49.—PRESERVATION OF BAIT.*

By P. WAAGE.

A person engaged in the bank fisheries had requested the Danish Fishery Association to give him some directions for keeping herring and other small fish used as bait in a fresh condition for a considerable time. As the method recommended by Mr. Waage may be of general interest, and may induce some of our readers to try it on a large scale and as a business, we will here describe it briefly.

The problem may certainly be solved by filling a tin can with fresh herring and pure water, and by placing this can in a freezer until its entire contents are frozen solid. If such blocks of ice are put in ice they may be kept for years, and the herring in them will decay scarcely at all. When the air is cold enough, which however will rarely be the case, the use of the freezer becomes unnecessary.

Waage recommends that the tin cans should be square and not round, so that the blocks of ice with the herring in them can be packed closer, and that they should be narrower at the bottom and broader at the top, so that it may be easy to extract the block of ice. The block of ice will therefore get the shape of a blunt pyramid. To prevent the ice from melting it will be well to make the blocks of ice large; but, on the other hand, it will in many respects be more convenient for the fisherman to use smaller cans, as, when the block has begun to melt, the herring should be used as quickly as possible, because they will decay very soon. It is evident that the more fresh water is poured into the can in proportion to the quantity of herring, the longer will the block of ice keep and the herring remain fresh.

The freezing is done by mixing three parts snow, or ice ground fine, with one part common salt. It is important that both the salt and the ice should be crushed very fine. The salt should be cooled off beforehand. With the view to keeping this mixture as long as possible and to derive the greatest possible use therefrom, it should be made in an insulated vessel. This vessel should also beforehand be cooled off with ice or snow. When ice and salt, properly cooled and ground fine, are mixed in the above proportion, a liquid will be produced whose temperature may fall as low as 18 degrees below zero [centigrade?].

The quantity of this mixture needed for freezing a certain number of herring depends on the general temperature prevailing at the time, and to a great degree on the manner in which the work is done. It is, therefore, impossible to state exactly how much of this mixture is needed for a can of a certain size. As a general rule, the proper quan-

* "*Om Opbewaring af Agn for Fiskere.*" From *Fiskeritidende*, No. 49, Copenhagen, December 2, 1884. Translated from the Danish by HERMAN JACOBSON.

tity can be ascertained in the following manner: A common, solid fish-barrel is taken, whose height is supposed to be about 20 inches. This barrel is placed inside a large barrel or box, and the remaining space is filled with sawdust or closely-packed hay. After the fish-barrel has been well cooled off with snow or ice-water, there are put into it 50 pounds of finely-ground and cooled salt and 150 pounds of finely-crushed ice or snow. These two ingredients are well mixed, and in this mixture is placed the square tin can containing the herring and the fresh water. This tin can is about 22 inches high on every side, and its upper opening measures about 4 inches on every side. The whole is well covered with a lid and a piece of cloth or matting. The tin can holds about 20 *potter* (one *pot* equals 1.6 pints), and by experience one should ascertain in what proportion the herring and the fresh water should be filled in. No salt or salt brine should get into the tin can.

For several reasons it will be more profitable to freeze a large quantity of herring at a time than to freeze smaller quantities at frequent intervals. In the latter case it will be necessary to have several tin cans and as many insulated double barrels. These should then be used so as first to put the cans in the least cold barrels and gradually move them to the colder ones. As soon as the temperature of the mixture is at the freezing point it has lost its strength.

Such blocks of ice with bait frozen in them might be a remunerative article of trade, if we consider on the one hand the frequent complaints as to the scarcity of bait which we hear from time to time and from many different places; and if on the other hand we remember that just during the cold season when ice is very plentiful large quantities of herring are caught in many places. If artificial cold was used on a large scale, it would probably pay to use again the salt brine from the mixture, which will hardly be possible if the freezing is done on a small scale.

50.—THE FISH-CULTURAL ESTABLISHMENT OF LAKE SAINT-FRONT, HAUTE LOIRE, FRANCE.

By Viscount DE CAUSANS.

[Abstract.*]

This establishment, founded in 1852, has an altitude of 4,100 feet; while the lake, on which it is situated, has an area of about 86 acres; 20,000 fry, on the average, are yearly put into the lake. In 1852 the establishment did not pay expenses; but since 1860 the sale of trout has never been less than $570, and it has sometimes reached $1,500. Since 1880 the establishment has put into the lake an average of 100,000 fry hatched on the spot.

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* *Bulletin de la Société d'Acclimatation*, March, 1885, p. 148.