

AMERICAN SILKWORM GUT.

ABOUT the first of this month I received a request from the noted German fishculturist Count von dem Borne, for cocoons of the American silkworm (*Attacus cecropia*), and wrote him that if possible they would be sent, but that the season was late and it was doubtful if they could be obtained. Letters of inquiry were sent to Mr. C. F. Orvis, Manchester, Vt., whose experiments in producing gut from the American worm have been lately recorded in FOREST AND STREAM, and also a correspondence was opened with Dr. E. Sterling, of Cleveland, Ohio. On June 15 Mr. Orvis sent me a box of cocoons, but they seemed to be so lively that there is danger of their hatching before reaching Germany, although they were immediately dispatched by a steamer sailing last Saturday. Mr. Orvis sent both the *cecropia* and *polyphemus* cocoons, and says that he has found the latter to produce nearly as large a worm as the *cecropia*, and very kindly offers to give Count von dem Borne the benefit of any experience he has had. Mr. Orvis has not found any difficulty in rearing worms this season, as he has raised great quantities of them.

A letter from Dr. Sterling refers to the experiments of the late Dr. Garlick, which have already been published in FOREST AND STREAM, and also by Mr. Wells in his book on fishing rods and tackle. He says that he saw Dr. Garlick draw a gut over 30in. in length from the worm, and it was as perfect in every respect as the most fastidious angler could desire. Dr. Sterling was unable to secure any specimens so late this season; years ago the wild rose swamps and the water sycamore bayous near Cleveland abounded with the cocoons of the *cecropia*, and a bushel could be gathered in a short time. All of these places are now converted into iron ore and coal docks, or filled up with warehouses and railroad buildings, and the insects have naturally abandoned the place. The best time to gather these cocoons for shipping would be February and March, so that they could reach Germany in favorable weather for development. Near Cleveland they do not hatch until the first or middle of June and sometimes not until the last of the month. They will devour the leaves of the alanthus, common plum, currant, and, in fact, almost any of the soft and tender leaves. Dr. Garlick fed them almost entirely on plum leaves.

Should these worms reach Germany safely there are enough of them to give Mr. von dem Borne quite a start in experimenting with gut made from the American silkworm; but should they fail, I will try to obtain a lot for him next winter; which will no doubt reach him in condition to hatch after arrival.

FRED MATHER.

COLD SPRING HARBOR, N. Y.

CANADIAN ANGLING.

THE wilderness north of Quebec is just now an attractive region to anglers, because the Quebec & Lake St. John Railroad makes it of very easy access, and because the region is still a wilderness in the true sense. Caribou, moose and bear may be had there; at this season it is trout fishing that occupies the mind. The entire country is filled with beautiful lakes, and almost every lake has an abundance of brook trout; in some are also pike and the fork-tailed trout. Such advantages of accessibility and an abundance of sport have already attracted many local anglers; some of the waters have been taken up by Quebec clubs, but there still remain a great many lakes, and even systems of lakes with connecting streams, unleased and ready to afford pleasure to a host of visitors. The railroad people, counting on sportsmen for a part of their revenues, find it to their interest as well as to their undoubted pleasure to extend every facility and courtesy to brethren of the rod and gun. The country is still too new to offer luxurious accommodations, but all is done that can be done to make one comfortable. The summer climate is delightful, with an elevation of 1,000 to 1,200ft., a northern latitude, and unbroken forests all around, the air is extremely wholesome and the nights are cool. The other day two men left the station of Lake Edward at 3 A. M., and returned at 6:45 A. M., after 2½ hours of fishing, with 27lbs. of trout; the smallest weighed 1½lbs., the largest 2½lbs. As the water is still too high for fly-fishing, minnows are the bait. Plenty of these are caught in the lake. Another day two men, in about five hours, took 65lbs. of fine trout, the largest of which weighed 4lbs. 2oz. The famous Saguenay River, with its remarkable scenery, its salmon rivers and its landlocked salmon waters, lies at the end of the railroad. Altogether the region offers many attractions within easy reach.

C. H. F.

COMPARATIVE WEIGHT OF MAINE AND CANADIAN SALMON.—Camp on St. Mary's River, Sherbrooke, N. S., June 15.—*Editor Forest and Stream:* I notice in edition of June 9 communication of Dr. R., under date of May 29. Not wishing to enter into a controversy with the Doctor, but feeling that he is mistaken, I wish to say in regard to his remark (speaking of the Penobscot River salmon), "The average run of fish is larger than that of any river in the Eastern States or Canada, excepting the Caspacia. Most of the salmon taken here are over 15lbs. in weight," that my experience will contradict him. In 1884 I killed 11 salmon on the St. Mary's River that averaged 30½lbs. In 1886 I killed 42 salmon on the Restigouche that averaged 23½lbs. This season I have killed 8 salmon on the St. Mary's River weighing 28, 27, 32, 47½, 39½, 28, 24 and 25lbs.; total, 254lbs., and average 31½lbs. I was late upon the ground, and most of the large fish had passed along before I arrived.—LAWSON B. BELL.

