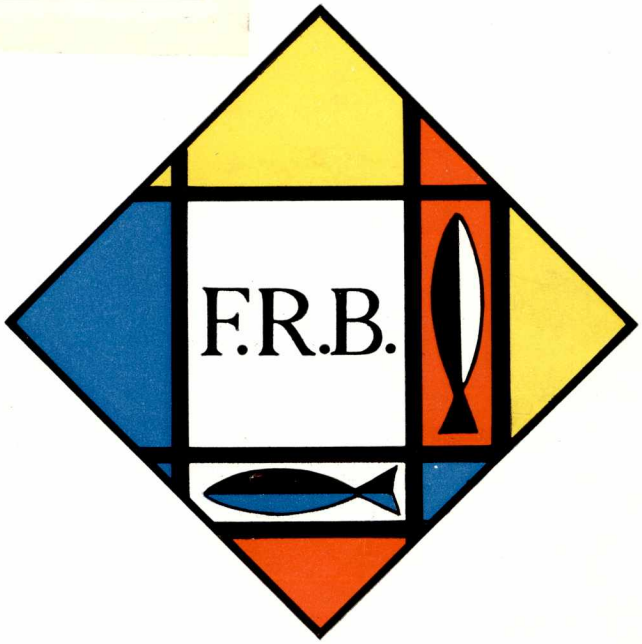


BIOLOGICAL STATION NANAIMO, B.C.

1908·1958

FISHERIES RESEARCH BOARD OF CANADA

Biological Station, Nanaimo, B.C.

1908–1958

By A. W. Needler, Director

In 1958 the Fisheries Research Board of Canada's Biological Station at Nanaimo, British Columbia, celebrates its fiftieth anniversary. From small beginnings in 1908 it has become one of the large, active fisheries research units of the world. In its early years the Station had no year-round staff. Its work was carried on by visiting scientists, mainly in the summer, and, though of much fundamental value, was restricted in scope. The Station has now grown until its research activities extend the length of the British Columbia coast and from far in the interior to the mid-Pacific. In this work it employs a hundred scientists and technicians the year round and about half that number seasonally, and operates several vessels and field stations.

ESTABLISHMENT OF THE STATION

The value of scientific knowledge to the maintenance and development of fisheries was from the first the key-note of the proposals to establish biological stations in Canada. The latter half of the nineteenth century was a period of imagination and adventure in the study of the sea. The epoch-making voyage of H.M.S. *Challengar* in 1872–1876 to study the physical characteristics and the life of the world's great oceans, and the establishment of the first great marine biological laboratory at Naples in 1872 were but two examples. Especially in northern Europe, much attention was turned to learning about the commercial fishes, and the economic value of fisheries research was stressed. In 1899 the International Council for the Exploration of the Sea was formed to coordinate the great volume of research by the European countries, and became the first international body with the expressed purpose of benefitting the fisheries.

Interest in the study of the sea and its fisheries also developed in Canada during this period. As early as 1884 a paper by James Playfair McMurrich, later to become a chairman of the Biological Board of Canada (precursor of the Fisheries Research Board), advocated the establishment of stations for scientific studies to assist fisheries development. The Department of Marine and Fisheries in 1892 appointed Mr. E. E. Prince of St. Andrew's Marine Laboratory, Scotland, as Commissioner and General Inspector of Fisheries for Canada. He brought with him knowledge of marine research in Europe and became a strong advocate of marine biological stations for Canada. Support also came from the Royal Society of Canada which, in a resolution in 1896, urged the Government to implement Mr. Prince's proposals. Finally in 1898 $7,000 was appropriated to build a station on the Atlantic coast and operate it for one year. A Board of Management of the

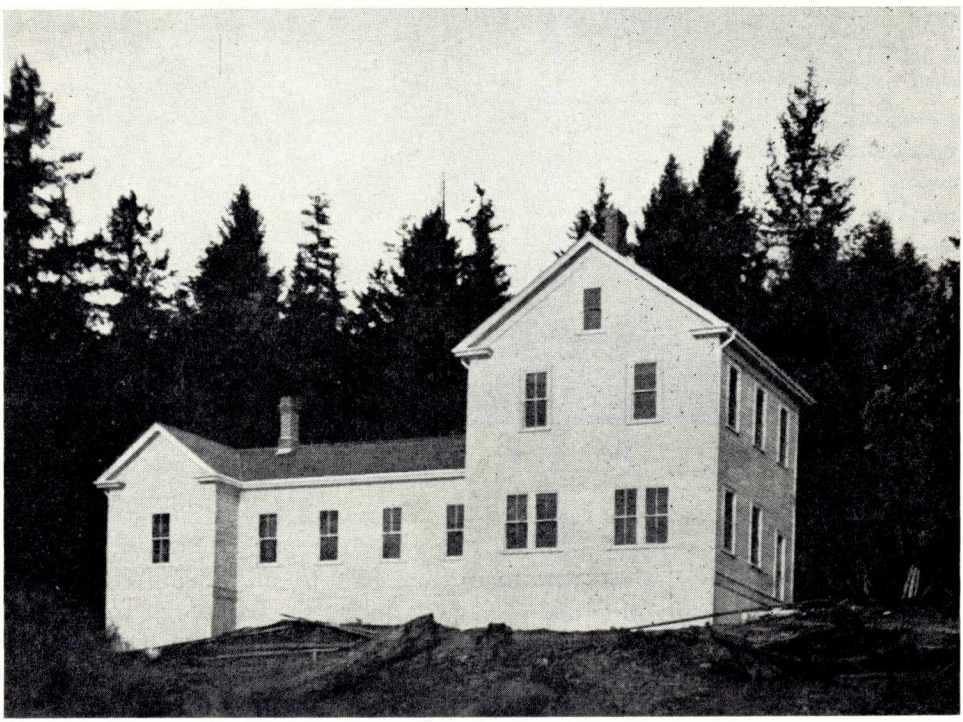
Marine Biological Station of Canada was appointed, with the Commissioner of Fisheries, Mr. Prince, representing the Government. This Board, later to become the Biological Board of Canada by Act of Parliament in 1912, built a floating station in 1899 and operated it at St. Andrews, N.B., Canso, N.S., Malpeque, P.E.I., and Gaspé, Quebec, before building a permanent station at St. Andrews in 1908.

