

3500 square miles, I have so far received 250 records in which the time is given, from the outer sound-area of about 5700 square miles 223 records (including 122 from Norfolk and fifty-six from Lincolnshire), and from the zone of silence of about 4500 square miles only one, and that one close to the sea. The greatest distance to which the sound-waves penetrated is about 121 miles.

A remarkable feature about these records is that, though all of them have been sent in reply to my newspaper letters (and therefore sent as it were at random), they are almost as thickly grouped near the boundaries as near the centres of the two areas. There is none of that increasing sparseness of records near the boundary which is so characteristic of earthquake investigations. It would seem as if the boundary were determined, not by the sound-vibrations becoming inaudible, but by the absence of sound-vibrations from the area beyond. It may be of interest to add that, at a large number of places, pheasants showed signs of alarm, as they did during the North Sea battle of January 24, 1915.

May I, in conclusion, state how glad I should be to receive (address: 16 Manor Road, Edgbaston, Birmingham) further accounts of the explosion, and especially *negative* records? Observations on the direction of the surface and upper winds would be of great value.

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RECENT PAPERS ON PARASITES.

ONE of the most notorious of protozoan parasites at the present time is the microsporidian *Nosema apis*, which, since the well-known researches of Drs. H. B. Fantham and Annie Porter in 1912, has been generally regarded as the cause of "Isle of Wight disease" in hive-bees. In the Proceedings of the Royal Physical Society of Edinburgh (vol. xx., part 1) two papers have lately appeared in which this conclusion is called in question—one by John Anderson, the other by the same author in collaboration with Dr. John Rennie. Stress is laid on the possibility of bees heavily infested with *Nosema* showing no symptoms of the disease; this condition was recognised by Fantham and Porter, who attributed it to immunity in certain strains, and directed attention to the danger caused to other bees by such "carriers." On the other hand, an epidemic of disease among bees on Deeside with all the characteristic "Isle of Wight" symptoms appeared to be unaccompanied by any trace of *Nosema* in the affected insects. It may, of course, be retorted that the parasites were present in inconspicuous stages and in relatively small numbers, as Fantham and Porter concluded to be the case in similar instances observed by them. Anderson and Rennie, however, "are unable to recognise any causal relation between the presence of this parasite and the disease," though it "may be a contributing weakening factor favouring in certain cases the development of the disease." It may be doubted if the authors sufficiently recognise the possibly deadly effects, on certain strains of bees; of parasites so few in number as to escape observation.

Students of the Sporozoa will read with more than usual interest Dr. Howard Crawley's paper entitled "The Sexual Evolution of *Sarcocystis muris*" (Proc. Acad. Nat. Sci., Philadelphia, lxviii., part 1), in which the early development of the parasites in the intestinal cells of the mouse is described with numerous figures. The spores swallowed by the mouse reach the hinder-end of the small intestine within an hour and invade the epithelial cells. Some spores then undergo a great enlargement of the nucleus and degeneration of the cytoplasm, while others remain much as when they entered the cell, becoming, however,

relatively shorter and broader than the original spores; the author regards the former as male and the latter as female gametes. From six to fifteen hours after penetration chromatin granules separate from the nucleus and are absorbed by the protoplasm; this process is interpreted as maturation. "Finally, in the eighteen-hour stage, macrogametes may be found which in some cases show minute, thread-like bodies upon their surfaces, and in others contain within their substances small, solid chromatic bodies, one in each case. These appearances are regarded as warranting the interpretation that fertilisation takes place." Dr. Crawley's work goes far to establish the existence of a sexual phase in the sarcosporidian life-cycle, but it appears to fall short of demonstration.

In the Proceedings of the U.S. National Museum (vol. l., No. 2131) an important systematic paper on "Nematode Parasites of the Rodentia and Hyracoidea" has been published by Maurice C. Hall. Most of the species described are illustrated by clear structural figures, and there are diagnoses of the various classificatory groups, so that the paper will be of much value to students. In the class-diagnosis of the Nematoda it is rather surprising to find no stress laid on the entirely epithelial nature of the intestinal wall or on the anomalous character of the body-cavity.

Several papers on parasites are to be found in the lately issued third and fourth reports of the director of veterinary research for the South African Union Department of Agriculture (Pretoria, 1916). Sir A. Theiler and W. Robertson describe the life-history of *Trichostrongylus douglasi*, a nematode parasite of the ostrich, somewhat unfortunately called a "wireworm." The four larval stages are carefully distinguished, and it is shown that the young worm can survive and become mature in the bird's stomach only when swallowed in its late second stage. No evidence that the worms ever enter through the skin could be obtained. Dr. F. Veglia contributes an exhaustive paper on "The Anatomy and Life-history of *Haemonchus contortus*," a well-known strongylid parasite of the stomach in ruminants; in this memoir a number of structural and bionomic details are recorded. The photographs and careful drawings illustrating these reports are reproduced in excellent style; it is all the more disappointing to find that for the letterpress of these valuable zoological papers a cheap contract method has apparently been adopted by the South African Government which recalls the worst traditions of our Home Stationery Office.

THE LOUTREUIL FUND.

GRANTS FOR SCIENTIFIC WORK.

IN the *Comptes rendus* of the Paris Academy of Sciences for November 27 is given the report of the council of the Loutreuil Foundation. The grants allotted are divided into three groups, as follows:—

I. ESTABLISHMENTS MENTIONED BY THE TESTATOR.—
(1) Museum of Natural History. 2000 francs to Prof. Louis Roule for the continuation of his researches on the migratory fishes of French marine and fresh waters, the Salmonideæ in particular. 10,000 francs for refitting the maritime laboratory of the Island of Tatihou at Saint-Vaast-La-Hougue. This laboratory has been used as a concentration camp since the outbreak of war, and considerable damage has been done. (2) The Collège de France. 700 francs to E. Gley to complete the frigorific installation for which an allocation was made last year. 4350 francs to Prof. Nageotte for the purchase of apparatus for pursuing his studies on the regeneration of nerves. 4000 francs to M. l'Abbé Rousselot for continuing and developing the experiments commenced by him on locating artillery by