The Alaskan Science Conference[1]

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PART I

ON NOVEMBER 9–11, 1950, the first Alaskan Science Conference was held in Washington, D. C., under the auspices of the National Academy of Sciences and the National Research Council. Participating in the conference were approximately 300 American and a few Canadian scientists, whose deliberations took place in 10 sections, grouped in 3 divisions—biological sciences, physical sciences, and social sciences. The Biological Sciences Division included sections on agriculture and forestry, botany, public health and medicine, zoology, and physiology; the Physical Sciences Division, sections on geology and geography, geophysics, meteorology, and oceanography; and the Social Science Division, a section on anthropology. The conference included some general sessions in which all sections joined, several symposia embracing two or more sections, and individual sectional meetings. Growing out of the meeting was a series of recommendations to the National Research Council that are expected to go far toward eventual attainment of the conference objectives.

These objectives were: (1) to review the status of scientific research in Alaska, (2) to appraise the major requirements for scientific research still to be carried out, and (3) to explore ways and means of activating any required facilities and of coordinating existing facilities to attain the maximum results.

The status of scientific research in Alaska. Since 1867, when the United States purchased Alaska from Russia, research in the territory has been the special concern of the Federal government. The small population, the difficulty and expense of research activity in most parts of the territory, and the lack of adequate financial resources at the disposal of the territorial government, all combined to keep at a modest level research under territorial administration and by private institutions and individuals. Nevertheless, research was necessary, and a substantial amount was, and is, being carried on under Federal auspices.

Continuing research is important for increasingly cogent reasons. The territorial resources were, and still are, very great. Since the purchase of the territory, its waters have yielded almost two billion dollars worth of new wealth in fish products, and the present annual contribution from fisheries is about $95,000,000. Similarly, its mines and quarries have contributed approximately one billion dollars worth of mineral products to the nation—mostly gold, copper, silver, platinum, and coal. At the present time, because of economic conditions, mining is at a low ebb, but the future still holds great possibilities. From Alaska during the American regime has come more than $120,000,000 worth of furs, and the average annual fur catch is about five million dollars.

With World War II came an increasing recognition of the strategic geographic position of Alaska, and events since the war have underscored the significance of the territory's location in terms of the global age.

A large part of the research pertinent to Alaska appears to be incidental to the general pattern of the research of the times. Through the general fabric, however, runs a surprising number of threads that are of special significance in regard to Alaska and to other areas fronting upon the north polar sea—meteorology, transpolar air navigation, auroral studies, radio propagation, geomagnetics, permafrost, agriculture including forestry, hydrology and hydrography, volcanology, location and appraisal of mineral resources, oceanography, and a host of others, all have a special Alaskan importance.

The Federal research work done thus far has been sponsored by many bureaus in most of the departments. Important contributions have been made, also, by some non-Federal individuals and groups. Here might be mentioned as examples the University of Alaska, the National Geographic Society, the Harriman Alaska Expedition, the Smithsonian Institution, the Arctic Institute of North America, the American Geographical Society, and a number of state universities.

In general, Alaskan research appears to have been rather poorly coordinated. In substantial part, research facilities are so organized that planning and

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execution are largely and properly carried on according to a functional pattern, but far too little attention has been paid to the possibility of a coordinated approach involving several or many scientific disciplines. Such coordination is especially needed in a place like Alaska, where the overhead in research effort is extraordinarily high. Herein lay the basic reason for the calling of the conference by the National Academy of Sciences and the National Research Council.

Attempts have been made in the past to coordinate some research activities in Alaska, and in many instances these attempts have been markedly successful. Such efforts have been sporadic, however, and their success seems more to point the need for general coordination than to indicate that any substantial coordination has yet been attained. True, individual cooperative arrangements have sometimes been worked out between individuals or groups, and coordination in some segments of the research field has been systematically attempted. One illustration is the Arctic Research Laboratory at Point Barrow, which is operated by The Johns Hopkins University under contract with the Office of Naval Research. In that laboratory research in several scientific disciplines is being accomplished and the whole coordinated through the scientific director and the advisory board of the laboratory. Facilities are also supplied from time to time to research projects of other Federal agencies, both military and civilian.

