Fig. 2

Utilization of the diffusion chamber technique is suggested as a possible approach to immunological studies requiring *in vivo* isolation of animal parasites.

This investigation was supported by a research grant, G 14342, from the National Science Foundation.

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Transatlantic Journey of a Tagged Cod

ALTHOUGH cod (*Gadus morhua*) populations in the North Atlantic form more or less discrete stocks, many tagged cod have travelled long distances, for example, between Iceland and Greenland, from Iceland to the Faeroes, and the Faeroes to the North Sea¹, and from Bear Island to Iceland and Greenland². Since 1956 more than 4,000 cod have been tagged in the central North Sea from English vessels, and until this year none had been returned from outside the North Sea. On January 4, 1962, the Lea-type tag³ No. 1137 which had been attached by a monofilament nylon loop between the first and second dorsal fins to a cod caught on the North-west Rough (central North Sea, 55° 6' N., 1° 24' E.) on June 9, 1957, was handed to Mr. G. R. Williamson by a member of the crew of the Polish stern trawl factory ship *Kastor* at St. Johns, Newfoundland, as having been caught on the Grand Banks. At the time no special significance was attached to this fish, as it was presumed to have been tagged in the Newfoundland area. When the exceptional movement was known, further inquiries were made through Mgr. Jozef Wolek, director of the Polish Sea Fisheries Institute, Gdynia, who visited the ship and interviewed the fishermen. They confirmed that the fish was caught on December 7, 1961, on the north-eastern slope of the Grand Banks (47° 54' N., 47° 54' W.) in 300–320 m., as witnessed by several fishermen, including the second mate. The fish was still alive, with the tag attached normally, and was measured before the tag was removed and the fish sent for filleting and freezing. It had grown from 57 cm. total length when tagged to 75 cm. when recaptured. In the North Sea a 60-cm. cod might

grow 15 cm. a year, but on the north-east slopes of the Grand Banks only about 3 cm. a year.

It is impossible to make more than a guess at the route by which the fish moved. The shortest route around the north of Scotland is a distance of more than 2,000 miles, which would be one of the longest distances travelled by a tagged cod, if not the longest, though it would be by no means impossible in the four and a half years since tagging. It is more probable that the fish travelled via the Faeroes, Iceland and Greenland, or even farther north.

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Cultivation of *Eisenia foetida* (Sav.) Free from Infection with Acephaline Gregarines

A PLENTIFUL supply of earthworms known to be free from any infection by acephaline gregarines is required for the examination of the mode of transmission of these parasites. Vigorous cultures of *Eisenia foetida* (Sav.) free from any gregarine infection were successfully established by means of the following technique.

Cocoons gathered from laboratory cultures of the wild host worm were washed thoroughly for 15 min in a flour sieve with a strong jet of water, and then surface sterilized in Nance's solution (0.1 per cent mercuric chloride in 0.5 per cent 'Teepol') for 1 min. They were then washed again for 5 min and finally placed in non-infective soil. The latter was contained in metal biscuit tins holding some 10 lb. of moist soil and having a layer of activated animal charcoal at the base. Each container received 50 cocoons before being set aside, with the lid replaced, to allow the worms to develop. The main difficulty experienced was the preparation of soil which was non-infective, but which would yet support the normal growth of worms from the cocoons. This was finally achieved by first sterilizing the soil in the biscuit tins and then recolonizing it with as many of its living constituents as possible without re-admitting gregarine sporocysts.

The soil was autoclaved, already in the biscuit tins, for 3 h at 60 lb./in.². Sterility was judged to be complete when attempts to culture fungi on 'Dox' agar and bacteria on nutrient agar from soil inocula failed. (It appeared that the type of soil used was of some importance, the most successful being a light friable loam, the least, a mixture containing dung.) The sterilized soil was now inoculated with a crumb of normal soil in order to re-introduce living constituents. In order to prevent the re-entry of gregarine sporocysts this inoculum was packed into the middle of a glass cartridge (open at both ends) between two firm plugs of sterilized soil (Fig. 1). Soil organisms capable of growth or movement would gradually recolonize the sterilized soil, while any gregarine sporocysts, being non-motile, would remain inside the cartridge. The latter was removed intact 4–6 weeks after implanting, at which time profuse growth of common soil fungi and bacteria could be obtained by plating suspensions of the remaining soil on appropriate media. Even so, such soil would not support