

# The Fisheries of Norway

UNITED STATES DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF COMMERCIAL FISHERIES

Circular 235

UNITED STATES DEPARTMENT OF THE INTERIOR

Stewart L. Udall, *Secretary*

John A. Carver, Jr., *Under Secretary*

Stanley A. Cain, *Assistant Secretary for Fish and Wildlife and Parks*

FISH AND WILDLIFE SERVICE, Clarence F. Pautake, *Commissioner*

BUREAU OF COMMERCIAL FISHERIES, Donald L. McKernan, *Director*

**The Fisheries of Norway**

By

SIDNEY SHAPIRO

Circular 235

Washington, D.C.

November 1965

## CONTENTS

Page

Introduction . . . . .	1
Marine fisheries . . . . .	2
Landings . . . . .	2
Areas of operation . . . . .	2
Principal species . . . . .	4
Herring and sprat . . . . .	4
Cod and allied species . . . . .	6
Other fish and shellfish . . . . .	6
Whaling . . . . .	8
Sealing . . . . .	8
Fishing craft . . . . .	9
Fishermen . . . . .	10
Fishermen's organizations . . . . .	11
Marketing . . . . .	11
Preservation and processing . . . . .	11
Frozen products . . . . .	11
Cured products . . . . .	12
Canned products . . . . .	15
Meal and oil . . . . .	16
International trade . . . . .	16
Exports . . . . .	16
Imports . . . . .	17
Support to the fisheries . . . . .	17
Subsidies . . . . .	17
Loans for vessels and gear . . . . .	18
Loans for processing . . . . .	19
Regional Development Fund . . . . .	19

# The Fisheries of Norway

By

SIDNEY SHAPIRO

Foreign Fisheries Specialist  
Bureau of Commercial Fisheries, Washington, D.C.

## ABSTRACT

This report presents trends and developments in the Norwegian fisheries, the largest in Europe, excluding those of the U.S.S.R. Since domestic consumption uses only about one-eighth of fishery landings, the Norwegian fishing industry is dependent on maintaining a large export trade. The industry has encountered difficulties because of declining landings of cod and winter herring and because of competition in foreign markets. The Norwegian Government has committed itself to a policy of supporting fishermen's incomes so that they are on a level with the general wage level of the country. Support to the industry consists of subsidies, loans, and programs to modernize vessels, processing plants, and other facilities.

## INTRODUCTION

Landings by Norwegian fishermen have averaged about 1.3 million tons annually between 1960 and 1964. These landings make Norway the foremost fishing nation in Europe (excluding the U.S.S.R.). Three main features characterize the Norwegian fisheries. Domestic consumption of fishery products is among the highest in the world and is estimated to be about 45 kg. (nearly 100 pounds) per person per year on a live-weight basis. The Norwegian population, however, is comparatively small--about 3,654,030 in 1963--and domestic consumption absorbs only 12 to 15 percent of total landings. The remainder of the catch is utilized in two principal ways. A large part is prepared or processed for export as edible fishery products. Secondly, many species, principally herring, are reduced to meal and oil, which also are largely exported.

The firsthand or ex-vessel value of Norwegian fishery landings in 1964 was \$100.7 million, including \$19.6 million in Government subsidies. If the added value of fish processing, marketing, construction and maintenance of fishing craft, manufacture of fishing gear, and the like is considered, the estimated total value of the fishing industry as given by official Norwegian sources was \$280 million, or 4.4 percent of the gross national product for 1964.

Both in quantity and in value, Norway is one of the world's leading exporters of fishery products. In 1963, exports of 404,600 tons

were valued at \$141.6 million, or about 13 percent of the value of total Norwegian exports. This was a decline, however, from the much higher level of 10 years ago when fishery exports exceeded 600,000 tons.

The Norwegian fisheries, despite their large size, have shown a declining profitability since the mid-1950's, when the highest rate of production was attained. Direct Governmental subsidies to the fishing industry have increased as the decline has continued. A number of factors are responsible. Fishery landings have decreased mainly because of smaller catches of cod and of winter herring, the latter a mainstay of the meal and oil reduction industry. Although catches of other species have increased, overall landings in recent years have been as much as 35 percent below the average for 1954-57. Along with declining yields, prices for fishery products in Norway's main foreign markets have been unfavorable compared with other products traded internationally. Some Norwegians claim that to reverse the decline in profitability, the fishing industry will have to adjust to new production and marketing situations.

The Norwegian Government has adopted a policy of supporting fishermen's incomes so that they are raised to a level comparable with incomes in other sectors of the economy. The basic organizational structure of the Norwegian fishing industry is a series of laws and administrative orders that regulate and control ownership of the fishing fleet, fishing methods, marketing, processing, and exports. As examples, a 1956 law limits people outside the fishing industry from owning fishing vessels, and purse seines are banned from the main cod fishery in the Lofoten area.

Note.--Statistical data in this report are presented in metric units. A metric ton equals 2,204.6 pounds; a kilogram (kg.) equals 2.2 pounds.

In actual practice, regulation of the industry is under the control of numerous fishermen's organizations, but their actions are subject to the approval of Government boards. Government subsidies are given on the prices of herring and certain bottomfishes, for scrapping obsolete vessels 30 feet or longer, and for reducing the cost of equipment and bait. Loans and loan guarantees for investment in fishing vessels and processing plants are also given. In addition, the Government supports schools for fishermen, conducts fishery research on a large scale, and operates scouting vessels to aid fishermen in locating schools of fish.

## MARINE FISHERIES

### Landings

The Norwegian fisheries, characterized by landings which are for a large part herring, have been subject to sharp fluctuations. After World War II, annual landings<sup>1</sup> increased rapidly from 1 million tons in 1947 to nearly 1.7 million tons in 1951 and 1952 (fig. 1). The mid-1950's witnessed a series of ups and downs, but landings rose to 1.9 million

tons in 1954; record landings of nearly 2 million tons were made in 1956. Between 1951 and 1957, herring landings alone exceeded 1 million tons in each year except 1953. Since 1956 the Norwegian fishing industry has had lowered catches, especially from coastal waters. Total landings declined to about 1.6 million tons in 1957 and have remained below this level; they were 1.1 million tons in 1962 and 1.2 million tons in 1963. A recovery to 1.4 million tons was made in 1964 mainly because of larger landings of winter herring.

### Areas of Operations

Although Norway is located in latitudes that extend from about 58° N. to 71° N., its ports, even in the most northern arctic reaches, are ice free the year round. Sea surface temperatures are mild for such northern latitudes and range from about 44° F. in the south to 39° F. in the north. The North Atlantic Drift, an extension of the Gulf Stream, is mainly responsible for the extremely favorable climate and hydrography that produce an abundance of aquatic resources. This drift, which flows along the northern two-thirds of the Norwegian coast, results