TAKING CARP ON FLY-RODS.—For some time past it has been evident that there were some good-sized carp in the lakes of Prospect Park, Brooklyn, the result of plantings made there by Mr. E. G. Blackford, as agent of the U. S. Fish Commission. On Friday last Park Commissioner Somers, Mr. O'Reilly and Mr. Blackford tried the fishing in Long Pond, in the Park, with fly-rods, using crusts of bread instead of flies, and they took thirty-one carp in less than an hour. The fish were all scale carp and weighed from 1½lbs. to 6lbs. The carp were all saved alive and planted in the pond by the musicstand. Bread crust is now in order as a carp lure, and at the next tournament of the Rod and Reel Association we may see a class made for "casting the bread-crust."

THE NORTHERN NEW YORK ASSOCIATION.—The Northern New York Fish and Game Protective Association, which was incorporated on Monday, held a meeting for organization last week at Troy. The following officers were elected: President, W. E. Hagan; Vice-President, Joseph DeGolyer; Secretary, Dr. C. C. Shuyler; Treasurer, Samuel S. Bullions. The honorary members chosen follow: Marshall McDonald, United States Fish Commission, Washington; Eugene G. Blackford, New York State Fish Commissioner; the Hon. James Shanahan, Superintendent of Public Works, Albany; Fred Mather, Cold Spring Harbor, and N. A. Cheney, Glens Falls. The association has a membership of about 100.

Fishculture.

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FISH PRESERVATION BY ACIDS.

BY A. HOWARD CLARK.

[Read before the American Fisheries Society.]

AN important method of preventing decomposition of animal flesh is the application of antiseptic salts in a powdered form to the surface of the substance or to impregnate it with a solution either by atmospheric or hydraulic pressure. Among the commonest and most effective antiseptics, exclusive of chloride of sodium (common salt) are acetic, as contained in vinegar, and boracic acid. The latter preservative is fast coming into favor in the preparation of fishery products, because of its very satisfactory properties. As compounded with salt in the form of a powder or in solution with tartaric acid, boracic acid is found to effectually preserve either dry or pickled fish in good condition for a long time.

At the Fisheries Exhibition, at London, in 1883, some Pacific salmon were shown which had been packed in a solution of boracic acid and other ingredients for several weeks, and after their long land and water journey they were removed from the solution and exposed to the atmosphere at the fish market for several days, still retaining most of their original flavor and freshness.

It is my purpose in this paper to enumerate some of the more important methods of preserving fish by chemical treatment. Only a few of the numerous compounds which have been brought to the notice of fish curers have come into commercial use, though it is probable that many of them would upon trial be found effectual and profitable.

At the Centennial Exposition at Philadelphia, in 1876, there were some exhibits of fresh oysters and clams preserved in chemical liquids, and which the juries on awards pronounced of good quality. Boracic acid was reported to preserve animal matter for several months without changing the texture as common salt does. Citric and acetic acids also proved good preservatives, and fish cured in these acids were, after a little soaking in fresh water, found free from all unpleasant flavor.

In Portugal, fish are kept fresh for a considerable time by removing the viscera and sprinkling the abdominal cavity with sugar, when they are hung up to allow the sugar to impregnate the flesh as much as possible.

I shall notice the several methods in the order of their commercial importance, beginning with acetic acid, which, next to common salt, is perhaps the principal antiseptic in use in this country.

1. *Vinegar, Spices, etc.*—Lobsters, oysters, oyster crabs, mussels, scallops and some other marine products are preserved in vinegar alone, and, packed in glass jars, are common in the New York markets under the name of "pickled" products. Herring, mackerel, and other fish are largely prepared with compounds of vinegar and spices and sold as Russian sardines, marinated fish, soured fish, and by other trade names. The preparation of Russian sardines from the common sea herring was introduced into this country by some enterprising New York merchants during the Franco-Prussian war. The principal set of operations was Eastport, Me., and the methods employed, as patented in 1875 by Messrs. Sellman, Reessing, and Wolff, have been as follows: The fish while alive are thrown into strong brine contained in suitable casks on board the fishing vessels. This part of the process is important, as it not only kills the fish but prevents them from spoiling while being cleaned and cured. After being kept in the brine for at least ten days they are beheaded, gutted, scaled, and are thoroughly cleaned in clear cold water and placed in large willow baskets or in sieves to drain off the superfluous water. In five or six hours they are spread upon packing tables and assorted as to size, each size being packed by themselves.

