weekly group receiving a slightly lower dose in order to maintain similar skin reactions in the two groups.

A large number of the cases assessed has been followed up for more than 10 years. At no time has there been any apparent difference in the late radiation effects, such as fibrosis, atrophy or telangiectasis, between the patients treated three times weekly and those treated five times weekly with the doses mentioned. Close observations at follow-up have not, so far, revealed that curtailed fractionation has apparently influenced survival times and recurrence free rates; it is hoped to publish with fuller details the results of some further investigations into this at a future date.

J. A. C. Fleming
G. Wiernik

Department of Radiotherapy,
St. Thomas' Hospital,
London, S.E.1.

[1] Coutard, H., *Amer. J. Roentgenol.*, **28**, 313 (1932).
[2] Barth, G., Bohmer, D., and Wachsmann, F., *Strahlentherapie*, **109**, 599 (1959).
[3] Barth, G., Graebner, H., and Wachsmann, F., *Strahlentherapie*, **112**, 280 (1960).
[4] Mallender, L. J., *J. Faculty Radiol.*, **1**, 267 (1950).
[5] Churchill-Davidson, I., and Johnson, E., *Brit. Med. J.*, i, 1465 (1954).
[6] Fowler, J. F., Morgan, R. L., Silvester, J. A., Bewley, D. K., and Turner, B. A., *Brit. J. Radiol.*, **36**, 188 (1963).
[7] Fleming, J. A. C., Filbee, J. F., and Wiernik, G., *Brit. J. Radiol.*, **34**, 713 (1961).

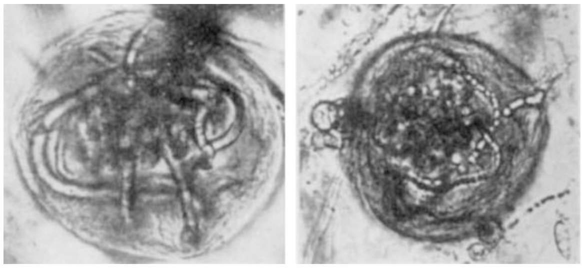
BIOLOGY

Effect of Certain Soil Organisms on the Eggs of Parasitic Roundworms

The influence of biological factors on the development and viability of eggs of parasitic roundworms (geohelminths) in soil has not yet been sufficiently explored. It is known that some fungi are able to attack free-living Nemathelminths[1-3]. It has also been shown that some fungi can attack larvæ of *Strongyloides* from horses and larvæ of *Trichostrongylides* from cattle[3]. Some fungi are also capable of inhibiting the development of eggs of ascarids *in vitro*[4]. Gudzhabidze and Preobrazhenskaya[5] performed experiments on *Ascaris* eggs by influencing them with micro-organisms, which had been isolated from the soil specimens from sewage farms. Certain species of actinomycetes and soil bacteria were capable of exerting a depressing effect on the eggs of ascarids.

I have attempted to ascertain whether in open fields the eggs of human parasitic geohelminths are influenced by organisms which are living in the soil and to what extent. I carried out my experiments in the following way: on the specimens of the soil with fæcal pollution (human or animal) I placed small piles of fertilized and unfertilized eggs of ascarids from pigs. Organisms from the soil to which the *Ascaris* eggs produced favourable conditions of life broke from the soil through the piles of eggs and profusely multiplied there. These organisms either inhibited the development of *Ascaris* eggs or even destroyed them.

On some piles of *Ascaris* eggs Acari and Collembola multiplied considerably. Acari: *Rhyzoglyphus* sp. (Claparède 1869), *Sancassania tschernyschevi* (Zachvatkin), *Annoetus ferroniarum* (Dufour 1939) and *Fuscuropoda marginata* (Koch 1939); Collembola: *Hypogastrura* (*Ceratophysela*) *denticulata* (Bagnall 1941), *Hypogastrura* (Hypogastrura) *vernalis* (Carl 1901), *Folsomia candida* (Willem 1902) and *Folsomia candida* var. *distincta* (Bagnall 1939). Acari from the family Acaridae (Tyroglyphidae) were especially capable of consuming a large quantity of ascarid eggs. For example, in one experiment 5 adult individuals of Acari were put on 0·5 g ascarid eggs. At the end of this experiment, which lasted 32 days, these Acari multiplied in 58 adult individuals and a very large number



a b

Fig. 1. Eggs of ascarids broken through by the fungus *Fusarium redolens* Wr.

of larval stages. In the course of this experiment the Acari consumed 0·38 g of eggs.

Besides these soil animals various species of fungi and soil bacteria penetrated into the *Ascaris* egg piles. Some of these organisms destroyed the morphological structure of the eggs. Numerous experiments were made with isolated clear cultures of these fungi. The eggs were destroyed especially by two species of fungi: *Fusarium redolens* Wr. and *Cephalosporium* sp. Both these fungi have already been described by other authors as parasites on free-living Nematoda in the soil. These fungi penetrated the eggs, consumed their contents so that only deformed thin eggshells remained (Figs. 1*a* and *b*). The eggs were also destroyed by other species of fungi and even bacteria. The isolated organisms, however, soon lost their biological activity after having grown for a short time in the artificial medium.

In this communication I wish to direct the attention of parasitologists who are engaged in the problem of cleaning soil of eggs of pathological nematodes to the fact that the development and the length of viability of these eggs in the soil are influenced not only by physical and chemical factors but also by some animals and fungi which live in the soil.

I thank Dr. O. Fassatiová, Faculty of Natural Sciences, Charles University, Prague, for her assistance in identifying the fungi, Mr. J. Nosek, Virological Institute of the Academy of Sciences, Bratislava, for his assistance in determining the Collembola, and Dr. K. Samšinák, Biological Institute of the Czechoslovak Academy of Sciences, Prague, for his assistance in identifying the species of Acari.

Hynek Lýsek

Department of Biology,
Medical Faculty Palacký University,
Olomouc, Czechoslovakia.

[1] Balfour, E. B., *The Living Soil* (Faber and Faber, Ltd., London, 1946).
[2] Duddington, C. L., *The Friendly Fungi* (Moscow, 1959) (in Russian).
[3] Dollfus, R. P., *Parasites/animaux et végétaux/des helminthes* (P. Lechevalier, Paris, 1946).
[4] Lýsek, H., *Scripta Medica Fac. Med. Univ. Brunensis et Olomoucensis*, **31**, 345 (1958); *Acta Universitatis Palackianae Olomucensis*, **23**, 65 (1961).
[5] Gudzhabidze, G. Sh., and Preobrazhenskaya, T. P., *Med. par. i par. bol.*, **28**, 400 (1959).

Influence of Mechanical Damage on Opaline Silica Deposition in *Molinia caerulea* L.

In our microscopic investigations of opaline silica bodies in the leaves of a large number of British grasses[1], we have found that where leaves were already bruised or torn before being taken from the tiller or culm, the epidermal preparations made from them often showed abnormalities in the degree and pattern of deposition of silica. It was therefore decided to investigate the effects of various kinds of deliberate damage. *Molinia caerulea* was chosen for preliminary experiments because the silica pattern in this grass had been examined in some detail by us, and opal had been found in a variety of its epidermal