

I may call your attention to the results of an examination and analysis of the stomachs of twenty-five brook trout which was made in New York state by Prof. James G. Needham* who, more than any other investigator, has endeavoured, and with considerable success, to bring about a truer conception of the importance of the subject of my address. These trout were obtained from a pond controlled by the Adirondack hatchery. With the exception of two hundred and fifty small crustacea known as 'water fleas' (*Daphnidae*) devoured by one specimen, a few trout scales and one small fresh-water mussel, the entire food of the twenty-five specimens of brook trout consisted of insect life, and almost wholly consisted of the larval and pupal stages. The total number of insects found in order of their abundance was as follows: 2,906 *Chironomus*, 156 *Corithra* ('the phantom larva'), 14 trichopter larvæ ('caddis worms'), 2 dragon-fly nymphs (*Aeschna constricta*), 7 May-fly nymphs (*Callibaetis*), 8 water mites (*Atax crassipes*). This gave an average for each trout of the following: 116.24 *Chironomus*, 6.24 *Corithra*, 10 *Daphnids*, .56 caddis larvæ, .32 water mites, .28 May-fly nymphs and .08 dragon-fly nymphs. The first three species, namely, the *Chironomus* larvæ, the *Corithra* larvæ and the caddis fly larvæ formed the chief food of the trout.

Professor S. A. Forbes, in his study of fishes of Illinois† has pointed out the importance of these insect larvæ as fish food. He says, "Among aquatic insects, minute dipterous larvæ, belonging mostly to *Chironomus*, *Corithra* and allied genera, are of remarkable importance, making, in fact, nearly one tenth of the food of all the fishes studied." Further in his report‡ on the aquatic invertebrate fauna of the Yellowstone National park (quoted by Needham), he again refers to the importance of *Chironomus* and other fly (dipterous) larvæ. He records the following observations indicating the importance of these larvæ to young fish: "The pond was swarming with mountain trout (*Salmo mykiss*) a few of which I dissected for a determination of their food. One of these, an inch and a half in length, had eaten *Chironomus* larvæ and imagoes chiefly, the remainder of its latest meal consisting of other insect larvæ, not in condition to identify, and the Entomostrachan (*Polyphemus pediculus*). A second, an inch and a quarter long, had also fed on *Chironomus* in its various stages of larvæ, pupa and imago, but had made about a third of its meal of Entomostracha. Another, still smaller (.92 of an inch long), taken from the open lake among the

* Aquatic Insects of New York State, Part II. Food of Brook Trout in Bone Pond. Bull. es. N. Y. State Museum (1903), pp. 204-217.

† Ill. State Lab., Nat. Hist. Bull. No. 2, p. 483.

‡ U. S. Fish Comm., Bull. XI, pp. 207-256.