FISHERIES RESEARCH BOARD OF CANADA

The Fisheries Research Board of Canada

A Short History and Some Thoughts on Organization and Management

BY

J. L. KASK

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FOREWORD

New staff members of the Fisheries Research Board of Canada are often unaware of the Board's organization, its objectives and long history. This short historical review with a few notes on organization, administration and some Board problems has been prepared for their information and orientation. The historical review may prove of momentary interest to new Board Members as well. The study is designed for internal Board use only.

J.L.K.

O T T A W A,
April, 1961.

Definition of terms as used in this study

1. Authority : In this context "authority" purports dominion or jurisdiction rather than right or power. It is more permissive than the right to issue orders and carries the thought of approval rather than the right to command. The meaning also includes authority on matters of principle or action; authority to interpret government and organizational regulations; authority to get facts; authority to review plans, programs and results and to comment upon them. Its derivative meaning implies that you know what you are talking about, i.e. an authority.

2. Leadership : "The capacity and the will to rally men and women to a common purpose, and the character which inspires confidence ... there must be truth in the purpose and willingness in the character".

   Field Marshall Bernard Law Montgomery
   (Memoirs 1958)

3. Co-ordinate : To bring into common action; harmonious adjustment. It also means of equal rank (as in co-ordinate clause). A co-ordinator is not a director, but a director of a large establishment has to be a co-ordinator.

4. Plan : A general idea of what is desirable or what needs to be done; an outline, sketch or draft.

   Scheme : a highly speculative plan
   Project : a tentative plan
   Design : a settled plan

5. Program : A brief outline of order to be pursued; a forecast of performance; a plan of procedure. In scientific programming this involves equating required and proposed action to available or realistically foreseeable money, men and materials.

6. Estimates : Careful calculation of approximate needs of money, men and materials to carry out well considered and well documented programs during the next and ensuing fiscal years. Approximate calculation.

7. Budget : The actual amount of money, men and materials allocated and authorized for a current year's expenditures. Cost of operations.

THE FISHERIES RESEARCH BOARD OF CANADA

A short history and some thoughts on
organization and management

I

Organization and Management in a Research Institution

Organization has been described as the chassis on which management or administration is mounted. If organization is the framework then administration supplies the essential moving parts and motive power necessary to achieve desired objectives. The size and complexity of modern problems whether of business or government call for greater and greater sub-division, so as to provide manageable parts. The great variety of problems calls for variety and flexibility of organization and administration.

Essential elements in any successful administration are :

1. Sound basic organization
2. A firm central policy with easily discernible goals.
3. Systematic arrangement and effective utilization of individuals, funds and equipment
4. Division of labor
5. Ability to co-ordinate specialized effort
6. Clear command channels
7. Clear responsibilities
8. Wise use of authority (not synonymous with power, but which includes persuasion)
9. And perhaps most important of all "leadership", that difficult-to-define but easily recognizable quality which is so necessary to a successful operation (see Definitions)
10. Of course morale and mutual respect are important; and in government particularly, due attention must be given to public opinion and to government policy and procedures.

In all administration the basic operational unit is the individual person. The more original, specialized or talented the individual, the more specialized and flexible are the organization and management required to get the best out of each person. Over-organization can be as destructive of desired results as under-organization. If scientific innovation is the objective then over-organization could easily destroy the very creativity that is basic to the ends sought. The nature of the research function or research personnel requires a special environment and a special series of dependent circumstances to produce the best work atmosphere and results.

Special attention to large-scale research organization and administration is in most instances quite recent. This has developed through necessity, as research has become a big and complex business involving large outlays of private or public monies as well as emphasizing the team and large organizational approach.

Canada in spite of its relatively small population and its large and difficult area has been in the forefront in encouraging research. Because we are deficient in large indigenous private industry (ours are mostly branch factories of U.S. and British concerns) researches have been largely government-sponsored and resource-oriented. Thus Canada's contributions in the study of fisheries, agriculture, forestry and geology have long and distinguished histories. In large part all have been government-supported and the scientific units have usually grown up as science services or branches in the appropriate and related departmental administration. The one original exception to this general pattern of departmental organization of scientific research in Canada was in the study of the living aquatic resources which included the commercial and sport fisheries. Provision for research in this field from the earliest times has been delegated to an independent honorary board. During considerably more than a half century of successful operation the Board guiding this research has undergone changes in name, in numbers and composition of membership and in the scope of its responsibilities, but it has never changed from the original concept which placed it under rigorously selected separate auspices directly responsible to a Minister of the Crown.

Two of Canada's largest research organizations launched in more recent years, the National Research Council (1917) and the Defence Research Board (1947), have followed this latter type of organization. As research is becoming increasingly important in meeting the country's and the world's supply problems and also since it is posing an increasingly complex administrative problem, many other departments of government are showing growing interest in the Board type of research administration, as are many countries of the world, both those that have been in the research field for a long time

and those new states which are just beginning to organize government services and research units of their own. The reason for this interest is based on the simple fact that to achieve the best research results this type of organization has proved the most stable and effective.

The characteristics of an independent research Board which give it flexibility in organization and administration and still make it responsive to the needs of government and industry can be readily named. First, the Board lies outside Civil Service, which allows somewhat wider scope for the recruitment and encouragement of gifted and capable people. The Board is administered and its scientific program is guided by a group of independent citizens made up of scientists of acknowledged reputation in fields related to the Board's work, as well as leading businessmen chosen for their intimate knowledge of fishing and the problems of the fishing industry, and senior officers of the Department of Fisheries. This type of organization sets it apart to some extent from the expediencies and necessities of the moment. To ensure that scientific programming receives the greatest consideration, the Board's Act provides that "a majority of the members of the Board.... shall be scientists". Thus the Board's research staff and their work are judged by dispassionate and highly qualified scientists, tempered by interested practical-minded businessmen and administrators.

It may be worth while examining the Fisheries Research Board and its development in a little more detail.

II

The Board's History

In 1958, two of the Fisheries Research Board's principal biological stations, at Nanaimo, B.C., and St. Andrews, N.B., celebrated their golden anniversaries. Actually the Board's history started 10 years before these first two shorebased biological stations were built in 1908. Encouraged by the Royal Society of Canada, the British Association for the Advancement of Science recommended in a memorial to the Minister of Marine and Fisheries dated April 20, 1898, that a Board of Management of a Marine Biological Station consisting of eight university professors and including the Commissioner of Fisheries be set up to encourage and supervise marine biological research. The establishment of the Board of Management was actually authorized on the basis of this recommendation by the Minister of Marine and Fisheries and supported by federal funds in the supply bill of 1898-99. The Board of Management was the forerunner of the Biological Board of Canada which later became the Fisheries Research

Board of Canada. The present Fisheries Research Board is thus a lineal descendant of one of the oldest organized scientific institutes in Canada and is the oldest government-supported independent scientific board in North America.

The Board of Management operated a portable biological station at St. Andrews, N.B., from 1899 to 1901. This "Station" was then moved on a scow to Canso, N.S., (1901-03) then to Malpeque, P.E.I., (1903-05) to Gaspé, Que., (1905-07). The scow and station were damaged on tow from Gaspé and the whole thing was abandoned at Grande Vallée, Que., in 1907. The Board of Management also sponsored a biological station at Go-Home Bay on Lake Huron in 1901, and took over its direction in 1904. Permanent shore-based marine biological stations were established as already indicated at St. Andrews, N.B., and Nanaimo, B.C., in 1908.

To formalize the above arrangement the Parliament of Canada passed a special act, the Biological Board Act creating a Biological Board of Canada in 1912. The Biological Board took over the stations at Go-Home Bay, St. Andrews and Nanaimo. The Go-Home Bay Station was however not operated after 1913 and was disposed of in 1917.

In 1924 the Board's responsibilities were broadened to take in fisheries technological studies in addition to those strictly biological. A technological (experimental) station was opened in Halifax, N.S., in 1924 and another in Prince Rupert, B.C., in 1925. Later, in 1936, a third technological station was established in Grande-Rivière, Quebec.

The broadening of the Board's researches to fields other than aquatic biology brought about the need for a change in name and terms of reference. This was accomplished in 1937 by supplanting the old Biological Board Act of 1912 by a new Fisheries Research Board Act.

