

Canadian Translation of Fisheries and Aquatic Sciences

No. 5061

Processing of stockfish and appraisal of stockfish:  
guidelines

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Original title: Skreidarverkun og skreidarmat

In: Framleidsluaftirlit Sjavarafurda, 32 p., 1981, Iceland

Original language: Icelandic

Available from:

Canada Institute for Scientific and Technical Information  
National Research Council  
Ottawa, Ontario, Canada K1A 0S2

1984

48 typescript pages



MULTILINGUAL SERVICES DIVISION – DIVISION DES SERVICES MULTILINGUES

TRANSLATION BUREAU

BUREAU DES TRADUCTIONS

LIBRARY IDENTIFICATION – FICHE SIGNALÉTIQUE

CTFAS 5061

Translated from - Traduction de Icelandic Into - En English

Author - Auteur Johann Eiriksson, Johann Gudmundsson, and Johann J.F. Kuld

Title in English or French - Titre anglais ou français Processing of stockfish and appraisal of stockfish

Title in foreign language (Transliterate foreign characters) Skreidarverkun og skreidarmat

Reference in foreign language (Name of book or publication) in full, transliterate foreign characters.

Reference in English or French - Référence en anglais ou français

Table with 3 main columns: Publisher - Éditeur, DATE OF PUBLICATION, and Page Numbers in original. Includes details for State Fish Inspection and Quality Control Service, published in 1981, with 46 pages.

Requesting Department DFO

Translation Bureau No. 1253759

Branch or Division SIPB

Translation (Initials) GF

Person requesting A.T. Reid

Your Number

Handwritten number: 1253759

Date of Request 20.12.1983



MULTILINGUAL SERVICES DIVISION -- DIVISION DES SERVICES MULTILINGUES

TRANSLATION BUREAU

BUREAU DES TRADUCTIONS

Client's No.—N° du client	Department — Ministère DFO	Division/Branch — Division/Direction SIPB	City — Ville
Bureau No.—N° du bureau 1253759	Language — Langue Icelandic	Translator (Initials) — Traducteur (Initiales) GF	MAR - 8 1984

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1981

UNEDITED TRANSLATION  
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TRANSLATION - NON REVISEE  
Information seulement

STATE FISH INSPECTION AND QUALITY CONTROL SERVICE

PROCESSING OF STOCKFISH

AND

APPRAISAL OF STOCKFISH

GUIDELINES

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Information statement

## PREFACE

A few pamphlets and guidelines on the processing of stockfish and appraisal of stockfish have been published in this country following the recommencement of stockfish processing in the thirties. Most were written by Kristján Elíasson, former Chief Stockfish Appraiser. Kristján learned the appraisal of stockfish from Norwegians who were brought here and based Icelandic stockfish appraisal on the Norwegian example and controlled it for many years. Stocks of the older pamphlets are mostly exhausted, but they, in many respects, form the basis in the writing of this publication. However, much has been added, and changes have been made.

The authors of this pamphlet are Jóhann Eiriksson, Divisional Manager in the State Fish Inspection and Quality Control Service (SFIOCS), Jóhann Guðmundsson, General Manager, and Jóhann J.F. Kúld, former SFIOCS representative.

Processing of stockfish has increased considerably in recent years and many new producers and appraisers have arrived on the scene. Expectations are that this publication will be useful to those engaged in the processing and appraisal of stockfish.

Jóhann Guðmundsson  
General Manager

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## INTRODUCTION

In the processing of stockfish the same principle applies as in any other processing of fish i.e. the condition of the fish which is processed is a basic factor. The better the rawmaterial, the better the prospects of obtaining good stockfish. Weather during the period when the stockfish is dried is a very important factor. Hanging up fish on drying racks during periods of frost in the winter should be avoided. To begin with, fish which has frozen to some extent on the racks, suffers an abnormal weightloss, and secondly, stockfish which has frozen is unacceptable for the best markets. For this reason people avoided hanging up for stockfish processing, good or adequate rawmaterial during that period of the winter when risks of frost are most. The best results in stockfish processing are usually achieved by hanging up the fish in the racks late in the winter or early in spring. The weather and temperature determine how far into spring it is safe to hang up fish for stockfish processing. The main danger facing fish which is hung up in the racks late in spring, stems from the blow-fly. If conditions permit, it is best to hang up the fish in the racks when a gentle breeze is blowing and the sun is shining. In recent years attempts have been made to guard against the danger from fly larvae by bathing the fish in a pyrethrum emulsion before it is hung up. This significantly reduces the danger stem<sup>m</sup>ing from the larvae but is not infallible. For example, if it rains soon after the fish has been hung up, then this defensive measure will not prove useful unless repeated.

P 4

Fish, the skin of which thus manages to become dry soon after it has been hung up, usually maintains its skin colour and withstands weather better even if it is subject to wet or rainy weather subsequently. The species of fish selected for stockfish processing are cod, ling, tusk, blue ling, saithe and haddock. However, the cod forms the main element in Icelandic stockfish processing.

Two methods are used for preparing fish for stockfish processing:-

The first method involves hanging up the fish beheaded and gutted. Two fish are then tied together by their tails and thus prepared, hung on a bar. In stockfish processing such fish is referred to as beheaded and gutted fish.

However, there is another approach to preparing for stockfish processing and that involves splitting the fish lengthwise back to the tail and removing the spine. When this is done, the spine is broken off so far down the back as to remove the segment from the head to the spawn-hole. Fish prepared in this manner for stockfish processing is referred to as split fish. Before such fish is hung up on the drying racks, a string is run into the cut at the tail and twisted twice around the tail and then tightened up with a knot. This is done to prevent the two fish halves from breaking apart on the bar. Split fish is primarily produced from large fish, particularly after the weather becomes warmer.

The main markets for split stockfish are in Sweden, Finland and Nigeria.