Similarly, the Arctic Institute of North America attains a degree of coordination in northern research, including Alaska, in regard to the specific projects with which it concerns itself. The institute's effort is oriented toward arctic and subarctic research in general and is not limited to Alaska.

Major requirements for Alaskan scientific research. The conference made very plain that much more Alaskan research is needed in almost all scientific disciplines. If the nation looks forward to Alaskan development, and if defense requirements are to be satisfied, a strenuous scientific effort must be made in order to minimize waste, eliminate mistakes, and even forestall failure on some fronts.

The outstanding generality in considering many Alaskan problems is the lack of adequate scientific knowledge. A single example will illustrate this point. In a report on Cook Inlet and Tributaries prepared by the Alaska District, Corps of Engineers, and released on January 20, 1950, it is stated that "This report has been prepared with limited basic data because of the . . . lack of knowledge of the natural phenomena of the region and the general absence of previous technical investigations, explorations, and studies of the area."

Thus it goes throughout the whole research field; many more examples could easily be found. Most Alaskan scientists are conscious of the research deficiencies in their own specific fields of interest and perhaps also of some of the deficiencies in related fields. The conference underscored the fact that the important thing is to recognize the existence of the same characteristic deficiencies in most, if not all, fields.

Ways and means of stimulating Alaskan research and of attaining maximum research coordination. Once it is agreed that over-all research progress is deficient in Alaska, it is a small step to recognize the advisability of making up the deficiency so far as possible. It then becomes clear that coordination is necessary if the job is to be done effectively and with dispatch. It has already been pointed out that scientific research in Alaska is carried on with difficulty and at relatively high cost. The area is large, distances are great, the population is small, facilities are meager, and the terrain and climate are not conducive to cheap or easy operations.

The interest of the National Academy and of the Research Council in this problem seems most appropriate. The research effort in Alaska thus far has been largely at Federal expense, and the Federal government's interest appears destined to continue indefinitely. As advisers to the Federal government, the academy and council are acting precisely in line with their defined responsibility. At the same time, the desirability of encouraging and making possible a broader research base outside the Federal establishment is recognized.

How can desirable coordination of Alaskan research be accomplished in the interests of economy and effectiveness? One way is through such meetings as the Alaskan Science Conference. Coordination should start in the planning and programming stages. Furthermore, it is plain that each scientific discipline is best able to plan the program in its own field.

In any moves toward coordination the full facilities of organizations already interested should be used and extended. The conference recognized in this connection the potential utility of such organizations as the Arctic Institute of North America. It also pointed out that Pacific coastal Alaska already comes within the sphere of interest of the Pacific Science Board, although that board up to now has not emphasized its Alaskan interests. Once the areas of activity of the Arctic Institute and of the Pacific Science Board were recognized, it became apparent that some means of integrating their respective spheres of interest throughout Alaska could be most beneficial.

Coordination in some fields is also being attained through such organizations as the Research and Development Board for the military interests, the Arctic Research Laboratory Advisory Board, and the University of Alaska. All these and others like them should be encouraged to continue and become even more effective.

After coordination in planning and programming has been satisfactorily attained comes the equally pressing need for coordination in carrying out the research programs. Many field projects, with a small

additional effort, could be expanded sufficiently to provide for additional research in other fields by other specialists. This is especially desirable where operating facilities are so costly.

The conference reached the conclusion that some continuing agency is the first requirement for attaining coordination by keeping track of what research is going on, where, and under whose auspices. It felt that this agency should have its finger on the pulse of Alaskan research, not only in Alaska, but also in or near Washington. For the Alaskan central point the University of Alaska was suggested, and President Moore generously indicated his willingness to consider such a possibility. The university is becoming more and more a cultural and research center in Alaska; it is centrally located, and the needed facilities may conceivably be made available there.

For the good of Alaska, and for the scientific advancement and protection of the nation, it is hoped that the results of the conference and of any subsequent coordinative efforts will meet with signal success.