As the work of the Board increased in scope and importance organizational changes were made, research units were added and the research field was expanded. The technological station on the Pacific Coast was moved from Prince Rupert to Vancouver in 1942. A biological station for the study of freshwater fish was established in Winnipeg, Man., in 1944. A headquarters for biological work in the Eastern Arctic was opened in Montreal in 1947. Separate oceanographic groups to study the ocean environment were established in St. Andrews and Nanaimo in 1946. The biological work of the Newfoundland Government Laboratory in St. John's was taken over in 1949, on union of Newfoundland with Canada, and a technological unit was

established in St. John's in 1953. Work toward the study and control of sea lamprey in Lake Superior was started by the Board in 1953 in co-operation with a Federal-Provincial (Ontario) Committee, and a temporary headquarters was established at Sault Ste. Marie, Ont. In 1957 a combined biological and technological station was established in London, Ont., to carry out investigations on freshwater fisheries. This entailed the closing of the Winnipeg Station and moving of the headquarters of the lamprey work from Sault Ste. Marie to London.

Prior to May 15, 1953, the Board operated under a Chairman and a Vice-Chairman elected from members of the Board, all of whom served without remuneration. The Chairman and Vice-Chairman did not reside in Ottawa, where the Board's headquarters are situated and as both of these officers had other full time occupations, neither could give the Board's increasing and complex operations the time required for constant on-the-spot direction and guidance. On amendment to the Act, assented to May 14, 1953, provision was made for a full-time Chairman "appointed by the Governor in Council" and who "is the chief executive officer of the Board and has supervision over and direction of the work of the Board" and who is a member of the Public Service of Canada. The first full-time Chairman was appointed in August, 1953. This for the first time placed both policy guidance and full-time executive authority and responsibility in the hands of one person always available to the Minister and to the field establishments.

III

Statutory Authority

The Board operates with the statutory authority of the Fisheries Research Board Act R.S.C. 1952, c. 121 as amended by 1952-53, c. 37. (Reproduced herein as Appendix I.) The antecedents of this Act, as already indicated, run back to 1912. That such a research "Bill of Rights" exists at all is a matter of some wonder; that it has existed for 50 years, is a real tribute to an enlightened Parliament.

Like all really good documents the Act is very short and very specific and like freedom itself, its intent must be constantly reviewed and guarded. The Board's relatively small size, its dependence (especially at headquarters) on a few external administrative services, as well as the very differences that Parliament in its wisdom has granted, make the Board conspicuous and vulnerable. Its long and stable history attests to its durability.

IV

Parliamentary Representative

The Act places the Board "under the control of the Minister" (of Fisheries) who is responsible for and who reports to Parliament on its work.

V

Board Functions

By the Act, "The Board has charge of all Dominion fishery research stations in Canada, and has the conduct and control of investigations of practical and economic problems connected with marine and freshwater fisheries, flora and fauna, and such other work as may be assigned to it by the Minister". This gives the Board well defined yet broad terms of reference, with the general objective of increasing the knowledge, the scope, the value and efficiency of Canadian fisheries and other living aquatic resources useful to man through scientific research.

VI

Board Members

The Board's researches and operations have always been guided by an honorary Board appointed, since the Act of 1912, by the Minister of Fisheries. In the first instance Board members consisted of scientists chosen from Universities and one or more senior officers of the Department of Fisheries. In 1924, following a revision of the Board's Act and the expansion of researches into the technological field two industry members were added with a view to having industry's problems more directly represented to the Board as well as providing a channel for making the Board's problems and results of research known to the fishing industry. With this innovation the Board consisted of Canada's foremost scientists in the fields of the Board's interest, senior officers of the Department of Fisheries and knowledgeable representatives from the fishing industry.

This same type of broad representation on the Board was carried into the 1937 and subsequent revisions of the Fisheries Research Board Act. The Act now provides for a "a Chairman and not more than eighteen other members". The type of membership is further qualified:"a majority of the members of the Board, not

including the Chairman, shall be scientists, and the remaining members of the Board shall be representative of the Department [of Fisheries]and the fishing industry".

At the time of writing there are seventeen members of the Board, made up of 10 scientists, 6 representatives from industry and one senior officer of the Department of Fisheries. This assures sound scientific programming with the Department's and the industry's needs always being ably represented. All the scientific members on the Board are specialists in one or more of the disciplines related to the Board's work; industry representatives are business leaders in Canada with an intimate knowledge of fishing and the fishing industry; and Departmental representation is at a professional and very senior level.

This very close liaison and tie-in of all interested parties is all provided for in the Board's Act. Geographic representation as well as the importance of fisheries in the various areas are also considered in the appointment of members but in no case has the high quality of membership been sacrificed for any reason. A more thorough representation of interested parties can hardly be imagined.

VII

The Board and the Department of Fisheries

Although the Department of Fisheries employs a number of biologically trained personnel in its Conservation and Development Service, bacteriologists in its Inspection Service and engineers and food technologists in its Industrial Development Service for the solution of day to day resource management, quality control and industrial problems (thus having in effect a science service within its own framework), a principal responsibility of the Board still is to serve the basic research needs of the Department of Fisheries and the fishing industry. The Board also carries out "as may be assigned to it by the Minister" all of Canada's fishery research responsibilities under the various international fishery and sea mammal commissions to which Canada is a party and that do not have research staffs of their own. The Fisheries Research Board is the only organization in the federal government with research responsibilities in this field. This requires close liaison with the Department and an intimate knowledge of its long-term and even some of its short-term needs as well as related needs of other departments.

Close association with the Department of Fisheries is achieved not only by membership of one of its senior officers on the

Board, as indicated above, but also by joint executive and programming meetings at headquarters in Ottawa and in the field. Further formal liaison is established by Board action in inviting the Deputy Minister of the Department of Fisheries to serve as an ex-officio member of the Board's Executive Committee through which all Board business is transacted and also by provision in the By-laws that the Chief Treasury Officer of the Department of Fisheries should serve as Honorary Treasurer of the Board. The Honorary Treasurer also sits as ex-officio member of the Executive Committee and both of the above officers are invited to attend and participate in all formal Board meetings.

The greatest assurance of close liaison between the Department and the Board however rests with the fact that both serve the same Minister. Any necessary co-ordination that might not be met by the above very thorough organizational tie-in is assured at this level. The Minister, in matters of high fisheries policy, usually acts on the joint advice of his Departmental Deputy and his senior scientific research officer, the Board Chairman. The Minister, the Department and the Board are defined in paragraph 2 of the Act and their relationships and respective roles are detailed in subsequent paragraphs.

VIII

The Board, its Committees and its Chairman

The Fisheries Research Board has both advisory (criticism and review) and executive functions. The advisory functions are delegated in the first instance to regional Advisory Committees, who conduct on-the-spot regional reviews and report to the Board on the operations and scientific programs of each area and make recommendations to the Chairman and to the Board as a whole for program improvement. The executive functions are delegated to an Executive Committee selected from membership on the Board, and approved by the Minister.

The functions of the Board (when looked upon as a group of individuals as contrasted to the Board as an establishment) are entirely advisory. Members of the Board are chosen for their ability to constructively criticize scientific programs and policy, in order that the work of the Board (as an establishment) can be made as effective as possible. The Board as individuals set the broad objectives of the scientific work. Meeting as a Board, the members' functions are those of constructive criticism and review.

The functions of the Executive Committee are administrative. Its duties are to initiate programs of work pointing to the broad objectives approved by the members of the Board or seeking the answers to problems assigned by the Minister; to determine scientific and administrative policies to assist the programs; and to give general control over the operations of the Board as an establishment. It acts for, and reports to the Board on its actions.

The functions of the Chairman, as Chairman of the Board, is to guide the Board in its policy making and program review. As Chairman of the Executive Committee he guides administrative actions, and as a member of all the Board's Advisory Committees he helps to develop and guide regional programs and policies as recommended by the Committees and approved by the Board. As a permanent policy officer he supplies co-ordination and day-to-day continuity to the Board's planning and decisions.

As the Board's Chief Executive Officer, the Chairman's functions are directional and jurisdictional. He interprets the decisions of the Executive Committee to the operating units of the Board and supervises and directs their work generally, and sets up or interprets government regulations for orderly operation.

The Chairman is supported in Ottawa by a full-time Assistant Chairman who provides high-level scientific and administrative assistance the year round as a staff function and acts with full line authority during absences of the Chairman.

