

NUTRITION

More Protein From the Sea

Fish flour, the concentrate made from "trash fish" and fish scraps, is one of the most controversial protein and food sources available, William E. Small reports.

► **WORLD HUNGER** and malnutrition could be checked today by the revolutionary fish flour made from "trash fish" and fish scraps and used as a supplement to local diets.

The millions of tons of fish which are discarded annually because they are not marketable, as well as the thousands of tons of fish heads, scales and bones, could become the backbone of nutritional products ranging from baking flour to vegetable and meat preparations for undernourished populations. And the seas have only begun to be tapped for their great protein resources.

During the next 40 years the world population will more than double while the amount of crop land shrinks. Only four billion acres of the total 33 billion acres of land are presently tillable, and these are being developed and sapped of their fertility. More and more hungry nations turn to the ocean for food.

Increase Marine Food

Scientists have estimated that the world marine food production of more than 80 billion pounds annually could be increased to 500 billion pounds without upsetting the balance of life in the teeming ocean waters. From the billions of pounds of fish wasted by the U. S. alone each year, enough fish flour could be produced to solve present world food problems.

There are several reasons why this unusual food has been avoided by most nations, including the United States. The major one, perhaps, is the "repulsive" idea of eating fish scraps. And, too, the product must be made tasteless, odorless, colorless (or white), sanitary, inexpensive and nutritious in order to be acceptable to many people.

Although research has been carried on in several countries for years, basic standards for such a product have not yet been set. Whether fish flour could be made from any type of whole fish or only quality species, or just from thoroughly-cleaned, marketable fish is only one of the big problems.

Fish flour can, realistically, be made safely and cheapest from all parts of all fishes. Water and oil and fatty wastes, which influence odors and are of little value, are processed out. The dehydrated product is ground, cooked, and chemically and bacteriologically cleaned. The protein and vitamins left are still enough to prevent deficiencies in the scantiest diet when only 10% fish flour is added.

Just the unharvested U.S. fish, made into fish flour, could produce enough animal protein to supplement the deficient diets of one billion people for 300 days at a cost

of less than one-half cent per person per day. Yet two billion of the total three billion persons in the world are badly undernourished and millions die of starvation annually.

Three methods of producing fish protein concentrate are presently under investigation, two of which have proven valuable.

Chemical processes can produce a completely deodorized and tasteless concentrate. This concentrate is bland enough to be used in stews, bread or other staple foods of the local diet. The biological digestion processes result in a tasty and flavorful product acceptable in many countries. Initial processing may start aboard ships, guaranteeing quick treatment of fresh fish. The third method is physical, the separation of solids from liquids. Little is known about physical processes. Eventually a combination of processes may be the answer.

Planned programs for testing model units of the three types in this country will cost nearly \$750,000, a very small amount compared to the billions spent annually for foreign aid.

The present stumbling block to fish flour use is not scientific or technological, however. A Food and Drug Administration ruling, indicating that consumers would

consider the product as "filthy," now prevents process development and sale in the United States. Politically, then, the Russians could say that the United States is feeding other countries food we would not eat if the United States were to produce the concentrate for other countries. Therefore, we are denying starving peoples both abroad and in this country a vital animal protein.

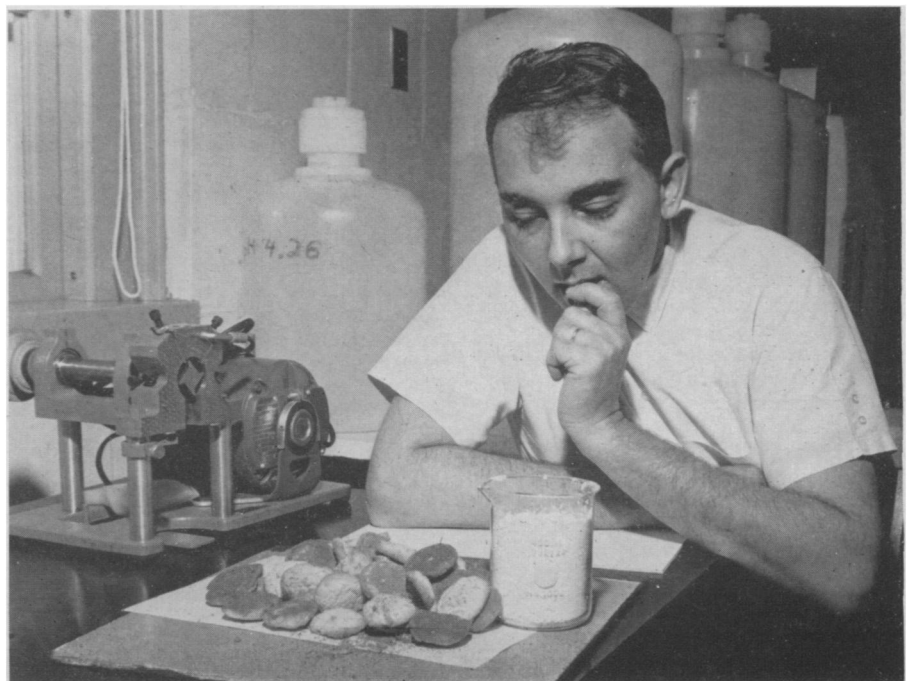
With the indefinite postponement of hearings by the Food and Drug Administration on the fish flour problem, the National Academy of Sciences has taken on the responsibility of trying to determine whether a safe and nutritious product can be made from whole fish and whether the need for protein is real. A favorable report by the Academy may convince FDA to drop its ruling.