PART II

Many of the 400 scientists and administrative officials who participated in the Alaskan Science Conference flew down from Alaska especially for this meeting; others came from the West Coast, Canada, the Middle West, and the Atlantic states, with the largest group from government agencies in Washington. Private institutions with arctic research programs were well represented. Among them were the Arctic Institute of North America, the University of Alaska, the University of Washington, the University of Minnesota, and the Catholic University of America.

The opening session of the conference, under the chairmanship of the Honorable Ernest Gruening, began with an address of welcome by Douglas Whitaker, the new chairman of the National Research Council, who spoke on behalf of both the National Academy of Sciences and the council. This was followed by a keynote address by the governor, and a statement of conference objectives by John C. Reed. Statements were then made setting forth the research activities and interests in Alaska of the departments of Agriculture, Interior, and Commerce by (or for) respective assistant secretaries. C. Earl Albrecht, the Territorial Commissioner of Health, gave a report for the territory. The Federal Security Agency speaker was its administrator, Oscar R. Ewing; A. C. Richmond spoke for the Coast Guard, F. H. Richardson for the Department of Defense, Alexander Wetmore for the Smithsonian Institution, and A. L. Washburn for the Arctic Institute of North America. These combined addresses gave everyone at the conference a new concept of the magnitude and complexity of the present status of Alaskan research, as well as a preview of some plans of the Federal and territorial governments for its future development.

With the stage set, largely by the addresses of the administrators, the scientific participants in the conference were then divided into sections, each of which held separate meetings and some of which combined in joint symposia during the following two days. The meetings in *Agriculture and Forestry* under the chairmanship of P. V. Cardon, chief of the Agricultural Research Administration, USDA, dealt with such subjects as soils (C. E. Kellogg), research requested by farmers (C. G. Sherman), crop ecology (O. S. Aamodt), agricultural research (D. L. Irwin), and forest research (R. F. Taylor).

In *Anthropology* James L. Giddings, Jr., was chairman. Papers and discussions dealt with such subjects as the status of Indians in Southeastern Alaska (V. E. Garfield), Alaskan Eskimos (M. Lantis), preservation of archaeological sites (F. de Laguna), problems in the anthropology of southern Alaska (W. S. Laughlin), problems of early man in Alaska (J. L. Giddings, Jr.), and Eskimo archaeology in 1950 (F. F. Rainey).

In *Botany,* under the chairmanship of W. C. Steere, of Stanford University, there were papers on physiological ecology (H. M. Raup), vegetation (A. E. Porsild), botanical research (I. L. Wiggins), revegetation and soil formation (R. F. Griggs), and flora (J. P. Anderson).

Geology and Geography was first presided over by John C. Reed, of the U. S. Geological Survey, and, later, by Walter A. Wood, New York director of the Arctic Institute of North America. Papers in this section included such subjects as glaciological research (W. O. Field, Jr.), Juneau Ice Field research project (M. M. Miller), surveying and mapping (Gerald FitzGerald), petroleum geology (R. L. Miller), permafrost research (G. W. Rathjens), hydrology (A. O. Waananen), and geographic bases for planning new Alaskan settlement (K. H. Stone).

The *Geophysics* section was under the chairmanship of H. R. Joesting, also of the U. S. Geological Survey. There were papers on geomagnetism (E. B. Roberts), radio propagation research (A. G. McNish), geophysical investigations in the Aleutians (J. H. Swartz), geothermal studies (G. R. MacCarthy), geophysical prospecting for oil (W. H. Myers), and the Geophysical Institute Building at the University of Alaska (W. S. Wilson).

Meteorology, presided over by A. F. Spilhaus, of the Institute of Technology, University of Minnesota, included papers and discussions on meteorological factors affecting Alaskan development (H. G. Dorsey, Jr.), measurement of solar radiation (T. H. MacDonald), ice fog in interior Alaska (V. J. Oliver), insects, climate, and man (A. Court), agroclimatic investigations (B. M. Bensin), the Weather Bureau's arctic observation program outside of Alaska (B. C. Haynes), and maintenance of the Aleutian low (S. Pettersen).

