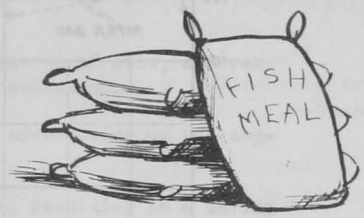
PAPER BAGS FOR FISH MEAL

By Charles Butler*

As early as 1938, the U. S. Fish and Wildlife Service carried out experiments at the Seattle Fishery Technological Laboratory and at fish meal plants in Washington, Oregon, California, and British Columbia to determine whether multi-wall paper bags could be adapted for packaging, transporting, and storing fish meals. The particular problem from which the investigation stemmed was the tendency of dried fish meals to overheat in the bag if the meal was sacked too soon after discharge from the dryer. Even when cooled prior to grinding, the meal was subject to heating in the sack if piles were compact in the warehouse. The alternative method involved loosely arranging the sacks on the floor for 24 to 48 hours to allow heat generated by oxidation of the oil in the meal to be dissipated prior to the regular piling operation.



Harrison[1/] has reported the extent of the heating taking place in burlap bags and in paper bags containing herring meal and pilchard meal. Figure 1 from this report shows the rather divergent temperature changes for bags loosely piled and for those tightly piled. Meal in paper bags at no time became appreciably hotter than the meal as it came from the grinder. The meal in paper did, however, require considerably longer to reach room temperature than the meal in burlap bags.

Experimental lots of these meals were held in storage for nine months, after which time the meals were examined for physical changes. Observers found that the meal in paper bags was somewhat superior, especially as to the color and odor of the meal in the center of the bag. A slight caking was noted, but was attributed to the necessity for tamping the meal into the experimental bags to accommodate the standard 100 pounds of meal. After one year of storage, the meals were examined by interested parties, including meal buyers, brokers, testing laboratory representatives and bag manufacturers' representatives. These observers expressed themselves as satisfied with the multi-wall paper bags as containers for fish meals. Chemical examinations made at that time brought out no differences between meals in paper and those in burlap.

The outbreak of war began to have an economic repercussion in the cotton and burlap market so that interest in the suitability of these paper bags increased. During the season of 1939, one California processor initiated the use of paper bags on a commercial scale. By 1940, others were likewise trying out the new container, largely from necessity due to shortening of the burlap supply and higher prices.

By 1941, the burlap situation was so critical that paper bags were in general use. Some processors insisted on one or more moisture-, vapor-, and water-proof laminations of asphalt-treated paper in the bag, while others preferred all-kraft paper bags.

Paper bags have continued in general use in certain fish meal plants. However, with the end of the war, burlap is again becoming available to the trade. The relative merits of each type of package has, therefore, become of current interest.

A recent survey of the companies using the paper bags and the companies buying meal packed in such containers was made to determine their opinions based on the actual plant-scale use for several seasons. Among the meal processors, one replied that his company had moved over 15,000 tons of meal in paper. Others stated that certain plants had been utilizing paper bags almost exclusively. Plant foremen and meal buyers were asked to discuss advantages and disadvantages encountered in the course of their experiences. The comments are summarized briefly:

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1/ HARRISON, ROGER W. "Chemical and Biological Aspects of the Manufacture and Distribution of Fish Meal," Proceedings of the Sixth Pacific Science Congress, 1939. pp. 309-315.