The Reverend George W. Taylor. A strong advocate of the establishment of the Station and its first Director, 1908 to 1912.

The Reverend George W. Taylor, a naturalist and a Fellow of the Royal Society of Canada, played an active part in the establishment of the Pacific coast station. He was a member of the federal government's British Columbia Fisheries Commission, which was appointed in 1905, with Mr. Prince as chairman, to consider the many pressing problems of the province's fisheries, then in a stage of very active development. In its interim report in 1905 the Commission emphasized that its work was hampered by lack of information and recommended action to initiate scientific investigations. The proposal was endorsed by the Vancouver Board of Trade and urged in Parliament in 1907 by Mr. William Sloan, M.P. Mr. Taylor presented a strong case for the establishment of a Station

in a paper which appears in the Transactions of the meeting of the Royal Society of Canada in June 1907. Provision for the construction of a Station on the Pacific coast was included in the funds voted by Parliament in 1907 for the construction and maintenance of marine biological stations and investigations in Canada. The British Columbia Fisheries Commission expressed the belief that the new Station would "prove of the very greatest value to the fishery industries of Canada".

The Board of Management of the Biological Station appointed a sub-committee to select a site, and a number of localities were examined. A central position among Strait of Georgia fishing grounds, a local herring fishery, good shelter and accessibility from Vancouver and Victoria commended the Nanaimo area on Vancouver Island. Land was acquired at Departure Bay and the new Station was made ready for use in the summer of 1908.



The first Station building soon after its completion in 1908.

EARLY YEARS OF THE STATION

The laboratory built in 1908 could accommodate about eight scientists. It had running fresh and salt water but, of course, no electricity. Space was provided for office, library, photographic dark-room and, upstairs, four bedrooms for visiting scientists which were supplemented, as occasion demanded, with tents. An adjoining building housed kitchen and caretaker's quarters. Small boats were available for collecting specimens and observations.

The Reverend George W. Taylor was in charge of the Station until his death in August, 1912, his deep interest in its work persisting until the end. He was succeeded by Dr. C. McLean Fraser, who had spent several seasons in the Board's

Dr. C. McLean Fraser. Director, 1912 to 1924.

work on both coasts and who remained in charge until 1924. During this period the Station had no year-round scientific employees except the Director, and even Dr. Fraser spent only the summers there from 1920 to 1924, being Professor of Zoology at the University of British Columbia during the balance of those years. The research at the Station was carried out mainly by university scientists who visited it during the summers.

This was a period of active research in many branches of biology. Studies were carried out on the occurrence and life histories of many different kinds of marine animals and plants. The Station was also used for research on the chemistry and physiology of fishes and marine invertebrates. It was even used as a base for studies of land plants and animals and of geology; but most of the work was, of course, concerned with marine plants and animals, how they are constituted and how they live, reproduce and react with their enivronment. Work was carried out which was of very considerable general scientific value and, at the same time, essential background was provided for later researches aimed more directly at solution of fisheries problems. Nor were these themselves neglected. The subjects studied included many of immediate economic interest,

such as the reproduction and growth of salmon, halibut, herring and other commercial fish and shellfish, physical and chemical conditions in the sea and their effects on the movements of fish and other marine animals, marine wood borers, sea lions and potentially valuable seaweeds.

Most of the scientists who worked at the Station came from Canadian universities, some from the United States or even Europe. Many were then eminent in their fields; others were younger and had yet to make their names. All worked, without remuneration other than expenses, for the satisfaction that comes from scientific discovery and the development and exchange of new ideas. The individual scientists were interested in their own problems and usually continued to work on them after returning to their universities.

This association of university scientists with the work of the Station continued for some time after the development of its full-time scientific staff in the years following 1924. Scarcity of funds in the great economic depression of the 1930's and concentration of the Station's resources on specific fisheries investigations by its own employees combined to discourage the voluntary and relatively independent work of university scientists at the Board's stations. Those university workers who have taken part in the great development of the fisheries investigations in recent years have done so as paid seasonal employees on specific projects which are part of the program of the Fisheries Research Board. Although facilities can be made available for visiting scientists to work on their own problems, few now feel that they can afford to come without remuneration.

The association of the two groups of scientists was stimulating and valuable. Senior university scientists with their own active interests contributed experience and ideas from which the Station's work and employees gained much. Graduate students spending summers at the Station developed interest and ability in the solution of fisheries problems and many of the Board's most valuable employees started in this way. The university scientists gained stimulating contacts with other research workers and with living animals, as well as facilities for their work. It is hoped that the Station's contacts with independent university research can again be strengthened.

EXPANSION OF FISHERIES INVESTIGATIONS IN THE 1920'S AND 1930'S

In the middle 1920's there was a strong surge of interest in research on practical fisheries problems. One of its manifestations was the establishment of technological stations to study the problems of processing and transporting fish; another was the great expansion of the work of the biological stations on the two coasts. A year-round scientific staff was built up and facilities were greatly improved in order to carry out a research program which included for the first time major long-term investigations of fisheries problems.