IX

The Chain of Administrative Communication and Staff Functions

The chain of communication in the Board in matters of administration and overall instructions derives from the Minister to the Executive Committee to the Board Chairman (as Chief Executive) to the Directors or regional Unit Chiefs to the Project Leaders, etc. In administrative matters these line channels are clear and well defined. However, in the scientific and program area the protocol of administration becomes very informal as indeed it must to be effective in the scientific field. The junior scientist must have direct access to the senior scientist to benefit from his greater experience and knowledge; and advancement in the scientific field must be based as much on recognition in the discipline of the workers' competence as on increased responsibilities. In government this is not always easy where

scientific organization and administration is continually being compared with similar but much larger strictly service-type departments.

Service-giving positions and advisory or staff functions in the Board, as contrasted with line supervision and operational research workers and their assistants, are relatively few in number. In the office of the Chairman there is an Executive Assistant to the Chairman, who in turn has administrative assistants dealing particularly with finance and with personnel. Although these officers are mostly concerned with staff aid and non-scientific matters they require some knowledge of, and a large sympathy for, the general field of scientific investigation so that they can deal more effectively with the many delicate personnel matters of highly individualistic people and matters of specialized purchase of scientific equipment which continually arise. Administrative officers must also have training in business, in drawing up contracts and the peculiarities of government procedures which are legion. These officers are professionals in their own right and as the organization becomes increasingly large and complex, dependence upon them and their quality for successful operation becomes increasingly great.

This general pattern of administrative staff officers in the central co-ordinating and directional office in Ottawa is duplicated in the larger of the Board's establishments in the field. The functions at headquarters are principally those of direction, co-ordination and review with most of the staff work being done in the field where the several staffs are situated and the researches are conducted.

Because the quality of administrative support is so important to the successful functioning of a large research organization there lurks a continuing danger that the objectives of the organization itself may become secondary to administrative niceties. This is wrong and must be constantly guarded against. Administration is an aid function to the scientific staff. Its job is to see that anything that needs to be done can be done, not to say that it can't be done. This of course is true for all administration. It is particularly true in research where immediate objectives and methods cannot always be precisely defined. This relegation of administration to its proper and important function is best achieved by keeping the numbers of administrative officers small and the quality high.

Three staff or advisory functions are shared with other principal duties in the Office of the Chairman by specialists in the three scientific fields of the Board's competence. The Editor of the Board's publications, a professional biologist, also serves as Special Assistant to the Chairman in the biological field. His duties, in

addition to editing scientific papers in the biological field for technical content, include current assessment of the Board's biological programs across Canada and to serve as technical adviser in his field of competence to the Chairman and to other departments of government in Ottawa. Similarly the Associate Editor, a professional bio-chemist, serves as special assistant in fisheries technology; and the Board's Chief Oceanographer serves as special assistant in the broad oceanographic field and also acts as Secretary of the Canadian Committee on Oceanography, an interdepartmental programming committee.

X

The Research Director

Except for a small directional, co-ordinating, editing and review staff in Ottawa (as outlined above) the Fisheries Research Board is entirely decentralized. All research functions are carried out in the field. Thus field research directors become the most important individuals in the Board's employ since the degree of success in the Board's researches depends to a very real degree on the qualities of these men. The director's leadership qualities and reputation pretty well determine the quality of staff that he can recruit; his ability and willingness to delegate research and administrative responsibilities determine the size and effectiveness of the operation he can direct; and his scientific and management attainments largely determine the confidence the Board, the staff and the public whom he serves place in him.

A competent research director is a very rare individual because the types of talents required are so broad and quality demands so high. To many scientists, the term research director is in itself contradictory since in their opinion any activity which can be directed is not research. This concept entirely ignores the valuable contributions which can only be made by a well integrated and co-ordinated team, but this prejudice often has to be overcome before integration or co-ordination can be attained.

The research director must be both a competent scientist and a competent administrator. To be competent in only one of these fields is not enough. The director's great task is to channel the interests and efforts of many scientists toward desirable goals while preserving that environment of intellectual stimulation and freedom which makes scientific research possible. A prosaic but equally important part of his task is the provision of the necessary facilities and funds. On the technical side his duties include defining objectives, planning, programming, execution, review (supervision) assessment

and liaison; on the administrative side there is estimate preparation, personnel questions, facilities, reports, scheduling (priorities), checking on progress, disseminating information and results, and public relations. He must be an expediter, not a bottleneck.

The director's most important responsibility of all is the supply of that difficult to define but easily recognizable quality called "leadership". This quality is really the antithesis of direction but every good director must be a leader.

Leadership implies that a director by the force of his own personality and interest can inspire and create interest on the part of others. One successful scientific director * puts it this way. "He (a successful director) is able to mold a collection of individuals with varying backgrounds, skills and interests into a team enthusiastically pursuing a common goal. He does this in part by stating challenging tasks of difficulty appropriate to the skill of the team member, by giving credit and expressing appreciation for good work, by making wise and prompt decisions, by removing bottlenecks to the progress of the work, by creating a favorable physical and intellectual environment, thus promoting morale. The leader commands the respect of his associates and in turn respects the knowledge, skills, and ambitions of his associates. He regards them as persons, not as bodies or machine units. Such is the ideal way in which research should be directed".

The above requirements place heavy demands on a research director. It shows why good directors are hard to find. It also indicates the challenge of the job and the joys of carrying it out well.

XI

Board Programs

The Board's research programs are initiated in several ways. They may be dictated by the needs of the times through direct representation of the industry members on the Board, or more frequently through recommendation of Board directors, who are alert and sensitive to research requirements in their area, or "such other work as may be assigned to it by the Minister" (Board's Act). This last type of program includes special long-term research needs of the

* Hugh L. Dryden, Director National Advisory Committee for Aeronautics, 1955.

Department of Fisheries as well as researches that are carried out for various international fishery commissions to which Canada is party, and researches of a more fundamental nature developed by the Board itself, and agreed to by the Minister. The Board's unique value to marine and freshwater research, in its various forms, lies in its ability to recruit first-class scientists as career men and to plan and conduct long-term basic research. Good investigators, to remain happy and productive, must have the assurance of independence and long-term support for their work.

As more and more ad hoc problems in fishery biology, quality control and application in the industrial field are being taken over by appropriate and relatively recently organized Services in the Department of Fisheries, as well as by other departments of government (e.g. oceanographic survey work by the Department of Mines and Technical Surveys), Board scientists are finding more opportunity to program and carry on basic studies in population dynamics, fish genetics, animal behaviour, productivity of waters, control of marine bacteria, the composition and structure of fish flesh and fish oils, the bio-chemistry of maturing and migrating salmon and other species, etc. for which the Board's staff and organization are particularly suited.

XII

Basic and Applied Research

Researches are usually spoken of as being of two kinds, basic and applied. It is usually conceded that what is in the scientist's mind when he conceives the problem determines which kind. If his primary goal is the acquisition of new knowledge then the research is basic; if the main motive is the solution of a practical problem of value to mankind then it is applied. If however the distinction of the two forms is approached from the subject matter, or from the activities of the individual scientist, then the two cannot be readily separated. There are however some differences that stand out when approached from another angle which in the interest of clearer understanding of this much debated question may be worthy of quick review.

Basic (pure or fundamental) research is work a creative mind wants to do. To the talented worker this kind of research is play, whereas applied research is work which some one else wants done. There is less urgency and little priority to basic work, whereas applied work has a definite time limit and a high priority. The amount of basic work being carried out is relatively small (perhaps too small)

and commands little money support whereas the amount of applied work now is enormous and has large amounts budgeted for its conduct. Basic research cannot be fully planned; applied research must be carefully planned and co-ordinated to be effective. In basic research it is the individual that is supported; in applied research it is the project that is supported. Both kinds of research require good men and lots of encouragement and support, but basic scientific innovation requires the innately gifted individual whereas the translation into practical use rests with a host of expert but much more ordinary individuals. The highly creative mind will hardly acquiesce to any plan that would subordinate the person to the project.

Both kinds of research are absolutely necessary to propress and both kinds should receive encouragement and support from an organization like the Fisheries Research Board of Canada whose responsibilities are to sponsor and encourage all necessary research in the general field assigned by Parliament as its particular responsibility. But all research carried out by the Board must pass the test of falling into line with the Board's general objectives as defined by its Act and of its ultimate usefulness to man.