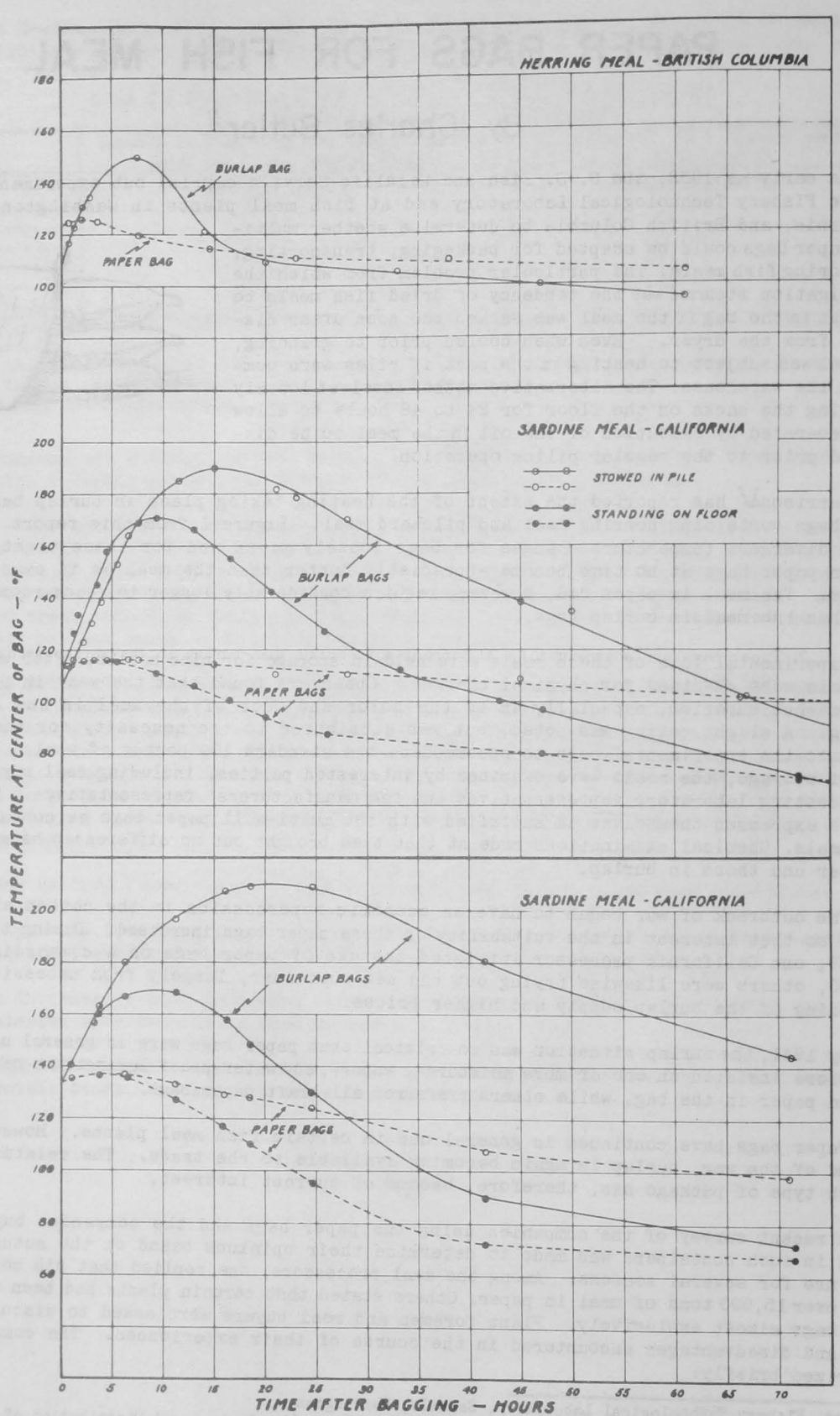


Figure 1 - Temperature changes in fish meal just after grinding when stored in burlap and multi-wall (4 kraft, 1 asphalt) paper bags.

ADVANTAGES OF PAPER BAGS

1. Fish meal may be piled as it comes from the sacker instead of allowing the bags to cool dispersed for 8 to 10 hours. This results in a saving of warehouse space, labor of extra handling, and lessens the fire hazard and loss of food value incurred in charring.

2. The warehouses, boats, etc., where fish meals are stored or in which they are transported are singularly free of the odor of fish meal formerly noted. This is due to the imperviousness of the paper bags to escape of volatiles and to stoppage of sifting out of the meal itself. Other materials stored in the adjacent space are thus protected from contamination from fish meal odors.

3. The paper barrier to free access of oxygen lessens the oxidation of oils, and very probably is advantageous from the standpoint of vitamin conservation.

