

this time the eggs should be washed by perfectly clear running water of even temperature. The least turbidness of the water will cover the outer shell of the egg with a layer of slime which constantly increases in thickness. The egg, which also has a sort of breathing process (absorption of oxygen and ejection of carbonic acid), is choked thereby and dies. Even a very superficial examination of our shell-lime brooks shows that they do not meet the requirements of the hatching period. They always appear slightly turbid, owing to a fine white sediment, which consists principally of carbonate of lime (with some clay and oxide of iron). The springs of these brooks are generally quite clear and pure, but before they have flowed any considerable distance they become more and more turbid. The aquatic plants withdraw from the carbonated lime dissolved in the water part of its carbonic acid, and thereby make it more difficult to be dissolved in water. This sediment of carbonated lime, together with some clay, which by a mechanical process is carried away from the bed of the brook, produces the unavoidable turbidness of our waters. Another essential condition of the well-being of trout is that they should not have too many other fish to share with them the natural food contained in the brooks. For this reason (besides the requirements of the hatching period), the trout are found only in the higher portion (near the springs) of our natural water-courses. If pike and other fish get in the streams, some fine specimens of trout will still be found, but no longer large numbers. The conclusion to be drawn from the above observations is simply this, that it will amply repay the trouble to place young trout in suitable brooks in our neighborhood (Frauconia) which are not too strongly polluted by refuse from villages, &c. Unfortunately the brooks will have to be stocked every year, if a proper stock of fish is to be obtained, because young fish from naturally laid eggs will not flourish in these brooks. The first and principal point aimed at should be that the young fish are strong and healthy and carefully hatched in suitable water. Neglect in this respect is probably the reason that many an experiment has proved a failure, and that many a willing heart has been sadly discouraged.

106.—MARTIN BRANDT'S METHOD OF PRESERVING FRESH FISH AND OTHER ARTICLES OF FOOD.*

The more the fish trade extends to greater distances from the fishing stations, and the more the improved and enlarged fisheries at times overstock the market, does it become the more necessary, in order to avoid losses, not only to preserve the fresh fish by pickling or some other process, but also to prepare them in such a manner that they may be safely stored away until there is a better market. This object has been

*“*Martin Brandt's Methode zur Konservierung frischer Fische und anderer Nahrungsmittel.*” From the *Deutsche Fischerei-Zeitung*, Vol. vii, No. 28, Stettin, July 8, 1884. Translated from the German by HERMAN JACOBSON.

sought for several years, and efforts are still being made in the same direction. If it should become possible to preserve fresh fish for months in such a manner that the flesh does not lose its delicate flavor, a problem will be solved by which, among other things, many drawbacks connected with transportation would be avoided.

Mr. Martin Brandt, the well-known Danish preserver of fish, who last year returned from Tobolsk, Siberia, where he was called to start a large preserving establishment, has now, according to the Danish *Fiskeritidende*, discovered a method of preserving fresh fish and other articles of food which probably solves the problem in a satisfactory manner, and at any rate deserves attention. Mr. Brandt is at present endeavoring to have his method patented, and intends to establish a fish-preserving business and general fish business at Rostock, Mecklenburg, Germany, because he thinks this a particularly favorable place through which, in his opinion, a large portion of the fish will pass which are imported into Germany from Denmark.*

It is well known that, so far, all methods of preserving have some drawbacks, or are suffering from some imperfections. The best method is the so-called Appert method, according to which the fish are preserved in tin cans. The imperfections of this method are not so much in the manner of preserving the fish, as in the circumstance that fish put up in such tin cans has nearly everywhere to pay a heavy duty. Since the year 1876, Martin Brandt has employed this method in his preserving establishment at Ringkjøbing, Denmark, and finally produced about 100,000 cans per annum, a quantity hardly reached by any other establishment in the north of Europe. When Germany, to which country he principally exported his goods, placed a heavy duty on preserved fish, he had to give up his establishment at Ringkjøbing.