Beheaded and gutted fish in stockfish processing

Beheaded and gutted fish is the common term applied to all fish which is selected for stockfish processing, beheaded and gutted.

A basic prerequisite for successful processing is that the rawmaterial is good. It should remain a constant managerial practice to divide the fish according to the methods of processing intended, as soon as it has been landed. Fish which is kept lying in a freezing plant's raw material storage until it no longer qualifies for freezing and then taken for stockfish processing, comes out of the process as poor stockfish and utilization will be poor. If fish, which has been bled\* when dead or not bled at all, is hung up drying racks, various defects will emerge in the fully processed stockfish and the fish can become sour or rotten during the processing.

P 5

Appraisers must in this connection be alert to the following defects and not overlook them during appraisal.

- a. A sour or rotten odour from the spinal canal, fish-neck or abdominal cavity, for example by the spawn-hole.

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\*Translator's note: Bleeding of fish as referred to in Iceland involves cutting the muscle under the frontal part of the throat of the fish between the gills.

- b. Open spinal canal and the emission therefrom of a yellow or brownish foul smelling discharge.
- c. A black or dark swim bladder which often identifies such fish.
- d. Looseness from the back, which i.a. can be evidenced by the fish not being well concave.

Beheaded and gutted fish for stockfish processing should have the wings joined together at the muscle under the frontal part of the throat of the fish between the gills. This is the principal factor determining the shape of the fish during the drying process and can greatly affect what quality classification the fish obtains, provided the rawmaterial that was hung up was good.

The abdominal cut on the fish should not extend any further back than to the spawn-hole. This also helps to get as good a shape of the fish as possible in line with what the market wants with respect to quality fish. These two aspects are consequently very important in the processing of stockfish.

All intestinal residue should be removed and cleaned out thoroughly. This is easily understandable and should not require much explanation. Nevertheless the fact remains that negligence in this area sometimes causes extensive damage if during the preparatory stage of the processing all intestinal residue has not been removed.

P 6            So-called neckblood (which is the kidneys of the fish) should be cleaned away. This is like a form of a bruise on both sides of the frontal part of the back. If the neckblood is not removed, it will frequently reduce the quality of the stockfish much. During a period of wet weather the neckblood hardens later than the fish and        often rots first, particularly during warm weather in spring. When this occurs the fish muscle becomes loose from the front-most vertebrae, which causes the fish to fall in quality appraisal. On the other hand, should the neckblood harden without rotting first, it nevertheless causes damage because blood sanies from it damages the appearance of the neck.

          It is necessary to open the swim bladder slightly on both sides of the frontal part of the back, but loosening it from the vertebrae should be avoided. This hastens the drying of the stockfish, and should there be any blood under the swim bladder, it is thereby provided with an exit.

          Beheading of the fish is very important in the processing of stockfish. The fish should be beheaded in a manner whereby two vertebrae go with the headbone. In the case of good rawmaterial, which is considered as having the potential of developing into good Italy fish, such fish should be beheaded manually and the neckmuscle torn from the headbone. The neck on such a fish looks better and its quality appraisal becomes easier.

All small liver particles must be removed before the fish is hung up. A small liver particle left behind can reduce quality fish to low quality stockfish. Dried blood on the swim bladder must be removed. Should this not be done, it could cause mould in the stockfish.

It is important in the processing of stockfish that the fish has been washed well before it is hung up on the racks. It should also be ensured that the fish is hung up as soon as possible after the wash and not let wait long before being hung up. This is particularly necessary when new fish is hung up which has not before been lying in ice. There is a much greater risk of slime forming again on the skin of such fish, if it has to wait to be hung up after the wash.

P 7

It should be a strict rule to scale both saithe and haddock before these species are hung up for stockfish processing. To scale these species of fish in machines used for scaling redfish is hardly justifiable since it loosens the muscular tissue of these fish too much. Scaling must consequently be performed on tables using electrical or manual tools. If this is not done, which occurs too frequently at various places, double damage results. The scales close off evaporation from the trunk of the fish, which in a great number of instances causes damages to the fish muscle. The fish both decays and rots at the back but does not become dry. Frequently attempts are made to dry such badly treated fish in chambers for salt-cured fish with a warm

air current, but the results vary. If the results are not so bad and the fish is processed, dried and becomes suitable for export as Africa stockfish, its weight will be considerably less than that of fish which is placed for drying scaled. The appearance of such fish is often such that it does not look like much more than skin and bones and the weight is commensurate. The reason for this is, that when the scales close off evaporation, they become firmly attached to the fish muscle, and various substances which on scaled fish dry up in the muscle are lost from the fish. Such workmanship in stockfish processing should be avoided ; it causes damage and bears witness to great ignorance amongst those that carry out stockfish processing in this manner.

Stockfish <sup>drying</sup> racks and where they should be located

When the location for stockfish racks is selected, many aspects have to be considered. Two factors, however, are most important in such a selection. The first is that wind can blow about the racks where they are located and the second is that they stand in a dry location, where they can easily be reached. However, they must never be located too close to roads with heavy traffic or densely populated areas.

P 8 It is necessary to keep the fish under supervision on the drying racks

Once the fish has been hung up on the racks, it is necessary to check on it daily until it has begun drying. Such control, however, is most important during the first days after the fish has been hung up, while its weight is at its peak, because that is when the risk of it being torn down is greatest. Then it is always necessary to check on stockfish racks after a storm while fish hangs on the bars.

The danger exists for fish to become stuck together by the skin during the drying process, if sufficient control is not exercised. Such fish must be separated as soon as possible. Should this not be done soon enough, permanent spots will form on the skin which will not disappear subsequently during the drying process. This blemishes the appearance of the fish and should consequently be avoided. Such spots on the skin of stockfish are called hanging spots. If fish lie together for a long time during the drying process without being separated, damage will develop in the fishmuscle under the hanging spot, and in the worst instances it can extend in all the way short of the spine of the fish. If a knife is stuck into such a hanging spot it will go in and through easily, although the fishmuscle is hard elsewhere.

