use of aluminum sulphate in quantities sufficient to reduce the alkalinity nearly to the neutral point has resulted in marked improvement in the physical condition of the soil, particularly with respect to its permeability to water. This improvement in condition is certanly not temporary. With some soils that have been under observation for two years it still continues.

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SIREN, A HERBIVOROUS SALAMANDER?

THE correlation of structure and habits is of great philosophical interest, and, if for correlation one read causation, of still greater interest. The study of form apart from function is a noted source of error, and the study of function apart from form, while not so productive of error, is frequently an unnoted waste of time.

These observations apply particularly well to the food preferences of Amphibians, which are in general comparable to the tolerably famous Ophidia of Iceland. In brief, Amphibians have no food preferences. Much careful work, very productive of negative results, has been done on the food of adult Salientia. These animals, as might be expected from their uniform dentition and digestive apparatus, are carnivorous and undiscriminating. What they eat is determined by its size and its propinquity. The food of the same species in different localities differs much more than does the food of different species in the same locality.

Larval Salientia differ considerably from adults in structure of mouth and of intestines, and in correlation with their long, convoluted digestive tract, their horny beaks and fringing rows of keratinous "teeth," they are herbivorous in the same fashion that the adults are carnivorous, and the food of tadpoles of different species is more alike than is the food of larva and adult of the same species.

Larval salamanders apparently do not differ in their food from adults, as is indicated by the similar structure of mouth and intestines in both. Nor do salamanders in general vary much from a uniform structure, or from an undiscriminating and carnivorous diet.

Siren and *Pseudobranchus*, of course, differ notably from the other salamanders in their mouth structures. Teeth are present only on the prevomers, and the dentary and the premaxilla are furnished with horny beaks, strangely reminiscent of those of tadpoles.

I had occasion recently to examine specimens of *Siren lacertina* from Gainesville, Florida. I found their stomachs and intestines packed with filamentous algae. The intestine was noticeably long and convoluted. Comparison with *Amphiuma*, a beast of similar shape and habitat, brought out a great difference in the proportionate lengths of the digestive tract. *Amphiuma* is carnivorous and the stomach of the specimen examined contained fragments of crawfish. The intestine extended almost straight through the body cavity and was of nearly the same length. The algae-crammed intestine of a *Siren* measured 1270 mm from mouth to anus, while the animal itself measured only 480 mm from mouth to anus.

Little has been published on the food of *Siren* from Linnaeus's original supposition that it ate serpents, to Hurter's remark, "Sirens feed on worms and minnows. Most of those in my possession were caught with hook and line baited with worms."[1]

Garman, indeed, says "LeConte found nothing but mud in the stomachs of those he examined."[2] This seems to be the only record of stomach examination, and the "mud" was very probably a black, semi-digested mass of algae.

Barton in his letter to Schneider in 1821 says that he fed his specimens on angleworms, pieces of meat, etc. This and Hurter's remarks may be compared with the well-known habits of tadpoles in aquaria, where they will eat decomposing animal matter, although their ordinary food is diatoms and algae.

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SCIENTIFIC BOOKS

The Domain of Natural Science. The Gifford Lectures delivered in the University of Aberdeen in 1921 and 1922. By E. W. HOBSON. The Macmillan Company, 1923. xvi + 510 pages.

THE purpose of this book is to set forth and maintain by cogent argument the author's theory of the true character of natural science and by means of a strict delineation of this domain of knowledge "to vindicate the perfect freedom of religious and philosophical thought from any fear of destructive interference from the side of natural science, subject to the sole condition that no encroachment is made upon the autonomy of natural science in its own proper domain." In its implications concerning the problem of forming a general philosophy of life and the world these lectures take their place with a body of literature which has recently grown up and which has shown the rise among scientists of a saner attitude towards the place and importance of natural science in the construction of our total view of phenomena and life and character. It affords further evidence of the growing tendency to recognize and emphasize the limitations of natural science as regards certain fundamental problems of thought and philosophy not

[1] Trans. Acad. Sci. St. Louis, XX, 5, p. 67, 1911.
[2] Bull. Illinois State Lab. Nat. Hist., III, p. 385, 1892.