Of Ants and Men (an Antology)
(See page 78 for the Photo Quiz)

Figure 1. A *Dicrocoelium dendriticum* egg. The dark brownish egg is thick-walled and relatively small when compared with other helminthic eggs found in human feces (size, 40 μm × 20 μm). A not-very-prominent operculum is marked by arrows (original magnification, ×20).

Figure 2. A hatching *Dicrocoelium dendriticum* miracidium from the patient’s stool sample (original magnification, ×20).

Diagnosis: *Dicrocoelium dendriticum* infestation

The adult trematode *D. dendriticum*, or lancet fluke, lives in the gall bladder and bile ducts of their final hosts (ruminants—in particular, sheep). *D. dendriticum* eggs (figure 1), which are passed in the feces of the final host, are swallowed by terrestrial snails. In these primary intermediate hosts, miracidia develop into cercaria within 3–4 months. A hatching miracidium from the patient’s stool sample is shown in figure 2. Subsequently, the cercaria are excreted by the infected snails in “mucus balls.” These mucus balls are eaten by ants, and the swallowed cercaria settle in the suboesophageal ganglion of the ants. This ironically named, so-called “brainworm” affects the behavior of its secondary intermediate host dramatically; instead of returning home when the daytime temperature falls, the “brainwashed” ant ascends to the tip of a blade of grass. There, it clings in a state of tetania of its mandibular muscles to the vegetation and, thus, becomes an easy victim for herbivorous sheep and cattle, the definite hosts of *D. dendriticum*. In the intestinal tract of their mammalian host, metacercaria excyst from the ants and develop into young flukes, which migrate through the common bile duct into the liver. There, the adult dicrocoelia produce eggs (figure 1), thus completing their complex life cycle [1].

After ingestion of infected ants, humans may also become final hosts. This, however, is a quite rare phenomenon. In the vast majority of cases, the appearance of *D. dendriticum* eggs in human feces is due to ingestion of raw or half-cooked liver of infected animals (e.g., sheep). For example, in a study involving 208 patients from Saudi Arabia with *D. dendriticum* eggs in stool samples, only 7 patients had true infection [2]. Similarly, in an additional study from Saudi Arabia involving 1196 parasitologically investigated patients, only 32 of 121 patients with *D. dendriticum* eggs detected on microscopic examination of stool samples had true dicrocoeliosis, as determined by examination of additional stool samples obtained.
after 3 days of a liver-free diet [3]. In 77 egg-positive Swiss patients, no true infection was diagnosed [4]. Such a spurious infestation, or pseudoparasitism, seems unlikely in our patient, because she denied having eaten animal liver in the past. However, examination of a control stool sample was not possible, because our patient was lost to follow-up.

Dicrocoeliasis is found in America, Asia, Europe, and Northern Africa. In some parts of Central Europe, the prevalence among sheep is >50% [1]. Even in the prehistoric human population of Central Europe, D. dendriticum was present [5].

Symptoms caused by D. dendriticum in humans include chronic obstipation, chronic diarrhea [6], vomiting, hepatomegaly, jaundice, or colic pain due to biliary obstruction [7]. It might be possible that the recurrent episodes of abdominal pain in our patient, which resulted in 2 laparoscopic examinations, were, in fact, caused by D. dendriticum, although this could not be proven because of the patient’s loss to follow-up. Recently, a patient with a case of chronic human infection presenting with relapsing diarrhea, recurrent upper abdominal pain, and weight-loss for >2 years has been reported [6]. Human infections are usually treated with triclabendazole or praziquantel.

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Potential conflicts of interest. A.S.: no conflicts.

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