So-called solar burning in stockfish can occur when the fish is hung up in strong sunshine. This is a rather rare form of defect in this country, but occurs more frequently in Norway where warm temperatures in spring and summer are higher. Solar-burned fish has wrinkled skin, often with streaks across. Such fish can only fall into a low quality class, and is not fit for the Italian market.

Once into the month of July and when the stockfish has begun drying considerably, inspection of the racks must be increased because of the risk of black-skin condition. Black-skin condition is caused by a fungus. The spores of this fungus are jet-black like the spores of the fungus *Bovista nigrescens* and they can be carried by the wind over long distances. When such spores land on the fish during a heavily overcast and warm weather, they begin to sprout immediately. An observant person, who examines the fish in stockfish racks under these circumstances, can see with the naked eye yellow dots on the skin of the fish. Using a magnifying glass it can be seen that these are fungi which in shape are similar to the fungus *Bovista nigrescens*. Secure protection has not yet been found against this fungus which spoils the appearance of stockfish and reduces its value. However, on the positive side is that the fungus is considered harmless from the standpoint of human consumption.

Stockfish storehouses and taking down the stockfish from the drying racks

The latter part of summer, when most of the stockfish is dry, is usually the time of the year when the risk of black-skin condition is greatest if the air at that time is humid and warm. At that time it is necessary to check the stockfish on the racks daily and use dry, sunny days to take it down and store it inside a storehouse.

It is most important for good processing of the stockfish after it has been taken down, that suitable and spacious buildings void of dampness are available for storing the fish. No other form of fish processing demands as much building space as does stockfish processing. Such buildings require good ventilation, high ceilings and wide distances between the walls. There must not be any cracks on the floors and the joints between the walls and the floor must be tight. These are basic elements in the storing of stockfish. Before stockfish is placed inside a storehouse that storehouse must be clean and well dried. When the stockfish is taken down from the sheds it is driven into a storehouse. Appraisers shall seek verification as to whether the storehouse space is approved by the State Fish Inspection and Quality Control Service (SFIQCS).

The next tasks will be to cut and remove all the strings tying the fish together by the tail and arrange it in the storehouse. If different species of fish have been mixed together on the racks, they must be separated and each species kept separately. This is a practical point which can save much work when the stockfish will be appraised for export.

The best arrangements for storing stockfish in a building are as follows: Care should be exercised to ensure that there is always airspace between a pile of stockfish and the floor, <sup>at</sup> least 12-15 cm. If this is not done the stockfish will season\* more slowly and there is the risk that the stockfish down by the floor will mould. The airspace is created by arranging wood planks on the floor under the fish at suitable intervals. Wood used for that purpose should be clean and well dried. Frequently the wooden bars from the racks are used, and it then becomes necessary to place wood planks under them crosswise at suitable intervals, so that airspace exists between them and the floor. Stockfish from beheaded and gutted fish should be placed on its side in a stack with the neck facing outwards. In each separate layer the fish are parallel but crosswise to those in the next layer. Suitable width of a stack is one meter and its height 2.0-2.5 meters. It is advisable to have a distance of 15-20 cm between the stacks and then tie the stacks together with fish in a few places so that the stacks remain straight. Laths of fish need to be in the stacks at suitable intervals because that prevents the stacks from becoming too compact.

First, after stockfish has been placed in a storehouse while it is seasoning [as it is called] and changing colour, stockfish storehouses need to be kept as much open as possible. This is best done by stretching a

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\* Seasoning is explained on p. 12 (translator's note).

fine-mesh wirenet over doorways in place of doors. Although stockfish has been placed fairly dry in a storehouse, it should be left standing at least three to four weeks, prior to commencing appraising it for export, because during that period the appearance of the fish will improve owing to moisture contained along the spine seeking out and the moisture contents of the fish being reduced.

P 11

When stockfish storehouses are not sufficiently large, people are tempted to place the stacks of stockfish closely together. This will prevent air from coming into sufficient touch with the fish. But when in addition to that, fish is thrown on top of the stacks of stockfish in a pile, as long as there is any ceiling space in the house, several risks are being invited.

To begin with, the pressure on the fish underneath will become excessive which will cause the fish to be dislocated in various ways. This risk is at its most first, after the stockfish has been put inside the house in varying state of dryness. Secondly, such compacting in stockfish storehouses courts the risk of mould, which is always present, most frequently when the air is very damp. Thirdly, it can never be avoided in stockfish processing, that some fish is not sufficiently dry when the stockfish is put inside the storehouse. If the stockfish is properly stacked, these fish will dry in the stacks and pose no danger. But if air does not circulate around the fish, moist fish dispersed inside the stacks

increase the risk of mould, and in such circumstances it will often not help if the weather is advantageous and dry. Should mould develop to any extent in stockfish storehouses, it can cause extensive damage, excessive labour costs associated with brushing, as well as reduced quality.

Additional drying indoors

When stockfish, in order to be saved, must be removed from the racks in the autumn because of long periods of rainy weather and the risk of black-skin condition, it is best to put such stockfish in the drying chambers of houses for salt-cured fish and blow luke-warm air on it until it is dry. Caution should be exercised so as not to blow too warm air and the stockfish must be dried slowly. In this manner it is often possible to preserve much value in stockfish processing if facilities for that purpose are available. There have been instances in Norway, where stockfish producers have developed their own facilities for hanging up good fish indoors when frost has been excessive during the period when the fish is hung up. In this manner damages caused by frost have been avoided as the danger from frost is greatest first after the fish has been hung up. Subsequently, this fish has been hung up on drying racks. This, of course, leads to considerable additional expenses, but more valuable stockfish has also been obtained in this manner than would otherwise have been possible. It is difficult to develop such facilities when stockfish processing takes place on a large scale.