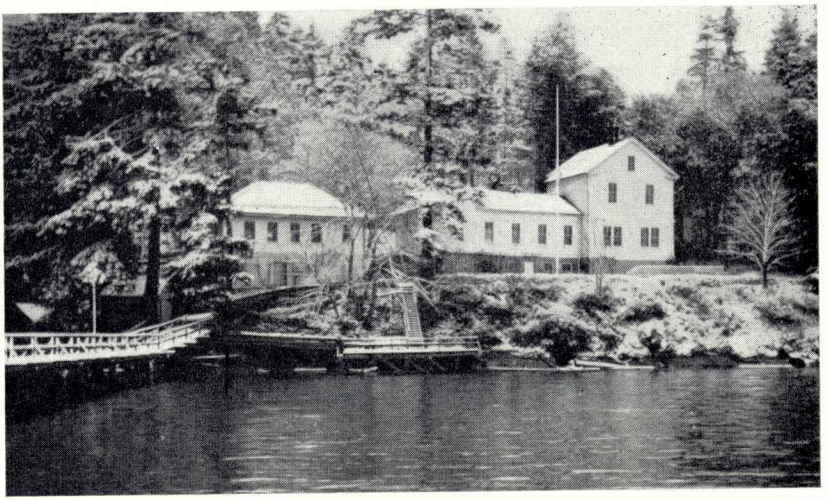
At the Nanaimo Station this expansion was carried out under Dr. W. A. Clemens, who was Director from 1924 until 1940, when he resigned to head the Zoology Department of the University of British Columbia and was replaced by Dr. R. E. Foerster.

Dr. W. A. Clemens. Director, 1924 to 1940.

A small chemistry laboratory had been built in the winter of 1923–24, but Dr. Clemens was faced with the problem of providing more adequate quarters for the growing staff and many visiting scientists. A bungalow for the Director and a cottage for the caretaker were built in 1925, releasing working space in the older buildings. A three-storey frame building was completed in 1928 to provide living quarters for visiting scientists and some of the junior members of the scientific staff. This has since been converted to working space.

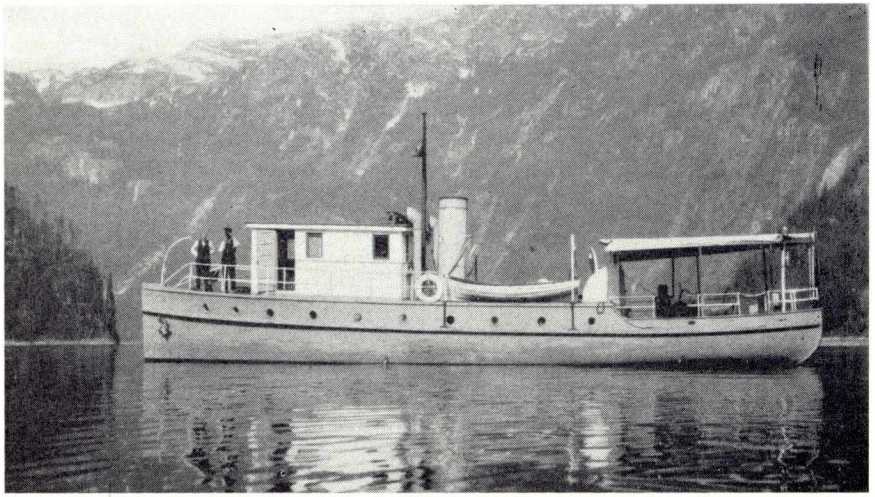
In 1926 a small vessel, named the *A. P. Knight* after the recently retired Chairman of the Board, was built by the Department of Fisheries for the Station's use. Though neither designed nor equipped as a fishing vessel, it served the Station well for oceanographic observations, scientific collections and transportation of personnel in inshore waters, until 1947.

Starting with two appointments in 1926, the year-round scientific staff was increased to eleven in 1932 and remained at about that level until the end of World War II. Many of the scientists employed at that time have since moved on to important posts elsewhere in Canada and the United States.

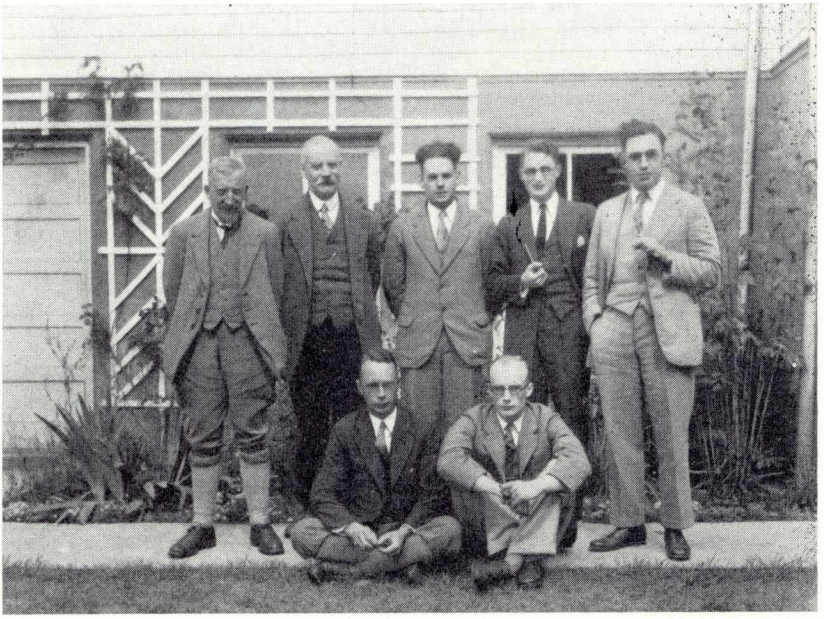


The Station in 1925. A chemistry laboratory (left) and a concrete basement for the first building were completed in 1924.

