3. Equip small vessels (especially small wooden vessels which work in fog areas) with radar reflectors or targets.
4. Give moral support to actions which promote higher standards for fishermen in seamanship and the traditions of courtesy and helpfulness at sea.

These steps should save money for every boat owner through insurance rate reductions. Furthermore, fishermen could place less reliance on avoidance of Friday sailings, avoidance of carrying aboard a black suitcase, or the tabu of the use of the word pig aboard the vessel. Far be it from me to object to good luck but fishermen need everything going for them and luck alone is not enough.

Fish Meal—Another International Problem

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Abstract

It is not news to you members of the U.S. fishing industry that there are international overtones to, for example, the fisheries for shrimp, tuna, and groundfish. We have, in addition, some problems in the import and export of fish and fishery products. However, for many years we have looked upon our industrial products (or reduction) industry as a thriving and vigorous segment of the total U.S. fishing industry. This was especially true of the Atlantic and Gulf menhaden industry, a segment solely engaged in the catching and processing of fish for reduction to meal, oil, and solubles.

The sudden changes of late 1960, and early 1961; the reasons for these changes; and a review of the further international developments relating to these new, fast moving and often confusing developments for the number one (in terms of total poundage of catch) segment of the U.S. fishing industry is presented.

Through review of the past pertinent events, statement of present situation, and a cautious look into the immediate future of this important and interesting U.S. industry a clearer picture should emerge of the place of fish meal and oil in international relations and trade.

THE ENTRANCE OF FISH MEAL as a problem on the international scene has been a recent one. However, judging from the scope and complexity of this problem, it will be with us for some time. It may be of value to take stock of the principal factors involved, to pull together the findings arising from several recent meetings on fish meal and related subjects, and to peer cautiously into the immediate future for clues to possible solutions to the problem.

We in the Bureau of Commercial Fisheries had, for many years, looked upon the industrial products segment of our fishing industry as an outstanding example of a vigorous and prosperous activity. There were international problems of long standing for groundfish, more recently for salmon and tuna, then with shrimp, and of course, the multiple complications for many fisheries over the possible extension of national jurisdiction outside the traditional three mile limit.

The fish reduction industry, and especially the menhaden segment along the Atlantic and Gulf Coasts, has forged ahead rather steadily over the past fifteen years. Meal production, while variable in any given locality, had trended

upward from about 78,000 tons in 1945 to approximately 300,000 tons in 1960. Technological improvements aboard the vessels and in the plants were made. The market for meal and oil was generally good, and solubles soon found a place in poultry feedstuffs, when their large-scale manufacture began in the 1940's.

Meanwhile, fish meal production elsewhere in the world began to change, both as to numbers of producing countries and relative amounts of production. Before World War II fish meal production was centered largely in North America, Northern Europe, and Japan. For example, in 1938 these areas produced approximately 98 per cent of the 723,000 tons world production. By 1953 Angola, Morocco, Denmark, and South Africa had become large producers and exporters. The most recent, and spectacular increase in fish meal production has taken place in Peru. For example, 1953 production was 13,000 tons, 1955—22,000; 1957—71,000; 1959—366,000; and for 1961 an estimate of between 600,000 and 700,000 tons. The total world production in 1960 is estimated at something over 2,000,000 tons.

The demand for fish meal, especially in Northern Europe and North America, had increased over supply because of such agriculture program changes as the increased production of broilers and swine. Efforts to provide more fish meal included both the exploitation of new fishery resources and the diversion of effort from supplying fish for human food. The failure to foresee the limits of demand, or to assess it, at the end of the period of stable prices and firm demand, led to a situation in which there was a very sudden increase in supply.

This large and sudden increase in production was not met by a parallel increase in use of fish meal. Late in 1959 symptoms of trouble in the market for fish meal and fish solubles began to show up. For example, the average annual price for menhaden fish meal declined from $137 per ton in 1959 to $97 in 1960. Solubles prices declined from a high of $103 per ton at New York in January 1959, to $36 by December 1960. There was selling of fish meal short for guaranteed delivery for 12 to 18 months in anticipation of further increases in production. Feed manufacturers, in view of the price situation, began to reduce inventories of fish meal and shift from contract buying to spot sale purchases as meal was required.