4. Bags may be easily marked with attractive labels, and with advertising or use suggestions.

5. Rodent infestations in stored meals are almost non-existent, resulting in a saving of meal wastes and of labor for repacking damaged sacks as well as simplification of rodent control of nearby premises.

6. Insect infestations are at a minimum.

DISADVANTAGES OF PAPER BAGS

1. Filled bags are slippery and difficult for warehouse employees to handle, only one end has an "ear" for grasping, and workmen complain frequently of "paper cuts" on the hands.

2. Paper bags are approximately 20 percent more bulky than burlap in the warehouse or boat hold.

3. Rough handling or high piling results in a very high percentage of broken bags. In trans-shipment from dock to boat or vice versa, losses are especially heavy unless special care is used. Some estimates of breakage are as much as 20 to 30 percent over that for burlap or other bags.

4. Broken bags are very difficult, if not impossible, to repair.

5. Very oily meals stain through the paper bags rather badly, and, as the stains are more conspicuous than in other bags, prejudice is established.

6. Meals improperly prepared will cake, and in some cases, actual deterioration is rapid in the tight paper bags.

7. Paper bags have little, if any, re-use value and may actually pose a disposal problem.

As is often the case, the advantages from the standpoint of economy of operating time and expense at the processor's plant have been readily recognized. If the moisture content of the meal is controlled, and if the moisture, vapor and mold-spore permeability of the container is known and taken into account, the quality of the product does not suffer appreciably by being stored in paper bags of proper size. Freedom from the risk of odor contamination, especially in water-borne shipments, or in a custom warehouse where there is apt to be a mixed cargo, is a valuable asset. No one questions the superior attractiveness of a nicely printed bag, and the value of attractive advertising is recognized. Minimization of rodent and insect infestations in plant, warehouse, or ship is a public health benefit aside from the improved housekeeping consideration.

Disadvantages of multi-wall paper bags as now used are, however, serious. Regardless of the economies of plant operation, workers object strenuously to handling the paper bags, and with reason. Even where the system involves use of pallets and lift trucks, a certain amount of hand labor is always required. Rough handling has so long been the custom for many commodities that extensive education plus persistence by management will be required to get cooperation in alteration of established practice. Some progress has been made. For example, ship slings of canvas have lessened the damage in dock-side operations.

With all the many and diverse materials developed under stress of the gigantic packaging problem brought on by the war, it is not unreasonable to expect that a means can be found to render paper bags less susceptible to breakage. Oil staining, likewise, should be a minor problem. One possible solution might be a composite bag consisting of a two-way stretch crepe paper inner-liner for a cotton or burlap over-bag. The advantage of paper could thus be added to the recognized ruggedness of cloth. Other commodities such as salt and sugar have been packed successfully in small cloth bags which were then placed in burlap bags having a crepe paper inner-liner. Cost of the composite bags might be prohibitive, but if advantages can be shown sufficient to promote general use, the cost would be reduced by mass production.

Paper bags have been developed for cement, sugar, flour, mixed feeds, etc., and, although the demand for such bags is undoubtedly much greater, such an instance illustrates that the problem is not unsurmountable.

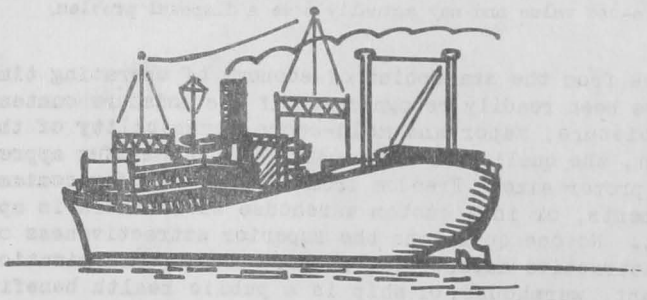
Despite the discussions of advantages from all angles, the considered opinion of persons contacted was that when burlap or cotton bags are again available, the trade will demand them, unless a bag can be brought out that is superior enough to overcome the strong pressure of workmen's dislike plus the resale value of burlap to the meal user.

