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Preliminary Annotated List of Papers pertinent to ICNAF

compiled in the Secretariat[1/]

To date, 27 April 1964, lists of annotated papers pertinent to ICNAF interests and published in 1963 have been received from the following member countries (papers published in ICNAF publications are not considered):

Canada, Germany, UK, USA

In addition, USSR reminds Commission scientists of the collection of Soviet scientists' contributions concerning the problems in the Northwest Atlantic area published as "Soviet Fisheries Investigations in the North-Western Atlantic" VNIRO, PINRO, 1962. (consists of 28 papers summarizing results of Soviet investigations since their inception in 1954). Soviet works published in 1963 were not pertinent to the ICNAF interests; however, pertinent scientific papers are in print and will be published in the second half of 1964 from VNIRO in Trudy Vol. 53 and PINRO in Trudy Vol. XVI.

## I. HYDROGRAPHY

Bary, B. McK. Temperature, Salinity and Plankton in the Eastern North Atlantic and Coastal Waters of Britain, 1957. II. The Relationships between Species and Water Bodies. J. Fish. Res. Bd. Canada, 20(4): 1031-1065.

Occurrences of seventeen species of zooplankton from near-surface oceanic and coastal waters about Britain have been correlated with temperatures and salinities, in temperature-salinity-plankton (T-S-P) diagrams, for the 12 months of 1957. Species exhibit distinctive relationships to the several water bodies, as these have been defined in temperature-salinity (T-S) diagrams. Similar relationships between species have been used as a basis to group species together and 6 such groups are discussed. The species of three of the groups are oceanic; one of these groups is restricted to warm water, but the others are less restricted. A fourth group consists of species confined to coastal waters. The remaining two occur in oceanic, mixed oceanic-coastal and coastal waters. The relationships to the water bodies are shown to persist throughout the seasonal fluctuations of properties in the waters.

Bary, B. McK. Temperature, Salinity and Plankton in the Eastern North Atlantic and Coastal Waters of Britain, 1957. I. The Characterisation and Distribution of Surface Waters. J. Fish. Res. Bd. Canada, 20(3): 789-826.

Monthly temperature-salinity diagrams for 1957 have demonstrated that three surface oceanic "water bodies" were consistently present in the eastern North Atlantic; two are regarded as modified North Atlantic Central water which give rise to the third by mixing. As well in the

[1/] Please submit further lists to the Secretariat during the Annual Meeting, or not later than 15 July, 1964.

L. R. Day
Executive Secretary

oceanic areas, large and small, high or low salinity patches of water were common. Effects of seasonal climatic fluctuations differed in the several oceanic water bodies.

In coastal waters, differences in properties and in seasonal and annual cycles of the properties distinguish the waters from the North Sea, English Channel and the western entrance to the Channel.

The geographic distributions of the oceanic waters are consistent with "northern" and "southern" water bodies mixing to form a "transitional" water. Within this distribution there are short-term changes in boundaries and long-term (seasonal) changes in size of the water bodies.

Water in the western approaches to the English Channel appeared to be influenced chiefly by the mixed, oceanic transitional water; oceanic influences in the North Sea appear to have been from northern and transitional waters.

Couvin, N. and D. A. McGill. Nutrient distribution in the Labrador Sea and Baffin Bay.

U. S. Coast Guard Bulletin No. 48, pp. 79-94.

Day, C. Godfrey 1963. Oceanographic observations, 1960 East Coast of the United States. U. S. Fish and Wildlife Service, Special Scientific Report - Fisheries No. 406, 4 p. + 19 tables.

Daily water temperature and salinity observations for 1960 from 18 locations along the Atlantic seaboard are tabulated, plotted and discussed.

Hester, Frank J., Donald C. Aosted and Robert W. Gilkey. 1963. A bathykymograph, a depth-time recorder. U.S. Fish and Wildlife Service, Special Scientific Report - Fisheries No. 441, 5 p.

The device records depth (pressure) on a time scale. Operation, construction, and limits of accuracy are discussed.

Höhn, R. Zur Entwicklung des Wetterbeobachtungs- und Wettermeldedienstes auf See (On the development of the meteorological observation and reporting system at sea). Der Wetterlotse 15, No. 203: 217-240.

As per title.

Lee, A. J. The hydrography of the European, Arctic and sub-Arctic Seas. Oceanogr. Mar. Biol. (Ed. H. Barnes), vol. 1, 47-74.

A full review of the present knowledge of hydrography of the area.

Rodewald, M. Wie häufig ist "Schlechtwetter" auf dem Nordatlantischen Ozean im Vergleich zum "mittleren Wind"? (What is the frequency of "Bad Weather" in comparison to "mean wind velocities" in the North Atlantic Ocean?) Hansa 100, No. 19: 1939-1940.