The industry, through the Industrial Products Division of the National Fisheries Institute, and the Government through the Bureau of Commercial Fisheries and the State Department, tried several possible avenues of assistance in coming to grips with this serious situation. After considerable study and negotiation by interested industry and government groups, at home and abroad, an International Meeting on Fish Meal was held by FAO in Rome from 20-29 March, 1961. Twenty-seven nations, representing principal producers and consumers of fish meal, participated. The purpose of the meeting was to assess world demand for fish meal, both short and long term, in relation to resources and productive capacity; to consider ways and means of increasing the effective demand for fish meal by action on the part of governments and of the industry individually or in concert, and to explore possibilities of ensuring stable conditions in the international market for fish meal.

It became apparent, early in the meeting, that some countries considered stabilization of the world fish meal market had been attained through a series of marketing agreements between several of the principal producers, but not including the United States. However, several action programs were recom-

mended. To promote more favorable marketing conditions producers were urged to ensure, to the extent practicable, a regular flow of supplies throughout the year; and to follow price policies realistic in relation to prices of competing high protein feedstuffs, even when meal is in short supply.

Governments were urged to review various economic barriers against the import of fish meal in potential consuming countries.

Governments and industry were urged, where necessary, to intensify efforts to develop and apply suitable standards for ensuring uniformly high quality fish meal. FAO was to assist in the development of these standards to foster more orderly marketing throughout the world.

In the interest of improving and extending usage of fish meal, intensified efforts to disseminate information concerning the special nutritive values of fish meal and its proper use in animal feeds were suggested. Especial emphasis was indicated for those areas where fish meal is not now used, is used in only limited quantities, or where knowledge of properly balanced rations is now lacking. For developing agricultural countries the establishment of feed-mixing units for small farmers was suggested. More intensive efforts are needed to develop new uses for fish meal and fish oil, for example in ruminant feeding, for pharmaceutical purposes, and for other industrial purposes.

The standardization of analytical procedures, by such agencies as FAO, the International Fish Meal Manufacturers Association, and others was favored. Lastly, all interested groups were asked to continue the watch on production and utilization and, if necessary, consult together on the need for, planning for, and conduct of a campaign to increase the consumption of fish meal and related fishery products.

An interesting side development of the fish meal meeting was the recognition that the present use of fish resources for production of animal feed might be channeled, in part, into production of a low-cost, highly nutritious concentrated fish protein for use in combating the malnutrition problems of humans, so serious in many areas of the world. Accordingly, FAO was asked to work with other specialized agencies of the United Nations, interested governments, and other agencies on the best ways to plan and promote such a program.

A series of actions followed. Provisional specifications for such products were drafted at the Fish Meal Meeting. The Protein Advisory Group of the UN reviewed and modified the specifications in June, 1961. The FAO International Conference on Fish in Nutrition, held in Washington, 19-27 September, 1961, included a substantial number of research papers bearing on the preparation and use of concentrated fish protein in human diets. On 28 and 29 September, 1961, FAO, in consultation with UNICEF and WHO, convened a panel of experts on fish meal production and trade, food technology, nutrition, marketing and market promotion, and consumer education and mass feeding, in conjunction with the Fish in Nutrition Conference. The deliberations of the panel resulted in the view that: concentrated fish protein of appropriate quality is suitable to meet serious protein deficiencies now existing in a large proportion of the world population; raw materials to produce such products are available; and present limitations on such are due to problems of cost, production, market promotion, and lack of resources of finance.

The panel next reviewed the prospective supply of concentrated fish protein for human nutrition in the light of the specifications previously developed. Three types were approved: type A—completely deodorized and defatted,

68% minimum protein; type B—partially deodorized and defatted, 65% minimum protein; and type C—non-deodorized and non-defatted, 60% minimum protein.

Country representatives present agreed to encourage contributions of qualifying products for use in the conduct of palatability and acceptability tests, and controlled clinical and mass feeding tests. The areas recommended for the tests, in order of priority, were: (1) Peru-Chile; (2) Morocco-Senegal; (3) Ghana; (4) Pakistan; and (5) others, including Congo (Leopoldville), Somalia, Uganda, Burma, Thailand, and Mexico.

Initially not over two tests were to be started, with others to be scheduled based on experience from the first tests. A rough estimate of costs for each test, during a three-year period, was $350,000, exclusive of costs the recipient government would be expected to bear.

