the body. These superficial sense organs are circular hillocks projecting slightly above the surface and surrounded by moat-like depressions in the epidermis. They are typical sense-organs with central, pear-shaped sensory hair-cells and more peripheral, non-sensory, supporting cells. The latter possess striated surfaces and show well-marked terminal bars between their tips. Numerous mucous cells are present in and around the moat. On the surface of the organ is the cupula, an elongated cone of gelatinous material.

Live fish were immersed in a dilute solution of methylene blue in tap water over night in order that the sense organs might be more easily located. The cupulae were unstained in these specimens and were seen as projections from the surface of the blue-tinted lateral-line organs. The tip of the cupula, however, often appeared blue, because of the staining of adherent mucus and particles of dirt. The diameter of the cupula is about that of the free surface of the organ. They vary in length, sometimes being as long as they are wide, but more often three or four times their diameter. The shorter cupulae are of the consistency of a stiff jelly and are firmly attached to the summit of the organ. After their tips had been pressed to one side with a needle they quickly returned to a vertical position as if made of an elastic material. The longer ones were less stiff and swayed to and fro with the movements of the water. The material was transparent, but when examined in the fresh condition showed vertical striations throughout its length, *i.e.*, at right angles to the surface of the body. These striations were longer than any of the hairs observed on the lateral sense cells. The source of the cupular material was not definitely determined. The supporting cells gave no evidence of secretory activity, while the sensory cells frequently contained numerous granules. However, it was not possible to relate directly the presence of granules to cupula formation.

The occurrence of this structure was irregular. Many fish showed no cupulae. Frequently they were observed on some organs but were absent from others on the same animal, and in a few cases cupulae were observed on every lateral line organ on the surface of the body. In most instances they were found on animals which had been kept in fresh water for several weeks.

Fixed and stained cupulae were also studied. In most cases there was a small space between the outer surface of the organ and the inner surface of the cupula, as if the latter had shrunken during fixation. In sections at right angles to the surface of the body the longitudinal striations described above were visible, and occasionally delicate cross striations could also be seen. The latter were not as closely or regularly spaced as the longitudinal ones. Due to the shrinkage of the cupula, its normal relation to the tips of the cells could not be determined. In cross sections, *i.e.*, those parallel to the surface of the body, the longitudinal striae were shown to be the boundaries of minute spaces or canals in the cupular material. This is similar to the condition described for the crista ampullaris of the ear by Shambaugh and others.

Both in structural detail and in their characteristic association with a sensory epithelium, the cupula of the lateral-line organs in Fundulus and the cupula of the crista ampullaris are strikingly similar. The implications are obvious, especially in the light of the theory of the phylogenetic derivation of the inner ear from a portion of a primitive lateral-line system, and suggest further that the classical descriptions of the cupula of the ampulla are not entirely products of histological fixation as some recent studies imply.

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THE LIFE HISTORY OF A POULTRY CESTODE

AN ant, *Tetramorium caespitum* Linné,[1] has been demonstrated as an intermediate host for *Raillietina echinobothrida* (Mégnin, 1880), Railliet, 1921, a tapeworm of common occurrence in poultry. Cysticercoids, which were obtained from ants collected in a poultry yard of the Zoological Division, National Research Center, Beltsville, Maryland, were fed to 3 laboratory-reared chickens. These birds were fed, respectively, 15, 12 and 3 cysticercoids and at necropsy there were recovered, 10, 8 and 2 specimens of *Raillietina echinobothrida,* respectively. Except for these cestodes, both the infected birds and 4 controls were free of helminths. No nodules in the intestinal wall, which are frequently associated with *R. echinobothrida,* were present. One bird passed gravid segments in 19 days after the first feeding of cysticercoids and another passed segments 20 days after the feeding; the third bird was killed before the worms had completed development.