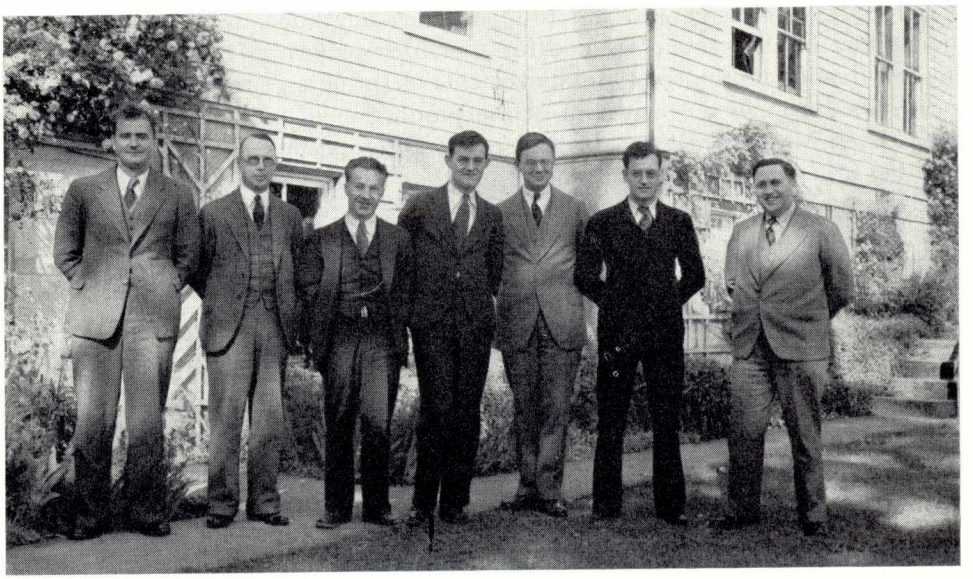
Mr. and Mrs. C. J. Berkeley, who have been active volunteer research scientists at the Station from 1919 to the present time. Mrs. Berkeley has specialized in the study of marine polychaete worms; Mr. Berkeley has conducted a variety of studies, mainly on invertebrates.



The Station's research vessel *A. P. Knight*, 1926 to 1947, here at work in Princess Louisa Inlet, was equipped for dredging and general biological and oceanographic investigations in inshore waters.



A group of scientists at the Station in 1927. Seated: left, Dr. Clemens, Director; right, Dr. D. B. Finn, then Director of the Board's Technological Station at Prince Rupert, now head of the Fisheries Division of the Food and Agricultural Organization of the United Nations. Standing: left to right, Dr. C. H. Williamson, Mr. G. H. Wailes, Mr. Louis Smith, Dr. H. N. Brocklesby, Dr. R. E. Foerster, later Director of the Station, 1940 to 1950.



Some members of the scientific staff in 1938. Left to right: Dr. D. B. Quayle (later in charge of the Province of British Columbia's Shellfish Laboratory), Dr. W. A. Clemens, Director (recently retired as head of the Zoology Department, University of British Columbia), Dr. A. L. Tester (now Chief, Division of Biological Research, United States Fish and Wildlife Service), Dr. W. M. Cameron (now Director of Scientific Services, Royal Canadian Navy), Dr. J. L. Hart (now Director of the Fisheries Research Board's Biological Station, St. Andrews, N.B.), Dr. J. L. McHugh (now Director, Virginia Fisheries Laboratory), Dr. A. L. Pritchard (now Director, Conservation and Development Service, Department of Fisheries, Ottawa).

The research program of the Station was influenced by the state of knowledge and the special problems of the day. Over a period of six years, intensive long-term studies were started on salmon propagation and migration, on herring and pilchards, on oysters and other shellfish, on trout propagation and on oceanography. From this period onward the work of the Station has been more and more directly concerned with pressing fisheries problems.

In 1926 an intensive study of the relative efficiency of natural and artificial propagation of sockeye salmon was commenced at Cultus Lake, tributary to the lower Fraser River, under Dr. R. E. Foerster who had been studying conditions in the lake as a graduate student since 1922. The numbers of young seaward migrants from the lake resulting from known numbers of eggs under natural conditions were compared with those resulting from two fish-culture techniques applied with the cooperation of the Department of Fisheries. The thoroughness of this experiment, continued over eight broods, made it a classic in the field of salmon research. It demonstrated for the first time the high mortality in the early stages of salmon development. Its failure to show advantages from the existing fish culture techniques commensurate with their costs led to the closure of the salmon hatcheries in British Columbia. Other important studies on sockeye salmon reproduction were associated with this program.

A program of tagging salmon to reveal their migrations in the sea was also commenced in 1926 and continued for a number of years. It gave us our first firm information on the coastwise movements of spring and coho salmon.

In 1930 a major investigation of the production of pink salmon was commenced. At Masset Inlet in the Queen Charlotte Islands the numbers of fry resulting from known numbers of eggs, and the factors responsible for mortalities from egg to fry stage, were studied using a counting fence on McClinton Creek to enumerate fry and adults. Attempts were made without success to establish runs of pink salmon in the alternate years when none occur naturally in that area.

Research on trout production, then a responsibility of the federal government, was started in a preliminary way in 1928 and expanded in 1930. It included studies on hatchery rearing of Kamloops trout and their introduction into a small under-populated lake in the interior. Work on the reproduction of rainbow and brown trout, and on Atlantic, spring and coho salmon was conducted at Cowichan Lake, where the hatchery was turned over to the station for experimental purposes.

Intensive study of herring and pilchard was commenced in 1929, and investigations on which to base regulation of the important herring fishery still form an important part of the Station's program. The early work established the pattern of herring movements and the divisions of the stock, and laid the groundwork for intensive quantitative studies on herring production. The pilchard investigations demonstrated that the British Columbia fishery depended on older fish which were part of the larger California stocks. Their serious decline in 1942 affected both areas and brought the Canadian fishery and research on this species to an end.