As the successful conduct of basic research requires persons with the best minds, who in turn require the utmost in academic freedom in order to give their inquiring minds free reign, the locale for basic research has traditionally been, and still is to a degree, the university. In addition to trying to create a comparable research atmosphere in its own operations the Board has over the years acknowledged this fact and has supported talented individuals at universities. Present policy is to increase this support whenever a deserving individual at a university is in need of such support for full employment of his talents. Support at universities can take the form of providing facilities, moneys through grants and contracts and supplying scientific and supporting personnel.

Another means of supporting basic research in the fisheries field in recent years has been through the encouragement of post-doctorate fellows (supported by the National Research Council and U.S. research foundations) to conduct research in scientific areas related to the Board's interest at Board laboratories. This is a relatively new development but has already contributed high-quality research on a number of important fishery problems. This type of activity in the view of many Board members is worthy of further encouragement.

Since its early beginning however, the Board has fostered, encouraged and conducted basic research in its own regular

programs in all areas of its interest. Many long-term programs, led by highly talented and competent scientists, have been underway for several years and in many fields substantial contributions to very necessary basic knowledge has been made.

XIII

The Board and Universities

The Board since its inception has worked very closely with universities. This close relation is historically due in part at least to the fact that most Board members have been and still are drawn from universities across Canada; also because most early investigations, and many recent Board researches as well, have been conducted by volunteer or seasonal investigators from universities. Thus much of the scientific talent available in Canada in disciplines related to the Board's work could be brought directly to bear on many Board problems. This traditional close relation still exists.

Professors from practically all of Canada's universities have served or are now serving as seasonal investigators at one or another of the Board's Stations in all scientific fields of the Board's interest. In some instances professors return year after year during the summer university recess to carry out long-term researches. This has greatly enriched the Board's scientific contacts and research scope and it has doubtless been of value to the investigators as well. In addition each year directors recruit graduate and senior undergraduate students to add to the seasonal strength of Board operations. This has the double value of supplying summer employment to students and of keeping prospective employers in touch with promising research candidates.

On the other hand senior Board scientists give occasional and in a few instances regular lectures at nearly all universities and fisheries schools that have interests bearing on the Board's special field of competence. In some instances the specialties required can only be supplied from Board sources. This exercise is also mutually helpful, as it brings the Board's specialized experience to university students and in turn interests students in the Board's field of endeavour.

The Board also supports a modest university scholarship program which is administered by the National Research Council and it makes occasional grants and awards contracts to universities toward researches of interest and value to the Board. It also grants special educational leave to worthy staff members toward completing their university training.

These university associations are most valuable and Board members have placed great emphasis on their maintenance and expansion.

XIV

Estimates, Budgets and Red Tape

In Canada the raising and spending of public moneys is based upon the budget concept. That is, the raising of money and its spending must be considered simultaneously by the appropriate executive branch of government which prepares the budget for proposal to Parliament. The amounts of money available and the estimated expenditures must be kept in reasonable or at least acceptable balance.

The senior agencies for administrative management and financial control in Canada are the Cabinet or its formal statutory counterpart the Governor in Council, and the Treasury Board, which consists of the Minister of Finance as chairman and five members of the Cabinet named by the Governor in Council. In addition the Comptroller of the Treasury, an officer of the Department of Finance, has statutory duties which are principally those of control, and the Auditor General who functions as an independent financial auditor, responsible directly to Parliament.

The Governor in Council and Treasury Board are policy making and budgetting bodies although the latter has administrative staff and expenditure functions as well. The individual ministers and departmental officers are responsible for day-to-day management and provide the decentralized managerial direction and control necessary for effective and efficient operation.

The principal statutory authority and direction for money raising and spending is contained in the Financial Administration Act. This Act provides among other matters, that every collector or receiver of public money shall see that it lands in the hands of the Receiver General of Canada (the Minister of Finance). It also assigns control of expenditures to two powerful and strategically placed agencies, the Treasury Board, and the Comptroller of the Treasury. The Treasury Board's prime function is to ensure that departmental expenditures are in line with broad general policies laid down by the Cabinet; and the principal function of the Comptroller of the Treasury is to ensure that the decisions of Parliament, the Governor in Council, the Treasury Board and ministers relating to Crown funds are properly carried out.

Government operations in Canada are divided into

financial or fiscal years extending from April 1 to March 31 of the following year. During the course of any financial year there are three such years under simultaneous consideration by each spending unit of government, including the Fisheries Research Board of Canada. There is first the control of the current budget or amount approved by Parliament from which authorized expenditures are being made; there are carefully prepared estimates for the next fiscal year which are being considered by the Executive Committee of the Board, the Minister, the Treasury Board and Parliament; and there are the general estimates and plans for the year beyond the next, being thought of by project leaders, directors, advisory committees and others.

The point to be made here is that to obtain additional support for changes in existing or new programs requiring an increase in money, men, or materials, the need must be foreseen and carefully documented at least 2 years and more often 3 years before it is reflected in an effective budget or before implementation of the project can be undertaken.

Government accounting also deserves a special word. Government accounting is much the same as that of any business with one significant difference. Commercial accounts recognize that while many transactions are taking place with varying degrees of profitability or loss, it is of relatively small concern if individual transactions turn out adversely if in the aggregate the result is satisfactory. In government, however, transactions must be controlled and recorded so that any individual item, regardless of size, can be defended before Parliament or its agencies as having been carried out within statutory authority.

The above-described rather close adherence to the government fiscal year, which requires great patience as well as great foresight in planning and programming, and the apparent slavish regard for careful documentation of even very minor expenditures of public moneys, form the principal administrative basis for most of the so-called "government red tape". If the sound basis for this "red tape" is better understood, perhaps the irritation it causes energetic and restless investigators with a sense of urgency for getting along with their work will be mollified and minimized. It is with this intent and hope that these lines have been written. A further word on this much discussed and often exasperating subject might be in order.

"Red tape", further defined, provides in government a standard procedure for handling a great many matters by persons at lower levels of authority in a routine fashion. If the documentation of a case or other attending statements meet the criterion or established

standard, action can be taken quickly and smoothly in the steady stream that the routine or "red tape" provides. It is only when established standards are not met in the first instance that delays are encountered and the problem becomes frustrating to busy people whose major efforts lie outside the administrative field. The alternative to this rather rigid standard for getting things done in an enormous public organization such as government, is to treat each item of business as a special case. This of course is out of the question.

It would seem that government routine or "red tape" is here to stay and really serves a good purpose and causes little delay where staff work is thoroughly done. This however in no way relieves those in authority of the responsibility of initiating changes in the "red tape" where it becomes unworkable or causes injustice. It should also be remembered that special cases can be brought before proper authority for special consideration at any time if the need is warranted and the case can be convincingly documented.

XV

Cost Accounting

Cost consciousness in government is not always easy to achieve. If the employee, manager, or director has been a career government man all his working life it is even more difficult since he has no previous "business" experience on which to draw for comparison. If a management officer has never had to meet a payroll or protect profits for his employer, and if his own advancement is not directly dependent on operational efficiency there is little incentive for cutting down costs.

In government, accounting has been designed to assure that expenditures are made in accordance with parliamentary authorities. This is an essential function but it does not concern itself with reporting the full cost of individual operations nor is it designed to provide yardsticks to measure efficiency. About the only yardstick that is available in considering government expenditures and the efficiency of administration is the amount spent in prior years for the same or similar purposes.

How then can we measure when we are getting our money's worth in government-sponsored research ? It has been alleged on the one hand that you cannot estimate the cost of research at all since it is impossible to calculate the cost of determining the discovery of tomorrow. On the other hand it can be argued with equal force that one discovery (for instance the lengthening

of the shelf life of fresh fish by 4 days or the doubling and stabilizing of the catch of halibut between 1930 and 1945) pays for all researches since the beginning of government support for this activity. It can also be said with some confidence that most of human progress has been brought about through research and development and any cost is justifiable and small. None of the above generalizations, however true, serve as continuing controls and evaluations of day-to-day expenditures against accomplishment. These costs, it seems, can only be estimated and equated against progress by the same general system of accounting used in any other management situation. Estimating the total cost of a basic research project is virtually impossible, but estimating the cost of operations of a given laboratory or research organization with known employment, facilities and reasonably foreseeable material costs is relatively easy. If into this accounting system controls can be added to insure that the will and emphasis of management is being satisfactorily carried out in a reasonable period of time, you approach a system of cost accounting that has considerable value to management. Some techniques to achieve this control and cost accounting are :

(a) regular reporting on and evaluation of propress;

(b) cost per page of good scientific reporting in a particular discipline;

(c) cost per scientific employee per year or other suitable period of time;

(d) comparison of costs between comparable researches carried out by government agencies and universities or private institutions, etc.