A linear relation exists between the mean monthly wind velocity (in knots) and the mean percentage frequency of strong and stormy winds (of 22 knots and more). An increase of the former by 1 knot results in an increase of the latter by 4%.

Soule, Floyd M., Alfred P. Franceshetti, R. M. O'Hagan and V. W. Driggers. Physical Oceanography of the Grand Banks region, the Labrador Sea and Davis Strait in 1962.

U. S. Coast Guard Bulletin No. 48, pp. 29-78.

## II. PLANKTON

Biester, E. and W. Mahnke. Untersuchungen uber das Vorkommen von Fischeiern und Fischlarven im Gebiet Westgronland 1961 bis 1963 und zwischen den Faroern und Kap Farvell 1961 und 1962. (The occurrence of fish eggs and larvae in the West Greenland area 1961 to 1963 and between Faroes and Cape Farewell 1961 and 1962). Fischereiforsch.1 (1963) 1. pp. 37-46.

Cooper, G. A. and D. C. T. Forsyth. 1963. Continuous plankton records: Contributions towards a plankton atlas of the North Atlantic and the North Sea. Part 7. The seasonal and annual distributions of the pteropod Pneumodermopsis Keferstein. Bull. Mar. Ecol., 6, 31-38, 1963.

Cushing, D. H. et al. Studies on a Calanus patch I-V. J. Mar. Biol. Ass. U.K., 43, 327-390.

Five closely related papers on the study of a plankton patch off the North-east coast of England, describing the identification of the patch, and the dynamics of the phyto- and zooplankton. The role of nutrients, and grazing by copepods in the control of the phytoplankton population is discussed.

Johnston, R. 1963. Sea water, the natural medium of phytoplankton. I. General features. J. mar. biol. Ass. U.K., 43, 427-456, 1963.

Culture techniques employing various marine unicellular algae are used to compare sea waters from different areas, depths and seasons. Chemical factors modifying the responses are examined.

Johnston, R. 1963. Antimetabolites as an aid to the study of phytoplankton nutrition. J. mar. biol. Ass. U.K., 43, 409-425, 1963.

Synthetic analogues of important natural metabolites have been used to demonstrate inherent differences among members of the marine phytoplankton.

McLaren, Ian A. Effects of Temperature on Growth of Zooplankton, and the Adaptive Value of Vertical Migration. J. Fish. Res. Bd. Canada, 20(3): 685-727.

Existing theories of the adaptive value of vertical migration are examined and found wanting. Adult size and generation length are negative functions of temperature. It is shown that Belehradek's temperature function gives a close fit to size and development rate of several species of zooplankters growing in adequate food supply, although conclusions do not depend on the theoretical content of this equation. Fecundity is an exponential function of adult size, and enough data are available for two quite different zooplankters - the copepod Pseudocalanus minutus and the

Chaetognath Sagitta elegans - to depict relative rates of increase as generally positive functions of temperature. Diurnal migrants are known to feed nearer the surface, which is almost universally warmer. Increased fecundity gained by spending part time in deeper, cooler waters, might be offset by slower development, although interrupted or seasonal breeders could sacrifice development rate for greater ultimate fecundity. However, an animal which does all necessary feeding in warm surface waters and "rests" in cooler waters gains an energy bonus which may be put into fecundity. A model of the effect on fecundity is derived from a much-generalized version of von Bertalanffy's growth equation. From the most probable range of solutions it is deduced that migration in thermally stratified waters would be disadvantageous when surface waters were cool, but increasingly advantageous as surface waters warmed up, and this is supported by empirical evidence. The theory accounts for many geographical, seasonal, systematic and ontogenetic regularities in the large and confusing literature on vertical migration.

O'Connell, Charles P. and Roderick J. H. Leong. 1963. A towed pump and shipboard filtering system for sampling small zooplankters. U.S. Fish and Wildlife Service, Special Scientific Report-Fisheries No. 452, 19 p.

The towed collector and its electrically driven pump can operate to a depth of 5 or 6 meters at a vessel speed of 9 knots.

Williamson, D. I. 1963. An automatic plankton sampler. Bull. Mar. Ecol. 6, 1-15, 1963.

A sampler designed for horizontal towing to collect up to 20 consecutive samples, each covering 6 to 8 km, at 9 to 12 km per hour (5-10 knots).

## III. FISHES

### A. Cod Group

Anon. Die Deutsche Kabeljaufischerei 1961 (The German fisheries for cod in 1961). Allgemeine Fischwirtschaftszeitung 15, No. 48: 19-21.

Refers to A. Meyer's report in Ann. biol. 18.

Hodder, V. M. Fecundity of Grand Bank haddock. J. Fish. Res. Bd. Canada, 20(6): 1465-1487.

