PUBLICATIONS

(Annotated list of publications arising from the California Cooperative Oceanic Fisheries Investigations, 1 January 1955-30 June 1956)

Ahlstrom, Elbert H., and Robert C. Counts

1955. Eggs and larvae of the Pacific hake *Merluccius productus*. *U. S. Fish and Wildl. Serv., Fish. Bull.*, no. 99, vol. 56, pp. 295-329, 25 figs.

The eggs, larvae, and early development of the hake are described. Data on the abundance and distribution of hake larvae in 1951 and 1952 are given. Information on vertical distribution and temperatures at which larvae are found is also included.

Ahlstrom, Elbert H., and David Kramer

1955. Pacific sardine (pilchard) eggs and larvae and other fish larvae, Pacific coast, 1953. *U. S. Fish and Wildl. Serv., Spec. Sci. Rept.: Fisheries*, no. 155, 74 pp., 1 fig.

Basic data are given on the numbers and location of sardine eggs and larvae and the larvae of northern anchovy, jack mackerel, Pacific mackerel, hake, and rockfish taken in 1953. One of a continuing series of reports.

Berner, Leo D.

1955. Two new pelagic tunicates from the Eastern Pacific Ocean. *Pac. Sci.*, vol. IX, no. 2, pp. 247-253, 8 figs.

Two tunicates, *Cyclosalpa strongylenteron* and *Cyclosalpa pinnata quadriluminis*, are described.

Boden, Brian P., Martin W. Johnson, and Edward Brinton

1955. The euphausiacea (crustacea) of the North Pacific. *Univ. of Calif., Scripps Inst. of Oceanog., Bull.*, vol. 6, no. 8, pp. 287-400, 55 figs.

A description of the taxonomy and life-history of the euphausiid shrimps.

California Department of Fish and Game

1956. The marine fish catch of California for the years 1953 and 1954 with jack mackerel and sardine yield per area from California waters 1946-47 through 1954-55. *Calif. Dept. of Fish and Game, Fish Bull.* 102, 99 pp., 10 figs.

This bulletin contains a report of catch by block areas to show fish concentrations, seasonal tonnage and the percentages of catch taken from each area. A list of common and scientific names of fishes, crustaceans, and mollusks is also included.

Clark, Frances N.

In press. Average lunar month catch of southern California sardine fishermen, 1932-33 through 1954-55. *Calif. Fish and Game.*

A discussion of the average lunar month catch for the period indicated. Based on total boat months calculated to be required to make each season's catch, the relative strength was measured for 22 year-classes between 1932-33 and 1954-55.

Clark, Frances N., and John C. Marr

1955. Population dynamics of the Pacific sardine. *In* Prog. Rept., Calif. Coop. Oceanic Fish. Invest., 1 July 1953-31 March 1955, Sacramento. State Printer. Pp. 11-48, 24 figs.

The problems of sardine population dynamics are defined, the present knowledge summarized and generalized and deficiencies noted.

Clothier, Charles R., and Edward C. Greenhood

1956. Jack mackerel and sardine yield per area from California waters, 1946-47 through 1954-55. *Calif. Dept. of Fish and Game, Fish Bull.* 102, pp. 7-16, 10 figs.

This article presents tables to show the sardine and jack mackerel yield from designated block areas and from records of landings of commercial fishing boats along the coast.

Cromwell, Townsend, and Joseph L. Reid

1956. A study of oceanic fronts. *Tellus*, vol. VIII, no. 1, pp. 94-101, 6 figs.

Oceanic fronts and frontal layers are defined. Temperature data obtained at two fronts in the equatorial Pacific are presented and a particular circulation, considered basic to the existence of a front, is proposed.

Eckles, Howard H.

1955. Age composition of the commercial catch of Pacific sardines, 1932-38. *In* Age determination of Pacific sardines from otoliths, by Kenneth H. Mosher and Howard H. Eckles, *U. S. Fish and Wildl. Serv., Res. Rept.* no. 37, pp. 24-30, 2 figs.

