medium.[2] On May 5, 1938, 0.1 cc of a positive culture was inoculated on the chorio-allantoic membrane of each of 10 eggs, incubated for 10 days, according to the method of Goodpasture and Buddingh.[3] Transfers were made every 4 or 5 days. To effect a transfer, 2 or 3 membranes were triturated in a mortar with Alundum and Locke's solution to make a 10 per cent. suspension. For the inoculation of each egg, 0.1 cc of this preparation was dropped on the presenting ectodermal surface of the chorio-allantois.

The spirochetal organisms were carried through 20 successive passages in the developing egg. After each fifth passage, 1 cc of the "transfer inoculum"—the 10 per cent. suspension of triturated infected membranes—was injected subcutaneously into each of 2 guinea pigs. In every instance, the inoculated guinea pig developed fever within 4 or 5 days and became jaundiced. The infection was uniformly fatal in from 6 to 8 days. At autopsy, the characteristic findings of experimental Weil's disease in guinea pigs were encountered. Jaundice of the skin, jaundice and hemorrhages in the subcutaneous and cartilaginous tissues and hemorrhages in the lungs and abdominal viscera were typical.

The organisms were seen by the darkfield technic in centrifugalized "transfer inoculum" and in the amniotic fluid.

After inoculation on the chorio-allantois, the organisms regularly invaded the embryo. The resulting generalized infection killed the embryos in 6 or 7 days. The organisms have been recovered from the blood of the embryos and from various tissues by the inoculation of these materials into guinea pigs. It has been found that 0.15 cc of blood from the allantoic artery contain sufficient spirochetes to kill guinea pigs within the usual period.

Grossly, the membranes showed scattered, grayish, opaque, pin-point nodules. Microscopically, the nodules were seen to be the result of a localized proliferation of ectodermal cells, and of edema, proliferation of the fibroblasts and infiltration of a few inflammatory cells in the mesoderm. Sections of infected chorio-allantoic membranes and embryos, stained according to the silver impregnation technic of Levaditi, revealed the presence of *Leptospira icterohemorrhagiae* in both the membranes and embryos.

In summary, it has been shown that *Leptospira icterohemorrhagiae* can be successfully cultivated in the chorio-allantoic membrane of the chick embryo. The organisms produced a generalized and fatal infection in the developing chick. After 20 serial passages in the embryonic tissues, the pathogenicity of the spirochetes for guinea pigs was unaltered. Indeed, virulence may have been enhanced. An attempt is being made to grow other members of the family *Spirochetales* by this method.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

AN IMPROVED APPARATUS FOR THE SERIAL SECTIONING OF FOSSILS

IN 1933 Simpson (*Amer. Mus. Nov.* No. 634) described a very simple method of producing serial sections of fossils to which the reader is referred for the actual technique. Without claiming to introduce something essentially new it is suggested that the apparatus then described is capable of certain improvements, making it less delicate to handle, and at the same time increasing its accuracy. The number of components is even smaller, and the actual execution is still within the scope of any mechanic provided with an ordinary instrument-maker's lathe. The overall length of the new design is greater than that of the original construction, which may even be an advantage affording a better grip. This greater length is due to the holder being extended to carry a millimeter scale above the threaded portion, the pitch of the thread being one mm. The sleeve on its conical upper end is divided into 100 parts, the two scales together forming a micrometer reading to 0.01 mm. This arrangement prevents the locknut being placed above the sleeve. Instead it has been placed inside the latter and is made in one piece with the guide. Its lower edge stands 0.5 mm behind the lower edge of the sleeve. A suitable spanner with two studs fitting the two holes in the lower rim of the guide (locknut) is used for tightening it. If a right-hand thread is used the scales should read in the direction given in the diagram.

The advantages claimed are the following: absence of the delicate pointer, which is easily bent; the threads are covered and thus protected from injury; the scale is an integral part of the sleeve, doing away with the sticking on of a paper-scale; mistakes in taking the readings are less to be feared.

