

In the first part, elaborated upon in an appendix, the different energy budget components are briefly discussed for the North Polar Ocean and the southern pack ice belt, separately for an assumed full ice cover and for the same areas ice free. In addition, the same budget components are discussed for Antarctica. These discussions of the budget forms are not based on new calculations but on the results from other publications which the author chose as the most likely ones.

The author rightly points out frequently that the observational basis for the energy budget calculations leaves much to be desired and accordingly the results are highly tentative, especially over the southern pack ice belt. A further source of error, inherent in the author's approach is, that different authors used different assumptions with the consequence that their results might not be compatible. This becomes especially evident when, as in Fig. A9, the solar radiation absorbed in the atmosphere is obtained as a residual. In this instance the values seem substantially too high. The implication of this might be that, for instance, the minimum in radiation loss for the atmosphere in summer is not present. Similar doubtful points are apparent at some other places. This however, does not detract from the merit of such compilation of comparative energy budgets.

The author discusses then the implication of advances or delays in the break up period and shows convincingly, its profound effect on the energy budget even with moderate assumptions about the albedo.

For the Arctic ocean the theory is developed that higher cyclonic activity, coupled with warm air advection, advances the break up period.

The second part of the paper concentrates on the relation between pack ice extent and general circulation, and their long and short term fluctuations. For the southern hemisphere a clear seasonal relation between atmospheric heat loss — obtained from the energy budget calculations — and the zonal wind gradient is established. Further calculations with the different energy budgets give interesting numerical values of the changes in atmospheric heat loss with different annual marches of the pack ice extent. The final result given by the author is that a later melting of the pack ice increases the atmospheric cooling in winter, and hence should increase the zonal circulations. Using the empirical results by Lamb that stronger southern hemisphere circulation leads to a northward displacement of all circulation belts in both hemispheres, the author tries to explain with long term records of ice extent in the Orcadas and temperatures at far northern and

southern stations firstly the interrelation between ice cover and general circulation intensity in the south, and then opposite temperature curves in the north and south.

Some of the comparisons given by the author are strikingly good, others rather poor, for instance, if a correlation coefficient of 0.17 is quoted for the relation between ice extent in the Orcadas and a southern hemisphere general circulation index.

In many places in the paper the author points out, that a verification of the hypotheses put forward can only be obtained, once the computer models are further developed to make best calculations in the indicated directions.

To sum up, this type of constructive summarising paper, which is only too rare in present literature, is a valuable contribution. The only general criticism might be that too little is said as to why the author chose the one reference paper in preference to another, which would have given the reader more insight into the uncertainties and diversities of opinion in this field. But this is a minor shortcoming and every student of energy budget and climatic change will have to read this paper and will read it with pleasure.

E. Vowinckel

ESKIMO PREHISTORY. BY HANS-GEORG BANDI, TRANSLATED BY ANN E. KEEP. *College, Alaska: University of Alaska Press, 1969. 6 x 9 inches, 226 pages, 72 figures. \$6.50*

The present volume which appears as Number Two in the University of Alaska *Studies of Northern Peoples* series constitutes an updating of the author's earlier *Urgeschichte der Eskimo*, first published in Stuttgart in 1964. The earlier volume was designed to provide German readers with an overview of the increasingly specialized field of Eskimo prehistory. The present revision now makes Bandi's synthesis available to English readers, and has the additional virtue of including new archaeological material up to 1967, the date the manuscript was completed. This makes possible the inclusion of recent work by Ackerman, Anderson, Dumond, Hadleigh-West, Humphreys, and other northern archaeologists. Quite understandably this additional material further complicates the task of synthesis, although Bandi manages to fit these new finds into his basic *schema*. Moreover, as the author is the first to admit, the very title *Eskimo Prehistory*, is now something of a misnomer, since many finds in the North antedate the development of Eskimo culture as anthropologists now define it, and other significant sites such as the Campus and the site which John Cook and I

are at present excavating at Healy Lake in the Alaskan interior are clearly outside Eskimo territory.