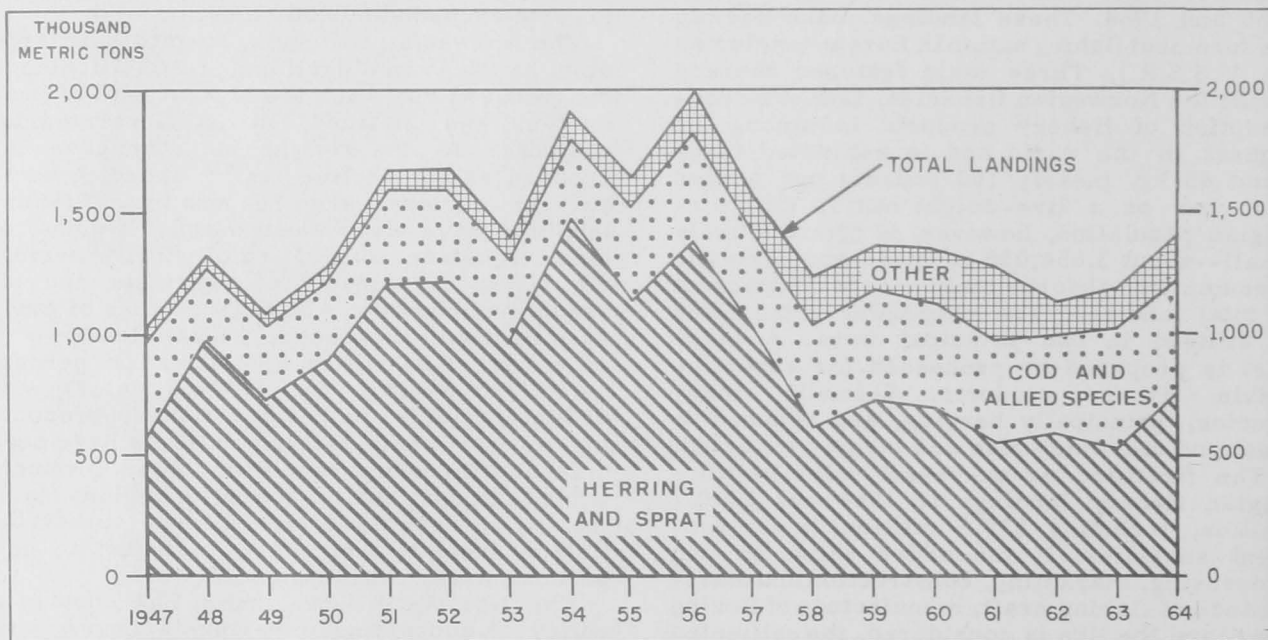


Figure 1.--Annual Norwegian fishery landings, 1947-64.

<sup>1</sup>Norwegian fishermen immediately head, gut, and remove the livers of a large part of their catches of cod and other bottomfishes. Also, some of the fish are salted on board the vessels. Landings are reported in the dressed or semiprocessed weight. On a live-weight basis, the Norwegian fishery catch is about 15 percent larger than the landed weight.

in comparatively moderate water temperatures that are suitable for the herring and bottomfishes that approach the coast on spawning or feeding migrations. As is characteristic of northern waters, the number of species is not large, but the fish occur in vast schools.

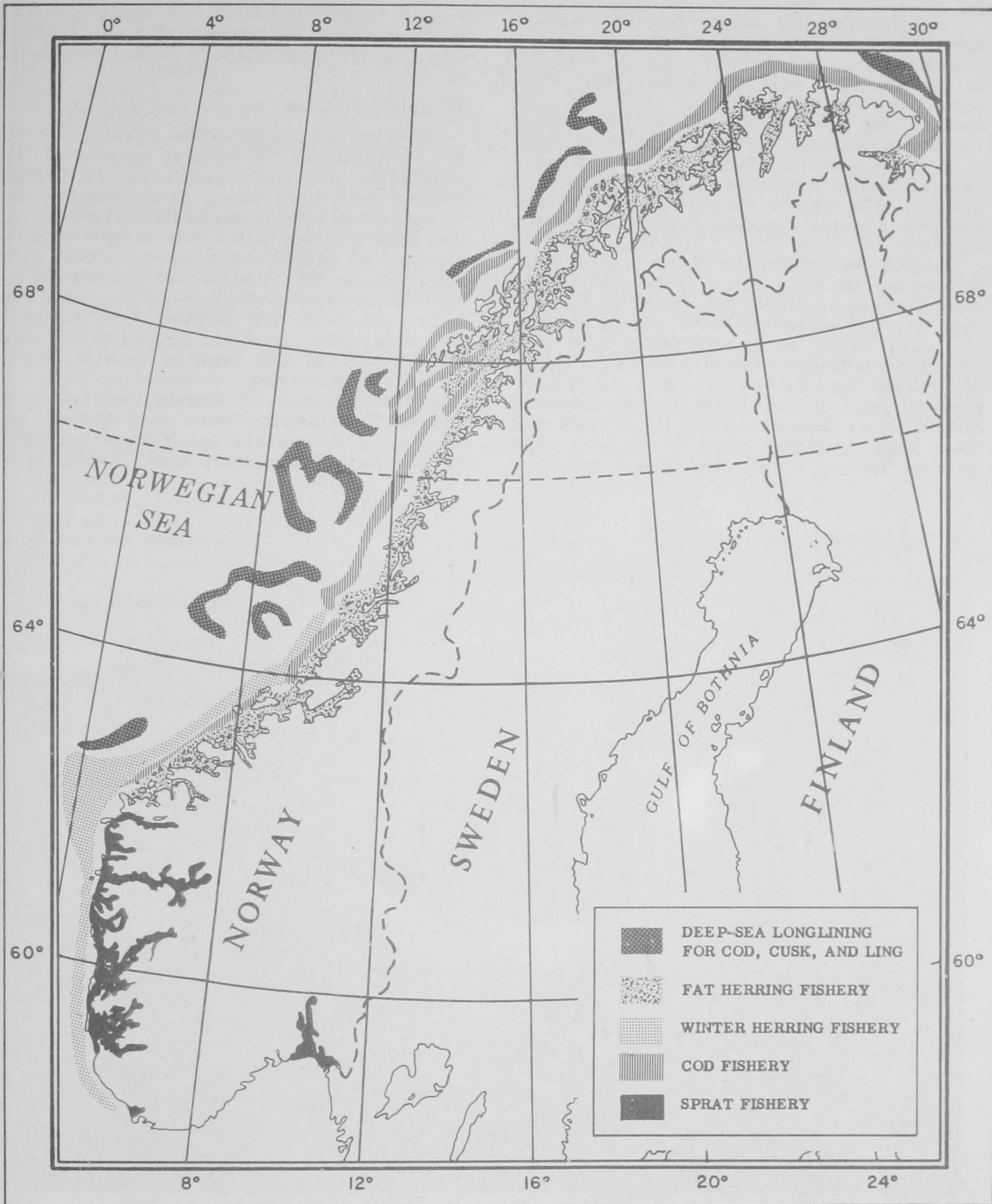


Figure 2.--Principal fishing grounds along the Norwegian coast.



The physiography of the Norwegian coast also lends itself to the conduct of extensive fisheries that are largely coastal (fig. 2). In the southern part of Norway, the coast bordering the Skagerrak is not much indented, but good inlets and harbors exist. Farther north many fjords and an archipelago of large and small islands, islets, and rocks provide many sheltered ports and fishing grounds. The waters surrounding this archipelago are major spawning grounds for herring and cod.

As late as 1955, only 6 percent of total Norwegian landings came from offshore or distant areas, such as the North and Barents Seas and the waters off the Faeroes, Iceland, the west coast of Greenland, Spitsbergen, and Bear Island; however, declining catches of coastal herring and cod have led fishermen to build larger craft and to intensify distant-water fisheries. Also, large craft with their high operating costs and upkeep must be kept fishing at all times, and the Nor-

wegian coastal fisheries are highly seasonal. In 1964 about 20 percent of total landings was obtained from offshore distant waters.

### Principal Species

Herring and sprat.--The herring fishery (fig. 3) produces the largest quantity of fish caught by the Norwegians. In 1964 about 734,900 tons were taken, accounting for over 50 percent of total landings (table 1). Although the 1964 herring catch was larger than the average of 600,000 tons taken between 1958 and 1963, it did not approach the size of the herring catches of the mid-1950's, when they averaged about 1.2 million tons annually. The size of the catch has depended primarily on the take of one type of herring, known as the winter herring.