Following earlier preliminary investigations, an intensive program of research on oyster culture was started in 1930 and expanded to include study of the clam stocks and fishery. Investigations were also carried out on the crab fishery, on prawns, and on marine borers. Other projects included studies on the food of fur seals, on sea lions, and on lingcod.

The above illustrates the increasing attention paid to problems of significance to fisheries. In these studies there was close co-operation both with branches of the Canadian Department of Fisheries and with the Provincial Government, which contributed financially to some projects.

The need for knowledge of oceanographic conditions, so important to an understanding of the movements and fluctuating abundance of fish, was not forgotten during this period. An oceanographic study of the Strait of Georgia was carried out by scientists of the University of British Columbia for a number of summers starting in 1926. Two full-time oceanographers joined the Station's staff in 1930 and 1931.

An interesting development was the construction of a hydraulic model of Alberni Inlet to study the circulation. Using dyes to colour water layers having different salinity and to indicate their movements, it was possible to determine the circulation at various levels of river discharge. Results were checked by actual observations in the inlet. As a result the dispersion pattern of pulp-mill effluents

The Station in 1944 showing, from left to right, the annex first built as a residence in 1928, the Director's house, the boat house and workshop (at foot of wharf), the chemistry laboratory, and the original station building. The research vessel *A. P. Knight* is at the wharf.

in the inlet was predicted and effective measures to prevent damage to fisheries were recommended and carried out.

THE STATION DURING WORLD WAR II

During the early years of the war the work of the Station proceeded at a somewhat reduced rate, owing to absence of scientific staff on war service. It was possible, however, to continue to accumulate knowledge applicable to the maintenance and development of our fisheries.

The outstanding feature of the war years was the development of co-operation with the Royal Canadian Navy in oceanographic research. The Station provided scientific personnel not available elsewhere, and the Navy provided ships. The joint effort was very effective in getting useful information for defence purposes. It laid the basis for increasingly useful co-operation along the same lines in the post-war period. The information needed by Navy as a basis for submarine detection, and that needed to understand the abundance and movements of fish, coincide to a very high degree. With this background, our knowledge of the pattern of oceanographic conditions and circulation has advanced so far in the last few years that we are looking forward to the day when we can predict changes in the sea and resulting changes in size of fish stocks and in the timing and course of their movements. This day is still in the future but when it comes it will mark an extremely important advance in fisheries management and exploitation.

POST-WAR DEVELOPMENT

Commencing in the last years of the war the Station's research program, staff and facilities have grown steadily and rapidly in response to strong demands for work on domestic and international fisheries problems.

The year-round scientific staff increased from 12 in 1943 to 46 in 1958 and is now assisted by 55 technicians and 32 clerical, maintenance and vessel personnel. About 50 seasonal scientists and technicians are also employed in the Station's research. Dr. R. E. Foerster was succeeded as Director by Dr. J. L. Hart in 1950. An exchange of Directors between the Fisheries Research Board's biological stations at Nanaimo and at St. Andrews, N.B., brought the writer to the Station in 1954.

To keep pace with growing needs for working space, a four-storey concrete laboratory was completed in 1949 on the site of the original 1908 frame building. A two-storey concrete workshop was built in 1950, replacing an older frame structure, and a third storey was added in 1955 to house work on electronic equipment. In spite of these additions it has become necessary to use all of the former residence building for scientific work and to seek further laboratory space by re-arrangement of the main building.

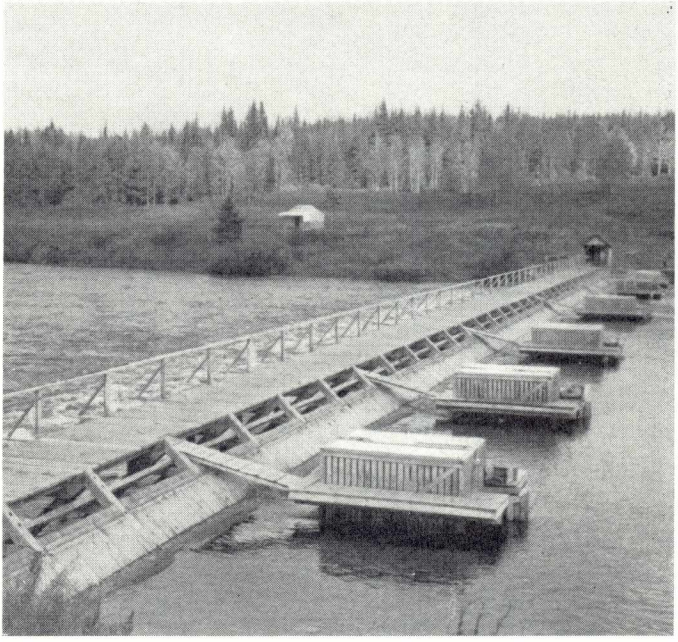
The Station acquired the 54-foot dragger *Investigator No. I* in 1946 and the 39-foot troller *Alta* in 1952. A modern 76-foot multi-purpose fishing vessel was purchased in 1958 and re-named *A. P. Knight*, after the Station's first research vessel. Many other vessels, mainly commercial fishery, have been chartered from time to time for special purposes.

The dragger *Investigator No. I* bought by the Station in 1946 and still in active use in herring, groundfish and other investigations.

It is possible to mention only some of the principal new projects in this post-war period of very active development.

The war itself, through creation of a demand for bottom fish and consequently an otter-trawl fishery, stimulated work in a new field. Fears of over-fishing, which seem to have some justification in the case of certain species, led to the initiation in 1943 of a program including statistical study of the fishery, sampling of the more important groundfish stocks and study of their life histories and migrations, in order to provide the basis for regulation as required. Desirability of co-ordinating regulations governing Canadian and United States fishing of the same stocks has recently involved some co-operative studies.