Age determinations from otoliths were used to extend knowledge of age composition of sardine population to include a 10-year period for which adequate data had been previously lacking.

Felin, Frances E., John S. MacGregor, Anita E. Daugherty, and Daniel J. Miller

1955. Age and length composition of the sardine catch off the Pacific coast of the United States and Mexico in 1954-55. *Calif. Fish and Game*, vol. 41, no. 4, pp. 285-293.

Basic data are given as indicated by title. One of a continuing series of reports.

Fitch, John E.

1956. Age composition of the southern California catch of Pacific mackerel for the 1954-55 season. *Calif. Fish and Game*, vol. 42, no. 2, pp. 143-148.

The author compares the age composition and tonnage of the 1954-55 season's catch with previous years.

Fry, D. H., Jr.

1955. Role of the herring in California's fishery. *Outdoor California*, vol. 16, no. 12, pp. 8, 11.

The author describes the spawning areas of the herring, the history of the fishery and its future. He emphasizes the danger of overfishing if reduction and canning restrictions are lifted.

Hand, Cadet

1955. A study of the structure, affinities, and distribution of *Tetraplatia volitans* Busch (Coelenterata: Hydrozoa: Pteromedusae). *Pac. Sci.*, vol. IX, no. 3, pp. 332-348, 8 figs.

The author describes results of examination of two hundred and eleven species of the marine invertebrate tetraplatia taken from Marine Life Research collections and the evidence of diurnal vertical migration of these organisms.

Hubbs, Carl L.

1955. Black scoters reported from Baja California. *Condor*, vol. 57, no. 2, pp. 121-122.

The records of black scoters reported from Baja California are discussed briefly.

Horrer, Paul L., and Roger Revelle

1956. The ocean off the California coast. In *California and the Southwest*, edited by Clifford Zierer. New York. John Wiley & Sons, Inc., pp. 80-96.

A general review of the oceanography of this area covering physical and chemical characteristics, bottom topography and marine resources is presented.

Loukashkin, Anatole S., and Thomas C. Groody

1955. On the Pacific sardine (*Sardinops caerulea* Girard) in aquaria: transportation, handling, maintenance,

and survival. *Proc. Calif. Acad. Sci.*, vol. 28, no. 7, pp. 339-353, 3 figs.
This study shows that despite its sensitivity to handling, the Pacific sardine may be satisfactorily maintained under aquarium conditions, and that it may, therefore, be subjected to experimental investigations.

McHugh, J. L.
1955. Distribution of black-footed albatross, *Diomedea nigripes*, off the West Coast of North America, 1949 and 1950. *Pac. Sci.*, vol. IX, no. 4, pp. 375-381, 3 figs.
Monthly records of the albatross seen at each station of the oceanographic survey cruises of the California Cooperative Oceanic Fisheries Investigations are presented, and the seasonal distribution and evidences of migration of these birds are discussed.

Marr, John C.
1955a. The use of morphometric data in systematic, racial and relative growth studies of fish. *Copeia*, 1955, no. 1, pp. 23-31, 8 figs.
The general forms of relative growth and methods of analysis are discussed.
1955b. Sardine spawning surveys. *Pan-American Fisherman*, vol. 10, no. 3, pp. 14-15.
The apparent relationship between the spring distribution of sardine spawning and the availability of fish to the southern California fishery in the fall is discussed.
1956. The "critical period" in the early life history of marine fishes. *J. du Conseil*, vol. 21, no. 2, pp. 160-170, 4 figs.
The evidence bearing on whether or not there is a brief period of catastrophic mortality in the early life history of pelagic fishes is reviewed.

Miller, Daniel J.
1955. Studies relating to the validity of the scale method for age determination of the northern anchovy (*Engraulis mordax*). *In* Age determination of the northern anchovy, *Calif. Dept. Fish and Game, Fish Bull.* 101, pp. 7-34, 18 figs.
A discussion of the methods of sampling and measuring and of disagreements in scale reading is given with a summary of the results obtained with the scale method for age determination.