Cysticercoids which were measured as living material, not under a cover slip, were approximately ellipsoidal and varied from 338 μ by 193 μ to 384 μ by 272 μ in size. The larval scolex, enclosed by the cyst walls, was armed with hooks on the rostellum and on the suckers, the hooks being similar to those of the adult worm. Neither the 6 embryonal hooks nor a caudal appendage were observed. The cysticercoids were found in 12 out of 314 specimens of *Tetramorium caespitum* (approximately 4 per cent.) which were collected in the previously mentioned poultry yard

[1] Identified by Dr. W. M. Mann, Smithsonian Institution.

during August, 1935. Cysticercoids were located in the abdomens of the ants; 11 ants contained 1 to 3 cysticercoids and one ant harbored 8. *Tetramorium caespitum* is cosmopolitan in distribution and has such varied feeding and nesting habits that its control may be a difficult problem.

Previously, snails have been considered as intermediate hosts for *R. echinobothrida,* but on a morphological rather than an experimental basis. Direct development also has been reported, but confirmation of this is lacking; however, development involving an intermediate host does not preclude the possibility of a direct development.

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SULFOCYANATE TREATMENT OF MANGE IN GUINEA PIGS

THE problem of controlling mange in my colony of guinea pigs has been difficult for several years, due to the fact that infected dogs have been brought to the school from time to time. Sulfur remedies ("flowers of sulfur," resorcinol, and lard or lard substitute) have been effective in most cases, but they have certain disadvantages: (1) time required for preparation; (2) time required for applying; (3) difficulty of getting the materials in contact with the skin; (4) expense. If the disease had been of long standing so that the animal had lost most of its hair on the sides and hips, it was almost impossible to effect a cure. Such animals often lost weight and finally died.

Lauryl sulfocyanate,[1] the compound being used as an insecticide, was selected as a posisble remedy for the mange. The pure compound was dissolved in cottonseed oil and a 2 per cent. solution was used for the tests. The solution was easy to apply and it proved to be a quick and effective remedy. Because of the cost of the pure compound, a technical preparation, which is being sold under the trade name "Loro,"[2] was also tested for its effect upon the mange. This preparation consists largely of lauryl rhodenate (sulfocyanate), but contains a certain amount of rhodenates of octyl, decyl, myristyl and cetyl alcohols. The "Loro" contains 50 per cent. of the active ingredients, the remainder being an emulsifying and wetting agent which enables one to use it in aqueous solution. A 5 per cent. aqueous solution of this preparation was applied by means of a rubber sponge. This solution also proved to be effective in the control of mange in the guinea pig. It was used on several guinea pigs that had not recovered after several applications of the sulfur preparations and all recovered after two treatments.

If any of the above remedies are applied in cold weather, it is well to keep the animals in warm quarters, since these preparations have a tendency to cause the hair to separate into small bunches, thus allowing the animal to chill easily.

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SCIENTIFIC BOOKS

FARADAY'S DIARY

Faraday's Diary. Edited by THOMAS MARTIN, M.Sc., and published by order of the Managers of the Royal Institution of Great Britain, with a Foreword by Sir William H. Bragg, O.M., K.B.E., F.R.S. G. Bell and Sons, Ltd., London, Vols. VI, VII and Index.

WITH these volumes this important work is completed. The earlier volumes were reviewed in SCIENCE of January 13, 1933, and of August 23, 1935. The volumes are sold only in sets, at the price of twelve guineas the set.

The highest praise can be given to the way in which this great task has been executed. The editor and his assistants, the publishers and the Managers of the Royal Institution deserve the warmest thanks and commendation from the scientific world.

Volume VI opens with the continuation of Faraday's study of magnetic lines of force, which was begun in the previous volume. This concept of lines of force was his most important contribution to physical theory. It directed attention to space or to a medium in space as the seat of the electric or magnetic actions exerted between bodies. When taken up by Maxwell and put into mathematical form it proved to be able to account for most of the phenomena then known and to predict others which were afterwards experimentally verified.

The rest of the volume contains many experiments, mostly on the magnetic properties of bodies. In particular, there are tests of various substances for paramagnetism or diamagnetism, and a study of magnecrystallic action made with a torsion balance. Trials made to discover an action of the magnetic field on the spectrum and the production of electricity by the passage of light through crystals yielded no results.

Volume VII contains a long study of the relations of gold and other metals to light, also an attempt to

[1] Roger Adams, University of Illinois, Urbana, furnished the pure lauryl sulfocyanate.

[2] The Grasselli Chemical Company, Cleveland, supplied the "Loro."