

# Sea Food Exhaustible

➤ MAN is capable of using up the resources of the ocean just as he is those of the land, and if he is going to exploit them intelligently, he has a lot to learn.

A rough picture of one marine food chain shows that 10,000 pounds of microscopic plants (phytoplankton) are converted into 1,000 pounds of small drifting animal life (zooplankton). They continue the chain by becoming 100 pounds of herring, which become 10 pounds of baby tuna, which finally become a single pound of adult tuna.

The efficiency ratio of this process is 10,000 to one. Other than that, knowledge is sketchy, and although we know the quantities of plant life and the resulting amount of fish, there is much that needs to be filled in about the stages in between.

"The old descriptive methods are insufficient for studying the biological resources of the ocean," said Soviet biologist Dr. M. E. Vinogradov of the Institute of Oceanology in Moscow.

The kind of information presently available is simply not complete enough to guide economical utilization of the ocean, but newer mathematical research techniques are already in use in the USSR, he told the Second International Oceanographic Congress in Moscow.

The general outlook at the moment is pessimistic. The world's annual fish catch went up from 23 million to 46 million tons between 1953 and 1963, and is now estimated at 50 million tons, but scientists do not expect it to double every decade indefinitely.

Most of today's principal fishing grounds are set at top capacity and future increases will have to come from exploitation of newly studied upwelling areas where nutrients are

brought to the surface in vast quantities. One zone in the Peru Current, exploited less than 10 years ago, already brings in its top limit of nine million tons of anchovies, which are processed into fishmeal to feed livestock.

Dr. David Cushing of the Lowestoft Fisheries Laboratory in England described an experiment in Scotland where baby plaice (European flounder weighing eight pounds or more when grown) are being reared within a fjord walled off by a lock. Since their mortality rate in nature is 99.9%, it is hoped this breeding experiment will increase their survival.

Prof. T. S. Rass of the Moscow Institute of Oceanology reported experiments in acclimatizing fish to new regions, such as moving tropical milkfish from waters west of Mexico to areas off Central America.

All in all, however, the future of commercial fish populations seems limited. The biologists agreed that the combination of heavy fishing with modern, highly developed technical gear and unfavorable climatic conditions can bring about the exhaustion of a species within just a few years.

## NECROLOGY

### Philipp Frank Dies at 82; Colleague of Einstein

➤ PROF. PHILIPP FRANK, brilliant mathematician and theoretical physicist as well as an internationally known philosopher of science, died on July 21 in Cambridge, Mass., 12 years after his retirement from Harvard University.

In 1912, when Prof. Frank was only 28 years old, he succeeded Albert Einstein as professor of theoretical physics at the University of Prague, a position he held for 26 years until he came to this country on a lecture tour in 1938, just at the time Czechoslovakia was invaded by the Nazis.

He remained in this country for the rest of his life, teaching mathematical physics and the philosophy of science at Harvard from 1939 until his retirement in 1954.

Prof. Frank was a great personal friend of Einstein, and wrote the definitive biography, "Einstein, His Life and Times." During his long career, Prof. Frank strongly influenced both physics and countless physicists and philosophers of science, as well as making many fundamental contributions to relativity and quantum theory.

He was a founding member of the "Vienna Circle" of logical positivists, a group of students who assembled every Thursday night in one of the old Viennese coffee houses to talk about the problems of science and philosophy.

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