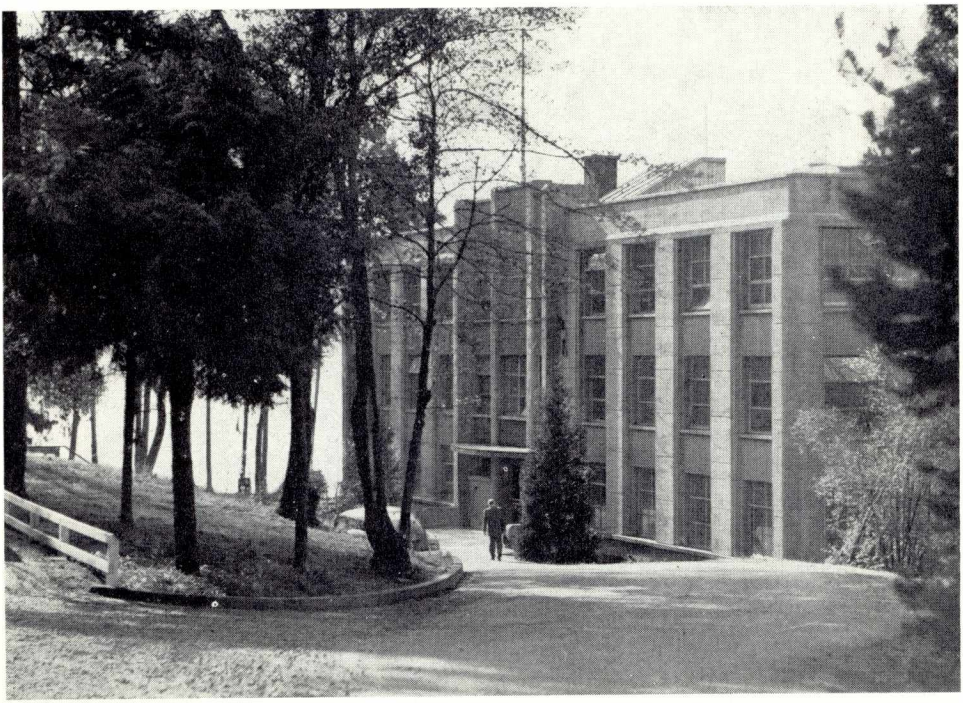
The salmon fisheries are the most important on the Pacific coast and attention has, of course, been given to improving the basis for their management. The sockeye, and more recently the pink, salmon of the Fraser River have been studied by the International Pacific Salmon Fisheries Commission but many other salmon stocks present problems, and those of the Skeena River system have been specially important. A survey of this system in 1944–48 provided valuable background. Since 1955, investigations have been intensified in connection with the Skeena River Salmon Management Committee through which the federal department's Area Director of Fisheries and the Director of the Station combine resources to learn how to obtain the best yield from the fishery. To determine how many spawners should be allowed to escape the fishery, studies are made of the



A counting fence completed in 1946 at the outlet of Babine Lake, the principal sockeye salmon nursery of the Skeena River system. Salmon on their way to the spawning grounds approach the fence from the left; they are counted, sampled and examined for tags as they leave the five traps on the right.

numbers of young seaward migrants produced by various numbers of spawners and of the capacities of streams and lakes to incubate the eggs and rear the young. To determine how to regulate the fishery to let the needed spawners pass, salmon are tagged to discover the routes and timing of various runs, proportions caught by the fishery are closely studied and special gill-netting is carried out just above the up-river boundary of fishing to get early enough information on the numbers getting through to permit adjustment of regulations if desirable. In these ways progress is being made towards making the best use of the Skeena salmon resource. Efforts to improve the basis for regulation of the fishery are being extended to other stocks as resources permit.

Population growth and industrialization offer serious threats to salmon production through pollution, through diversion of water to other uses and through obstructions such as dams for hydro-electric power. The Station has been paying increasing attention to solution of the difficult and complex problems involved in the attempt to maintain our fisheries in the face of these developments. Individual cases of actual or threatened pollution are studied to learn how to dispose of domestic or industrial wastes with the least possible damage to fisheries, and the toxicities of particular pollutants are studied and means sought for rendering them innocuous. An experimental study of the capacities and reactions of salmon was started in 1950 with the principal aim of learning how to guide them past obstructions. This work was concentrated first on the problems of getting young



The main building of the Station, completed in 1949 on the site of the original 1908 structure.

The 39-foot troller *Alta* acquired by the Station in 1952 for salmon investigations.

salmon safely down to sea, and progress has been made towards this objective. More recently attention has been turned to adult salmon and a major study of their physiology and behaviour is in progress, still aimed at discovering what stresses they can stand, how they behave under various conditions and how their capacities and reactions can be used to get them past obstructions without impairing their potential as spawners.