Different types of herring are taken in coastal and inshore Norwegian waters, but all belong to one species, Clupea harengus. In Norwegian statistics, four coastal types



(Courtesy of Norwegian Export Council)

Figure 3.--Fishing for herring off the west coast of Norway. A dip net is being used to remove the fish from the purse seine.

Table 1.--Norwegian fishery landings, by principal species, 1957 and 1962-64

Species	Quantity				Value 1964
	1957	1962	1963	1964	
FISH	<u>Thousand metric tons</u>	<u>Thousand metric tons</u>	<u>Thousand metric tons</u>	<u>Thousand metric tons</u>	<u>Million U.S. dollars</u>
Herring and allied species:					
Herring.....	1,010.3	559.0	509.9	734.9	30.5
Sprat.....	9.5	10.6	16.6	10.2	1.4
Cod and allied species:					
Cod.....	229.5	200.3	189.7	153.7	24.5
Saithe (coalfish).....	75.9	83.2	107.6	143.9	10.9
Norway pout.....	---	40.8	106.1	85.1	2.1
Haddock.....	41.8	41.7	46.4	33.9	4.8
Cusk.....	11.2	16.7	17.5	19.8	2.9
Ling.....	9.5	10.6	12.6	13.1	2.8
Other <sup>1</sup> .....	34.1	24.5	25.2	28.2	2.3
Mackerel.....	13.3	17.0	23.4	51.4	2.2
Dogfish.....	18.7	28.7	30.9	24.2	2.1
Capelin.....	70.0	.4	28.3	19.6	.4
Flatfishes.....	10.2	15.8	14.6	17.1	3.9
Sand eel.....	3.2	11.6	11.6	10.4	.3
Salmon and trout.....	1.4	1.7	1.8	1.6	2.8
Other <sup>1</sup> .....	14.0	33.1	19.9	30.0	6.8
Total fish.....	1,552.6	1,095.7	1,162.1	1,377.1	100.7
SHELLFISH					
Shrimp (deepwater).....	7.1	10.9	11.7	11.0	6.2
Lobster, European.....	.7	.6	.5	.4	1.0
Other.....	3.5	9.8	4.4	6.1	.7
Total shellfish.....	11.3	21.3	16.6	17.5	7.9
SEAWEED					
All kinds <sup>2</sup> .....	10.0	13.4	10.7	12.0	0.3
Grand total.....	1,573.9	1,130.4	1,189.4	1,406.6	108.9

<sup>1</sup> Includes fish livers and fish roe.

<sup>2</sup> Dried weight.

Note:--Data on fishery landings are in weight of fish and shellfish as landed. Many fish, except herring and sprat, are partly dressed on board vessels and also may be salted if they are to be prepared as klipfish (dry-salted fish). The 1963 catch, on a live-weight basis, was estimated to have been 1.4 million tons.

Source:--Fiskets Gang, Feb. 25, 1965, and Food and Agriculture Organization, Yearbook of Fishery Statistics, 1962, Vol. 15, and 1963, Vol. 16.

are listed--small, fat, winter, and fjord herring. Small, fat, and winter herring designate fish that are at different stages of development. Fjord herring is a geographical entity applied to herring taken in fjords. In addition, two categories--North Sea and Icelandic herring--are listed, but these are also geographic entities.

The Norwegian term small herring (småsil) applies to fish that are 1/2 to 1 year old. Fat herring (feitsil) designates immature fish that are 3 to 5 years old. Mature herring older than 5 years are known as winter herring and are of two types--large or full herring (storsil) and spring or spent herring (vårsil).



Small and fat herring (fig. 2) are found all along the western and northern coasts of Norway. As fat herring begin to attain maturity, they move offshore to feeding grounds located mainly off northern and northeastern Iceland. There, the herring (known as Icelandic herring) remain on the feeding grounds until they are mature. The mature or winter herring then migrate to banks off the western and southwestern coasts of Norway, where they are caught between January and March. When the winter herring first approach the Norwegian coast, they have enlarged roe and milt and are ready for spawning. Large or full winter herring are the most valuable of all the types taken. Upon spawning, the herring (spring or spent) bring a lower price. The industry divides landings of winter herring into full winter and spent winter herring.

The North Sea and Icelandic herring fisheries have expanded largely because of the decline in catches of Norwegian winter herring. Herring landings from North Sea banks increased from 7,700 tons in 1957 to 189,300 tons in 1964. Similarly, landings of maturing Icelandic herring, mainly caught during the summer and fall, increased from 31,000 tons in 1957 to a peak of 152,200 tons in 1962; landings in 1964 were 91,620 tons.

Most herring are sent to reduction plants (fig. 4), although sizable quantities are utilized fresh, frozen, cured, canned, or as bait. In 1964 about 87 percent of the herring catch was reduced to meal and oil.

Sprat (*Clupea sprattus*), a small species of herring, is taken in far less quantity than herring but is important as the famous Norwegian brisling sardine. In 1964 about 10,200 tons of sprat were landed. The bulk of these landings were canned and exported. Fishing grounds for the sprat are located in inshore waters along the southwestern Norwegian coast and also in Oslo Fjord on the southern coast (fig. 2).

Cod and allied species.--With landings of 477,700 tons in 1964, the group of cod and allied species was next to herring in quantity landed (table 1). In value, however, these species were the leading group, worth \$50.3 million to the Norwegian fishermen, or about half the value of the total catch. Included in the group are species of high-unit value, such as the cod, haddock, cusk, and ling, which enter the fresh-fish trade or are frozen or cured. Species of low unit value, such as the Norway pout, are used entirely for reduction to meal and oil. Ordinarily the saithe is consumed fresh or is frozen or dried; landings, however, have been increasing at a rapid rate, and in 1964 about one-quarter of the catch was sent to reduction plants.

Though a single species (*Gadus callarias*), four types of cod are taken by Norwegians from coastal and nearby offshore waters.

Two of the types, bank cod (*banktorsk*) and fjord or coastal cod (*fjordtorsk*), are local races which do not migrate extensively. Both bank and coastal cod can be taken throughout the year and are especially important in the fresh-fish trade. The other two types are members of Barents Sea cod stocks that make periodic migrations southward to the Norwegian coast. One group consists of immature cod (*loddetorsk*), which undertake an annual feeding migration to the coastal waters off Finnmark, Norway's most northern province. These young cod feed mainly on capelin (a member of the smelt family), which is on a spawning migration toward the Norwegian coast. When the capelin migration fails to materialize, as it has during recent years, landings of young cod decline. Young cod are taken during the spring, mainly in April and May. The other group consists of mature cod (*skrei*), 6 to 7 years old and upward, which undertake a spawning migration to the west-central coast of Norway from January to April. About two-thirds of the catch of mature cod is made around the Lofoten Islands, principally between the islands and the mainland. Because the fishery for young cod takes place after the fishery for spawning cod, many fishermen take part in both fisheries. The bulk of the landings of either immature or mature cod is made during a short time, and most of the catch has to be preserved by freezing or curing.

Landings of cod from Norwegian coastal and nearby waters have been declining. Some authorities attribute this to overfishing of Arctic cod stocks in the Barents Sea. Others claim that fluctuations in landings are due to cyclical periods of abundance and scarcity and that the fish stocks are now in a period of decline. These cycles are believed to be about 25 years in duration.

For many years, the Norwegians have operated cod longlines on the banks off Spitsbergen, Bear Island, the Faeroes, and Iceland; however, as coastal catches have declined, cod fishing has been extended to waters off West Greenland.

Other fish and shellfish.--Other than herring and cod and allied fishes, the most important species are mackerel, sharks, capelin, flatfishes, sand eel (or sand lance), salmon, and shrimp.

