

*Copy to: Louis B. Harrison
Chas. Craig
Carol J. Wyland*

INSTITUTE FOR FISHERIES RESEARCH
UNIVERSITY MUSEUMS
UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN

RECEIVED

JAN 20 1931

January 19, 1931

Report No. 47

FISH DIVISION

PRELIMINARY REPORT ON FIVE FROZEN WHITEFISH, IMPERFECTLY PRESERVED,
RECEIVED FROM LOUIS B. HARRISON, CITY CHEMIST, BAY CITY, MICHIGAN.

The fish under discussion were taken from the Bay City freezer. On arrival they were completely frozen, except that the surface of the two top specimens had thawed out.

Two of the fish were partially enclosed individually in a box of white paper stamped, "The fish in this bag has been keenkooled".

The evidence at hand does not tell us whether all the fish were "Keenkooled" in individual bags or not but the letter states that the trouble occurred in a "certain batch", which suggest that they were all treated the same way. We do not know whether the fish were bagged individually and frozen or pan frozen first and then bagged some time after that.

Other questions which have a bearing on the difficulty and on which we have no information are listed as follows:

1. Was there by any chance a breakdown in machinery which resulted in the thawing of the fish?
2. Were the fish thawed out by any chance for any reason after the initial freezing?
3. Is a record of the temperature of the freezer maintained?

4. How sure can we be of the answers to these questions?
5. How long does it take for the fish to freeze?
6. Were the fish held in dummy nets to ripen and killed after varying periods of holding?
7. How long were the dead fish held before freezing?
8. Where were the fish taken?
9. How were the fish taken?

This preliminary report is being forwarded without answers to the questioning stated above, since it was requested at the earliest possible date.

As a result of the evidence obtained from a study of the five specimens we conclude that these fish were in a very poor state of preservation. It seems that the postmortem changes probably resulted from the effects of being held overlong before freezing rather than from the effects of heat.

The examination showed that the two largest fish had a softened area on the back immediately behind the head. In both, these areas were mashed and the skin broken either before or during shipment, so that we do not know what the exact condition was when they left the freezer. There was apparently some disintegration of muscle but it appeared more as though the muscle fibers had been broken up and surrounded with oil. By pressure on various parts in the affected region, oil could be forced out. This indicated that the oil has been set free from the cells making up heavy layers of adipose (fat) tissue in this region. It is in the largest fish that this tissue seems to be in abundance. The condition could have been brought about by decomposition (post-mortem change), pressure, a blow on that part of the body, and possibly other causes.

There was some evidence of a gill net marks on one of the fish, but we do not believe that the net mark caused the trouble. The decomposition on the back occurred in some way from the mark, and the decomposition of the internal organs surely had

another cause.

The top of the heads, was examined for broken bones or lesions. They were all intact so that apparently they had not been clubbed. The one fish received earlier had the head caved in and decomposing.

The skin over the head was drawn and shrunken as if it had sometime dried out. This however, may be a normal condition.

The gills of all specimens were pale and bloody, with a small amount of disintegration at the tips of the filaments in several of the specimens.

The visceral cavity and contained viscera was examined in all. In the two large fish, which appeared to be in very good condition except for the soft spot on the back, the visceral organs including the contained fat were in a perfect state of preservation. In one the swim bladder was considerably distended. The peritoneal lining of the cavity was smooth, intact, and shiny with some diffuse reddish streaking. The liver was firm, looked fresh and was of good color.

The other three smaller fish were grayish in color partly due to some cheesy granular material covering about the anterior one half of each fish. One of these fish smelled musty, all of the others smelled fishy, but in the small ones the smell was stronger than in the larger ones.

In all three of the smaller specimens the belly was perforated and the flesh grayish, giving a perfect impression of decay or disintegration. Tissues binding the muscles had apparently given up their function, for the muscles separated freely. In the two worst specimens the liver had completely broken down and this was true of the fatty tissue throughout most of the abdominal cavity of these two specimens. In one of these a section of the intestine in an otherwise more or less normal region had disintegrated.

In the specimen which was in better condition than the two fish just described, the liver had partially disintegrated and the contents of the posterior part of the

cavity was quite normal.

The kidneys had completely broken down in all three of the small specimens.

The peritoneum had completely broken down in the three specimens, the ribs stood out free, the flesh under the broken down peritoneum was like thin jelly and pinkish.

The swim bladders in these three had collapsed and contained large perforations, and the tissue had roughened.

In his letter, Mr. Harrison writes "These fish were frozen at the same time with others and this trouble occurred only in a certain batch". We suppose that some of all of the fish obtained from one fisherman were not in the proper condition.