At the Eleventh Session of the FAO Conference convened in Rome, 29 October-25 November, 1961, Fisheries Division Director, Dr. Finn, reported the recommendation of the expert panel that the tests described be initiated. The details of plans for setting up the tests were discussed with Fisheries Division staff members, Dr. Dreosti of South Africa, and the author. These plans were further developed in collaboration between the Nutrition and Fisheries Divisions of FAO, and led to specific proposals for action programs which FAO will now endeavor to implement under the auspices of its Freedom-from-Hunger Campaign. All of these people had participated in the three previous meetings to develop the program for use of concentrated fish protein in human nutrition.

At the meeting of the International Association of Fish Meal Manufacturers in Lisbon, 25-27 October, 1961, FAO was offered use of plant facilities for the preparation of concentrated fish protein products for use in the human nutrition program. The next step in FAO planning is to develop full details of the large-scale acceptability and promotion program and a cost estimate for it. There will be several stages in the program. Local diets will be studied to determine in which currently used food dishes the fish products might best be used as a protein supplement. The most suitable of the supplemented food combinations will then be used in small-scale acceptability tests both with children and adults, and with varying amounts of the supplement.

For the larger scale acceptability tests, two approaches are planned. Through tests in hospitals or Mother-Child-Health centers, under medical control, the nutritional advantages of these products can be demonstrated. Acceptability of the products to both children and adults will be tested through cooperation with the food services programs of schools, factories or other similar groups.

FAO has assurances that sufficient supplies of suitable fish products for the initial stages of the program will be forthcoming. Meanwhile, the selection, modification (if necessary), and operation of the plant (or plants) to produce the larger quantities of concentrated fish protein will be under way. The products are to be sampled, analyzed for compliance with the specifications, then properly packaged and stored. Periodic evaluation of the stored products is planned to learn type and extent of any changes in the products, to supply information regarding packaging materials and techniques, and of storage conditions as the factors may affect the products.

Early in the acceptability evaluation program results will be used to plan for, and then conduct a public education and promotion campaign. At selected

areas in the countries the public will be made aware of the nutritional values of the concentrated fish protein by means of exhibits, cookery demonstrations, advertising projects conducted by the press, radio, cinema and other local mass communications media. The objective is to foster interest of the public in purchase and use of the products in the daily diet. It will, of course, be necessary by the time the impact of this last stage of the program is felt to have suitable products available from commercial suppliers.

Thus, there is now under way the final planning for the type of program recommended at the FAO International Meeting on Fish Meal for the channeling of a part of the resource, and of productive capacity heretofore directed to fish meal for animals into the supplying of concentrated fish protein for the supplementation of human diets deficient in high quality animal protein. Active support by the many interested groups throughout the world will foster a sufficiently extensive and significant experiment to demonstrate not only the nutritional niche of these products, but provide data for assessment of the technological, promotion and marketing, and economic implications as well. Once these essential factors have been established, fish protein concentrates, or similar uniformly high quality, stable, and low cost fish products should become items of international trade.

When fish scrap and fish meal were first produced they were rather crude products, used entirely as fertilizer. Subsequently, extensive improvement in quality took place and fish meal now fills an important niche in animal feedstuffs formulations. There is good evidence that the even higher quality fish protein concentrate can now provide the animal protein supplement so urgently needed by a large proportion of the world human population.

For fish meal, the present market situation is not as bleak as it was in mid-1960. Some new markets have been developing. Mixed feed manufacturers have, in many instances, increased the amount of fish meal used in animal rations, but only to the extend that its nutritive value and price remain competitive with alternative protein sources. There has been no request for a concerted market promotion program at the international level. One group of manufacturers is reported to be studying means for creation of an international fund with the purpose of promoting greater use of fish meal.

There has not yet been sufficient agreement on the proposal to supply country statistics on production for consolidation and current release to interested groups, on the basis that information is not sufficiently complete to be meaningful. However, one estimate of forward sales for 1961 was 1,273,000 tons of fish meal, with the projection for 1962 slightly less at 1,185,000 tons.

At the FAO Conference in Rome, 29 October-25 November, 1961, Director-General Sen concluded that, for the immediate future, the effort to more nearly meet the needs of the world for food through the agricultural program under way and planned was not likely to be successful. A number of the country spokesmen pinpointed the most pressing need as that for animal protein. This view is one frequently mentioned at each of the other meetings referred to above. It would seem, therefore, that the world ocean will be increasingly important as a source of food in several ways. Among these pertinent to this report are: the good prospect for greater use of fish meal in rations to promote maximum feed efficiency and growth rate for animals subsequently used in human nutrition; and the opportunity for development of the more direct use of concentrated fish protein products in human diets.