In recent years, the mackerel fishery has become a large producer; landings increased from 13,300 tons in 1957 to 51,400 tons in 1964 (table 1). Mackerel are utilized fresh, frozen, salted, or canned. The supply, however, has recently been in excess of the amounts that could be disposed of for human consumption, and large quantities have been sent to reduction plants. In 1964 about 33,100 tons, or nearly 65 percent of landings, were reduced to meal and oil.

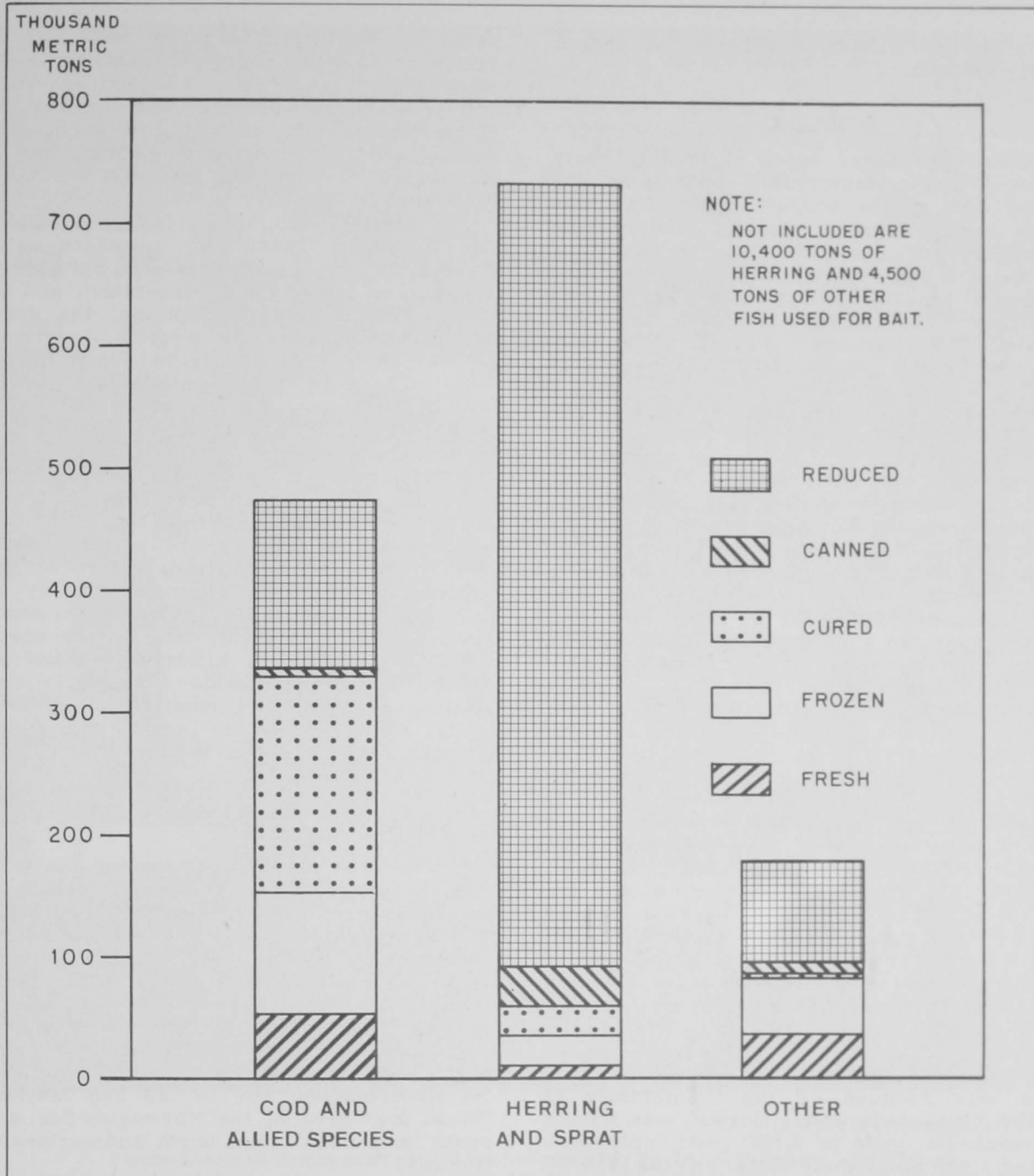


Figure 4.--Disposition of Norwegian fishery landings, 1964.

All landings of capelin and sand eel are sent to reduction plants. In some years, the catch of capelin has been exceedingly high--217,200 tons in 1961--but recent catches have been much less; 19,600 tons were taken in 1964.

The principal species of sharks are the dogfish and porbeagle. They are exported fresh or frozen.

Of the flatfishes, the plaice and the Greenland halibut are the most important. The plaice (1,330 tons landed in 1964) is taken

from nearby waters and is consumed mainly fresh, whereas the Greenland halibut (11,830 tons landed in 1964) is mostly frozen.

Salmon are taken in small quantities--1,600 tons in 1964, but the fish brings high prices, as do shrimp.

Shrimp are caught in many places along the Norwegian coast, but the principal grounds are in deep waters off the southern coast. In 1964 about one-quarter of the deepwater shrimp catch of 11,000 tons was consumed

fresh; the remainder was frozen or canned mainly for export.

## WHALING

Norway has three types of whaling operations. Pelagic factoryship operations for baleen and sperm whales in the Antarctic is the most important. Coastal whaling from Norwegian shore stations is also conducted for baleen and sperm whales. These two types of operations are under regulations adopted by the International Whaling Commission. The third type, a small-whale fishery off the Norwegian coast, is regulated by the Norwegian Government.

Production of oil from Antarctic factoryship operations has been declining. At one time Norway was the leading producer, but this position has been taken over by Japan. During the Antarctic whaling season of 1954/55, Norway operated 9 factoryships and 101 catcher boats in the Antarctic. That fleet produced about 62,400 tons of whale (baleen) and sperm oil, or nearly 40 percent of total Antarctic production in 1954/55. In the 1964/65 season, Norway operated 4 factoryships and 32 catcher boats; production was 17,926 tons of whale and sperm oil, or 20 percent of a lower Antarctic total.

Higher operating costs and competition from the Japanese (who, in addition to oil, utilize whale meat and other whale products more fully than the Norwegians) have been given as reasons for Norway's curtailment of Antarctic operations. Also, the Norwegians have found it more difficult, as have other Antarctic whaling countries, to fulfill their quotas for baleen whale oil because of serious depletion of the Antarctic whale stocks. Beginning with the 1962/63 season, an international quota system for taking baleen whales was adopted by the International Whaling Commission, and Norway was given a 28 percent share of the Antarctic quota of 15,000 blue-whale units. For the 1963/64 season, the baleen catch limit was reduced by the Commission to 10,000 blue-whale units. Norway was unable to reach its quota of 2,800 units, only producing 1,485 blue-whale units. For the 1964/65 season, the limit was further reduced to 8,000 blue-whale units by the countries participating in Antarctic whaling. Again Norway was unable to reach its quota, producing only 1,273 of the 2,240 blue-whale units allotted to it.

Coastal whaling from Norwegian shore processing stations is conducted on a small scale. In 1962 the catch of eight catcher boats operating from three shore stations was 91 sperm whales and 149 baleen whales. These yielded 690 tons of sperm oil, 800 tons each of whale oil, whale meat, and animal feed, and 500 tons of whale meal. The Inter-

national Whaling Convention prohibits the taking of blue and humpback whales along the Norwegian coast, but other baleen whales can be taken between May and October. The Convention permits the taking of sperm whales during any consecutive 8 months, and the Norwegian Government has set the season for March to October.