Essentially the book falls into four main sections: (1) A brief review of current archaeological thinking regarding the peopling of the New World. Here the author relies on Hopkins' discussion of the Bering Land Bridge and the alternate openings and closings of the Cordilleran corridor as well as agreeing with Müller-Beck that these geological events resulted in the diffusion of three distinct cultural traditions to the New World, *viz.*, an early chopper tradition, a later Mousteroid tradition, characterized by bifacial points, and finally an "Epi-Gravettian" one characterized by burins and microblades which eventually developed into Eskimo culture. (2) In a second, equally short section entitled "Milestones in Research," Bandi outlines the early development of northern archaeology. (3) The third section, the real *corpus* of the book, takes the reader through the literature of northern archaeology, area by area and site by site. Bandi is not always too critical here, but in his defence it should be said that he is largely relying on the investigators' own research reports and providing abstracts of these which both the specialist and the non-specialist should find useful. (4) For his final section the author attempts to fit these multitudinous data into the scheme outlined in his first section. He shows considerable ingenuity here and by and large is successful, although specialists will disagree with some of his conclusions, *e.g.*, his equating of the Campus site with Anangula. More secure C¹⁴ dates, of which we now have lamentably few, may well upset his apple cart. However, in the final analysis the function of hypothesis is to provide a basis for further testing and research.

Archaeologists have often been criticized for the confusing maze of terms they devise for traditions, horizons, sites, and the like. This becomes painfully evident in a careful reading of the third section, although the fault is not of Bandi's making. However, he has not helped the matter by compounding a term of his own, "American Epi-Gravettian."

Robert A. McKennan

LE CANADA. BY LOUIS-EDMOND HAMELIN. Paris: Presses Universitaires de France, 1969. 5½ x 7½ inches, 300 pages, 8 illustrations, 24 figures. 22 F.

"Le Nord constitue indubitablement l'une des dimensions fondamentales du Canada Avant tout, le Nord, c'est le froid. Le déficit en chaleur constitue l'un des éléments les plus

déterminants de la personnalité géographique du Canada"

Cette affirmation claire et nette introduit un examen particulièrement stimulant des grands traits de la géographie du Canada. En plus de la nordicité, M. Hamelin étudie quatre autres thèmes: la nature et la régionalisation de l'espace (y compris les déséquilibres régionaux); les types multiples de Canadiens et les problèmes politiques qu'ils posent; les structures économiques et enfin, la vie urbaine: "Par sa puissance depuis trente ans, le monde urbain . . . fait le Canada." On ne saurait nier que ces thèmes sont vraiment les plus importants, et il faut exprimer de l'admiration devant la manière dont on les a analysés et démontrés par des exemples. Cet ouvrage est relativement court, mais il est toujours pertinent et assez complet.

Il convenait qu'un ex-membre du conseil d'administration de l'*Arctic Institute* soulignât l'importance de la nordicité. Les quatre premiers chapitres traitent du climat, surtout les indices thermiques et les précipitations nivales, de la glace dans le sol et enfin, de la détermination des limites du Nord canadien, en fonction également des réalités physiques et humaines. Il est à regretter que M. Hamelin ait cité seulement l'indice circumpolaire valable qu'il a mis au point (*Annales de Géographie*, 1968.)

On remarquera qu'un autre auteur, lui aussi intimement associé à l'*Arctic Institute*, a récemment adopté une approche semblable, comme la comparaison suivante nous le démontre: "En latitude comme sur le plan climatique, le Canada est vraiment un pays nordique; un royaume du froid lié à des facteurs cosmiques et aux caractères "advectifs" de la circulation générale de l'air; le Canada qui a pignon sur trois océans ne jouit pourtant que d'une "océanité" limitée, surtout du "bon côté", celui du Pacifique." (Hamelin). ". . . the greatest endowment is with something that remains a millstone around the neck; vast areas of unproductive land and ice-choked seas. Instead of praising in fulsome language the prodigality of nature, Canadians should perhaps wonder how nature managed to put so little of use into an area so large." (F. K. Hare, in *Canada, a Geographical Interpretation*, ed. J. Warkentin, 1968.) En français comme en anglais, la conclusion est claire: le Nord est moins une frontière riche et inconnue qu'une contrainte importante et omniprésente.

In summary, this is by no means a geography text useful only in francophone education; it is an original and thought-provoking view of the geography of Canada, written from a viewpoint well to the north of most previous surveys. One hopes that an English-language edition will eventually appear.

C. I. Jackson