All the above controls and techniques are used by the Fisheries Research Board of Canada in trying to keep a check on its effectiveness and comparative costs. All are reported upon to the Board each year by the Chairman in his annual report to Board members.

XVI

Travel

Travel by scientists in the Board is of two principal kinds : travel for the conduct of work and travel to attend scientific meetings and to visit scientific institutions.

Work travel involves travel of individuals from their headquarters to and from field stations, to industrial establishments and as scientific advisers or members of scientific working groups to international fishery commission meetings, Board, and committee meetings, etc. Work travel has increased very considerably in recent years. With improvements in automobile, rail and air travel more and more work can be carried out in remote areas from a centrally located station such as at Nanaimo or St. Andrews, by quick trips to the field without an undue loss of time. This, theoretically at least, reduces the number of permanent or seasonal field stations required and allows more centralization of people and activities and guards against scientific isolation. Travel as members of scientific working parties and as scientific advisers to international commission meetings has also increased a great deal. This arises mostly because the number of commissions has increased since World War II (5 for which FRB is Canadian scientific research representative) as have the number of scientists going to, and the duration, of each meeting. This all adds to travel costs both in money and perhaps more particularly in time, especially when meetings are held in distant areas or countries and the subjects under discussion are specialized and controversial.

Travel to attend scientific meetings or to visit scientific institutions in Canada, the United States and abroad is quite different. Attendance at some scientific meetings is as necessary to a creative scientist as food is to the body. It is a part of an active scientist's job to keep up with developments in his field, and to test his thinking and his ideas against those of his peers. This is stimulating to the thought process. But too many meetings like too much food can give indigestion. Meetings can and frequently do become an end in themselves. Scientific societies are proliferating without limit, and scientists could devote their full time to attending meetings if this were allowed, with resultant danger of sterility in research achievement.

The question then becomes : Who should attend meetings and how often ? Should it be the senior scientists and administrators who have already made their reputations or should it be the younger and more junior men ? How many should attend one meeting (a) from the same station (b) from the whole of the Board ? When is the saturation point in meetings reached ? How many meetings a year ? etc. etc.

These questions perhaps do not have a simple answer. Circumstances must dictate the needs. However, the subject does need careful and continuing attention, both to ensure that scientific staff do not suffer from isolation and also that the meetings attended

are profitable to the scientist and the organization they serve, as well as to see that attendance at meetings does not become an end in itself.

XVII

Communication and Application of Research Results

Communication of the results of research to the ultimate user, and their application when appropriate, continues to be a vexing and stubborn problem in some areas. But there are signs that provision is being made organizationally to overcome this difficulty.

The problem differs somewhat according to the group towards whom the products of research are directed. In the biological field researches are for the most part carried out for the use of the fisheries administrator or area director to assist him in resource management, or for international fisheries commissions with the same general objective. Often the strictly scientific findings are interpreted to the administrator by a middleman, the management biologist on the staff of the administrator. When liaison between the administrator and the scientist is good and if the industry is kept fully informed concerning the need for the management measures recommended, the application of results does not present too formidable a problem. In two important instances special "management committees" with designated industry advisory groups have been appointed by the Minister to ensure complete liaison and co-ordination. These are the Skeena River Management Committee and the Herring Management Committee on the Pacific Coast. The above Committees work very effectively. In most instances, however, the formality of special committees has not been found necessary for effective liaison and application.

In the fishery technology field however, where the ultimate users of the products of research are for the most part fishermen or individual processors or merchants in the fishing industry, the problems of communication and application are often more difficult. Although some technological researches conducted by the Board have been picked up and applied quite fast by industry to their profit, such as fish oils as a source of fat-soluble vitamins, use of refrigerated sea water in place of ice for holding fish catches, antibiotics as fish preservatives, etc., other technological research results produced by the Board, such as separation and uses of individual fish-oil fatty acids, improved methods for canning herring, etc. have been very slow in being translated to the use of industry. In fact people in other fishing countries have often made more use of

some of these research results than have Canadians. It seems that one of the difficulties in this communication was the lack of an intermediate step between the researcher and the industry; namely a proper development section.

Over the years many conscious and deliberate efforts have been made by the Board to overcome this difficulty in communication leading to application. One of the first efforts in this regard was in the appointment of fishing industry members to the Board in 1924 (see History). This step was taken with the idea that these practical men would represent the problems of the industry to the Board's research workers and they would also be in a favoured position to convey the results of research back to the industry. Almost concurrently with this development the Board engaged engineers in their laboratories with the thought that these professional but very practical people would be in a desirable position of augmenting industry members in translating the results of research to industry by pilot-plant development and demonstration. This latter, in effect, resulted in an early small attempt at instituting a developmental and application section. About this time too, series of new publications were instituted. They were in popular language directed specifically at the industry. These included Progress Reports, Circulars, Industrial Memoranda and Bulletins on general procedures or products. More recently "open houses" at Board stations, where researches are reviewed to the industry, as well as short courses of study for fishery officers have been started.

The combination of having industry members on the Board and engineers on the Fisheries Research Board staff and a series of prompt and readable reports and "open houses" successfully filled a very great need for many years. Mechanical fish driers, washers, improved refrigerated railroad cars and many other developments were introduced and adopted by the fishing industry during this earlier period.

Since World War II, fishery technology, like technology in most other fields, became more specialized and developed faster than industry (engrossed as it was in production and marketing problems) could absorb for its own improvement. The complexity and number of new developments also quickly outran the capacity of the Board's few engineers to handle adequately. A new more comprehensive and better equipped industry-development organization was obviously needed.

In response to this need provision for a special industrial development vote within the Department of Fisheries' estimates

was made in 1950 and subsequent years and a special Industrial Development Service was organized in the Department in 1955. In order to establish intimate liaison and to provide experienced people several Fisheries Research Board engineers were recruited to the new Service. Most of the early industrial development projects, since special moneys were available in 1950, were programmed and executed by Fisheries Research Board staff or under their direction. At present direct participation in strictly application work by the Fisheries Research Board is becoming progressively less as the Industrial Development Service is getting organized and staffed.

With the growth in size, strength and the decentralization of the Industrial Development Service, the Board's responsibilities in communication beyond the laboratory and pilot-plant stage is being taken over by the Department of Fisheries. With continued close liaison and co-operation between research and the industrial development men in the first instance and the Industrial Development Service and industry in the second, the problems of communication existing between industry and research in the technological field should be possible of early solution.

Communication of the results of research to other scientists is accomplished principally through the medium of a special Board periodical, the Journal of the Fisheries Research Board of Canada. Many scientific papers or articles originating in Board laboratories are published in other recognized scientific journals as well such as :

Canadian Journal of Biochemistry and Physiology
American Journal of Science
Analytical Chemistry
Canadian Journal of Zoology
Agriculture and Food Chemistry
Nature (Britain)
Science (U.S.) etc.

Separates of these are collected and bound annually as Board "Studies" for distribution among libraries and a select scientific clientele. The fact that scientific papers are accepted for publication by reputable journals is itself a measure of the high quality of the researches being reported upon. That scientists in and outside the Board consider it an honor to have a scientific paper accepted by the discriminating editors of the Board's Journal is a tribute to the high standards maintained by the editors and the authors of that periodical.

Board communications to other scientists appears to be competently handled at this time. The researches reported upon have lasting value everywhere.

XVIII

The Board and Research Atmosphere

Parliament and the people of Canada for more than half a century have granted us a unique opportunity to experiment with research organization and administration with a view to creating a healthy atmosphere for the conduct of creative work leading to new knowledge and scientific innovation. If the number of scientific papers published and their reception by the world's scientific community is any criterion, then I think we can say that we in the Board now, and more particularly our predecessors who set the organization and research pattern, have achieved some measure of success. The large number of highly talented FRB life-long "career" men in the employ of the Board and the continued healthy support we receive from the Ministers of the Crown and Parliaments under whom we have been privileged to serve seems to confirm this. If under these auspicious circumstances we cannot deliver a competent performance in this delicate but increasingly important field, the fault certainly does not lie in our stars, but in ourselves.