The small-whale fishery is conducted along the Norwegian coast and in waters as far distant as those off western Spitsbergen, Jan Mayen Island, East Greenland, and Iceland. With several exceptions, the season established by the Norwegian Government extends from March 15 to September 14, with a 3-week closed period in July. The season ends July 1 north of lat. 70° N. and east of long. 0°, including the area off the northeastern coast of Norway south of lat. 70° N. Between 3,700 and 4,800 small whales were taken in recent years. In 1964, however, the number declined to 3,170; these whales yielded about 4,500 tons of meat, 2,000 tons of blubber, and 28 tons of bone, valued at 9.8 million kroner (nearly \$1.4 million). The principal species taken was the minke (or little piked) whale; other species were the bottlenose, killer whale, and pilot whale. The 165 vessels engaged in small whaling in 1964 were mostly typical fishing boats, 40 to 80 feet in length, with a small harpoon gun mounted on the bow.

## SEALING

Norway has the largest sealing operations in the North Atlantic. The take of seals during the past decade has ranged between 200,000 and 300,000 pelts annually. In 1962, 58 vessels and 1,116 men took 238,830 pelts and 3,750 tons of blubber, for a total value of about 16.7 million kroner (\$2.3 million). The vessels were mostly of large size, up to 180 feet in length and averaging about 200 gross tons. The principal sealing grounds have been off Newfoundland and in the Jan Mayen or "West Ice" area of the Norwegian Sea; a few seals have been taken north and northeast of Norway.

Four species of seals--members of the family Phocidae--are taken by the Norwegians. The Greenland seal is by far the most important, providing 60 to 80 percent of the total pelts taken. Most of the remaining pelts are those of the hooded seal; only small numbers of bearded and ringed seals are taken. Although these seals are not fur seals, Greenland seals retain their baby fur for a few weeks and young hooded seals for about a year. The hides of the young are classed as furskins and used for clothing and trimming. Hides of mature seals are used for leather.



(Courtesy of Norwegian Export Council)

Figure 5.--Small fishing craft used in the Lofoten fisheries. Based at Svolvær, Norway.

### FISHING CRAFT

Because most of the grounds fished by the Norwegians are in coastal and inshore waters close to numerous fishing ports, a large part of the fishing fleet consists of small and medium-sized craft (fig. 5). During the last decade, however, the number of larger craft has increased as purse seining, longlining, and trawling have been extended into distant offshore waters.

In 1962 the Norwegian fishing fleet of 39,705 registered craft (table 2) consisted mainly of 28,429 small open motorboats and 8,799 decked, wooden motor craft under 50 feet. Fourteen decked steel craft made up the rest of the motor-powered fleet under 50 feet. The remaining motor craft (2,440 of 50 feet and over) were mostly in the 50- to 80-foot class. There were 23 steam craft.

Open undecked motorboats and small decked craft are used a great deal by fishermen



Table 2.--Number and gross tonnage of registered Norwegian fishing craft, 1962

Type of craft	Number	Total gross tonnage	Average gross tonnage
MOTOR			
Open motorboats.....	28,429	75,112	2.6
Decked craft:			
Wooden:			
Under 50 feet.....	8,799	94,790	10.8
50 - 80 feet.....	1,754	72,446	41.3
80 - 110 feet.....	232	25,453	109.7
Over 110 feet.....	35	7,052	201.5
Total or average, decked wooden craft...	10,820	199,741	18.5
Steel:			
Under 50 feet.....	14	183	13.1
50 - 80 feet.....	51	2,799	54.9
80 - 110 feet.....	153	20,058	131.1
Over 110 feet.....	215	64,270	298.9
Total or average, decked steel craft....	433	87,310	201.6
STEAM			
All kinds.....	23	( <sup>1</sup> )	( <sup>1</sup> )
Grand total.....	39,705	362,163	9.1

<sup>1</sup> Tonnage not available.

Source:--Organization for Economic Cooperation and Development, Subsidies and Other Financial Support to the Fishing Industries of OECD Member Countries, Paris, 1965; Food and Agriculture Organization, Yearbook of Fishery Statistics, 1962, Vol. 15.

who do not practice fishing as a full-time occupation. These small boats, usually operated near home ports, may also travel great distances along the coast to participate in the different seasonal fisheries, such as those for winter herring or Lofoten cod. The smaller craft are not as highly specialized as the larger vessels and may be used for purse seining, gill netting, longlining, or trawling with slight changes in deck gear and winches.

A growing fleet of steel vessels over 80 feet in length includes large purse seiners, high-seas longliners, and trawlers. Since 1960 the trend toward building vessels of larger size has intensified. In 1965 Norway had 473 trawlers, of which 34 were over 300 gross tons. Some of the newer vessels, over 150 feet in length, are stern trawlers equipped with a ramp for hauling nets on board to be unloaded. Since 1961 about 20 stern trawlers have been added to the Norwegian fishing

fleet; 3 of these vessels were registered at 1,000 gross tons each, 3 at 800 tons, 2 at 600 tons, 2 at 400 tons, and 6 between 200 and 300 tons.

## FISHERMEN

Because of the abundance of fish in nearby waters, people early in Norway's history settled along the coast. The first settlements were made largely in the fjord districts, but soon people moved to the outermost islands within easy reach of the coastal fishing banks. Today, although the fishing population is scattered along the entire coast, the principal fishing centers are in western and northern Norway. Furthermore, almost half the Norwegian fishermen are located in the northern third of the country.

The fishing population has been declining steadily. According to the most recent census,

the number of fishermen decreased from about 86,000 in 1948 to 56,890 in 1962. The latter number was less than 2 percent of the total population and included 21,475 who had fishing for their sole occupation, 19,756 for their main occupation, and 15,659 for their secondary occupation. The large number of part-time fishermen in relation to full-time fishermen is characteristic of highly seasonal coastal fisheries. Many part-time fishermen have small farms or work in fish processing or other industries.

### FISHERMEN'S ORGANIZATIONS

Most fishermen are organized into a trade union, known as the Norwegian Fishermen's Association (Norges Fiskarlag). Members are drawn mainly from fishermen engaged in coastal and nearby offshore bank fisheries. A distinct feature of the Norwegian fisheries is the fish marketing organizations, which represent fishermen in their dealings with buyers (see below under Marketing). The fish marketing organizations work in close association with the Fishermen's Association. Fishermen on vessels operating in distant waters generally are members of the Seamen's Trade Union.

### MARKETING

Marketing in the Norwegian fishing industry is conducted under laws which regulate and control firsthand sales of fish. The basic legislation authorizing this is the Law on the Marketing of Raw Fish (Råfiskloven) of 1951, which stipulates that fishermen's marketing organizations have exclusive rights to sell almost all fish landed in Norway. The basic reasoning behind this legislation is that fish are landed at a great many ports in relatively small quantities, and fishermen are at a disadvantage in dealing with buyers, who had previously exercised virtually complete control over prices.

Fishermen have now established 15 marketing organizations with firsthand marketing rights either for a specified area or for certain species of fish. For example, Norges Råfisklag, the most important in terms of membership and of fish handled, markets practically all fish (except herring) landed at ports from Nord-Møre to Finnmark, which is an area corresponding to the northern half of Norway. In this area, the organization sells almost all cod and similar species used to prepare dried fish, two-thirds of the fish that is frozen, and most of the fish that is salted and dried. Norges Sildesalslag, the second most important sales organization, sells the entire catch of winter herring regardless of where the fish are caught and landed.

The fishermen's marketing organizations stipulate ex-vessel prices through negotiations with groups of fish buyers. Buyers must obtain a license from the marketing organization and are required to grant guarantees for payment. The prices established and the marketing policies of each organization vary widely. Norges Råfisklag confines its operations to setting fixed or minimum prices for the different species it handles and ensuring compliance with the rules of the organization. On the other hand, Norges Sildesalslag, which handles large amounts of winter herring within a short time, has a more elaborate price and marketing system. Prices are determined beforehand, depending on the final use of the herring, and the catch is distributed according to a quota system.