Oceanography, under the chairmanship of Roger R. Revelle, acting director of Scripps Institution of Oceanography at the University of California, included papers on the sea floor of the Gulf of Alaska (R. S. Dietz), physical oceanography of Bering and

Chukchi Seas (E. C. LaFond), topography of the Arctic Basin (K. O. Emery), oxygen and phosphate in the Arctic Sea (W. S. Wooster), vertical transport of sensible and latent heat (J. Wickham), physical and chemical oceanography of the Gulf of Alaska and the Aleutian Islands (T. G. Thompson), tides and sea level in Alaskan waters (H. A. Marmer), and studies on plankton of the Bering and Chukchi Seas and adjacent areas (M. W. Johnson).

Physiology was presided over by John Field, head of the Biology Branch of the Office of Naval Research. In this section papers were given on climatic adaptation in arctic and tropical mammals and birds (L. Irving), metabolic studies above and below freezing in arctic and tropical cold-blooded animals and plants (P. F. Scholander), immunological phenomena in arctic mammals (D. H. Campbell), fat metabolism in arctic as compared with Temperate Zone mammals (C. G. Wilber), acclimatization to cold environments (L. D. Carlson), and comparative physiology of Alaskan bird migrations (D. R. Griffin).

The section on *Public Health and Medicine* was under the chairmanship of C. Earl Albrecht, Territorial Commissioner of Health for Alaska. The papers included one on medical history and studies of the control of tuberculosis (J. D. Aronson), observations on arctic parasitology (E. L. Schiller), psychological aspects of arctic and subarctic living (E. L. McCollum), phlyctenulosis among Eskimos, Indians, and Aleuts (M. H. Fritz), control of biting insects (C. S. Wilson), water supply problems in low temperature areas (A. J. Alter), sewage and waste disposal problems in low temperature areas (E. K. Day).

The *Zoology* section meeting was first presided over by Albert M. Day, director of the U. S. Fish and Wildlife Service, and later by Remington Kellogg, director of the U. S. National Museum. Papers were presented on Territorial Fishery Administration (C. L. Anderson), salmon research (W. F. Thompson), fishery exploration and development (A. W. Anderson), management of fisheries in Alaska (S. Thompson), bird fauna (A. A. Allen), Alaskan waterfowl (I. N. Gabrielson), planning for Alaska's big game (O. J. Murie), fur animals (R. M. Anderson), administration of wildlife resources (W. A. Elkins), and predator control (D. D. Green).

The section meetings on the first day of the conference were followed by an evening reception and smoker at the Cosmos Club, where the participants had an excellent opportunity to get together and exchange ideas.

The following morning a general symposium dealt with the subject of permafrost under the chairmanship of Arthur H. Lahlum, Chief, Arctic and Subarctic Investigations Staff, Corps of Engineers. The papers included one by L. L. Ray on permafrost, one by A. J. Alter on the relationship of permafrost to environmental sanitation, and one by W. S. Benninghoff on interaction of vegetation and soil frost phenomena. Other symposia included "Health Problems of Alaskan Eskimos, Aleuts, and Indians," under the chairmanship of Jack C. Haldeman, Medical Officer in Charge, U. S. Public Health Service, Alaska. At this meeting papers dealing with these problems from the viewpoints of anthropology (H. B. Collins and W. S. Laughlin) and public health (J. C. Haldeman), and with epidemiological observations on North Coast Eskimos (J. R. Paul) and biotic interrelationships of helminth parasitism (R. Rausch) were presented.

The symposium on "Relationship of Vegetation to the Physical Environment" was presided over by R. W. Trullinger, Chief, Office of Agricultural Experiment Stations, USDA, and included papers on "Congeliturbation as a Primary Physical Factor in Tundra Plant Communities" (R. S. Sigafoos), "Pathology in Future Forest Practice" (D. V. Baxter), and "Ecological Effects of Forest Fires" (H. J. Lutz).

There was great interest in the "Sea Ice Symposium" under the chairmanship of F. W. Reichelderfer, Chief, U. S. Weather Bureau. Papers on geography and morphology of sea ice (L. Allen) and investigations into the physical and electrical characteristics of sea ice (W. J. Dichtel) formed the basis for discussions, as did the papers on floating islands (J. O. Fletcher), growth of sea ice thickness (S. Fritz), and polar ice reconnaissance (J. G. Dyer).

