

Rosita Worl examines the modern Inupiat (northern coastal Eskimo) whaling complex. Her description of crew composition, contemporary equipment used, and outfitting costs adds a recent chapter to earlier accounts of North Alaskan whaling. Of particular interest is Worl's discussion of customary laws applying to possessory rights and whale part distribution. A complex series of judgments are made to determine rights to a dead whale, based primarily on reconstructing the succession of bombs which ultimately killed the animal.

This cooperative volume is praiseworthy as a tool for today and an inspiration for the future. Through the writings of these seasoned authors, we have excellent interpretations of culture history, past and present, which are useful for research and instruction. On the other hand, the volume reminds us of the largely unrealized potential for studying the richest resource available in Alaska today — its native peoples and their history.

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**THE ARCTIC AND THE ANTARCTIC: THEIR DIVISION INTO GEOBOTANICAL AREAS.** By V.D. ALEXANDROVA (Translated by DORIS LÖVE). Cambridge University Press, 1980. xii + 247 p. + illustrations. ISBN 0 521 231J9 1. \$34.50.

With the publication of Kamorov's monograph, "Introduction to an Investigation of the Vegetation of Yakutia" in 1926, a major stride was made toward the division of Arctic regions into geobotanical areas. Dr. Vera Alexandrova has now undertaken the task of synthesizing her own extensive research and that of other northern investigators, including Kamorov, into a well organized classification system.

It has often been said that there are as many different ways to classify vegetation as there are individuals who classify. Although this may be somewhat of an overstatement, one only has to peruse the botanical literature from 1950-1970 to appreciate the theoretical problems which confront phytosociologists. Though one may not agree with the particular classification system or may prefer different ones, Alexandrova has adequately set out and explained the principles and tenets (Chapter One) upon which her system is built: an essential component in a book of this nature.

Her taxonomic units are separated on the basis of diagnostic characteristics which draw on floristic, vegetational, structural, biomass, life form, soil profile, soil formation, faunistic and ecological information. The hierarchy of the classification is based upon Lavrenko's (1947, 1968) system, modified by the author, and includes the following: Dominion, Subdominion, Region, Subregion, Province, Subprovince, and District. The Arctic belongs to the Holarctic Dominion and the Subdominion Arctogaea. Diagnostic characteristics or distinguishing criteria for the remaining five synsystematic units in the hierarchy may be briefly, and somewhat elusively, summarized as follows:

- 1) *Regions* are distinguished by the distribution of a characteristic zonal type of vegetation on mesic habitats of an area and by the absence of this vegetation type on zonal, mesic habitats of adjacent areas. The presence of a specific set of non-zonal, non-mesic vegetation types is also important in defining regional boundaries.
- 2) *Subregions* are distinguished by the presence of vegetation subtypes of the characteristic Regional zonal vegetation type and also by the presence of a specific set of non-zonal vegetation types particular to non-mesic habitats of that Subregion.
- 3) *Provinces* are distinguished by the occurrence of classes and groups of plant associations which are endemic to that province. These are represented by a typical zonal type of vegetation developed on mesic sites and also by the characteristics of plant associations which develop on non-zonal, non-mesic habitats.
- 4) *Subprovinces* are distinguished by the presence of endemic phytocoenotic units (vegetation subclasses and groups of plant associations) and by the relative abundance of these units in an area.
- 5) *Districts* are distinguished by the presence of a specific combination of plant associations typical for a particular subprovince. They are also distinguished by the presence of plant associations

formed because of the special orographic, type of soil forming bedrock and local climatic conditions which prevail in that District.

Alexandrova concludes the discussion of her hierarchical system with a brief analysis of the problem of placing geographic boundaries around areas that essentially belong to a natural continuum. The remainder of the book (pp. 18-186), with the exception of her concluding chapter, provides an elegant and comprehensive discourse on the nature of specific units within each of her hierarchical levels. As one reads this portion of the book, some of the lack of clarity with definitions of diagnostic characteristics in her synsystematic units is removed. The author concludes with a firm statement that her work should only be considered as a step toward solving the problems of Arctic geobotanical classification: "... as an hypothesis launched, which may serve as a departure point for debate and discussion and for further refinement and elucidation."

One cannot conclude a review of Alexandrova's work without a special note of acknowledgement to Doris Löve, the translator. Although my linguistic abilities in Russian are inadequate to judge the accuracy and faithfulness of her translation, it is apparent, as one studies the work, that she has paid close attention to choosing equivalent English terms for the many Russian ecological expressions. This terminological precision is something that is all too often lacking in ecological literature and has been a source of great misunderstanding in the field.

Clearly this is an essential volume on the bookshelf of any arctic ecologist and one that should be a constant companion in the field. It would also be an excellent textbook for any advanced course dealing with northern phytogeography or ecology. I recommend it very highly.

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**SEA ICE PROCESSES AND MODELS**, Proceedings of the Arctic Ice Dynamics Joint Experiment, International Commission on Snow and Ice Symposium at Seattle, September 1977. Edited by R.S. PRITCHARD. University of Washington Press, 1980. 474 pages. \$30.00.

In March 1975 the main camp of the Arctic Ice Dynamics Joint Experiment (AIDJEX) was installed (76°N; 145°W) on the constantly shifting pack ice of the northern Beaufort Sea. Funded by the National Science Foundation, the Office of Naval Research and the Canadian Polar Continental Shelf Project, with headquarters at the University of Washington, Seattle, AIDJEX may still hold the record for being the largest and most ambitious scientific program to have taken place in the high Arctic.

Prior to AIDJEX, an understanding of the basic nature of pack ice dynamics had accumulated since Nansen's crossing of the Eurasian Basin (1893-1896). However, data derived from isolated points such as long-term drifting ice stations precluded significant progress possible through analyses of synoptic data, a basic requirement perceived in the planning of AIDJEX. Thus, during the main experiment until its end in early May 1976, four manned camps were surrounded by a ring of data buoys with the long-term goal of providing answers for the following questions: (i) how is large-scale ice deformation related to the external stress field?; (ii) how can the external stresses be derived from a few fundamental and easily measured parameters?; (iii) what are the mechanisms for ice deformation?; and (iv), how do ice deformation and morphology affect the heat balance?

According to the Director of AIDJEX, Dr. N. Untersteiner, in the initial AIDJEX review paper which introduces the book, these questions maintained their validity throughout the five years of observations and analyses. In hindsight, he poses four more fundamental questions, namely: (i) were the scales of observation chosen correctly?; (ii) were the right observations taken?; (iii) was it possible to deduce the external stresses to sufficient accuracy?; and (iv) did the model development advance our understanding of sea ice mechanics and heat balance?

The answers, a qualified "yes" for each of the questions, form the basis for most of the forty papers presented in the book. These are presented in four sections: AIDJEX review papers; deterministic ice modeling; ice observations; and boundary layers. The latter three also contain research papers from programs other than AIDJEX including sea