In association with these "defensive" attempts to maintain salmon stocks in spite of population increase, industrialization, and ever-increasing fishing power, a positive approach has not been forgotten. Work has proceeded on artificial means of increasing the numbers of salmon. Investigations have been carried out on the conditions required for the incubation of salmon eggs and on their occurrence in the gravel beds where salmon spawn. Practical means of assuring conditions under which larger numbers of eggs will survive are being explored. Hatcheries have long been able to incubate a much higher proportion of salmon

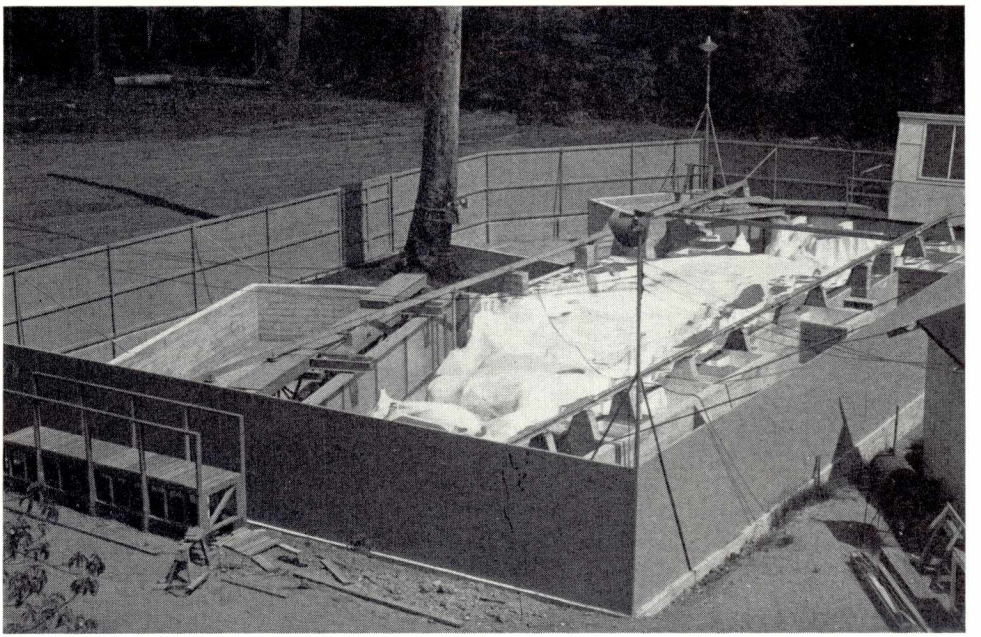
eggs than does Nature, but the resulting fry have not usually survived well enough to achieve any over-all gain. Experiments are in progress on the improvement of techniques of hatching and releasing fry in the light of recent advances in knowledge of the behaviour and physiology of young salmon. Artificial propagation of salmon has great potentialities if its many challenging problems can be solved, and the Station is becoming increasingly active in this field.

In 1953 Canada, Japan and United States ratified a treaty which established the International North Pacific Fisheries Commission and led to one of the world's greatest co-operative fisheries investigations. The Station has carried out Canada's share in a research program to discover where salmon originating in various rivers in North America and Asia go in the North Pacific. Exploratory fishing has shown that salmon are widely distributed on the high seas and has provided samples for comparison with others taken in inshore and fresh waters. The Station has played an active part in the high-seas fishing and inshore

The Station in 1957. At the left is the annex built in 1928 as a residence for summer workers but now used for research. To its right is the Director's house (partly hidden by trees), then the 3-storey concrete workshop, the small chemistry laboratory built in 1924, and the main building. Behind the main building is a storehouse and the caretaker's cottage, the latter mostly concealed. A model of Hecate Strait is under construction in the cleared space above the main building. The house in the woods at the right was built by the first Director, the Reverend G. W. Taylor. In the right foreground are the "Black Rocks".

sampling, and in studies of parasites, scales and other characteristics of salmon. These studies have shown that salmon originating in various river systems mix over wide areas of the North Pacific only to separate again and return as spawning adults to their native streams. These investigations have carried the Station's work to mid-ocean and are greatly increasing our knowledge not only of the distribution of salmon stocks but also of the North Pacific and its potential resources generally. A particularly promising by-product of this work is an ever-increasing insight into the pattern of oceanographic conditions and their changes, by which we hope to understand and perhaps eventually to predict changes in existing fisheries, and to discover new ones.

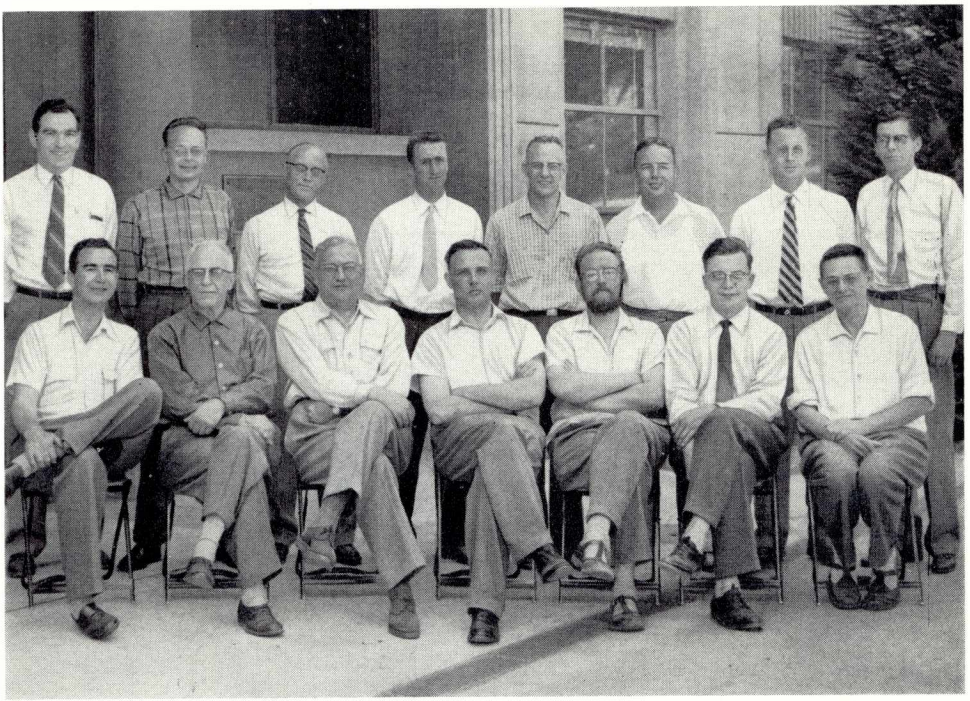
The Station has also conducted investigations on marine mammals. Since 1948 research has been carried out to satisfy Canada's obligations in the Pacific under the International Whaling Agreements, and to learn more about the potential of the stocks on which our whaling industry depends, and how they are related to stocks elsewhere in the Pacific. Canada, Japan, U.S.S.R., and the United States concluded a treaty in 1957 to manage the fur seal herds of the North Pacific so as to obtain the greatest sustained yield possible without damage to other fisheries. Preliminary studies on the food of fur seals were carried out in 1931–32, 1935 and 1952 but, under the new treaty, a more intensive study was commenced in 1958 to determine where they occur and how they affect valuable