Backing up the program is the wealth of information from several foreign countries presently studying or producing the rich protein product.

Norway was the first country to embark on a concentrated program to manufacture a concentrated fish protein for human consumption at least 60 years ago. During the last 25 years many processes have been developed and tried in various other fishing nations, including South Africa and Russia.

The Food and Agriculture Organization of the United Nations and several world-hunger-fighting organizations are also sponsoring much of the research and doing much of the work in the battle to free fish

(Continued on p. 95)



NUTRITIOUS COOKIES—The cookies being tested by Dr. Ernst R. Pariser, program leader of fish protein concentrate research at the Bureau of Commercial Fisheries Technological Laboratory, Washington, D. C., contain 10% fish flour. The cookies were made from the concentrate in the beaker.

Protein From the Sea

(Continued from p. 87)

flour rulings and turn the wheels of production.

Fish meal, a product made from the same substances as fish flour but not sufficiently processed for human consumption, has been used successfully for many years to feed livestock and poultry in this country and foreign lands. Fish oil and fish solubles are used in many drugs and medicines as well as foods daily on our tables.

The processing of fish meal and fish oils is essentially the same as that for fish flour, except that processing is not as intense or pure. The meal is now widely distributed, increasing in production yearly.

As fish meal has come to be judged on its known nutrients, it has become more directly competitive with vegetable protein feeds. Thus it is possible that fish flour could become competitive with vegetable protein products in cereals and flours.

Vegetable and meat scraps and by-products have long been used in a variety of products for animals, plants and man. Bone meal is known to increase plant growth. Oil seeds and plant scraps are used in a number of growth stimulators, food additives or medicines. Artificial or dehydrated products are added daily to the growing list of salable items.

Fish flour would probably compete with condensed or dehydrated milk because it is low in cost and does not spoil easily. The fish powder would, however, contain more of the essential vitamins, minerals and proteins than dried milk and be much more abundant.

The United States could break into another field of world leadership with the production and inexpensive distribution of the most promising food miracle: fish flour.

• Science News Letter, 82:87 August 11, 1962

AGRICULTURE

Unshielded Cultivation Boosts Herbicide Kill

➤ MORE EFFECTIVE ways of using herbicides and cultivators to control weeds in cotton appear likely through research by United States Department of Agriculture and the Mississippi Agricultural Experiment Station.

One of the most significant findings of the research is that unshielded cultivation can be used in fields treated with pre-emergence herbicides. In the past, only shielded cultivation was used in such fields to avoid disturbing treated soil.

Agricultural Research Service agronomist J. T. Holstun, Jr., found that unshielded cultivation late in the season actually supplements preemergence application of diuron, a herbicide of low volatility widely used in cotton. Soil thrown into the row covers and kills very young weeds not killed by diuron and also kills some weed seedlings that develop after diuron loses its effectiveness.

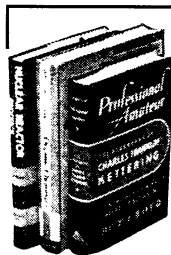
A combination of preemergence and post-emergence herbicide applications, supplemented with unshielded and shielded cultivation, gave most satisfactory weed control.

• Science News Letter, 82:95 August 11, 1962

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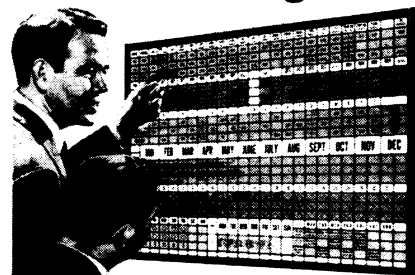
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