Miller, Daniel J., Anita E. Daugherty, Frances E. Felin, and John MacGregor
1955. Age and length composition of the northern anchovy catch off the coast of California in 1952-53 and 1953-54. *In* Age determination of the northern anchovy, *Calif. Dept. Fish and Game, Fish Bull.* 101, pp. 36-66, 1 fig.
Basic data are given as indicated by title. The first of a continuing series of reports.

Miller, Daniel J., and John Schmidtke
1956. Report on the distribution and abundance of Pacific herring (*Clupea pallasi*) along the coast of central and southern California. *Calif. Fish and Game*, vol. 42, no. 3, pp. 163-187.
It is indicated that the population of Pacific herring in central and southern California waters is of relatively small magnitude compared to the populations of Canada. Spawning studies are summarized.

Morris, Robert W.
1955. Some considerations regarding the nutrition of marine fish larvae. *J. du Conseil*, vol. 20, no. 3, pp. 255-265.
The question of whether or not marine fishes can utilize dissolved organic substances as food is reviewed.
1956. Early larvae of four species of rockfish, *Sebastodes*. *Calif. Fish and Game*, vol. 42, no. 2, pp. 149-153, 2 figs.
The larvae of four species of rockfish are described.

Mosher, Kenneth H.
1955. Determining age of adult Pacific sardines. *In* Age determination of Pacific sardines from otoliths, by Kenneth H. Mosher and Howard H. Eckles, *U. S. Fish and Wildl. Serv., Res. Rept.*, no. 37, pp. 1-23, 2 figs.
The method of determining sardine age from otoliths is described.

O'Connell, Charles P.
1956. The gas bladder and its relation to the inner ear in *Sardinops caerulea* and *Engraulis mordax*. *U. S. Fish and Wildl. Serv., Fish. Bull.*, no. 104, vol. 56, pp. 505-533, 15 figs.
The gas bladder and inner ear ramifications of the gas bladder are described for the sardine and northern anchovy. The first of a series of reports on the sensory systems of these fishes.

Orton, Grace L.
1955a. Early developmental stages of the California scorpionfish, *Scorpaena guttara*. *Copeia*, 1955, no. 3, pp. 210-214, 5 figs.
The eggs, embryonic development, and the prolarval stage of the California scorpionfish are described.
1955b. Separation of eggs of synentognath and allotriognath fishes in early embryonic stages. *Calif. Fish and Game*, vol. 41, no. 1, pp. 103-105, 1 fig.
The author provides a description of the distinguishing features of the eggs of synentognath and allotriognath fishes.
1955c. Some aspects of ecology and ontogeny in the fishes and amphibians. *The American Naturalist*, vol. LXXXIX, no. 847, pp. 193-203.
A comparative study is made of the fishes and the amphibians in regard to their life histories and environmental conditions with respective survival rate in mind.

Reid, Joseph L.
1956. Observations of internal tides in October 1950. *Amer. Geophys. Un., Trans.*, vol. 37, no. 3, pp. 278-286, 5 figs.
Hydrographic data from anchor stations and the methods of analysis are presented, and conclusions concerning internal waves of tidal (and other) periods are drawn.

United States Fish and Wildlife Service, South Pacific Fishery Investigations
1955. Zooplankton volumes off the Pacific coast, 1954. *U. S. Fish and Wildl. Serv., Spec. Sci. Rept.: Fisheries*, no. 161, 35 pp.
Basic data on the wet volume (per $1000M^3$) and location of zooplankton catches are given. One of a continuing series of reports.

University of California, Scripps Institution of Oceanography
In Press. Oceanic Observations of the Pacific, 1949. Berkeley. Univ. Calif. Press.
Tabulated observed, interpolated, and computed hydrographic data of cruises of the California Cooperative Oceanic Fisheries Investigations and other such investigations are presented by stations for standard depths.

o

printed in CALIFORNIA STATE PRINTING OFFICE

43882 10-56 6M