In order to reduce wear of the lower edge of the sleeve a ring could be shrunk on to it, either of hardened steel, or better still, of one of the modern cutting metals like Stellite, Acrite, etc. In this case it might be necessary to use kerosene oil instead of water for

[2] W. Fletcher, *Trans. Roy. Soc. Trop. Med.*, 21: 265, 1928.

[3] E. W. Goodpasture and G. J. Buddingh, *Amer. Jour. Hyg.*, 21: 319, 1935.

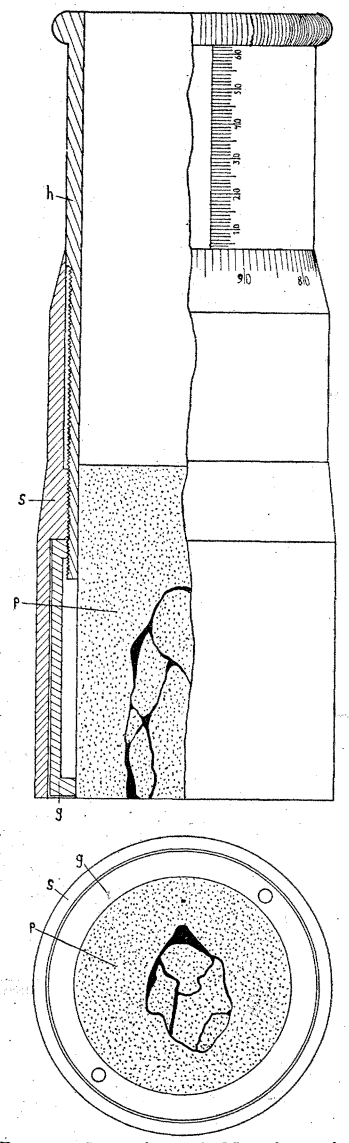

FIG. 1. Improved specimen holder for grinding serial sections. The upper figure represents, to the right, a lateral external view of the apparatus, and, to the left, a longitudinal section. The lower figure represents an end view. Both show a plaster block, with embedded specimen, in place at a stage when a section has just been completed. About one half natural size. g, guide for the plaster block, also serving as set-screw. h, holder. p, plaster block with specimen. s, sleeve.

the cleaning of grinding stone and specimen in order to prevent rust.

OTTO ZDANSKY

A MICRO-CONDUCTIVITY CELL OF SIMPLE DESIGN[1]

IN some recent studies of the rate of elimination of materials by the excretory system of insects, we have made use of the change in electrolytic conductivity of the physiological salt solution bathing the malpighian tubules as an indicator of change in overall salt concentration.

Since the volume of liquid was only about 20λ, it was necessary to use a conductivity cell of 10λ volume or less. While several micro-conductivity cells have been described,[2] they are not easily constructed, and they do not have the advantages of the pipette type in ease of filling and cleaning. Fig. 1 shows the complete cell, right, and a detail of the electrodes, left. For construction, pyrex capillary tubing of about 0.7 mm bore was broken cleanly and one of the cylindrical platinum electrodes with the lead attached was inserted and shaped to fill the tube, using a finely drawn glass rod as a tool. The two pieces of capillary were then reunited in a soft oxygen flame, taking care that the platinum cylinder completely filled the bore of the tube. The tube was then broken again at a second point and the second electrode was inserted in the same manner. Finally, the tip and safety bulb were formed, and the electrodes were ready for platinizing.

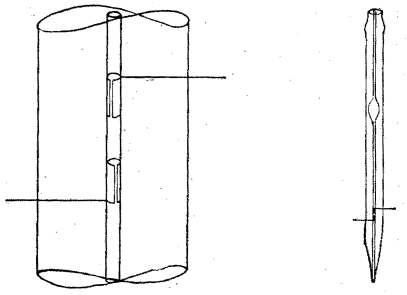

FIG. 1

A cell, as described, will have a resistance of about 2,000 ohms when filled with 1 per cent. NaCl solution. The cell resistance is accurate to 0.1 per cent. at constant temperature.

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[2] See, for example, H. L. White, *Jour. Biol. Chem.*, 99: 445, 1933.

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