It follows from the construction of the grab that, in the act of closing, the gap in the semicircular ends tends to become higher and reach a maximum height of about 15 cm. from the line joining the peripheral ends of the occluding sector radii. This gap in the instruments at present in use is unprotected, and since the portion of the sea-bottom taken in the instrument cannot slide freely into the cavities of the sectors due to internal obstructions and friction, the captured soil tends to pile up under the middle of the instrument and opposite the gaping ends. Consequently, there is grave danger of a portion of the surface with its contained animals becoming lost by being pushed out of the grab at the final closing strokes. The loss of soil from this cause is no doubt greater on muddy grounds than on sandy ones, but has nevertheless to be reckoned with on all types of grounds.

It follows, therefore, that quantitative estimates of animals in the sea-bottom made by using the type of grab described are in all probability too low. In using the grab for quantitative estimations of oysters, the loss of a single oyster from approximately one square foot of ground is a very serious error, and the instrument was quickly altered to the type shown in Fig. 1 by bolting thin steel plates to the sides of one sector, so that when the grab touched the bottom it actually cut into a rectangular piece of soil. This modification is, however, still open to objection where animals living *in* the soil are being sought for, and the type of grab which will pick up a definite portion of the bottom soil with certainty is one the end plates of which form a complete semicircle. In such an instrument the end plates would cut into the soil before the sector jaws reach it, and protect the gap during the whole of the closing operation.

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December 24.

The Nature of the Contractile Vacuole.

FOR some years we have been investigating the cytoplasmic bodies in the protozoa. In NATURE of March 10, 1923, we were able to give the first account of the stages undergone by the Golgi bodies in the sporozoon Adelea. A full account of this work has been published in the *Q.J.M.S.*, vol. 67, Part III., 1923. More recently M. Ph. Joyet-Lavergne (*Comp. rend.*, 1924) has described the Golgi bodies in *Aggregata Eberthi*, and *Adelina dimidiata*, confirming our account.

For some time our attention has been given to an examination of the Ciliophora and Rhizopoda, in which we have failed to discover anything which we can satisfactorily homologise with the Golgi apparatus of the metazoon.

Now, however, Dimitry Nassonov, in the *Archiv f. mikr. Anat. u. Entwick.*, Oct. 1924, publishes a large paper in which he seeks to homologise the contractile vacuole of the protozoon with the Golgi apparatus of the metazoon.

Nassonov, by means of osmic acid technique, has succeeded, as we have done in our material, in blackening the cortex of the contractile vacuole and the canals leading to it. He claims that this osmiophile membrane has the property of secreting an osmotically active substance into the lumen of the contractile vacuole, and also itself has the distinctive character of a semipermeable membrane.

Furthermore, Nassonov gives several reasons for homologising the Golgi apparatus of the metazoa with the contractile vacuole cortex of the protozoa :— first, both organellæ are not visible *in vivo*; second, their morphology is similar, both being bladders with an osmiophile wall; third, the sponge (the metazoon nearest to the colonial protist) has a Golgi apparatus which looks like a contractile vacuole; and finally, the Golgi apparatus of the metazoan cell also has the power of secreting various substances.

In the first place, Nassonov has shown that the cortex of the contractile vacuole has the power of reducing, and of becoming blackened by, osmium tetroxide. We agree fully, having succeeded ourselves in blackening this cortex in a number of ciliates. We are also not unprepared to accept some of his interpretations as to the function of this lipoid membrane.

When, however, we come to the homology of the metazoan Golgi apparatus and the protozoan contractile vacuole, we feel, at present, that there may be some grounds for doubt. The Golgi bodies in embryonic or undifferentiated metazoan cells are almost invariably associated with a centrosphere and centrosome. In the ciliates no relation between the contractile vacuole and any body similar to a centrosome can be demonstrated. The centrosphere in metazoan cells is never, to our knowledge, a bladder-like structure; the sponge Golgi apparatus lies around a centrosome, from which the flagellum arises, and there is no evidence that the centrosphere in sponge cells is more fluid than the rest of the cytoplasm—but quite the reverse.

The line of evidence that both the cortex of the contractile vacuole and of the Golgi apparatus are not visible *in vivo* need not detain us.

Similarly, the view that the cortex of the contractile vacuole and the Golgi apparatus have similar powers of secreting substances, is not one of much value. The whole discussion comes down to the fact that the metazoan Golgi body, and the cortex of the contractile vacuole, both have the power of reducing osmium tetroxide. There are a number of lipoid substances which share this power, and much attention should not be given to this faculty alone.

Coming down from pure hypothesis to facts, what we know at present is this : a perfectly normal Golgi apparatus has been shown to exist in certain Sporozoa —in Adelea, Coccidium, Aggregata, Adelina, and Haplosporidium. The methods used for this demonstration have not succeeded so far in revealing a similar structure in any ciliate, though the contractile vacuole cortex can be blackened by osmic acid. In this laboratory we have tried amœbæ, and many ciliates both free living and parasitic, and we have come to the conclusion that a Golgi apparatus probably does not exist in the Ciliophora and Rhizopoda examined by us.

Finally, we prefer to believe that the Golgi apparatus arose in some primitive flagellated organism in direct association with the blepharoplast.

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The Interaction between Silica and Electrolytes in its Relation to Theories of Soil Acidity.

IN a note to NATURE (Dec. 2, 1922) some experiments were described in support of a theoretical explanation advanced in an earlier paper (*Phil. Mag.*, vi. 44, 338-45) regarding the nature of soil acidity. Joseph and Hancock (T. 1923, 123, 2022), however, state that " pure silica produces no effect on a solution of an acid," and that the adsorption we reported " would not be observed if the silica were more highly purified." We have since repeated our experiments