To preserve the fresh fish in ice is, if carried out consistently, undoubtedly the best method. Both fish and flesh retain their shape and looks, but, in order to obtain a favorable result, a very large quantity of ice is needed, whose weight and the space occupied by it increase the expense of transportation very considerably. The construction of ice-boxes and the buying of ice-machines likewise involve a great expense. Competent judges also say that the method of keeping fish on ice has some drawbacks, as heat is developed during the melting of the ice, which, by generating steam, favors the inroads made by fungi.

Of older methods we must mention the one by which the fish were kept alive for a considerable period. But the number of fish which can be kept alive by this method is comparatively small, and every day of delay before the fish can be sold increases the loss. The fish are be-

* This opinion would have to be proved by experience. A very large proportion of the fish imported into Germany from Denmark are live fish, and the most natural port of debarkation for these is Stettin, which may now almost be considered a suburb of Berlin. In Stettin the fish are received in perforated boats, and in the same manner pass through the River Oder and the Finow Canal to Berlin. Mr. Brandt, therefore, probably refers only to the transportation of fresh fish.—Editor, *Deutsche Fischerei-Zeitung*.

coming leaner from day to day, lose their fine looks, and finally become unfit for human food.*

Martin Brandt's new method is said to have this advantage—that it does not change the shape, looks, and flavor of the fish, and prevents the development of fungus. It is done by compressed air. It may be continued for an unlimited period and be employed in the holds of vessels, railroad cars, warehouses, &c. For lining the rooms where the fish are kept metal or cement is used. The preserving medium weighs very little, as 1,000 cubic feet of compressed air weigh but 10 pounds.

In Mr. Brandt's warehouse a pipe runs along the wall from the floor to the ceiling, and back again, twisting several times, and finally ending on the floor. The machine or development apparatus consists of an iron cylinder connected with a so-called vacuum air-filter. The cylinder is filled with air compressed by about 200 atmospheric pressure. By means of the vacuum apparatus the machine is connected with the pipe in the warehouse, and the compressed air flows, after a valve has been opened, with great velocity through the filter and the pipes. New air is also introduced in the vacuum apparatus through cotton filters, thus purifying it of all matter apt to decay, and, united with the stream of compressed air, it continues to pass through the pipes. As the air expands it loses some of its warmth and is gradually cooling off. When let out of the pipes the air, which has now become quite cool, rises evenly throughout the room, and drives the warm air, filled with germs of fungi, through an opening in the ceiling. As the inventor claims, fish and meat can be kept fresh for an unlimited period in rooms whose air has been purified in the manner described above.

197.—A LIST OF THE BLANK FORMS, CIRCULARS, AND MINOR PUBLICATIONS OF THE UNITED STATES FISH COMMISSION, FROM AUGUST 1, 1883, TO AUGUST 1, 1884.

By CHARLES W. SCUDDER.

447. Blank for abstract of disbursements, by H. A. Gill, disbursing agent of the U. S. Fish Commission. 8 columns. August 8, 1883. 1 p., with filing on reverse. 43 by 56 cm.

448. Blank for acknowledging receipt of letters. September 6, 1883. 1 p. 20.5 by 25.5 cm.

449. Circular letter announcing that the sending of U. S. Fish Commission Bulletin signatures will be discontinued until receipts for former signatures are returned. Hektograph. September 8, 1883. 1 p. 20.5 by 25.5 cm.

* This is true, although the process is not so rapid as some people imagine. We hardly think that any other method will entirely replace this one. In the first place, it is, wherever practicable, the cheapest method of preserving fish, and, in the second place, many consumers desire live fish (at least freshwater fish). The quantity of fish which is preserved in this matter is not small, but, on the contrary, enormous.—Editor, *Deutsche Fischerzeitung*.

† This is a continuation of the list in F. C. Bulletin, Vol. III, page 129.