The fish are preserved and at the same time flavored by being packed with the following ingredients, the quantities given being for 120lbs. of fish: Two gallons vinegar, 1½lbs. allspice, 2oz. pepper, 4lbs. sliced onions, 2lbs. sliced horse radish, 1lb. bay leaves, ½lb. cloves, ¼lb. ginger, ½lb. coriander seed, ¼lb. Chili pepper, and 2½oz. capers. In packing the fish a small quantity of vinegar and a thin layer of the other ingredients are placed in the bottom of the vessel and a layer of fish, placed back upward, are put in and gently pressed down. Another small quantity of vinegar and thin layer of the other ingredients are put in and another layer of fish, and so on until the vessel is full. The fish are ready for market and consumption in about four days in summer and from three to four weeks in winter.

*Method of Soucing.*—Soured mackerel and other fish may be prepared as follows: The fish are cut into pieces about 2in. long and cleaned. A souce is made of cider vinegar and cloves, nutmeg or other spices, with parsley, bay leaf and onions, and the fish are immersed in this souce for twelve hours, when they are put in a second souce, made the same as the first with the addition of capers, olive oil, Worcestershire sauce, and extract of anchovy and lemons. After remaining in the second souce for ten hours, they are heated in the souce for four to eight hours at about 140deg. Fahr. and are then packed with the souce in air-tight pots or jars.

2. *Acetic Acid and Carbonate of Soda.*—The fish to be preserved are put in barrels, or other packages, with a liquid composed of acetic acid and carbonate of soda in sufficient quantities to make a slightly acid solution of acetate of soda, to which is added enough water to give the liquid a density of three to five degrees. A few grains of salt may be added to give an agreeable taste, and about five drops of nitrate of soda for each pound of the liquid to preserve the color of the substance. Prepared chalk may be used instead of carbonate of soda. The fish may be kept in this solution, or after being saturated with a denser liquid may be dried.

3. *Boracic Acid and Common Salt.*—In the United States, until within a very few years, little advantage has been taken in the fish trade of the effective preservative power of boracic acid in combination with common salt. In 1883 the writer found that at Gloucester, Mass., the headquarters in this country for the curing of dry-salted fish, the use of boracic acid was just begun, and then only by a few curers. Since that date, however, "Preservative" and other chemical powders having the above substances as their base have come into quite general use, particularly in the warmer months, when without this preservative it is often found impossible to keep dry fish in good condition for many weeks or even

days. This powder checks the peculiar reddening so commonly seen on dry-salted fish in summer.

The chemical powder used by the Norwegians in preserving fresh herring for export is a mixture of boracic acid and salt, using about two pounds of salt to each pound of boracic acid. Herring are packed in barrels in the ordinary methods with alternate layers of fish and powder, and after the barrel is headed they are "pickled" with a weak solution of pure boracic acid. Fish preserved in this way will keep perfectly fresh and of their natural flavor for a week or even longer. The Norwegians have already succeeded in profitably competing with Scotland in supplying the London market with fresh herring thus prepared. A more complete preservation of herring, so that they will keep in good order for a long time, is obtained by the Sahlstrom process and by the Roosen method by which a solution of boracic acid and salt is thoroughly impregnated into the flesh under a pressure of 60 to 100lbs. to the square inch. Successful experiments have been made in Scotland in treating fresh salmon by the Roosen process. Three hundred pounds of fish were packed in a strong steel barrel and with a pressure pump the solution was forced into the salmon until they were thoroughly impregnated. After three weeks subjection to this process the fish were cooked and found of excellent flavor. Strongly made wooden barrels may be substituted for steel barrels, or, after being treated under pressure, the fish may be repacked with the solution in common fish barrels.

4. *Eckhart's Method.*—By this process, devised by John Eckhart, of Munich, and patented in 1880-'82, fish are prepared in a preserving salt consisting of a mixture of 50 per cent. common salt, 47½ per cent. chemically pure boracic acid, 2 per cent. tartaric acid, and ½ per cent. salicylic acid. The fish are first stripped of skin and bones, and the flesh is mixed with the preservative in the proportion of 20 grams of the mixture to 1 kilogram of fish flesh. They are then packed in cases of parchment or other material and put into casks which are filled with a gelatine solution made in the proportion of 50 grams of gelatine, 20 grams of the preservative, and 1,000 grams of water. The casks are then headed and connected with a force pump and more of the solution is forced in until the contents are well saturated. The sacks or cases of fish are then removed from the cask and may be strewn over with more of the salt in dry condition and packed for shipment, or they may be shipped in casks with the liquid.