Fecundity increased at a rate proportional to about the fifth power of the body length and to the square of the age. Within any age-group fecundity increased with length and since the larger fish of any age-group are the first to mature, the fecundity of any fish may be more directly related to the number of spawnings than to length, weight or age.

Jean, Yves Where do Seven Islands cod come from? Canada, Dept. of Fisheries, Trade News, 16(2).

Tagging off Seven Islands on the north shore of the Gulf of St. Lawrence shows that some cod from there move outside the Gulf in winter. They travel mainly to the southwest

Coast of Newfoundland where they are fished heavily by Canadian and European trawlers. In summer some of them return again to the north shore of the Gulf of St. Lawrence, mainly in the Seven Islands area. Others, however, are caught across the Laurentian Channel, off the Gaspé coast. Some wanderers also leave the Gulf by way of the Strait of Belle Isle.

Jean, Yves — Discards of fish at sea by northern New Brunswick draggers. J. Fish. Res. Bd. Canada, 20(2): 497-524.

Sampling aboard northern New Brunswick draggers from 1956 to 1961 shows a substantial reduction in the percentage by numbers and by weight of the catch of cod discarded at sea. The total numbers of cod discarded in the southwestern Gulf of St. Lawrence, which amounted to about 7 million in 1956, have been reduced to an estimated 1 million in 1961. Two factors are mainly responsible for this reduction: large-mesh nets which, following an ICNAF recommendation, became effective in 1957, and reduction in sizes retained for landing. The mesh effect is believed to be 1.3 times greater than the cull effect in reducing cod discards in 1961. Discards of American plaice have increased during the same period, due to larger recruitment of young year-classes. Discards of species other than cod and plaice are negligible because they are only a small part of the catch. Survival experiments show that most cod and plaice are dead when returned to the sea. The use of large-mesh codends may result in long-term increase in the total cod landings in the southwestern Gulf of St. Lawrence.

Jensen, Albert C. and Robert K. Brigham, 1963. The line-trawl fishery for cod and haddock at Chatham, Massachusetts. U.S. Fish and Wildlife Service, Commercial Fisheries Review, Vol. 25, No. 6, p. 14-19. (Also available as Separate No. 679)

The vessels and longline gear are described and illustrated. A five-year summary of landings by species and a resumé of cod lengths are included.

Kabata, Z. — 1963. Clavella (Copepoda) parasitic on British Gadidae: One species or several? Crustaceana, 5(1), 64-74, 1963.

McCann, James A. and Frank A. Dreyer. 1963. Length and age frequency samples from Georges Bank haddock landings, 1931-1955. U.S Fish and Wildlife Service, Special Scientific Report-Fisheries No. 438, 2 p. + 125 tables.

As per title

McCann, James A. and Frank A. Dreyer. 1963. Length and age frequency samples collected from Georges Bank and Gulf of Maine haddock landings, 1956-1960. U.S. Fish and Wildlife Service, Special Scientific Report-Fisheries No. 439, 3 p. + 100 tables.

As per title

McCracken, F. D. — Migrations of haddock between Gulf of St. Lawrence and offshore Nova Scotian banks. J. Fish. Res. Bd. Canada, 20(3): 855-857.

About 18% of 968 haddock tagged in the southern Gulf of St. Lawrence during September and October 1956 were eventually recaptured. The pattern of recaptures is consistent

with the hypothesis that the haddock which spend the summer in the southern Gulf are a migratory stock. These fish in passing off Cape Breton in spring and fall are the basis of the spring trap fishery there and the small otter-trawl fishery in the fall. In winter they form part of the stock fished on the offshore Sable Island and Emerald Banks, and intermingle with other haddock which concentrate in this region.

Miller, D., J.B. Colton and R. Marak. 1963. A study of the vertical distribution of larval haddock. Journal du Conseil, ICES, vol. 28, no. 1, p. 37-49.

High-speed, multidepth samplers eliminated day-night differences in catch of larvae. The young fish were concentrated mostly between 20 and 30 meters, and mostly within the thermocline.

Rae, B.B. 1963. The incidence of larvae of Porrocaecum decipiens in the flesh of cod. Mar. Res. Scot., 1963, no. 2, pp. 28.

Infestation of cod in Scottish coastal waters has been evident for many years on the west coast; it is now increasing in the North Sea, in association with the increase in the numbers of grey seals, the definitive host of the parasite.

Saunders, Richard L. Respiration of the Atlantic cod. J. Fish. Res. Bd. Canada, 20(2): 373-386.