### PRESERVATION AND PROCESSING

The heavy concentration of Norwegian fish landings during certain seasons of the year and the comparatively long distances to European fresh-fish markets are among the principal factors responsible for the high percentage of landings that are processed (fig. 4). In 1964 only 97,500 tons, or 7 percent of Norwegian landings, were sent to domestic or foreign fresh-fish markets. The remainder of the catch was frozen (13 percent), cured (15 percent), canned (3 percent), and reduced to meal and oil (62 percent).

#### Frozen Products

The percentage of the Norwegian catch that has been frozen has been increasing steadily, and the amounts used in this manner have more than doubled in the past 10 years. In 1963 about 169,600 tons of fish and shellfish were sent to freezing establishments. Preliminary data for 1964 show a further increase to 174,400 tons. From the 1963 amount, 77,300 tons (net product weight) of frozen fish and shellfish were prepared; about 60 percent of this quantity was fillets (table 3). The trend has been to freeze smaller amounts of fish in the round or partly dressed and to increase the amounts of frozen fish fillets (figs. 6 and 7). Herring are usually frozen whole, as are some headed and gutted cod and other bottomfishes. Cod, haddock, and saithe generally provide the bulk of the fish fillets. Many new modern freezing plants have been built, especially in northern Norway where the supply of raw materials is more uniform throughout the year. Most of the frozen fishery products are exported, although increasing amounts are being used in such places as Oslo.



Table 3.--Norwegian output of preserved and processed fishery products, 1957, 1960, and 1963

(Net product weight)

Commodity	1957	1960	1963
	<u>Thousand metric tons</u>	<u>Thousand metric tons</u>	<u>Thousand metric tons</u>
FISH			
Frozen:			
Fillets.....	14.9	28.8	47.4
Other <sup>1</sup> .....	57.5	48.7	28.4
Dried, salted, or smoked:			
Dried, unsalted (stockfish).....	35.0	34.5	23.2
Dried, salted (klipfish).....	40.4	31.8	21.9
Salted <sup>2</sup> .....	73.0	45.1	19.7
Dried or salted, miscellaneous.....	.5	1.7	2.0
Smoked.....	4.0	6.5	2.5
Products and preparations:			
In airtight containers (canned):			
Herring and sprat.....	34.9	31.9	<sup>3</sup> 33.3
Other <sup>4</sup> .....	19.2	14.1	<sup>3</sup> 13.2
Not in airtight containers.....	11.2	8.8	<sup>3</sup> 4.8
SHELLFISH			
Frozen (shrimp).....	.6	1.1	1.5
Canned (shrimp, crabs, and lobster).....	2.4	2.5	<sup>3</sup> 2.4
OILS AND FATS			
Whale oil <sup>5</sup> .....	154.6	101.5	31.6
Sperm oil <sup>5</sup> .....	17.3	11.6	8.6
Seal oil.....	4.1	3.7	2.8
Fish liver oil.....	14.0	16.3	9.5
Fish body oil.....	67.1	54.0	54.7
MEALS AND SOLUBLES			
Whale meal and solubles.....	11.9	6.7	3.1
Fish meal.....	191.3	141.4	130.4
Total.....	753.9	590.7	441.0

<sup>1</sup> Mostly whole fish, some headed and gutted.

<sup>2</sup> Mostly salted herring and some wet-salted cod and codlike fishes.

<sup>3</sup> Data are for 1962; data for 1963 not available.

<sup>4</sup> Includes mainly fish balls and smaller amounts of mackerel and fish roe.

<sup>5</sup> Data are for whaling year beginning in December of previous year.

Source:--Food and Agriculture Organization, Yearbook of Fishery Statistics, 1962, Vol. 15, and 1963, Vol. 17.

### Cured Products

Norway has a long tradition of processing large quantities of fish by salting or drying, or a combination of the two methods. Smoked products are prepared in comparatively small amounts. Curing is done at many small and large fishing ports, mainly by small establishments.

The cool, sunny, and windy weather in parts of Norway, particularly the west-central coastal area, enables large amounts of fish to be processed by outdoor drying. The drying process, however, may be completed indoors by artificial means. In 1962 there were 110 drying establishments, mostly located in the west-central district of Møre og Romsdal.



(Courtesy of Norwegian Export Council)

Figure 6.--Fish filleting in a plant at Hammerfest, Norway.

Production of cured products has declined sharply since the early 1950's. Mainly responsible are (1) smaller catches of winter herring and of cod from Norwegian waters and the banks off the coast; (2) competition in foreign markets from other producing countries, such as Iceland; (3) restrictions imposed by some importing countries; (4) self-sufficiency in production attained by former importing countries; and (5) lesser consumption of salted herring. In 1963 the amount of fish utilized by the curing industry was 309,800 tons, compared with 494,600 tons in 1957. There is a considerable loss of weight, especially in the processing of dried fish. Output of dried, salted, and smoked fish was 69,300 tons (net product weight) in 1963, compared with 152,900 tons in 1957 (table 3).

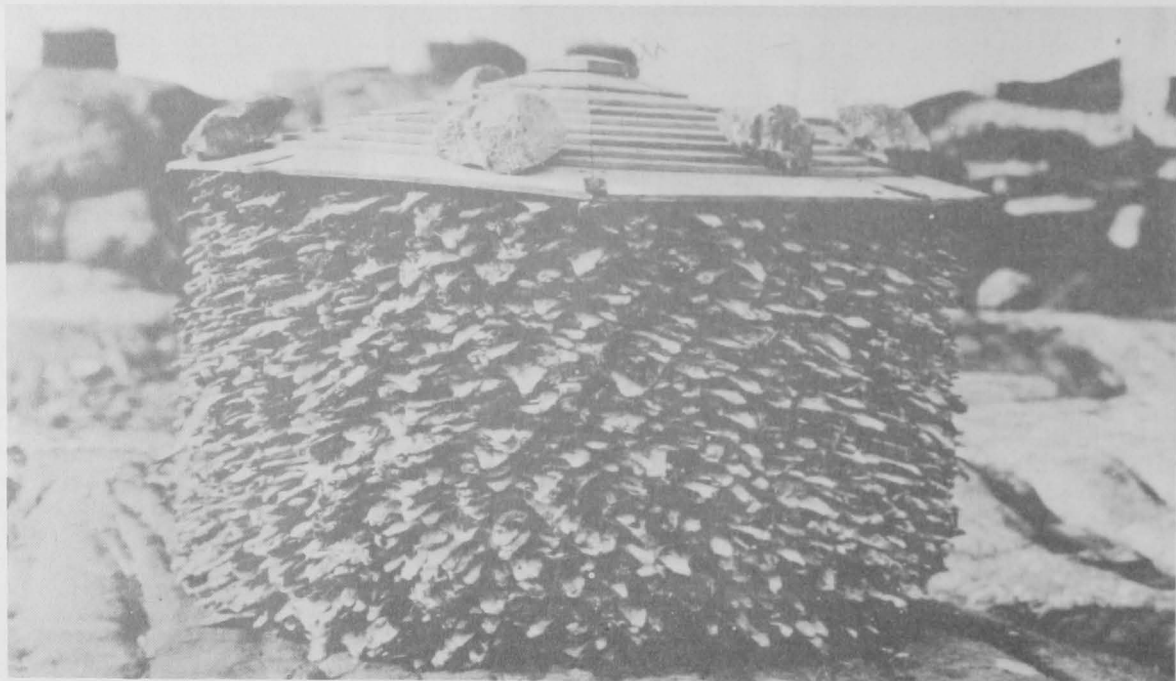
Although a large variety of cured products is prepared, the main types are dried fish (stockfish), dry-salted fish (klipfish), and salted herring. The principal species used

for stockfish is cod. In years of small cod landings, however, saithe and cusk are also used, though they bring a lower price. Stockfish (fig. 8) is prepared by hanging the fish in the open air and sun on wooden racks for 6 to 12 weeks; the final weight of the product is one-fifth of the round weight of the fish. Stockfish is highly durable and can be shipped to all parts of the world. Klipfish is prepared mainly from cod; lesser amounts of saithe and ling are also used. The fish are often gutted, headed, split, and salted aboard vessel and later dried ashore on bare rocks near fishing villages. Some are dried artificially. For salted herring the principal type used is the winter herring; Icelandic herring is also used. The herring is generally gutted and packed in barrels with salt, which forms a brine. The best quality brine-cured herring may also have spices and sugar added. Some cod and mackerel are wet-salted and exported in this condition.