ASPECTS TO BE CONSIDERED PRIOR TO COMMENCEMENT OF THE APPRAISAL FOR EXPORT

1. Preclassification

A rule, that should be strictly adhered to and <sup>followed,</sup> is by those who have acquired a good knowledge about stockfish processing, is to remove all fish that falls below the size standard and stack it separately at the time when the strings tying the fishtails together are cut off. This is a self-evident facilitating measure because this fish is available at a specific location, when appraisal and packing is to take place. Then it is also practical to let an appraiser search for high-quality fish for the Italian market in the stockfish a few days before packing is to commence. Such fish is then stacked again separately according to quality and size. Carried out in this manner, the quality appraisal becomes more even and reliable, in addition to which it will be easier to estimate how the stockfish in broad terms will be classified in the quality appraisal.

2. Level of dryness of the stockfish

Before appraisal of the stockfish for export commences, stockfish appraisers must satisfy themselves that the stockfish has fully hardened. The stockfish must have remained indoors sufficiently long to have "seasoned" as it is called, i.e. the moisture inside the fish should have come out to the surface which is always hardest when the fish is taken

P 13 inside from the racks . In order to ascertain this it is necessary to take a few samples of the stockfish and then preferably thick fish, saw them or split and examine the level of dryness in this manner. When stockfish has fully hardened it should not contain more moisture than about 18 per cent. Stockfish appraisers must always remain well alert to the right level of moisture because the stockfish is often not evenly dry. In order to examine the quality of stockfish it is also good to soak fish and then examine the fillets.

3. Stockfish presses

The stockfish appraisers must then inspect the stockfish presses used and ascertain that they are in complete operating order and deliver well bound and neat packs. Care should be exercised to ensure that the presses are not leaking pressure fluid so that there is a risk of it getting into the fish.

4. Scales and weights

Stockfish appraisers must inspect carefully those scales and weights which are used and ascertain that both are in good condition and certified. It is not sufficient to carry out this inspection just before the appraisal commences since appraisers must approve the person operating the scales, keep the scales under supervision, and see that the weighing

proceeds correctly. They are also responsible for that excess weight which is taken each time.

5. Packing material and wires

Stockfish appraisers are responsible for seeing to it that only the proper binding wires or cords and the proper packing material are used. Wires shall be of a type specially treated\*, or galvanized.

P 14

6. Packing

Stockfish appraisers should keep the packing under supervision and ensure that placement in the presses is well done, that the fish lie straight and preferably that the backs of the fish face as much outward in the packs as possible. It is also best that large fish are outermost in the packs. The packs should be well shaped, edged and suitably tightly bound. Particular care should be exercised to ensure that wires or plastic cords are so well spliced together that there is no risk of their coming apart at the joints.

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\* This refers to wires which have been specially treated through a heating process leaving the wire i.a. black. This is done at the manufacturing stage of the wire. (Translator's note).

The usual size of a pack:-

Length 70 cm , width 50 cm , height 42 to 45 cm .

Each appraiser has his appraisal number and he should always place it in each appraised pack.

7. The appraisal tables

Stockfish appraisers must have good tables set up on which to appraise the stockfish. On each table a measuring stick or standard scaled in centimeters should be provided for measuring the fish.

8. The light

The appraisal tables must be so located that the appraisers have sufficient and good light for their task. It is best to be in good daylight, however, not in sunshine.

If using lamps cannot be avoided, they should be good and positioned right over the appraisal table.

9. Trimming the fish

If the strings tying the fish tails together have not been cut off the fish then this must be done before it arrives on the appraisal table.

P 15

If the fish is badly cleaned, membranes, gut residue etc. must be cut away prior to appraisal. Stockfish appraisers should guide this task and ensure that it is well done and without damaging in any way the fish itself.

Furthermore, stockfish appraisers should also provide guidance on how to chop the tail on stockfish, when this is done.

10. Liaison with the chief appraiser

Before appraisal commences the appraiser should always contact the chief appraiser because of the appraisal.

As far as professional aspects are concerned, the appraiser works under the control of the respective chief appraiser.

QUALITY APPRAISAL

CLASS I

PRIMA

Only fish completely without any defects and produced from cod of Icelandic material<sup>s</sup> is classified as first class or Prima. The fish must have been well bled, be well beheaded so that two vertebrae go with the headbone, and the neckmuscle has been torn loose, so that it comes clean and roundish from the drying process.

The wings of the fish must be joined together at the muscle under the frontal part of the throat of the fish between the gills and the swim bladder clean and light in colour.

The fish must be straight and without barmarks.

The colour of the skin must be natural, dark on the back but lighter on the abdomen and the shine of the skin must be clearly visible.

Then the fish must be well concave and without any odour coming from the spinal canal or the abdominal cavity.

The tails of Prima fish should be chopped in such a manner that a strip across the end of the fishtail is removed.

P 16 For many reasons, Prima Icelandic stockfish is rare. There is very little hung up here of fish without any defects sufficiently early so that it can become Prima, and the weather and other factors contribute to little being available of such fish. For example, fish that has been kept in ice cannot become rawmaterial for Prima because of its light skincolour. However, such fish can be good rawmaterial for Saga. The market for Prima stockfish is almost exclusively in Italy.

Marking: Prima Round Cod and I.M. (Italiano Medium) or I.G. (Italiano Grande) according to the number of fish in the pack. Prima is not appraised in I.P. (Italiano Piccolo).

CLASS II

Saga (Sekunda)

Saga stockfish from Icelandic stock must be produced from good, unspoiled rawmaterial. Saga stockfish is almost exclusively sold to Italy, and quality demands are consequently primarily aimed at that market.

