler, Monné, Bowen, Nath, Hyman, Voinov, and to my own studies on *Paludina, Saccocirrus,* and *Peripatus.*

Finally, while there is little in Prof. Vejdovský's account of mammalian spermatogenesis and acrosome formation with which I can agree, his work has provided a stimulus, and will undoubtedly form the basis of much further work on the problems with which he has so long been prominently associated.

J. BRONTË GATENBY.

Trinity College,
Dublin, July 12.

The Movement of Sap in Plants.

AFTER the conclusion of his recent lecture at the University of Vienna, Sir J. C. Bose was kind enough to lend me his instruments for the repetition of some of his more important experiments in the Institute of Plant Physiology of the University. As this is the first time that his experiments have been successfully repeated in a European laboratory, the following results which I obtained will be of interest to readers of NATURE.

(1) *The Infinitesimal Contraction Recorder.*—This ingenious apparatus records the cellular contraction in the interior of the plant under external stimulation. The principle of the instrument is extremely simple; the extreme delicacy of the apparatus bears testimony to the extraordinary skill of the Indian mechanicians trained at the Bose Institute. The stem or other organ of a plant is placed between a fixed and a movable primary lever. The diametric contraction of the plant under stimulation is indicated by the movement of this primary lever, which is further magnified by optical means, the total magnification produced being a million times. The indication of the instrument is not affected by mechanical disturbances.

(2) *Sensitiveness of Ordinary Plants.*—An extremely feeble electric shock was sent through me and the plant, both being placed in the same electric circuit. The plant responded visibly by a contraction to a

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