(Courtesy of Norwegian Export Council)

Figure 7.--Blocks of frozen fish fillets being fed into an automatic cutting machine. The blocks are cut into sticks which are then breaded and fried, Stavanger, Norway.



(From Norway Fisheries and Fish Processing, 1950)

Figure 8.--Between periods of exposure to wind and sun, stockfish (dried fish) is stacked carefully under a protective covering.

## Canned Products

The amount of raw material utilized by Norwegian canning plants has varied from 40,000 to 60,000 tons annually. In 1962 from the 53,200 tons sent to canning plants, 46,500 tons of fish and 2,400 tons of shellfish were produced (table 3). Small herring and sprat (fig. 9)--smoked lightly and packed in oil, sardine style--are the leading canned fishery

products. Some kippered herring is also prepared. Since the sources of supply are close by, the principal canning centers for herring and sprat are in southern Norway, mainly along its southwestern coast and in the Oslo area. The next most important canned product is fish balls, which are prepared from bottom-fishes, mostly in canneries in northern Norway. Some mackerel, crab, shrimp, and cod roe are also canned. In 1962 there were 142



(Courtesy of Norwegian Export Council)

Figure 9.--Hand packing canned sprat, known as the Norwegian brisling sardine. Stavanger, Norway.

canneries officially reported with six or more workers and with a production value of more than 50 percent in marine products.

## Meal and Oil

The largest part of Norwegian fishery landings is reduced to meal and oil, the amount varying principally with the catch of herring, especially winter herring. During peak years of herring landings, as much as 1.2 to 1.3 million tons of herring and other species were sent to the reduction plants. The low was reached during the early 1960's; in 1963 about 591,400 tons were reduced. A marked recovery was made in 1964 when 868,200 tons were reduced, primarily because winter herring was landed in larger amounts; herring accounted for 642,900 tons of the total quantity reduced in 1964 (fig. 4). Also sent to the reduction plants were the entire catches of capelin, Norway pout, and sand eel. For the first time, large quantities of saithe and mackerel were reduced, since 1964 catches were too large to be marketed for human consumption. Data are not yet available on the output of meal and oil in 1964. In 1963 the reduction industry produced 130,400 tons of

meal--119,500 tons from herring and 10,900 tons from other species, mainly bottomfishes. Fish oil production consisted of 54,700 tons of body oil, mainly from herring, and 9,500 tons of liver oil, mainly from cod.

## INTERNATIONAL TRADE

### Exports

During the mid-1950's, Norway was the world's leading exporter of fishery products both in quantity and value. Norway still retains a prominent place, although it has given way to Japan in value and to Peru in quantity of fishery exports. The critical changes that have taken place in the Norwegian fishing industry during the past decade--for example, smaller landings, changing consumption patterns, trade restrictions, and competition in foreign markets--have reduced the total quantity and value sharply. In 1957 fishery exports (including whale oil) totaled 644,400 tons, valued at \$164.4 million (table 4). By 1963 exports had declined 37 percent to 404,600 tons, valued at \$141.6 million. Preliminary data for 1964 show an increase of about 18 to 19 percent over the quantity exported

Table 4.--Norwegian exports of fishery products, 1957, 1960, and 1963

Commodity	1957		1960		1963	
	Quantity	Value	Quantity	Value	Quantity	Value
	<u>Thousand metric tons</u>	<u>Million U.S. dollars</u>	<u>Thousand metric tons</u>	<u>Million U.S. dollars</u>	<u>Thousand metric tons</u>	<u>Million U.S. dollars</u>
<b>FISH</b>						
Fresh, chilled, or frozen.....	154.7	24.8	140.7	30.7	118.6	41.8
Dried, salted, or smoked.....	155.4	53.5	112.9	50.7	78.5	43.0
Products and preparations, whether or not in airtight containers.....	40.5	21.4	41.0	20.4	36.3	21.6
<b>SHELLFISH</b>						
Fresh, frozen, dried, salted, etc. ..	2.9	4.1	4.3	6.4	7.1	8.8
Products and preparations, whether or not in airtight containers.....	2.3	2.8	2.0	2.5	1.6	2.3
<b>OTHER PRODUCTS</b>						
Oils and fats, crude or refined, of aquatic animal origin <sup>1</sup> .....	142.9	34.4	98.8	20.6	56.4	9.8
Meals, solubles, and similar products of aquatic animal origin.....	145.7	23.4	106.0	12.7	106.1	14.3
Total.....	644.4	164.4	505.7	144.0	404.6	141.6

<sup>1</sup> Includes mainly whale oil (25,600 tons in 1963), fish liver oil (9,500 tons), and fish and other aquatic animal body oil (13,300 tons).

Source:--Food and Agriculture Organization, Yearbook of Fishery Statistics, 1963, Vol. 17.



in 1963. Exports of fish meal, which accounted for almost the entire increase, rose from 106,100 tons in 1963 to 188,100 tons in 1964.

Although Norwegian fishery exports go to a large number of countries, the principal buyers are the United Kingdom, West Germany, France, and Sweden. These countries account for a large part of the exports of fresh or frozen fish, canned fish, fish meal, and marine animal oils and fats. The United Kingdom, alone, takes about one-fifth of the total quantity and value of Norwegian fishery exports. The United States is an important customer for frozen fish fillets and canned fish, particularly sardines.

Of the traditional exports, dried fish goes mainly to Nigeria and Italy. However, the Italian market, once a monopoly for Norwegian exporters, has been buying large quantities of lower priced Icelandic dried fish. The principal markets for dry-salted fish are Portugal and some of the Latin American countries. Brazil, the most important buyer, has recently put a 30 percent surcharge on imports of such products. In 1964 Norwegian exports of dry-salted fish to Brazil were down to 5,200 tons, or less than half the exports in 1963. Spain and Portugal, once the principal European importers of dry-salted fish, have in recent years absorbed smaller quantities of Norwegian exports of this product.

Formerly, Norway exported large quantities of fishery products to Eastern European countries. The principal exports have been fresh, frozen, or salted herring, mainly shipped to the U.S.S.R., East Germany, and Czechoslovakia. There has been a sharp decline in these exports, especially of salted herring to the U.S.S.R.

To further the national policy of fostering fishery sales abroad, Government authorities have been granted the power to regulate exports. Under this authority, special fishery boards have been appointed to centralize and negotiate sales contracts, and special regulations have been issued requiring membership in an approved exporter's association as a condition of the right to export fish. Fishery exports are handled largely by national export associations whose members have exclusive rights to export only specified products, such as dried fish, dry-salted fish, or salted herring. The regulations do not apply to fresh fish and canned products, which, however, have to meet quality, sanitary, and technical standards.