On Friday afternoon the entire conference attended the general meeting in the auditorium of the Department of the Interior under the chairmanship of A. L. Washburn, executive director of the Arctic Institute of North America. The subjects covered were forestry (B. F. Heintzleman), fisheries (A. M. Day), mining (B. D. Stewart), Alaskan research and national defense (H. E. Landsberg), and Alaska and its development (J. T. Flakne).

In the evening a symposium on Alaska was held under the chairmanship of William E. Warne, Assistant Secretary of the Interior, who introduced representatives of principal government agencies interested in Alaska. Following the showing of three outstanding films on Alaska, those in attendance at the meeting had an opportunity to see an unusual selection of Alaskan exhibits set up for the occasion at the Department of the Interior by interested agencies.

The closing session of the conference under the chairmanship of Lyle F. Watts, Chief, U. S. Forest Service, was opened by a most gracious message from the National Research Council of Canada, delivered by R. F. Legget. Views on research coordination from the budget point of view were presented (S. R. Broadbent), followed by papers on facilities of the Arctic Aeromedical Laboratory (E. L. McCollum), Arctic Health Research Center (J. C. Haldeman), agricultural research in Alaska (D. L. Irwin), Arctic Research Laboratory (I. L. Wiggins), and statements on the University of Alaska by Terris Moore and on the Arctic Institute of North America by A. L. Washburn.

Recommendations were initially formulated by members of resolutions subcommittees appointed by section chairmen and later coordinated by a Conference Resolutions Committee, which introduced them for discussion at the final session of the conference. Here, with some amendments, they were unanimously approved. These recommendations embody ways and means of carrying forward the tangible results of many of the conference deliberations. The first two have particular reference to conference objectives and state

> that scientific information centers be established in Alaska and the States to provide information relative to scientific research and to facilitate cooperation between individuals, organizations, and Government agencies concerned with Alaskan scientific research and development in collaboration with the University of Alaska and the Arctic Institute of North America [and] that future scientific conferences relative to Alaska be held, and that they be held in Alaska when feasible.

Other recommendations call on the National Research Council to establish a number of special committees and to deal with matters of declassification and the publication of special monographs. Strong emphasis was placed on the need for a number of field research centers to handle such subjects as subarctic marine investigations; wildlife research; studies in forestry, public health, and medicine; and studies of snow, glacier ice, and sea ice.

It was further recommended that well-coordinated, long-range, year-round research programs in arctic and subarctic studies be encouraged at universities; that research fellowship programs be encouraged at various financial grades; and, further,

> that Federal agencies, foundations, and universities be encouraged to participate in Alaskan research, with emphasis on the value of interdisciplinary research; that the military services be encouraged to further promote and assist scientific studies in line with their operational duties in the Alaskan areas, and that the research of nonmilitary Federal services be expanded in order that the potentialities of Alaska may be realized and its defense fostered; that Federal aid to research be continued and expanded through such means as the programs of the Pittman-Robertson bill and the Office of Naval Research; and that the needs of and opportunities for Alaskan research be brought to the attention of the National Science Foundation.

An important conservation recommendation calls for studies to be made "to determine what areas in Alaska are suitable for designation as wildlife habitat combined with wilderness uses, from which shall be excluded uses incompatible with such purposes, such as private holdings, highways, etc."

In the field of international cooperation it was felt that, when appropriate, scientists of other nations should be encouraged to participate in field operations in Alaska. The value of this has already been demonstrated by joint United States–Canadian research. Close collaboration between the National Research Council and the Arctic Institute of North America was proposed.

There are eighteen specific recommendations on subjects ranging from agricultural land-use planning, and environmental health and sanitation, to high altitude cosmic-ray studies, ice islands, and archaeological sites. The recommendations close with expressions of appreciation to those military, nonmilitary, and territorial agencies that are supporting scientific research in Alaska, with special gratitude being extended to the government agencies and others who made this conference possible through their financial assistance and provision of essential facilities.

There is every indication that the impact of this timely conference on future research in Alaska will be substantial. Already benefits of various sorts have resulted from the very fact that it took place and proved successful.