Measurements of routine and standard rates of oxygen consumption of various sized cod at temperatures between 3 and 15°C revealed a well-marked size effect; small cod consume oxygen at a greater rate per unit weight than do large ones. Increases in temperature raise oxygen consumption in starved and fed fish. The increase in rate of oxygen consumption of starved fish between 3 and 10° is proportionately greater than that between 10 and 15°C. Feeding of cod which have previously been starved increases the rate of oxygen consumption by 40-90%. The rate subsides to the starvation level in 4-7 days depending on temperature and amount of food eaten. Handling cod causes them to increase their rate of oxygen consumption; rates return to normal levels in 3-5 hours. Crowding reduces the rate of oxygen consumption apparently by reducing the space for movement and thus restricting activity. Reducing the ambient oxygen from about 10 to 3 mg/l lowers the rate of oxygen consumption slightly, but the respiratory volume (volume of water pumped over the gills per unit time) is markedly increased. This suggests there is added stress because the increased metabolic cost of irrigating the gills is not met by increased rates of oxygen consumption.

Scott, W.B. A note on Gadus (Micromesistius) poutassou (Risso) from Western Atlantic Waters. J. Fish. Res. Bd. Canada, 20(3): 849-950.

Steele, D.H. Pollock (Pollachius virens (L.)) in the Bay of Fundy. J. Fish. Res. Bd. Canada, 20(5): 1267-1314.

Observations are made on stocks, migrations, landings, spawning, size composition, size segregation, food habits and growth of the pollock in the western Atlantic, primarily in the Bay of Fundy region of the Gulf of Maine.

Templeman, W. and A. M. Fleming. Longlining experiments for cod off the east coast of Newfoundland and southern Labrador, 1950-1955. Bull. Fish. Res. Bd. Canada, No. 141, pp. 1-65.

The experimental fishing showed that where large underwater shelves extend out from land into the sea profitable longlining for cod is possible near the boundary between cold Labrador Current water and the warmer bottom water. Commercial longlining experiments in such areas yielded excellent catches and satisfactory economic returns to the fishermen.

Wise, John P. 1963a. Bibliography on the biology of the cod, Gadus morhua and related species. Fishery bulletin of the U.S. Fish and Wildlife Service, Vol. 62, bulletin no. 215, p. 483-538.

A bibliography of 1,020 references reasonably complete through 1959. An extensive subject and geographical area index is included.

Wise, John P. 1963b. Cod groups in the New England area. U.S. Fish and Wildlife Service, Fishery Bulletin, vol. 63, no. 1, p. 189-203.

Tag returns and other evidence indicate four groups of cod in the New England area. Three are probably stocks not genetically separate, while the fourth is a genetic sub-population.

B. Flat Fishes

Lux, Fred E. 1963. Identification of New England yellowtail flounder groups. U.S. Fish and Wildlife Service, Fishery Bulletin, vol. 63, no. 1, p. 1-10.

Three distinguishable but not completely discrete groups of yellowtail flounders (Limanda ferruginea) are recognized from studies of tag returns, fin ray counts, and other evidence.

McCracken, F. D. Seasonal movement of the winter flounder, Pseudopleuronectes americanus (Walbaum), on the Atlantic coast. J. Fish. Res. Bd. Canada, 20(2): 551-586.

This paper relates the distribution and seasonal movements of winter flounders. In spring immature and mature flounders are alongshore with spawning fish concentrated in shallow water. During "summer", winter flounders leave the shore zone in areas where water temperatures rise above about 15°C but not where bottom temperatures do not reach this level. This movement toward cooler water does not continue into depths at which temperature is below about 12°C. Flounders return to the shore zone in fall after temperature decreases below 15°C. These temperatures are well below the upper incipient lethal for flounders of about 26°C. Off southern

New England a large, sustained fishery denotes a large population of flounders. In the Bay of Fundy and off the coast of Nova Scotia winter flounders are restricted to a narrow depth zone, and good exploratory catches there probably do not indicate large populations. In the broader shallow zones of the southern Gulf of St. Lawrence similar catches suggest a larger population. Exploitation will depend on increased efforts by small otter trawlers or possible development of marine sport fishing.

Pitt, T.K. Vertebral numbers of American plaice, Hippoglossoides platessoides (Fabricius), in the Northwest Atlantic. J. Fish. Res. Bd. Canada, 20(5): 1159-1181.

Vertebral numbers of plaice from various areas in the Northwest Atlantic are compared, with no significant differences found between vertebral averages of males and females. Over the whole area of investigation there was little variation in the averages, and possible effects of differences in spawning times, larval drift and inclusion of large numbers of year-classes in the samples are discussed.

Ronald, Keith 1963. The metazoan parasites of the Heterosomata of the Gulf of St. Lawrence. VII. Nematoda and Acanthocephala. Can. Jour. Zool., 41(1): 15-21.

Infestation rates, taxonomic notes on five species of Nematoda and three species of Acanthocephala from six species of flatfishes.