I think the Fisheries Research Board of Canada offers good and exciting career possibilities to earnest and competent young men and women, who wish to make research in the Board's vital and challenging fields of interest their life's work.

O T T A W A,
April, 1961.

(Tables Revised, 1962)

APPENDICES

I. The Board's Act

II. The Board's By-laws

III. Organization Chart

IV. Recent History as Revealed by Expenditures

V. Recent History as Revealed by Staff

APPENDICES

I. The Board's Act

II. The Board's By-Laws

III. Organization Chart

IV. Recent History re Reversal by Expenditures

V. Recent History re Reversal by Stats

FISHERIES RESEARCH BOARD ACT

R.S.C. 1952, c. 121, as amended by 1952-53, c. 37.

CHAPTER 121

An Act to establish The Fisheries Research Board of Canada

Short Title

1. This Act may be cited as the Fisheries Research Board Act, 1937, c. 31, s.1.

Interpretation

2. In this Act,

(a) "Board" means "The Fisheries Research Board of Canada";

(b) "Minister" means the Minister of Fisheries;

(c) "Department" means the Department of Fisheries, 1937, c. 31, s.2.

3. There shall be a body to be called "The Fisheries Research Board of Canada" which shall be under the control of the Minister. 1937, c. 31, s.3.

4. (1) The Board shall consist of a Chairman and not more than eighteen other members.

(2) A majority of the members of the Board, not including the Chairman, shall be scientists, and the remaining members of the Board shall be representative of the Department and the fishing industry.

5. (1) The Chairman of the Board shall be appointed by Governor in Council to hold office for such period, at such salary and upon such terms and conditions as the Governor in Council may fix, and the other members of the Board shall be appointed by the Minister to hold office for a period of five years.

(2) A member of the Board, upon the expiration of his term of office, is eligible for re-appointment.

(3) The Minister may appoint any person, or designate one of the members of the Board, to be Acting Chairman who may, if he is not a member of the public service, be paid such remuneration for serving as Acting Chairman as the Governor in Council may fix.

(4) The Chairman is the chief executive officer of the Board and has supervision over and direction of the work of the Board and of the persons appointed for the purpose of carrying out the work of the Board.

(5) The Acting Chairman may exercise all the powers, duties and functions of Chairman during the absence, illness or other incapacity of the Chairman or during any vacancy in the office of Chairman.

6. The Board has charge of all Dominion fishery research stations in Canada, and has the conduct and control of investigations of practical and economic problems connected with marine and fresh water fisheries, flora and fauna, and such other work as may be assigned to it by the Minister. 1937, c. 31, s.6.

7. The Board shall meet annually at the city of Ottawa and at such other times and places as are necessary for the work of the Board.

8. The Board may make by-laws for the conduct of its business, but no by-law shall be in force until it is approved by the Governor in Council. 1947, c. 61, s.1.

9. (1) Except as in this Act otherwise provided no member of the Board shall receive payment or emolument for his services as such, but each member shall receive such payments for his travelling and other expenses in connection with the work of the Board as may be approved by the Governor in Council.

(2) Repealed, 1952-53, c. 37, s.8.

10. Repealed, 1952-53, c. 37, s.8.

11. The Board may, subject to the approval of the Minister, employ such scientific, technical and other officers and employees

as may be necessary for the proper performance of the Board's work, fix the tenure of their appointments and their remuneration, and prescribe their several duties. 1942, c. 61, s.2.

(1) Notwithstanding anything in the Civil Service Act, the Civil Service Superannuation Act or any other Act of the Parliament of Canada, a person who, immediately prior to his appointment or employment under this Act, was a contributor under the Civil Service Superannuation Act, while holding office under this Act, continues to be a contributor under the Civil Service Superannuation Act; for the purposes of the Civil Service Superannuation Act, his service under this Act shall be counted as service in the civil service and he, his widow and children or other dependants, if any, or his legal representatives may be granted the respective allowances or gratuities provided by the Civil Service Superannuation Act; and in the event of his being retired from his office or position under this Act for any reason other than that of misconduct, he is eligible for re-appointment in the civil service or to receive the same benefits under the Civil Service Superannuation Act as he might have been granted if he were retired under like circumstances from a position in the civil service.

(2) Any member or employee of the Board, who at the time of his appointment or employment under this Act, holds a position in the civil service, or is an employee within the meaning of the Civil Service Act continues to retain and to be eligible for all the benefits, except salary, as a civil servant, that he would have been eligible to receive had he remained under that Act. 1947, c. 61, s.2.

13. All receipts and expenditures of the Board are subject to examination and audit by the Auditor General. 1937, c. 31, s.10.

14. From the moneys appropriated by Parliament for the work of the Board, or which the Board may receive through bequest, donation or the sale of natural history specimens or from any other source, the Board shall expend such sums as are necessary for its work. 1947, c.61, s.3.

15. The Board shall make a report upon the work done by it to the Minister as soon as possible after the close of each fiscal year. 1937, c. 31, s.12

FISHERIES RESEARCH BOARD OF CANADA

BY-LAWS

(Approved by Governor in Council Aug. 18, 1954)

MEETINGS OF THE BOARD

1. At each of its meetings the Board shall :

   (a) review the scientific programs of the Dominion fishery research stations;

   (b) review any investigations or work it controls or conducts, and

   (c) determine policy respecting any actual or proposed investigations or work within its competence and determine the scope and extent thereof, and the manner in which they are to be conducted.

2. Ten members of the Board, including not less than five scientists, constitutes a quorum of the Board.

3. The decision of a majority at a meeting of the Board is a decision of the Board.

CHAIRMAN

4. (1) The Chairman shall carry out his duties in accordance with policies adopted by the Board and approved by the Minister and he is responsible for liaison between the Board and the Department.

   (2) The Chairman shall make a report at the annual meeting of the Board upon the work of the Board and the progress and efficiency of the employees of the Board and shall make such recommendations as he deems advisable.

   (3) The Chairman shall provide from the staff of the Board such secretarial assistance as may be required for reporting any meeting of the Board and the Executive Committee and for any other purpose related to the Board's work.

HONORARY TREASURER

5. The Chief Treasury Officer of the Department of Fisheries is ex-officio, the Honorary Treasurer of the Board.

EXECUTIVE COMMITTEE

6. (1) There shall be an Executive Committee of the Board consisting of the Chairman, who is ex-officio the Chairman of the Executive Committee, and not less than four and not more than six other members of the Board elected at the annual meeting and approved by the Minister.

(2) A member of the Executive Committee, other than the Chairman, holds office until the annual meeting next following that at which he was elected, but any such member may be re-elected at the end of his term of office.

7. The Executive Committee shall meet at such times and at such places as the Chairman deems advisable, and at any meeting four members thereof including the Chairman constitutes a quorum.

8. The decision of a majority at a meeting of the Executive Committee is a decision of the Executive Committee.

DUTIES OF THE EXECUTIVE COMMITTEE

9. Subject to any general or specific direction of the Board, the Executive Committee

(a) may submit to the Minister for his approval any proposed investigation deemed by the Board to be of importance to the fisheries of Canada and recommend to him the manner in which any such investigation and any investigation assigned to the Board by the Minister shall be conducted;

(b) has the general supervision of the employees of the Board and the property under its control;

(c) may submit to the Minister for his approval recommendations for appointment to any position in the service of the Board and for reclassifications, salary increases, resignations and dismissals;

(d) may prepare estimates for the ensuing years and submit such estimates to the Minister for his approval.

(e) may, under such terms and conditions as it deems advisable, authorize scientists who are not employees of the Board to make use of the facilities of any Dominion fishery research station; and

(f) may, when the Board is not sitting, submit recommendations to the Minister for appointments and re-appointments of members of the Board.

10. The Executive Committee may, with the approval of the Minister, delegate any of its duties to the Chairman or to any special committee of members of the Board, but the Chairman or such Committee shall report any action taken under such delegation to the Executive Committee at its meeting next following the action.

ADVISORY COMMITTEES

11. (1) There shall be :

(a) an Eastern Advisory Committee for the Maritime Provinces, Newfoundland, Quebec and the Eastern Arctic,

(b) a Central Advisory Committee for the Great Lakes area, Ontario, Manitoba, Saskatchewan, Alberta and the mainland area of the Northwest Territories, and,

(c) a Western Advisory Committee for British Columbia, the Yukon Territory and the Western Arctic,

for the purpose of giving guidance to the Board in relation to scientific investigations conducted or controlled by the Board in its area.