The fish must have been bled while alive, because the demand is made that the flesh of the fish is quite white. Sagafish may have various minor defects, primarily defects affecting appearance, which are not acceptable on Prima fish, provided they do not diminish the value of the fish as far as consumption is concerned.

The Italians soak the fish and then fillet it, at which time defects must not appear in the fillets which reduce their value as far as consumption is concerned.

A trace of black-skin condition is permitted on one side of Sagafish, also a small hole in a wing made by a hook.

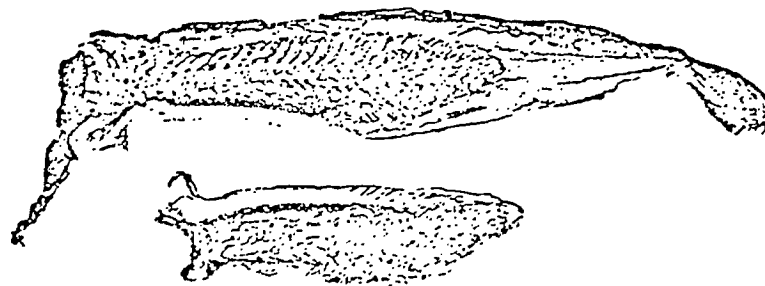
Then, there may be visible just a trace of blood vessels in the wings but not obviously so.

PHOTOGRAPHS ON PAGE  
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PAGE 16



Italy stockfish

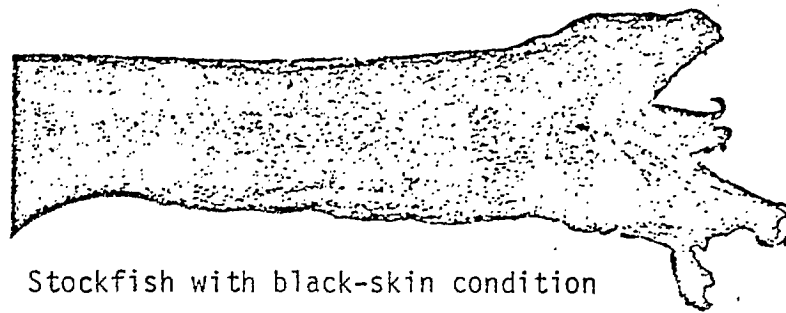
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PAGE 17



Wormeaten stockfish



Africa Stockfish



Stockfish with black-skin condition

The swim bladder need not be as light in colour as in Prima fish. On the other hand, the same demands are made as with regard to Prima fish in that the spinal canal and the abdominal cavity must not emit a sour odour.

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The skin of Sagafish may have a slightly exposed (to the weather) appearance, provided the fish carries clearly visible signs of being undamaged and the rawmaterial has been good.

There must be no frost damages in Sagafish. However, there may be a trace of frostbite in the neck, provided the unfrozen flesh of the fish is clearly visible on both sides of the frontal part of the back and the back of the fish is definitely not frozen.

A small hanging spot on the skin is acceptable, provided it is firm so that a knife will not go into it, but only a few such fish may be found in a pack.

This enumeration of defects which may be in Sagafish should not be interpreted to mean that all these defects may be in the same fish, but that a few fish, <sup>(2 to 3)</sup> with the defects previously described may be together with better fish in a pack.

The tail of Sagafish for the Italian market must be chopped. This is done by either cutting or chopping the end of the fishtail in such a manner that it becomes straight right across.

Sagafish is generally sold to Southern Italy or Sicily, but purchasers there make the demand that the fish is thick and fleshy. In Northern Italy, thick and fleshy fish is also sold, but also thinner fish. North Italians are stricter as far as skincolour of the fish is concerned, but fish of the Icelandic stocks of cod that has reached <sup>reproductive</sup> age, is more aftersought on the Italian market than younger fish because it has a stronger taste.

If stockfish in quality Class II is appraised for the American market, then it is subject to the same quality demands as in Italy, but it is primarily Italians that buy it.

Stockfish for the Italian market under the name of Saga is classified into three size categories in export-appraisal:

P 18

1. The smallest fish, 90-100 fish in a pack/50 kg net is marked:

Saga, Round Cod, I.P.

All the fish should be of a similar size.

2. The next size category, 70-75 or 70-80 fish/50 kg net is marked:

Saga, Round Cod, I.M.

All the fish should be of a similar size.

3. The largest size category, 40-58 fish/50 kg net is marked:

Saga, Round Cod, I.G.

All the fish should be of a similar size.

CLASS III

Edda

The quality of this stockfish falls below that of Class II or Saga. This should be good Class III fish of Icelandic cod stocks as well as Greenland fish, that previously was sometimes exported under the name of Finnmark fish. The natural quality of fish e.g. from the eastern part of the Greenland fishing banks is inferior to that of the Icelandic stocks of cod and its shape different. This fish should consequently not be appraised for Saga.

The same demands as are made in the appraisal for Saga should be made in the appraisal for Edda as far as frost is concerned. The fish may have a slight frostbite in the neck but never more so than with unfrozen fish appearing on both sides of the frontal part of the back, and the back of the fish definitely not being frozen.

However, the skin of the fish may have a more exposed (to the weather) appearance than on Sagafish.

A hole made by a hook may appear on the body of the fish provided it has not caused damage to spread from it or a bloodspot.

P 19 Hanging spots may appear on the fish provided they are firm and there is definitely no damage in the flesh of the fish underneath.

The wings may have continuous, narrow veins but nowhere wide or continuous bloodspots. Fish that has been bled when dead cannot be appraised for this quality class.

The fish may have dispersed black-skin condition to a minimal extent, but definitely not obviously so.

A sour odour from the spinal canal or the abdominal cavity is not permitted.

The fish must be concave.

The swim bladder may be dark but must be whole.