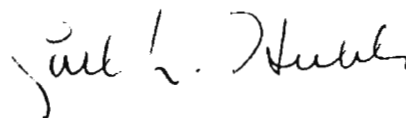
Contact with other fish in a poorer state of preservation and pressure, no doubt, could be assigned as factors in producing the softening of the back.

Although we know practically nothing about the history of the fish, we are strongly convinced that they either were not in proper condition when frozen or that the decomposition was brought about during the time they were frozen by a temporary thawing. This report is not to be used in legal procedure but is merely a report of findings to the best of our knowledge.

This report as stated before is of a preliminary nature, and is sent off now at the request of Mr. Harrison for a report at our early convenience. It is a statement of our findings, and provisional conclusions, and is therefore subject to modification on the obtaining of further evidence. If the case involves any legal proceedings, we request that this preliminary report shall not be used in that connection.

Report prepared by Wendell H. Krull, Fish Pathologist.

INSTITUTE FOR FISHERIES RESEARCH



Carl L. Hubbs, Director

Report sent to Louis B. Harrison

cc. to Mr. Harrison
cc. to Mr. Taylor

Re: Fish Preservation

INSTITUTE FOR FISHERIES RESEARCH
UNIVERSITY MUSEUMS
UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN

RECEIVED

JAN 30 1931

FISH DIVISION

January 29, 1931

Report No. 47
(Supplement)

SUPPLEMENTARY REPORT ON FIVE FROZEN WHITEFISH, IMPERFECTLY PRESERVED,
RECEIVED FROM LOUIS B. HARRISON, CITY CHEMIST, BAY CITY, MICHIGAN.

Since it is not possible to obtain any more information about the whitefish prior to the arrival at the freezer we are handicapped in changing or adding anything to our report No. 47.

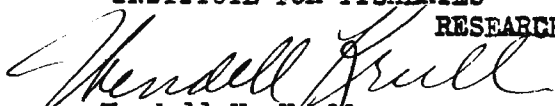
It might be said that judging from the fact an exceedingly small number of bacteria was found present in the soft tissue of the back of the affected fish that the tissue destruction was more probably due to autolysis than to bacterial decomposition.

If we knew the history of the fish we could carry out a series of experiments at the freezer in order to try to duplicate the existing conditions. This would, however, involve considerable expense.

As far as we are able to find out neither autolysis nor bacterial decomposition should take place in the back of the fish if it was in good condition when frozen, and was continuously maintained frozen.

We suggest that Mr. R. H. Fielder, Bureau of Fisheries, be consulted. He will perhaps be able to give some additional information. He experiments with just such problems of fish preservation, with which this Institute has had no direct experience.

INSTITUTE FOR FISHERIES
RESEARCH


Wendell H. Krull
Fish Pathologist

Noted W

INSTITUTE FOR FISHERIES RESEARCH
UNIVERSITY MUSEUMS
UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN

RECEIVED
APR 1 1931
FISH DIVISION

April 29, 1931

Report No. 47
(Second Supplement)

SUPPLEMENTARY REPORT ON FIVE FROZEN WHITEFISH, IMPERFECTLY
PRESERVED, RECEIVED FROM LOUIS B. HARRISON, CITY CHEMIST,
BAY CITY, MICHIGAN

Literature from the Bureau of Fisheries forwarded to us by Mr. F. A. Westerman, Fish Division, Michigan Department of Conservation, seems to substantiate our findings concerning the whitefish.

Certain parts of these references are of special importance and have, no doubt, a direct bearing in this case and are listed as follows: Memo. S-64, entire reference; S-91, p. 2, entire page; S-100, p. 1, entire page, p. 2, 2nd paragraph, S-135, p. 5, 3rd paragraph. This literature is being forwarded to Mr. L. B. Harrison, City Chemist, Bay City, Michigan.

Mr. Lewis Radcliffe, Acting Commissioner, Bureau of Fisheries, in his letter to Mr. F. A. Westerman, Fish Division, Michigan Department of Conservation, states, "It is not possible to express an opinion as to the reasons for the difficulties which have arisen in this instance. Before such an opinion could be expressed it would be necessary to have at hand complete data as to the handling of these fish. There are a number of factors to be considered in an instance of this nature, that is, the condition of the fish before being frozen, the method of handling before being frozen, the temperature at which they were frozen, whether or not the fish were allowed to defrost and then freeze, etc."

From this we conclude that he would be in no position to give any more information even if all available data were furnished since the history of the fish before their arrival at the freezer is not known.

This experience emphasizes the desirability of knowing the complete history of fish taken for freezing from the time they are secured.

INSTITUTE FOR FISHERIES RESEARCH


Wendell H. Krull
Fish Pathologist

Copy to Louis B. Harrison

RECEIVED
FEB 10 1954