Cultures of spleen and liver on other types of media to detect the presence of bacteria or other organisms remained sterile.

Experiments to ascertain the relationship between primary splenomegaly and the presence of the fungus in the spleen are in progress.

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Filaments in Siderotic Nodules of Spleen in Cases of Splenomegaly of Unknown Origin.

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In the recent studies concerning primary splenomegaly, much attention has been given to the presence in the spleen of the siderotic, so-called Gandi-Gamna nodules. Several observers[1, 2, 3, 4, 5] claimed that these siderotic or iron pigment deposits in the spleen were the direct result of the growth of a fungus. They considered the thread-like structures found in the nodules to be mycelium and were able to recognize club-like branches and fructification organs. The cultivation of fungi from a number of spleens from cases of primary splenomegaly seemed to confirm these views. On the other hand, many of the German pathologists since 1920 as well as several recent investigators[6, 7] believed that the filamentous structures composing the pigment deposits were degenerated tissue fibers.

We have made histological examinations of the spleens removed at operation from cases of primary splenomegaly and have compared the filaments found in the siderotic nodules as described by others, with the two varieties of fungi cultivated from the same spleens in this laboratory.[8] Upon close examination of sections stained in the usual manner certain structures were found in the

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FIG. 1.

Wavy, branching fibers as they appeared in a section of a siderotic nodule. Hematoxylin and eosin stain. Camera lucida drawing, X 500.

pigmented areas which could be readily mistaken for the mycelium of a fungus. Two kinds of fibers were often present in the same area. One form appeared like wavy, branching threads of varying width (Fig. 1). The other kind, which was less likely to be mistaken for mycelium was composed of wider, more irregular, heavily pigmented rods (Fig. 2). The rods appeared to be irreguarly segmented and the ends showed jagged edges suggesting fracture surfaces of brittle fibers. Structures resembling conidia were also occasionally found in the nodules. They proved to be deposits of calcium and iron pigment. However, the appearance of the thread-like structures was different from the 2 varieties of fungi isolated from the same spleens[8] (Figs. 1 and 2). Moreover, siderotic nodules with similar filaments were found in spleens from cases of malaria, tuberculosis, kala-azar and syphilis as well as in an adenomatous thyroid gland.

When sections of spleen containing the siderotic nodules were stained with Mallory's method for iron[9] the wavy, branched filaments in the nodules were stained bright blue indicating the presence of iron. When similar sections were stained with Weigert's elastic tissue stain the normal elastic fibers around the nodules stained

[9] Mallory and Wright, *Path. Tech.*, 8th Ed., p. 209.

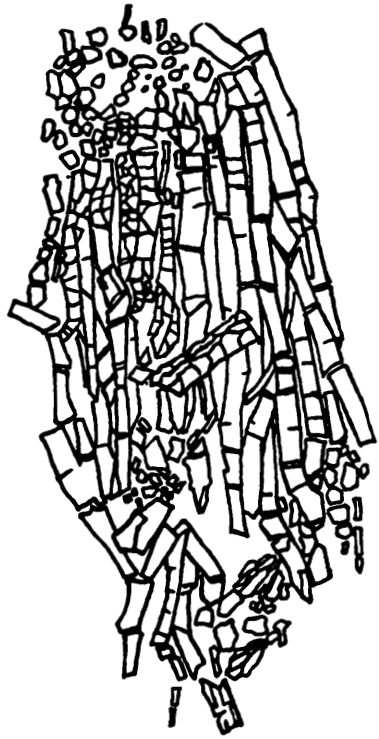

FIG. 2.
Large, brittle, rod-like fibers found in a siderotic nodule. Unstained, teased specimen. Camera lucida drawing, X 500.

FIG. 3.
Appearance of an unidentified fungus, recovered from 3 cases of splenomegaly, after injection into normal splenic tissue. (M) mycelium; (C) conidia or spores. Camera lucida drawing, X 500 from a section stained with Gram-Weigert's method.

blue-black. Finally by staining the same slide first with Mallory's method (without the counterstain) and then with Weigert's method it was observed that the normal bluish black elastic fibers were continuous with the iron bearing wavy filaments. In other words it appeared that the wavy filaments in the nodule were actually degenerated elastic tissue fibers in which iron pigment had been deposited.

Similar observations were made in regard to the wider, brittle rod-like structures. In sections stained with hematoxylin and eosin, normal collagen fibers are red. Within a siderotic nodule, normal collagen fibers as well as green or dark blue structures of a similar contour were found, which were frequently segmented and broken. It was possible to observe all grades of pigmentation from a fine or a coarse heavy green stippling of collagen fibers to fibers which were loaded with pigment and stained solidly green or blue. In some instances the gradation from stippling to solid staining was seen in the same fiber. Thus it appeared that the coarse rod-like structures in the nodules were degenerated collagen fibers which had become impregnated with pigment.

Similar staining methods applied to the 2 varieties of fungi recovered from cases of splenomegaly[8] gave entirely different pictures. To demonstrate the actual appearance of one of the fungi ([8], Fig. 2) when artificially introduced into the spleen, heavy suspensions in saline solution were injected into the splenic pulp of 3 dogs. The spleens were removed 1 hour, 1 day and 1 month respectively after injection. No traces of the fungus were found in the spleen removed after 1 month. The morphology of the fungus as it appeared in the tissue of the other spleens (illustrated in Fig. 3) did not resemble the fibers found in the siderotic nodules.

Conclusions: Although the relationship between certain fungi and primary splenomegaly is still undecided we feel that the filaments found in the siderotic nodules are not mycotic hyphae since (a) their origin can be traced to normal tissue fibers and (b) their staining reactions and morphology are different from the fungi cultivated from the same spleens.