Fish, which has been so split when gutted that the wings do not hang together at the muscle under the frontal part of the throat of the fish between the gills, may go into this class, provided its wings do not extend so far out that the fish can definitely not tolerate being pressed together without the wings breaking.

Fish, which has the processing defect of having been slit beyond the spawn-hole, may be classified as Edda stockfish.

There may be traces of slime in the neck of the fish or the abdominal cavity, provided there are no damages in the flesh of the fish itself.

The Edda stockfish quality class must not contain any fish which is of lower quality than good Class III fish. The general appearance of Edda stockfish should be fair. When Edda fish has been soaked like the Italians do, then it must be possible to obtain from it whole-looking undamaged fillets.

The weight of the Edda stockfish for Italy should be 50 kg net per pack. Edda stockfish is classified into size categories according to their centimetric length as follows:

40/50, 50/60, 60/70 and 70<sup>cm</sup> and above.

Edda cod is marked: Edda Round Cod, and then the size category.

The tail on Edda stockfish is not chopped.

Stockfish of Edda quality is primarily sold to Italy, but limited sales take place to other countries.

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Luna

This fish is classified according to the same rules and should possess the same material quality as Edda, except that it may have considerable black-skin condition though not so much that most of the skin is black.

Marking: Luna Round Cod, and the size category. Size categories are the same as for Edda.

Astra (Africa stockfish)

This is poor Class III stockfish and is sold to Nigeria and other countries under the name Astra. Although Africa stockfish is usually referred to as being of Class III quality, similar rawmaterial goes into this product as into both Class III and Class IV of salt-cured fish. The Astra quality class is for this reason broader and extends over a wider range than it would if it only contained fish of Class III quality according to salt-cured fish appraisal.

Into the Astra class goes fish which is of so low quality and appearance that it cannot go into higher classes but should, however, be materially fit for human consumption.

The following fish goes into Astra stockfish:

Fish that has frozen.

Fish that has been bled when dead, fish with holes made by hooks, bruises and minor wounds as well as fish with hanging spots, provided it is not decayed.

Also poorly cleaned and poorly washed fish with a trace of slime in the neck, abdominal cavity or on the skin.

Fish which has become mishapen or has the abdomen closed as well as fish with processing defects e.g. poorly beheaded fish, fish which has been so slit when gutted that the wings do not hang together at the muscle under the frontal part of the throat of the fish between the gills, or slit too far back.

Fish which has been affected considerably by exposure to weather as well as fish with a trace of black-skin condition falls into the class.

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Sour and decayed fish as well as fish with major wounds and fish with wasted skin do not go into this class.

As far as serious defects are concerned, many of these may not appear in the same fish.

Like Edda, Astra stockfish is classified into size categories according to length. The measure is centimetre measure, which is measured from the wing at its furthest inward curving point to the joint furthest back on the tail. All stockfish taken according to its length measurement is measured in this manner. Usual length categories are the following: 20-40 cm, 30-50 cm, 50-70 cm, 70 cm and above.

All Astra stockfish is bound into 45-kg packs net. The number of wire-bands should be three to four. Small fish should be bound with four bands. This last mentioned detail applies to all stockfish.

The tail on Astra stockfish should not be chopped.

Marking: Astra Round Cod, and the size category.

Stella

In appraisal, this quality class should be subject to the same rules concerning quality and size as Astra, except that it is permissible to classify into it fish with conspicuous black-skin condition.

Pack weight is the same as in Astra, 45 kg net.

Marking: Stella Round Cod, and size category.

Polar

Into this class is taken low quality fish with various defects, which can not be classified as either Astra or Stella, such as torn fish, fish with considerable wounds, fish with lesions on the skin, swollen fish ("Sausagefish", i.e., fish that does not have a concave shape) etc.

The low quality fish is not appraised for size categorization but only according to the species of fish. In the case of cod the packs are marked as follows:

Polar Round Cod; otherwise, the species of fish that the packs contain.

A pack shall weigh 45 kg net.

P 22 Blanda

A mixture of low quality stockfish is marked Blanda. As the name indicates, this involves low <sup>refuse</sup> quality stockfish where various species of fish are mixed together in a pack. Demands with respect to quality are the same as in Polar.

The weight of each pack shall be 45 kg net as in the case of all stockfish exported to the African market.

Marking: Blanda.

Low quality fish unfit for export

Although export of low quality fish is permitted, its condition can be such that it is not fit for export. E.g., fish in the following conditions:

1. Fish which is visibly hollow within from larvae from flies.
2. Fish which is so rotten that it is not considered fit for human consumption.
3. Fish which has been gnawed by harmful animals (pests) or picked by birds.

4. Fish into which soil or sand has blown. However, such fish may be exported if it is washed and dried anew.
5. Fishrags, which are not much more than skin or bones, whatever the reasons are for the fish having got into that condition.

### SPLIT STOCKFISH

In earlier years, considerable quantities of split stockfish were processed, with the stockfish being sold to Sweden, Finland and Africa. Presently over a long period of years no split stockfish has been processed in this country. However, Norwegians process split stockfish for the markets mentioned above.

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#### Split cod, "split cod"

Split cod, like other stockfish, is classified according to quality into three main classes, i.e.:

Class I (Prima), Class II (Sekunda) and Class III.

The fish that is so poor that it cannot be classified into the lowest quality class, is offal.

The demands with regard to the material quality in all these classes are in most respects similar to the demands made with respect to beheaded and gutted cod, and have been described in the preceding text.

However, the colouring of the skin is much less important in the appraisal of split fish, because the fish is first and foremost judged by the appearance of the flesh of the fish but not the appearance of the skin.

#### CLASS I

Fish in Class I should be smooth on the surface, its muscle should be limpid with a yellowish gleam. There must not be cracks in the flesh of the fish, no damages from frost may be found in this fish nor black-skin condition.