C. Others

Anon. Transatlantikwanderungen von zwei Thunfischen (Transatlantic migrations of two tunas). - Allgemeine Fischwirtschaftszeitung 15, No. 3:15.

Refers to F. J. Mather's report in J. du Conseil 27, No. 3

Blaxter, J.H.S. and F. G. T. Holliday. 1963. The behaviour and physiology of the herring and other clupeids. Advances in Marine Biology, 1, 262-393. London, Academic Press.

A comprehensive review of the behaviour and physiology of herring with some reference to other clupeid species and a bibliography of over 400 papers.

Blaxter, J.H.S. and G. Hempel. 1963. The influence of egg size on herring larvae. J. Cons. int. Explor. Mer, 28(2), 211-240, 1963.

A study of the great variation in dry weight of eggs of herring of different race and how this affects the size of the larvae at hatching and the time they can survive on their yolk supply.

Burd, A.C. On the selection by the drifter fleets in the East Anglian herring fishery. J. Cons. int. Explor. Mer, 28, 91-120.

The selection of herring by drift (gill) nets is examined Herring are mainly retained in two ways - at the gills or at the maximum girth, and the circumference of the fish at one or other of these points is closely related to mesh size. The selection by the fleet as a whole, using a range of mesh sizes, is also studied.

Falk, U. Vorloufige Untersuchungsergebnisse an Heringen (Clupea harengus L.) des Nord-amerikanischen Schelfs (Preliminary results of investigations on herring (Clupea harengus L.) of the North American Shelf). Fischereiforsch. 1 (1963) 1, pp. 20-24.

Kabata, Z. 1963. Incidence of coccidioses in Scottish herring (Clupea harengus L.) J. Cons. int. Explor. Mer, 28(2) 201-210, 1963.

McKenzie, R.A. and S.N. Tibbo. An Occurrence of Opah, Lampris regius (Bonnaterre), in the Northwest Atlantic. J. Fish. Res. Bd. Canada, 20(4): 1097-1099.

Rees, E.I.S. The batfish Dibranchus atlanticus Peters on the Canadian Atlantic slopes. J. Fish. Res. Bd. Canada, 20(5): 1513-1517.

The occurrence of this species on the western Atlantic continental slopes north of the Fundian Channel is discussed. Biological and morphometric measurements were made of 15 specimens.

Rees, E.I.S. and Malcolm R. Clarke. First records of Tetronychoteuthis dussumieri (d'Orbigny) (Cephalopoda; Onychoteuthidae) from the northwest Atlantic. J. Fish. Res. Bd. Canada, 20(3): 853-854.

Five specimens were found in the stomachs of redfish, Sebastes mentella Travin caught by otter trawl in 512 m, bottom temperature 3.4°C on the eastern edge of the Grand Bank.

Sindermann, Carl 1963. Use of plant hemagglutinins in serological studies of clupeoid fishes. U.S. Fish and Wildlife Service, Fishery Bulletin, vol. 63, no. 1, p. 137-141.

Individual variations were found in reactions of four clupeoid erythrocytes and legume extracts. Similarity was found between four alewife spawning populations, using this technique.

Sindermann, Carl J. and Kenneth A. Honey. 1963. Electrophoretic analysis of the hemoglobins of fishes. Copeia, 1963, no. 3, p. 534-537.

Hemoglobins of five species of Atlantic clupeoid fishes, including Clupea harengus, were analyzed by agar electrophoresis as a possible determinant of population discreteness. No variant patterns were found.

Templeman, W. Additional note on the oceanic puffer Lagocephalus lagocephalus (L.). J. Fish. Res. Bd. Canada, 20(1): 253.

Noting the description of the first western Atlantic specimen (Fowler, 1936).

Templeman, W. Distribution of sharks in the Canadian Atlantic (with special reference to Newfoundland waters). Bull. Fish. Res. Bd. Canada, No. 140, pp. 1-77.

An attempt is made to assemble all authenticated published records, to list new records and to discuss the distribution in the Canadian area of sharks occurring in Newfoundland waters.

Templeman W. and H. J. Squires. Three records of the black scabbard fish, Aphanopus carbo Lowe, from the Canadian region of the western Atlantic. J. Fish. Res. Bd. Canada, 20(2): 273-278.

Two female specimens captured by otter trawl in 695-732 metres on the Northeast Newfoundland Shelf and a female caught by longline below 550 metres off Sable Island Bank are described.

Tibbo, S. N. and T. R. Graham. 1963. Biological changes in herring stocks following an epizootic. J. Fish. Res. Bd. Canada, 20(2): 435-449.