The hydraulic model of Hecate Strait completed in 1958 to study the tidal circulation. When the model is filled with water, two gates tilt back and forth under electronic control to produce a replica of tidal rise and fall in all its various phases. Their effects on the circulation are studied by photographing the movement of dyed water.

fish stocks. Sea-lions have been studied to assess the need and develop the means of control to prevent damage to fisheries.

These examples serve to illustrate the growth of the Station's work in the post-war period and how it is related to fisheries problems. There are, of course, many other items in its program, but for these the reader must go to the many publications of the Fisheries Research Board, or visit the Station itself. For general reviews of the work of the Board he is referred to its published *Annual Reports*, and for accounts of special subjects to its *Bulletins*. Both these may be obtained from The Queen's Printer, Ottawa, Canada. Brief notes on the Station's investigations and their results appear in the *Progress Reports of the Pacific Coast Stations* of the Fisheries Research Board, also available from the Queen's Printer. The Nanaimo Station also issues *Circulars* on subjects of special interest to fishermen and the fishing industry. Circulars may be obtained by application to the Station.



Senior scientific staff in 1958. Front row, left to right: J. R. Brett (experimental studies on salmon), R. E. Foerster (salmon), A. W. H. Needler (Director), F. H. C. Taylor (herring), J. D. Strickland (primary productivity), N. P. Fofonoff (physical oceanography), W. E. Ricker (Editor of the Board). Standing: L. Margolis (parasitology), F. C. Withler (Skeena River salmon), F. Neave (high-seas salmon), F. C. Barber (oceanography), W. P. Wickett (stream life of salmon), D. J. Milne (spring and coho salmon), K. S. Ketchen (marine commercial fisheries), J. C. Stevenson (Assistant Director). Absent: J. P. Tully (Oceanographer-in-charge), M. P. Shepard (salmon stock assessments), M. Waldichuk (pollution) and G. C. Pike (marine mammals).

WHAT THE FUTURE HOLDS

True to the original purpose of those who first proposed the establishment of a biological station in Canada at the close of the last century, the Fisheries Research Board of Canada is providing scientific knowledge which is proving to be of great value to fisheries. In its particular field—biological research in the Pacific area—the Board's station at Nanaimo makes a substantial and a growing contribution. The pressing problems of the management of existing fisheries are close to the interests of the fishing industry, and efforts to solve them constitute an important part of the Station's work. Growth of population and industry offer ever-increasing threats to our fish stocks, which have created an urgent demand for research on how to get salmon past obstructions and dispose of wastes with the least possible damage to fisheries. Positive cultural methods of producing salmon and shellfish have unexplored potentials which are being studied and will be the subject of increasing efforts. A large part of the Station's work is required to fulfill Canada's obligations under international fisheries treaties. Less urgent but not less important is the broad exploration of the ocean off our coasts on which to base development of new fisheries and understanding of changes in those we have. Last but not least, all of these activities depend on improving our fundamental knowledge of the life processes of the fish and shellfish, and of the ever-changing climate in which they live.

The growing demand for research on fisheries problems has outstripped even the rapid growth of the Board and the Station in the post-war period. Populations continue to grow and the world's need for food continues to increase, and men must turn more and more to the sea for sustenance. The detailed course of events cannot, of course, be predicted but it is safe to say that the need for research on fisheries problems will continue to grow for some time to come. Sound development is more likely to be limited by resources than by demand, and the most important resource is a body of scientists genuinely interested in the problems, and able to make a broad, thorough and imaginative attack on them.

No field of research offers greater challenges to the scientist or more varied problems to interest him. The unseen world of the ocean cannot be observed directly and is difficult to study, but has secrets of great scientific and economic importance. Every problem of life itself is reflected in fisheries problems; every branch of science must help to solve them. On the Station's staff, physicist, chemist and engineer work with scientists in many branches of biology. The Station's work interests and needs many university scientists.

May the Fisheries Research Board of Canada and its biological Station at Nanaimo long continue to serve the people of Canada in an exciting and profitable adventure of discovery!

THE FISHERIES RESEARCH BOARD OF CANADA

The Fisheries Research Board of Canada consists of representatives of the federal government and the fishing industry, and of scientists from Canadian universities. Currently there are eighteen members. The Board operates under the control of the Minister of Fisheries as the research branch of the Department of Fisheries.

The Fisheries Research Board was founded in 1898 as the Board of Management of the Marine Biological Station of Canada, in 1912 it became the Biological Board of Canada, and it assumed its present name in 1938. Today the Board operates four biological stations, three technological stations, an Arctic unit, two technological units, and a number of field stations and research vessels.

The research work conducted by the Board includes all phases of the biology of fish stocks—including their reproduction, growth, enemies, behaviour and catchability; it also investigates the physics and chemistry of oceans and lakes as they affect fish production, methods and apparatus for catching fish and other valuable marine organisms, and the handling, processing, chemical composition, nutritive value and utilization of all fishery products.

Ottawa,
September 1, 1958

J. L. KASK
Chairman