Pacific Fishing Project

Sponsored by the War Food Administration, the Reconstruction Finance Corporation agreed to finance the establishment of an American-operated fishing enterprise in the Pacific as a measure to assist in the prosecution of the war effort. The completion of the project was assured December 21, 1945, when the Reconstruction Finance Corporation announced that the undertaking would be continued.

Substantial commitments had already been made in connection with the project, which was well under way several months before V-J Day.

The project, consisting of a factory ship with refrigeration and canning equipment to process fish, together with four trawlers which will accompany the floating cannery as the fishing fleet, will be made available on a lease basis to the Pacific Exploration Company, Seattle, Washington. The cost of the facilities is not expected to exceed $3,750,000.



The fleet will be used by the lessee to fish for king crab, groundfish, and other marine products of the Pacific. Operation of the fleet in the Bering Sea and other Pacific areas is expected to provide the basis for a substantial expansion of our fishing industry and will increase production of high protein food and provide employment to a large number of people in the Pacific Northwest. The steel cargo ocean-going vessel, the S.S. Mormacrey, obtained from the War Shipping Administration, for several months has been in process of conversion into a factory ship for the freezing, processing, and canning of fish, and it is estimated that the conversion work will be completed early next year. This vessel is 8,368 deadweight tons, 5,946 gross register tons, and 3,744 net register tons, and is now in the yards of Bellingham Iron Works, Bellingham, Washington, where it is being equipped and converted into a factory ship. When completed, it will have accommodations for approximately 250 male workers, as well as office quarters and office equipment. It is contemplated that four steel-constructed trawlers of approxi-

mately 165 tons each, all diesel powered, will either be built, or otherwise acquired, to be used in catching and conveying fish to the factory ship.

With the collapse of Japan, the project could no longer be considered essential to the prosecution of the war and, accordingly, the Department of Agriculture was not able to reaffirm the original recommendation of the War Food Administration. Consequently, the Reconstruction Finance Corporation requested the advice of the Director of the Office of War Mobilization and Reconversion with respect to continuation of the work. The matter was referred to interested Government departments and in consideration of the views and recommendations received, the Director of War Mobilization and Reconversion concluded that the completion of the project was to the benefit of the Government and requested RFC to proceed accordingly.

The Department of the Interior indicated that it would be to the interest of the Government to develop a substantial modern fishing industry in the Pacific Ocean. The Department also advised that the factory ship method appeared to be a practical means of accomplishing that objective, but pointed out that some Government financing would be required in the development of this modern fishing technique.

The State Department suggested that the project would be in line with the President's proclamation of September 28, 1945, concerning conservation and development of the fisheries in areas of the high seas which are of interest to this country.

Details of the lease arrangement are being worked out with officials of the Pacific Exploration Company in consultation with interested Government departments, so as to develop arrangements which will assure that the Government and the fishing industry will obtain a maximum amount of useful economic, scientific, and other information from the operation of the project, and will assure safeguards for the Government and the fishing industry.

New Hampton Office

A new center for the dissemination of market information on fish and fishery products was opened by the Fish and Wildlife Service in Hampton, Virginia, on December 17, to serve the Chesapeake Bay and North Carolina areas, which have not been covered adequately by other Market News offices of the Service. This office will issue daily bulletins and monthly summaries on landings of fish, crabs, and oysters, cold-storage holdings, and shipments of fish as an aid to the efficient distribution and marketing of fishery products.

At the Hampton office, regular information on movements of fishery products from Norfolk, Hampton, Phoebus, Crisfield, and other eastern shore points, and from Beaufort and Morehead City in North Carolina will be received and reported. It is planned also to cover prices in the Baltimore and New York markets, two important outlets for the fishery products of the region.

While early reports will be confined to food fish and shellfish, beginning next spring it is planned to include information on landings of menhaden, the principal fishery of the region in terms of volume of production. Almost the entire catch of menhaden is converted into meal and oil for animal feeding and industrial uses.

The Market News Office is located at 25 S. King Street. Persons who wish to receive bulletins should address a request to that office, Post Office Box 364, Hampton, Virginia.