(2) Each Advisory Committee shall consist of the Chairman and such members of the Board as may be elected at the annual meeting of the Board.

(3) A member of an Advisory Committee, other than the Chairman, holds office until the annual meeting of the Board next following that at which he was elected, but any such member is eligible for re-appointment at the end of his term of office.

(4) Each Advisory Committee shall elect a chairman and a secretary from among its members.

(5) An Advisory Committee shall meet at such times and at such places as its chairman deems advisable.

12. (1) The secretary of each Advisory Committee shall keep minutes of every meeting of the Advisory Committee and transmit such minutes to the Chairman as soon as may be after the meeting of the committee but in any case within thirty days after such meeting.

(2) Each Advisory Committee shall make a report at the annual meeting of the Board respecting its activities during the preceding year.

13. An Advisory Committee may, with the approval of the Chairman of the Board, call upon any person who is not an employee of the Board for advice respecting any scientific investigation reviewed by the Board, and any such person may be paid his actual travelling and living expenses while travelling to, attending at, and returning from a meeting of an Advisory Committee.

CONTRACTS, GRANTS, SCHOLARSHIPS

14. Subject to the rules and regulations respecting the expenditure of public money, the Board may, with the approval of the Minister,

(a) enter into contracts with scientists who are not employees of the Board, or with universities, research institutions or industrial organizations to conduct research respecting matters related to the Board's work,

(b) may award grants in such sums as it deems advisable for the conduct of research respecting any matter related to the Board's work,

(c) grant scholarships in such amounts as it deems advisable to promising undergraduate university students to attract such students to fields of study related to the Board's work,

but the total amount paid under such contracts or as grants or scholarships shall not exceed the amounts provided therefor in the estimates of the Board and included in its appropriations.

PUBLICATIONS

15. Subject to the policy and procedures of the government service, the Board may, with the approval of the Minister, publish such scientific and technical information as the Board deems advisable.

STANDING AND SPECIAL COMMITTEES

16. (1) The Board may appoint such standing and special committees as it deems advisable to conduct the work of the Board.

(2) A standing or special committee shall perform its functions in the manner prescribed by the Board and report to the Board at its annual meeting, and the Board may at any time dissolve any such committee.

APPLICATION OF REGULATIONS

17. The provisions of the Civil Service Regulations respecting leave apply to the employees of the Board, other than those described in sections 18 and 19, and for that purpose the term "deputy head" in those regulations shall be construed as "Chairman" and the term "Commission" as "Minister".

18. The Prevailing Rate Employees General Regulations apply to employees of the Board whose remuneration is based on rates of pay prevailing in the area of their employment for the class of work they do, or who are paid rates of pay based on rates of pay prevailing in any area in Canada for work comparable to the class of work they do, but those regulations do not apply to employees of the Board who are in receipt of a stated annual salary, and for this purpose the term "deputy head" in those regulations shall be construed as "Chairman" and the term "Treasury Board" as "Minister".

19. The Government Ships' Officers Regulations apply to employees of the Board employed in a ship that is the property of Her Majesty in right of Canada for duty,

(a) as a master, mate or marine engineer who is duly certificated under the Canada Shipping Act in respect of that employment, or

(b) in a position designated by the Minister as that of a ship's officer for the purposes of those regulations,

and for this purpose the term "deputy head" in those regulations shall be construed as "Chairman" and the term "Treasury Board" as "Minister".

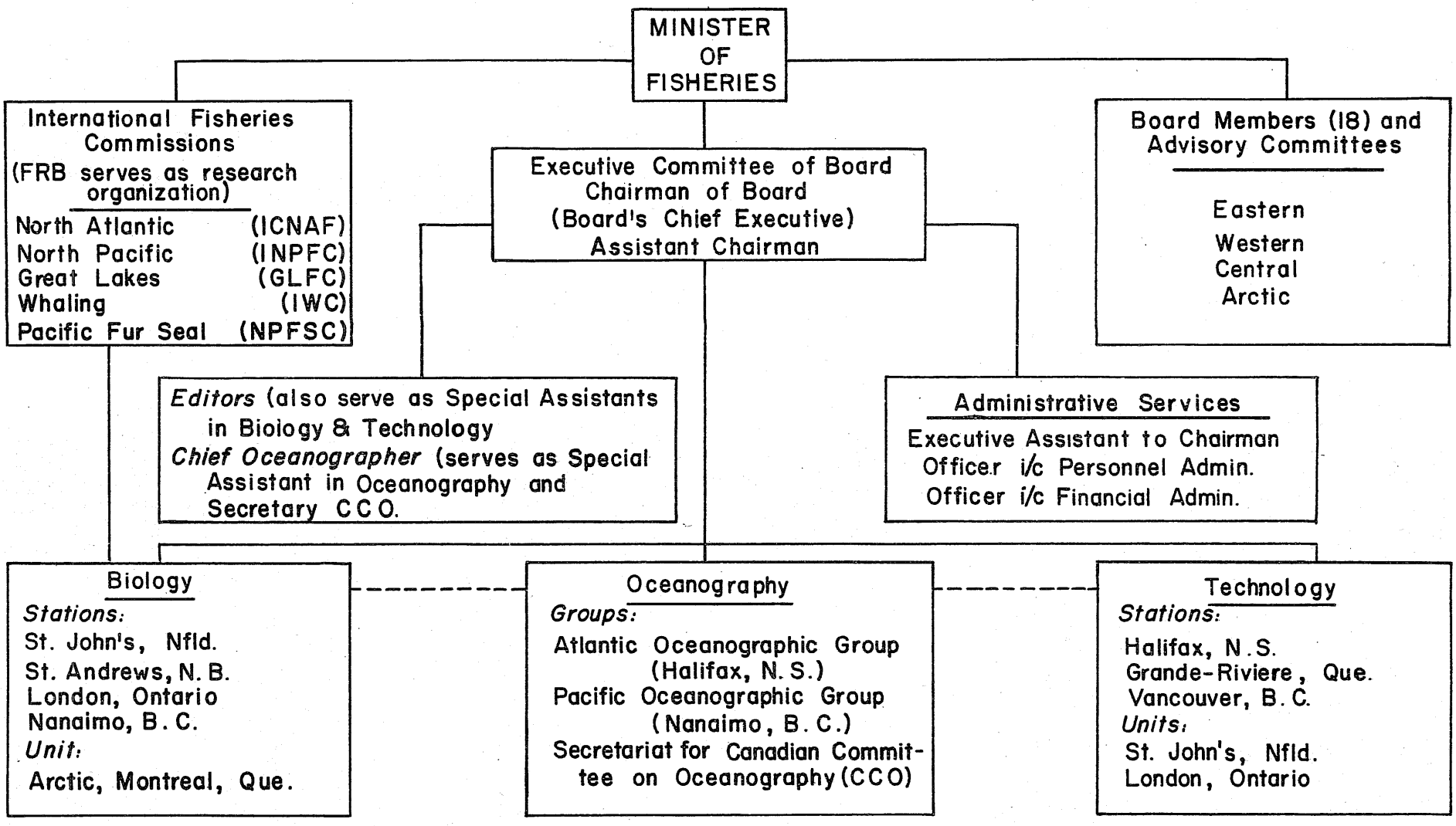
20. Section 117 of the Civil Service Regulations applies to employees of the Board and for this purpose the term "deputy head" in that section shall be construed as "Chairman" and the term "Commission" as "Minister".

O T T A W A,
January, 1962.