#### CLASS II

Class II fish may have minor defects. The fish should be smooth on the surface, but it is not demanded that it has a yellowish gleam which should be the distinctive feature of the Prima fish.

No damages from frost or black-skin condition may be found in this fish.

CLASS III

Into Class III may be taken fish which has been bled when dead and fish which has suffered frost damages, fish with uneven rough flesh, somewhat cracked fish provided it is cohesive and fish with occasional black-skin condition spots provided they are dispersed, and fish with a little slime.

Fish which is poorer than this is included in offal.

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When appraisal is carried out for the Swedish market or U.S.A., it should be particularly borne in mind that the fish be fleshy and thick.

For Finland this is not as important nor are quite as strict demands made with respect to other aspects of quality.

Split fish is always classified into size categories according to length which is measured in the same manner as in the case of beheaded and gutted fish and counting into the packs never takes place.

Both Class I and Class II split fish are packed into 50 kg packs but Class III in 45 kg packs.

The tail of split cod is never chopped.

Appraisal of other species of fish.

Saithe

The appraisal of Saithe is based on the appraisal of cod. The naturally darker appearance of Saithe has to be taken into account. If minor fish oil streaks or small spots occur on one side of the fish, it goes into Class II.

If there are obvious fish oil streaks on the Saithe, it goes into Class III. Length categories are most frequently 20-40 cm, 40-60 cm, 60 cm and above.

Saithe is marked: Round Sey, and the size category, or Split Sey, and the size category, in the case of split fish.

Saithe has in recent years solely been processed as beheaded and gutted fish for the African market and packed in one quality class. The demands made are that it attain Class III quality.

The weight of a pack is 45 kg net.

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Ling

Ling is appraised according to the same rules as cod. Stockfish from ling, however, is only sold for the African market and packed in one quality class, Class III. There is a market for split ling of quality Classes I and II, primarily in Sweden and Finland. In such instances, Class I and Class II will most frequently be packed together in equal portions. We have not sold to this market for a long period of years.

Beheaded and gutted ling is marked: Astra Round Ling, and the size category.

Split ling is marked: Split ling, and the size category.

The size categories are 20-40 cm, 40-60 cm, 60-80 cm, 80 cm and above.

The weight of a pack is 45 kg.

Tusk

Tusk is principally appraised according to the same rules as cod. In reality, we only sell beheaded and gutted tusk to Africa as Class III stockfish. Size categories are 20-50 cm, 50 cm and above.

Marking: Astra Round Tusk and the size categories.

The weight of a pack: 45 kg.

Haddock

Haddock is principally appraised according to the same rules as cod. In reality, however, stockfish from haddock is only sold as Class III beheaded and gutted fish for the African market.

Size categories: 20-50 cm, 50 cm and above.

Marking: Astra Round Haddock, together with the size category.

The weight of a pack: 45 kg net.

Blue Ling

P 26 Blue ling is appraised like ling into quality classes and size categories. However, in reality it is only sold as Class III to Africa.

Marking: Astra Round Blue Ling, together with the size category.

The weight of a pack: 45 kg net.

Appraisal of dried fishheads

When appraisal of dried heads takes place, it is done on the basis that the product is fit for consumption.

The heads should consist of undamaged rawmaterial, be well dried and free of slime and other dirt.

Heads, which larvae, birds or vermin have infected or that have a foul odour or other signs of damage, are not fit for export.

It is forbidden to export heads which have had the cheeks removed or the triangular muscle fastened in the front inside of the chin, at the back behind the tongue bones.

Heads are classified according to the species of the fish.

The weight of a pack is 30 kg net.

Marking: Cod heads (or the name of the species concerned).

Here, descriptions have only been provided of the main classes of stockfish appraised in Iceland today.

There is a large number of sub- and special classes of stockfish which we have only appraised to a limited extent or not at all, and which will consequently not be discussed here.

Should production and appraisal for such classes take place, appraisers will be specifically advised of this.

#### MARKING

The marking of the stockfish must be clear and neatly placed on the pack.

All stockfish packs must carry the following markings in addition to the markings of the recipient:

1. Produce of Iceland.
2. Mark of the producer
3. Mark of the vendor
4. The name of the species of fish (in English).
5. The marks of the quality class and the size category.
6. Net weight of the pack.

Samples of the marking:

Bottom I

SSF	34
PROD OF ICELAND	
45 kilos net	

Bottom II

N/KALU
LAGOS
ASTRA ROUND
COD 30/50

Stockfish appraisers shall examine the rubberstamps used for marking the packs. They shall also oversee that the marks are clear, fit well and are neatly arranged.

The English names of fish that are used for marking stockfish are as follows:

- |           |   |      |              |   |           |
|-----------|---|------|--------------|---|-----------|
| 1. Cod    | = | COD  | 4. Tusk      | = | TUSK      |
| 2. Saithe | = | SEY  | 5. Blue Ling | = | BLUE LING |
| 3. Ling   | = | LING | 6. Haddock   | = | HADDOCK   |

At the end of appraisal

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When stockfish appraisers have completed their task and depart from the fish-processing station concerned, they shall at the end examine whether all appraised stockfish has been well arranged, each class separately, and that all species are well and clearly marked so there is no risk of a mix-up.

Also close attention should be given to stockfish not being subject to any risk of external damages and that it has been properly elevated so that it does not rest on the bare floors. If there is<sup>a</sup> risk of leak in the storehouses, waterproof covers shall be placed over it.

Finally, the stockfish appraisers shall complete appraisal certificate(s) for the fish they have appraised and send it (them) to the office of the SFIQCS.

Appraisal certificates (appraisal books) are available at the office of the SFIQCS in Reykjavik and so are appraisal numbers for appraisers.