Herring landings in the Chaleur Bay area of the Gulf of St. Lawrence declined from 25 million lb (11,340 metric tons) in 1947 to 12 million lb (5443 metric tons) in 1959. The decline is attributed to lower levels of abundance resulting from mortalities caused by a fungus (Ichthyosporidium hoferi) disease which reached epidemic proportions during the mid 1950's. Data obtained during the periods 1946-48 and 1960-61 are compared and show mean lengths of herring have remained unchanged, mean ages have decreased, growth rates have increased, fewer year-classes are represented and relative abundance of autumn-hatched fish has increased.

Tibbo, S. N., D. J. Scarratt and P. W. G. McMullon. 1963. An investigation of herring (Clupea harengus L.) spawning using free-diving techniques. J. Fish. Res. Bd. Canada, 20(4): 1067-1079.

Free-diving (Scuba) techniques were used to survey a herring spawning bed near Blanchard Point, Chaleur Bay, N.B., in May 1962. The spawning bed occupied a long, narrow area running parallel with and near the shore in depths of 4-20 feet (1.3-6 m). The total area surveyed was 448,800 square yards (375,200 sq m) and the total number of herring eggs was estimated to be $35.46 \times 10^{11}$. The number of spawning herring was calculated to be 185 million fish (54.7 million pounds or 24,812 metric tons). The commercial fishery took 2.2 million pounds (998 metric tons) in the vicinity of the survey area which represents a fishing mortality rate of 4.0%. Hatching started about May 24 when large numbers of herring larvae 5-7 mm long were captured with plankton nets.

Tibbo, S. N., R. A. McKenzie and W. B. Scott. An Occurrence of Mako Sharks, Isurus Oxyrinchus, Rafinesque 1810, in the Canadian Atlantic. J. Fish. Res. Bd. Canada, 20(5): 1353-1356.

Tibbo, S. N. and R. A. McKenzie. An Occurrence of Dusky Sharks, Carcharhinus obscurus (Lesueur) 1818, in the Northwest Atlantic. J. Fish. Res. Bd. Canada, 20(4): 1101-1102.

Watson, John E. 1963. A method for tagging immature herring. U.S. Fish and Wildlife Service, Special Scientific Report-Fisheries No. 451, 7 p.

Herring (Clupea harengus L.) are tagged dorsally with plastic tubing inserted with a hypodermic needle. Recoveries are as high as 5 percent. Average time at liberty is 18 days; maximum is 391 days.

Williamson, G.R. The bluefin tuna in Newfoundland waters with some reference to the tuna fishes in general. Government of Newfoundland, Division of Tourist Development, Newfoundland Tourist Development Office, 23 pp., 1962.

## IV. SHELLFISH

Dickie, L.M. and J.C. Medcof. Causes of mass mortalities of scallops (Placopecten magellanicus) in the southwestern Gulf of St. Lawrence. J. Fish. Res. Bd. Canada, 20(2): 451-482.

In 9 of the years since 1928 there have been midsummer mass mortalities of scallops in the southwestern Gulf of St. Lawrence. There is evidence that sudden, great increases in water temperature sometimes exceeded the upper incipient lethal temperatures of scallops and that these were directly responsible for the more devastating, sudden and widespread mortalities (up to 80%).

Unusual and unexplained concentrations of predators, mainly starfish, are considered to have been responsible for several of the slower and less spectacular mass mortalities (up to 25%). Aquarium tests showed that, in spite of well developed escape reactions, scallops are nevertheless often killed by starfish.

Smaller, sudden temperature increases (too small to be lethal) and sudden decreases are common in the southwestern Gulf and both can cause temperature debility in scallops. Presumably debility hampers escape from enemies, and magnifies effects of predation. It probably helped to produce the minor mass mortalities but so far its importance has not been assessed.

Doherty, Richard M., George P. Draheim, Donald P. White and Charles L. Vaughan. 1963. Sea scallop industry of Canada. Commercial Fisheries Review, vol. 25, no. 7, p. 11-16. (July). (also available as Separate No. 681).

Canada's sea scallop fleet is increasing in size. Increased effort and landings from Georges Bank stock pose an economic threat to the United States' sea scallop fleet.

## V. OTHER MARINE ORGANISMS

Brunel, Pierre 1963. Les isopodes xylophages Limnoria japonica et L. Lignorum dans le golfe Saint-Laurent: notes sur

leur distribution et leurs Ciliés, Ostracodes et Copépodes commensaux. Crustaceana, 5(1): 35-46. (Contributions du Département des Pêcheries, Québec No 62).

Description of L. japonica, new to North Atlantic, found in deep cold water and L. Lignorum found in shallow warmer water; infestation rates with folliculinid ciliates, and morphological notes on crustacean commensals.

Kabata, Z. 1963. The free-swimming stage of Lernaeenicus (Copepoda Parasitica). Crustaceana, 5(3), 181-187, 1963.