FISHERIES RESEARCH BOARD OF CANADA

— Organization Chart —

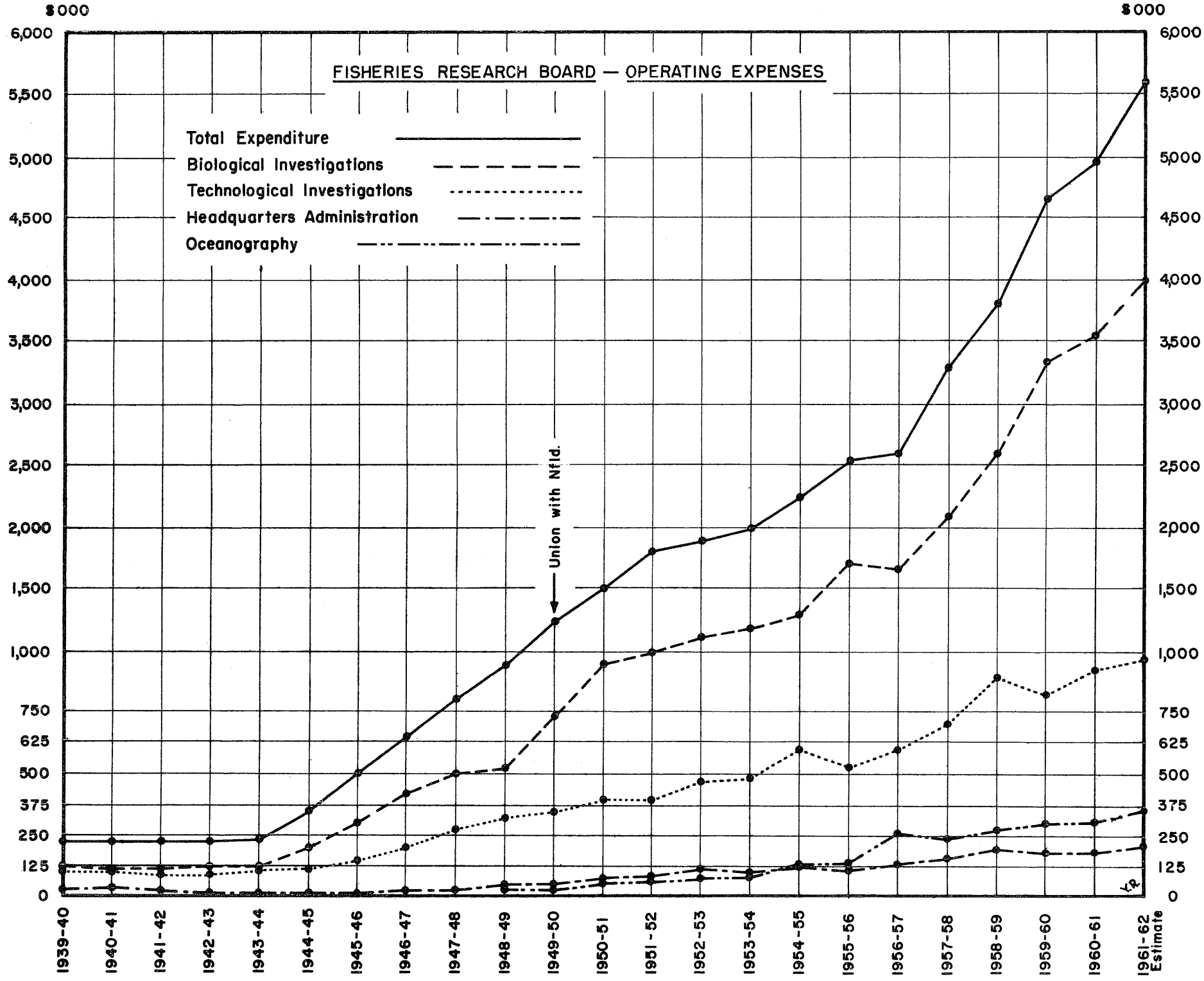
Authority: Fisheries Research Board Act R.S.C. 1952, c. 121, as amended by 1952-53, c. 37.
Constitution of Board: A Chairman (Chief Executive) appointed by Governor-in-Council and up to 18 Members appointed by the Minister of Fisheries



General Objective: To increase the knowledge, the scope, the value and efficiency of Canadian fisheries and other living aquatic resources of value to man through scientific research.

(R.L.M.)

APPENDIX III


$000
$000
FISHERIES RESEARCH BOARD — OPERATING EXPENSES
Total Expenditure
Biological Investigations
Technological Investigations
Headquarters Administration
Oceanography
Union with Nfld.
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
750
625
500
375
250
125
0
1939-40
1940-41
1941-42
1942-43
1943-44
1944-45
1945-46
1946-47
1947-48
1948-49
1949-50
1950-51
1951-52
1952-53
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1956-57
1957-58
1958-59
1959-60
1960-61
1961-62 Estimate

FIGURE IV

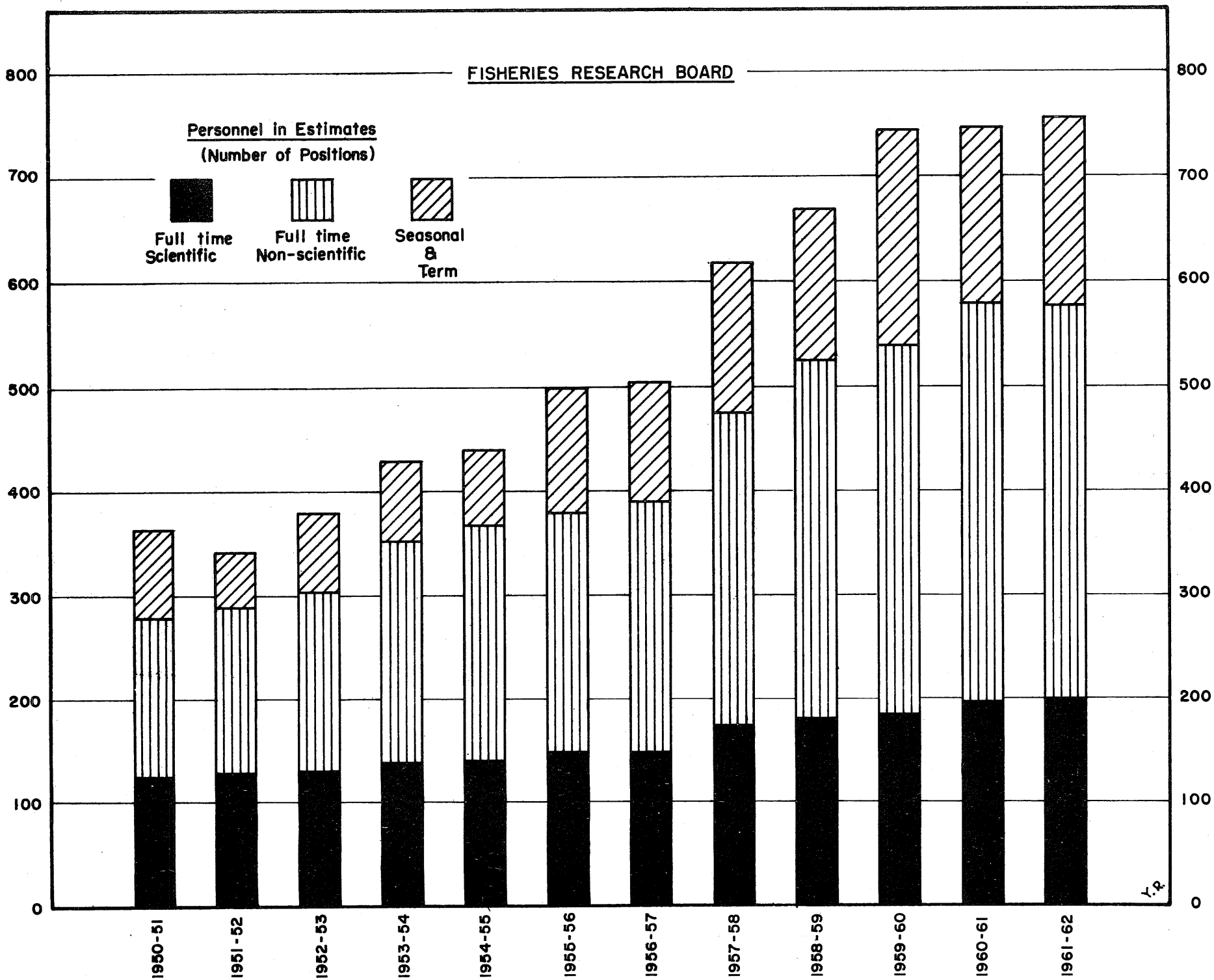
FISHERIES RESEARCH BOARD
Personnel in Estimates
(Number of Positions)
Full time Scientific
Full time Non-scientific
Seasonal & Term
800
700
600
500
400
300
200
100
0
1950-51
1951-52
1952-53
1953-54
1954-55
1955-56
1956-57
1957-58
1958-59
1959-60
1960-61
1961-62

FIGURE V