FOR LOADMASTERS

1. Prior to the commencement of loading stockfish for export loadmasters need to contact the office of the SFIQCS and obtain there information and (a) loadlist(s) over all the stockfish to be loaded on the ship concerned.
2. Loadmasters must examine the cargo hold of the ship concerned and satisfy themselves that it meets in all respects stipulated regulations, is in a good condition and prepared to receive stockfish.
3. Loadmasters should consult the officers of the ship concerned and find out where and when loading shall take place.
4. Furthermore, loadmasters should contact the chief appraisers concerned and obtain from them information about the condition of the stockfish.

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The loadmaster advises the shippers when they should bring the stockfish to the ship. He shall always ensure that the trucks are carefully covered so there is no risk of the stockfish becoming wet, soiled or damaged en route or while the trucks need to wait at shipside.

6. Loadmasters should as a rule ensure that all stockfish is well and cleanly handled during loading. Particular attention should be paid to it not suffering any shuffling damages so that packings are not damaged, wires not broken of the packs becoming loose or being misshaped.
7. Stockfish must never be loaded during precipitation or in such bad weather that the risk of damage is present, e.g. from water, snow or heavy seas.
8. Loadmasters shall consult the ship's officers regarding the loading itself and its organization. They shall particularly ensure that the cargoholds containing the stockfish do not also contain such goods as can damage it.
9. Loadmasters receive the ~~loading note~~ that should accompany each truckload. It shall then be ensured that they are completed correctly and so clearly that there is no risk of misreading or confusion.
10. Once loading is completed, the loadmasters shall carry out comparisons with the counters and the ship's officers. If any changes occur on the loadlists or if any reasons give rise to comments, the loadmaster shall immediately enter them in writing on his loadlist.

11. Finally, the loadmasters shall deliver all loadlists with changes made and their comments to the office of the SFIQCS and give there a final account of their task.

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An abstract on stockfish processing and consumption habits

Stockfish processing is the oldest fish processing method known to man, and it has come to this country with settlers from Norway.

In Norway fish has been hung on racks both as beheaded and gutted fish and as split fish so far back as history can trace. But because of a shortage of timber in this country, the processing of beheaded and gutted fish soon ceased here but processing for stockfish of filleted or split fish continued. This form of processing was for many centuries carried out by a method whereby the large bulk of the stockfish was dried on piled up rock walls with lavarock being considered particularly suitable for such walls. Remnants of such drying walls together with rock cots are still visible.

Stockfish was the most important export item Icelanders had for many centuries, but stockfish processing for export ceased late in the nineteenth century. What remained was processing of dried unsalted fish in minor quantities for the domestic market.

At that time, operation of decked vessels commenced here and salt curing of fish both aboard the ships and on shore increased greatly. After that, salt-cured fish processing almost reigned supreme in Iceland until the Fisheries Commission introduced new methods of processing, among which was stockfish processing, in the thirties. When stockfish processing commenced anew, we used the Norwegian processing methods. Classification and quality appraisal of the stockfish was also based on their experience and centuries-old practices. In the first decades following the Second World War, much stockfish processing took place in Iceland.

P 31 The country with the largest market for stockfish is Nigeria. The decline in stockfish sales experienced in that country a few years ago was caused by the hostilities which prevailed there. Now this market has opened up again and sales to it are increasing. Nigeria is a country richly endowed in natural resources, and the standard of living of people there is rising. Consequently, Nigeria could for a period extending far into the future become a major importer of stockfish, provided processors of stockfish strive to cater to this market.

As prosperity increases and the standard of living of the people rises, increased demands will be made with respect to the quality of the stockfish. Processors must keep this well in mind; their success rests on it.

We Icelanders know dried unsalted fish and appreciate it. But relatively few living Icelanders have tasted soaked stockfish, in spite of the fish thus treated being first class food. Those nations that purchase stockfish from us, usually soak it and boil it. The Italians e.g. have large soaking stations where the fish is filleted once it has been soaked and sold in that form to consumers. In the process of soaking it immediately becomes evident whether the fillets meet the demands made by consumers.

If they do not, consumption declines, but that can have very serious effects for the producers.

In Nigeria, the stockfish is generally soaked, but dietary practices are such that it does not matter as much as in Italy that the stockfish is wholelike. The best stockfish we produce for the Italian market is of Icelandic fish. It is cod that has reached the reproductive age.

The Norwegian Italy stockfish is almost solely processed in the Lofoten<sup>area</sup>, and the raw material used for it is fish of reproductive age caught during the winter fishing season. Quality demands for the Italian market are very strict as far as the raw material is concerned, but this branch of processing has often paid the highest price for fresh fish. In Lofoten it is common for fish destined for the Italian market to be hung up the same day it is caught, should meteorological conditions be favourable.

From this can be seen how high the demands are that are placed on raw material for Italy stockfish.

P 32 The role of fish appraisers.

These guidelines provide a minor illustration of how processing and appraisal of stockfish should be carried out. An effort has been made to describe, to the extent possible with words, how the quality and appearance of stockfish in the various classes should be and what the specific demands of the markets are. The appraisers must learn this and follow it firmly in their work, together with various advice which has been given here.

A fish appraiser, who carries out appraisal for export of stockfish or other fish produce, plays a double role because he represents both the seller and the buyer of the commodity at the time of appraisal and must guard the interests of both. Neither must be penalized. In order to make this possible, rules are prepared by the official export appraisal.

The position of the fish appraiser in Icelandic society, the complete well-being of which is based on an unobstructed export of fish produce and a success in the markets, is a position of heavy responsibility.

A good fish appraiser must not only possess good professional knowledge pertaining to the task he performs and supervises, but in addition he must also see to that instructions are followed, and have a good and independent approach towards those he associates with.

To combine all this can be difficult and cannot be done except through much training and concentration.

In teaching appraisers, it is consequently necessary, together with professional training, to explain the importance of good organization and administration in appraisal for export, because that aspect also rests on the appraiser's shoulders.

- END -