Kabata, Z. 1963. The second antenna in the taxonomy of Clavellinae (Copepoda: Lernaeopodidae). Crustaceana, 6(1), 5-14, 1963.

Kabata, Z. 1963. A new species of Clavella (Copepoda: Lernaepodidae) from the South Atlantic. Crustaceana, 5 (11), 5-14, 1963.

Mansfield, A. W. Seals of Arctic and Eastern Canada. Bull. Fish. Res. Bd. Canada, No. 137, pp. 1-30.

Provides a means of identifying the seals of Arctic and Eastern Canada and a summary of the more important facts of their life histories.

Sergeant, D. Harp seals and the sealing industry. Department of Fisheries of Canada, Trade News, 15(12): 3-9.

The western stock of harp seals is found in the Northwest Atlantic. Its annual migratory cycle, breeding habits, food and feeding, age composition of herds and population estimates are discussed. An account is given of seal hunting, methods of killing and the annual kill.

Williamson, G. R. Common porpoise from the stomach of a Greenland shark. J. Fish. Res. Bd. Canada, 20(4): 1085-1086.

A young 79 cm porpoise was found in the stomach of a 4.15 metre long female Greenland shark caught by otter trawl on the northeastern slope of the Grand Bank.

## VI. FISHERIES AND FISHING INDUSTRY

Anon. Swordfishing in Newfoundland. Department of Fisheries of Canada, Trade News, 16(4): 10.

A brief note on the successful swordfishing operations of the Newfoundland Department of Fisheries experimental and demonstration vessel "Beinir"

Anon. Die Fischereiverhältnisse 1961 (Fishing conditions in 1961). - Allgemeine Fischwirtschaftszeitung 15, No. 6: 17-18.

An evaluation of Lundbeck's biological-statistical report on the year 1961.

Anon. Die Neufundlandfischerei (The Newfoundland fisheries). - Allgemeine Fischwirschaftszeitung 15, No. 9 13-14.

A review of the "Laboratory Leaflet" No. 1 of the Lowestoft Fisheries Laboratory.

Anon. Die Weltfischerei 1961 (The world fisheries in 1961). - Allgemeine Fischwirtschaftszeitung 15, No. 7: 13-15.

A review of the fishing activities and results around the world according to the FAO Yearbook of Fishery Statistics vol. 13 and 14.

Anon. Die Fischwirtschaft im Jahre 1962 (The commercial fisheries in the year 1962).-Hansa 100, No. 13: 1371-1372, 1376.

As per title

Bundesministerium fur Ernahrung, Landwirtschaft und Forsten: Jahresbericht uber die Deutsche Fischwirtschaft 1962/63 (Annual report on German fisheries 1962/63).

As per title; contains a series of important articles and the statistics for the calendar year 1962.

Danker, L. Zur Fischereisituation im April/Mai 1963 vor Westgronland und Nordneufundland. (The fishery in April/May 1963 off West Greenland and North Newfoundland) Fischereiforsch. 1 (1963) 1, pp. 29-36.

Lundbeck, J. Biologisch-statistischer Bericht uber die deutsche Hochseefischerei im Jahre 1962 (Biological-statistical report on the German Deep Sea Fishery in 1962). Jahresbericht uber die Deutsche Fischwirtschaft 1962/63: 123-153.

As per title

Martin, W. R. Trends in Canadian Atlantic mainland fisheries past, present, and future. Canada, Dept. of Fisheries, Trade News, 16(2).

Trends in Canadian landings and values for Atlantic coast marine species are described for the period 1917-1961. Trends in Canadian landings are shown by provinces and correlated with development of new methods, greater efficiency and regional accessibility of a greater variety of marketable species. Canadian landings are described in relation to those of other countries from the Northwest Atlantic. Availability of various fish species as determined by research-vessel surveys is related to potentials for fisheries development. Forecasts based on background items indicate increased demand for fish and to meet this requirement increased landings from the southern ICNAF area are expected. Wise use of the resources will require development programs and international management to avoid waste.

Schulz, H. Franzosische Fischereiversuche vor der Ostkuste Kanadas und Nordamerikas (French exploratory fishing off the east coast of Canada and the United States). Informationen fur die Fischwirtschaft 10, No. 2, 63-64.

A short review of Ancellin's paper in Science et Pêche No. 109, 1962.

Voss J. and P. Draffehn — Vorloufiger Bericht uber die Durchfuhrung einer kommerziellen Fischerei in 600 bis 800 m Wassertiefe vor Neufundland-Labrador (Preliminary report on commercial fishing in 600 to 800 metres off Newfoundland-Labrador). Fischereiforsch. 1 (1963) 1, pp. 25-28.

Williamson, G. R. — The Soviet fishery in the ICNAF area. Canadian Fisherman, 50(7): 17-22, 36.