5. *Boracic and Acetic Acids.*—By the Am Ende process boracic acid either in a liquid or pulverulent state, is compounded with acetic acid in the proportion of about one drop of acetic to every ounce of boracic acid, and the compound is applied in the usual manner. The acetic acid is said to prevent the formation of fungi, while the boracic acid prevents putrefaction by hindering the formation of bacteria.

6. *Boracic Acid, Chloride of Potassium, etc.*—The process devised by Hugo Jannsch consists in subjecting fish to a compound prepared of chloride of potassium, nitrate of soda, and chemically pure boracic acid, which ingredients are dissolved in water, then mixed under exposure of heat, thus forming an antiseptic salt composed of hyponitrate of potash, hypochlorate of soda, borate of soda, borate of potash, and free boracic acid. The compound is applied either as a salt or in a more or less strong solution according to the time for which the fish are to be preserved.

7. *Borax, Saltpeter, etc.*—By the Herzen preserving process meat is soaked for 24 to 36 hours in a solution of three parts borax, two boracic acid, three saltpeter, and one salt, in one hundred parts of water, and then packed in some of the solution. Before use the meat must be soaked 24 hours in fresh water.

8. *Glycerine and Antiseptic Salts.*—Oysters, fish, meats, etc., may be preserved by the use of a mixture of glycerine with phosphate of soda or other antiseptic salt in connection with aldehyde, formic ether or acid in a solution of carbonic acid, water, glycerine, etc., and the preserved substance is then covered with paraffine or stearine.

9. *Miscellaneous Compounds.*—Among the many other chemical compounds that have been experimented with, and some of which have been successfully used in the commercial preservation of fish, may be mentioned:

- a. A solution of gelatine and bisulphite of lime forced under pressure.
- b. Fish flesh ground into fine pieces, pressed, moistened with glycerine, and wrapped in tinfoil.
- c. A solution of saltpeter and alum in proportion of 5lbs. of saltpeter and 4oz. of alum to 60 gallons of sea water.
- d. A solution of thymol, thymic acid, or any of the thymate salts and water, alcohol or glycerine.
- e. Acetate of lime solution in water at a density of six degrees by the areometer, to which is added acetic acid of eight degrees, so that the liquid will produce sensible acid reaction upon blue reaction paper.
- f. Sulphite of soda and carbolic acid in solution in proportion of 5gal. water, 2lbs. sulphite of soda and 2oz. carbolic acid.
- g. Hydrocarbon substituted for the air, which occupies the space in and around the substance to be preserved and subjecting the same to a temperature of about 30deg. Fahr., the gas entering by a hole at the top and the air escaping through a hole in the bottom of the package.
- h. A solution of salicylic acid dissolved in water, with which the fish is impregnated under hydraulic pressure.
- i. Salicylic acid dissolved in hot glycerine and mixed with hot water. Preserving cans are coated on the inside with the above solution, then the fish are hermetically sealed in the ordinary manner.
- j. A brine or composition for preserving fish, meat, etc., consisting of a solution of starch, sugar or glucose and common salt.
- k. Fish are packed in a dry powder of gypsum and carbon and then enveloped with plastic shell, composed of gypsum, carbon, silicate of soda and water.

WASHINGTON, D. C.

The Kennel.

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FIXTURES.

DOG SHOWS.

- Sept. 1 to 3.—Inaugural Dog Show of the Pacific Kennel Club, at San Francisco, Cal. J. E. Watson, Secretary, 516 Sacramento street, San Francisco, Cal.
- Sept. 12 to 17.—First Show St. Paul and Minnesota Kennel Club, St. Paul, Minn. W. G. Whitehead, Secretary.
- Sept. 20 to 23.—Wisconsin Kennel Club's Annual Show, Milwaukee, Wis. H. D. Whitehead, Manager.
- Oct. 12 and 13.—Stafford Kennel Club Show, Stafford Springs, Conn. R. S. Hicks, Secretary.

FIELD TRIALS.

- Sept. 6.—Manitoba Field Trials Club Field Trials. Derby entries will close July 1; all-aged entries Aug. 1. Secretary, Hubert Galt, Winnipeg, Manitoba.
- Nov. 7.—Third Annual Field Trials of the Western Field Trials Association. R. C. Van Horn, Secretary, Kansas City, Mo.
- Nov. 21.—Ninth Annual Field Trials of the Eastern Field Trials Club, at High Point, N. C. W. A. Coster, Secretary, Flatbush, Kings County, N. Y.
- December.—First Annual Field Trials of the American Field Trials Club, at Florence, Ala. O. W. Paris, Secretary, Cincinnati, O.