## Imports

Norwegian imports of fishery products, though small compared with exports, have risen in recent years. In 1963 about 92,000

tons were imported, compared with 26,300 tons in 1957 (table 5). The principal item in 1963 was 77,400 tons of marine animal oil. This product has recently been imported in large quantities because the winter herring catch has been below normal and because Antarctic whale oil production has declined. Norway has a sizable oil-hydrogenation industry that uses the country's plentiful supply of hydroelectric power, enabling marine oils to be imported and hardened and still remain competitive in European markets. The only other imports of significance are salted cod (8,300 tons in 1964) and salted herring (4,400 tons).

## SUPPORT TO THE FISHERIES

### Subsidies

The Norwegian fisheries, with few exceptions, operated without direct Government support prices until the late 1950's. The income of fishermen, however, has been lagging seriously behind incomes in other sectors of the Norwegian economy. Contributing to this lag have been sharp annual fluctuations in the catches of major species, increasing costs of vessel operations, and adverse price developments abroad. To reduce operating costs and support fish prices, payments were made to fishermen beginning in 1956 from the price equalization funds that had been accumulated since World War II for herring and bottomfishes. These funds had been derived from payments of fish exporters who had received prices in excess of agreed standard prices on which payments to fishermen had been based. It soon became evident that the equalization funds were insufficient, and Government funds were made available as of 1956 to support guarantee schemes that would give fishermen minimum weekly earnings.

In 1958 Government funds were first used to support ex-vessel prices for bottomfishes as well as for subsidies to reduce the cost of gear and bait in this sector of the fisheries. Since 1960 Government funds have been appropriated to reduce the cost of gear in the herring fisheries, and since 1961 subsidies have supported the ex-vessel price for herring.

During 1958-62 the Government and individual marketing organizations conducted annual price subsidy negotiations. To ensure better coordination of Governmental price support measures, the Norwegian Fishermen's Association was asked by the Ministry of Prices and Wages and the Ministry of Fisheries to act as the sole representative of fishermen beginning in 1963.

Support payments have climbed steadily from 1.1 million kroner (\$154,100) in 1956 to 140.2 million kroner (\$19.6 million) in 1964. Price



Table 5.--Norwegian imports of fishery products, 1957, 1960, and 1963

Commodity	1957		1960		1963	
	Quantity	Value	Quantity	Value	Quantity	Value
	<u>Thousand metric tons</u>	<u>Million U.S. dollars</u>	<u>Thousand metric tons</u>	<u>Million U.S. dollars</u>	<u>Thousand metric tons</u>	<u>Million U.S. dollars</u>
FISH						
Fresh, chilled, or frozen.....	2.9	0.8	8.4	1.0	5.5	1.2
Dried, salted, or smoked.....	2.6	.6	6.1	1.1	6.6	1.6
Products and preparations, whether or not in airtight containers.....	.1	( <sup>1</sup> )	.6	.4	2.4	1.0
SHELLFISH						
Fresh, frozen, dried, salted, etc. .	( <sup>1</sup> )	( <sup>1</sup> )	.1	( <sup>1</sup> )	.1	.2
Products and preparations, whether or not in airtight containers.....	.1	.1	.1	.1	( <sup>1</sup> )	.1
OTHER PRODUCTS						
Oils and fats, crude or refined, of aquatic animal origin.....	20.6	5.0	60.2	11.2	77.4	11.3
Meals, solubles, and similar products, of aquatic animal origin.	---	---	1.1	.1	( <sup>1</sup> )	( <sup>1</sup> )
Total.....	26.3	6.5	76.6	13.9	92.0	15.4

<sup>1</sup> Insignificant.

Source:--Food and Agriculture Organization, Yearbook of Fishery Statistics, 1963, Vol. 17.

subsidies and other support payments in 1964 accounted for 18 percent of the ex-vessel value of the total fishery catch.

An agreement between the Fishermen's Association and the Ministry of Fisheries now exists for the period between January 1, 1964, and May 31, 1966. The agreement stipulates that fish subsidies and freight equalization support payments should be transferred to fishermen's marketing organizations which are authorized to conduct the support programs at the fishermen's level. No subsidy is paid for fish that are sold to the meal and oil reduction industry or used for animal food. Support payments for gear and bait are transferred from the Fishery Directorate in Bergen to producers of such equipment. Other support measures include subsidies to modernize the fishing fleet by scrapping obsolete vessels 30 feet or longer and subsidization of the social security payments of fishermen.

A stated aim of the present agreement is to make the Norwegian fisheries independent of Government price support within 5 years. Some Norwegian fisheries people, however, are skeptical that this can be done since the Government is committed to a policy of raising the income of the fishermen to a

level comparable with the general wage level in the country. Much will depend on the modernization of the fishing fleet, marketing conditions, and the fishing industry's capability of making the catching, processing, and marketing of fishery products more efficient.

### Loans for Vessels and Gear

Norwegian fishermen have always had difficulty in having private credit institutions loan them sufficient capital to acquire fishing craft, gear, and other equipment. A Government organization, the State Fishery Bank, has been established under the State Fishery Bank Act of 1948 as a specialized credit institution to help fishermen in obtaining the capital necessary to stimulate the effective development of the fishing fleet. At the end of 1962, about 9 percent of the total number of registered fishing craft and 37 percent of the total gross tonnage had been granted credit by the State Bank.

To provide first mortgage loans, the State Bank obtains operating funds by issuing bonds or by loans in the open market. The amount of capital it may raise is 10 times its capital

foundation, which is 25 million kroner (\$3.5 million). An interest rate of 4 percent is charged on first mortgage loans for vessels and 4 1/4 percent for gear; this rate is similar to the rate established for Government credit to other industries. In 1963 first mortgage loans, issued up to 60 percent of total investment in vessels, gear, and other equipment, amounted to 40,408,000 kroner (nearly \$5.7 million).

Second mortgage loans are provided from a fund, the capital of which has been allocated by the Ministry of Finance to the State Fishery Bank. This fund grants loans only when the State Bank has issued a first mortgage loan, and is for the purpose of acquiring or improving engines and other equipment on vessels more than 50 feet in length. In 1963 second mortgage loans--issued up to 70 to 80 percent of total investment and bearing an interest rate of 2 percent--amounted to 13,207,000 kroner (\$1.85 million). Third mortgage loans may also be issued but have been temporarily suspended.

### Loans for Processing

The State Fishery Bank makes loans to processing plants, especially those operated by fishermen's cooperatives which process their own catches. Most of the plants are small units that salt and dry fish. First mortgage loans carry an interest rate of

4 percent, and second mortgage loans 2 percent. First mortgage loans outstanding at the end of 1963 amounted to 11.3 million kroner (\$1.6 million); second mortgage loans amounted to 3.0 million kroner (\$420,000). The Government has also invested in the fish-freezing industry by purchasing shares or by loans. In addition, short-term loan guarantees have been made for fish processing. Short-term loans, guaranteed up to 70 to 100 percent of production costs, amounted to 60 million kroner (\$8.4 million) at the end of 1963; the interest rate on these loans was 4 1/2 percent.

### Regional Development Fund

A fund has been established to provide loans and loan guarantees in districts that are poorly developed and have unemployment problems. In regard to the fishing industry, the Regional Development Fund has contributed chiefly to financing construction of large vessels that are able to land large quantities of fish for processing. The Fund has also supported plans for modernizing existing plants as well as plans for product development. Rates of interest on loans vary between 2 1/2 and 5 percent. In 1962 loans outstanding amounted to 13,075,000 kroner (\$1.8 million); guarantees on loans made by private institutions amounted to 3,261,000 kroner (\$456,700).

MS #1513

UNITED STATES DEPARTMENT OF COMMERCE  
FISH AND WILDLIFE SERVICE  
BUREAU OF FISHERIES