A practical description of some of the ships, methods of fishing and the fishermen of the Soviet fishing fleet operating on the Canadian Atlantic seaboard.

## VII. GEAR

Anon. — Nylon gill nets give new life to fishermen. Canadian Fisherman, 50(10): 21.

The introduction of nylon gill nets in the inshore cod fishery of Newfoundland has brough successful results.

Anon. — Fischereiforschungsschiff "Walther Herwig" (F. R. S. "Walther Herwig"). - Allgemeine Fischwirtschaftszeitung 15, No. 30: 14-16.

A description of the new technical fisheries research vessel "Walther Herwig".

Bohl, H. — Ein international anerkanntes Standardgerat zur Bestimmung der Maschenoffnung von Schleppnetzen (An internationally acknowledged standard gauge for the measuring of the mesh sizes in trawl codends). -Informationen fur die Fischwirtschaft 10, No. 1: 23-25.

A description of the Westhoff "ICES Gauge".

Craig, R. E. — 1963. The fisheries application of sonar. Radio electronic Engr, 25, 201-206, Mar. 1963.

Craig, R. E. and R. Priestley. 1963. Undersea photography in marine research. Mar. Res. Scot., 1963, no. 1, pp. 24.

Describes the principles of cameras built at Aberdeen, and discusses complete units, some applications and results.

Cushing D. H. — The uses of echo-sounding for fishermen. Min. Agric. Fish. and Food, London.

An account written for a non-technical reader, of the theory of echo-sounding, and its uses in fish detection.

Dickson, W. and M. J. D. Mowat. 1963. Tension meter for seine net warp. World Fish., 12(7), 124, 1963.

McNeeley, Richard L. — 1963. Development of the John N. Cobb pelagic trawl - a progress report. Commercial Fisheries Review, vol. 25, no. 7, p. 17-27. (July). (Also available as Separate No. 682).

Details and construction notes are given for a large single-boat pelagic trawl. The trawl uses hydrofoil otter boards.

Welsby, V. G., J. H. S. Blaxter and C. J. Chapman. 1963. Electronically-scanned sonar in the study of fish behaviour. Nature, Lond., 199, 980-981, Sept. 7, 1963.

A high frequency scanning sonar which enables fish to be watched as individuals in tanks.

## VIII. MISCELLANEOUS

Jones, F. R. H. Sound and shoaling in fishes. Anim. Behaviour, vol. 11, 406-7.

Lucas, C. E. 1963. International collaboration in fisheries research. A historical review, with particular reference to North Atlantic region. F. A. O. Fish. Biol. tech. Pap. No. 33, 1963.

Lucas, C. E. 1963. Report of the Director of Fisheries Research, Rep. Fish. Scot. 1962, App. 6, 59-99, 1963

Lucas, C. E. and A. J. Lee. 1963. International co-operation in Northwest Atlantic research. Fish. News int., 2(1), 32-34, 1963.

Muir, B. S. and H. White. Application of the Paloheimo Linear Equation for Estimating Mortalities to a Seasonal Fishery. J. Fish. Res. Bd. Canada, 20(3): 839-840.

Paloheimo, J. E. and L. M. Dickie. Sampling the catch of a research vessel. J. Fish. Res. Bd. Canada, 20(1): 13-25.

The sampling procedure commonly used on board research vessels in which catches are sorted by species and picked up into baskets was examined in catches containing several species, principally haddock. The procedure does not appear to permit withdrawal of random samples for lengths or counts of fish. Mixing these basket lots results in sample units which are effectively homogeneous for length composition and reduces the amount of sampling necessary to estimate numbers of fish caught. However, mixing does not appear to be effective if the species sort is omitted, especially in large catches.

Rae, B. B. 1963. The food of grey seals. Report of Consultative Committee on Research on Grey Seals and Fisheries, 28-33, 1963.

Ricker, W. E. Big Effects from Small Causes: Two Examples from Fish Population Dynamics. J. Fish. Res. Bd. Canada, 20(2): 257-264.

1. A population which, before exploitation, includes appreciable quantities, is very sensitive to fishing. For example, even as little as 5% catch per annum eventually causes a major reduction in the relative weight of older fish in the stock. With unchanging recruitment the absolute size of the total stock also

declines markedly, or even catastrophically, under moderate exploitation - so much so that it seems likely that recruitment must usually increase when the stock is first thinned, partly compensating for the removals.

2. A population that produces its greatest sustained yield at a high rate of exploitation - say 75% or more at average recruitment - is then close to a point where recruitment will fall off rapidly if utilization becomes only slightly more intensive. This fact, and the aggravating effect of environmentally-caused variations in recruitment, suggest that any really close approach to the point of optimum yield will usually be too dangerous to be practical.