

year old. The bi-monthly *ASTIS Bulletins* are, of course, even more current. The published products of ASTIS are similar in this respect to *Antarctic Bibliography*, which publishes bi-annual volumes based on monthly bulletins. The ASTIS annual total of 2400+ abstracts is similar to the bi-annual total of *Antarctic Bibliography*. However, one volume of *Antarctic Bibliography* is four cm thick — three years' output of fully cumulative ASTIS output covers a relatively few square centimetres of microfiche.

Although microfiche reading equipment is now available in all major libraries, the microfiche format of the *ASTIS Bibliography* still represents something of a deterrent to many who would benefit greatly from ASTIS. However, coping with the rising torrent of northern information is now more expensive even than it was when *AB* was struggling to survive financially. The almost 5000 pages of the 1980 edition of *ASTIS Bibliography* are contained on only 27 microfiche which are each the size of a large index card. The savings which this represents in terms of producing an equivalent volume or volumes are clearly enormous.

There has never been a greater need for a Canada-based arctic information system. Activity in the Canadian north is at an all-time high and is increasing, and published material about the north appears to be increasing at a rate which is disproportionate to the rate of increase in activity. Many northern problems require a multi-disciplinary perspective. Any information system which attempts to deal comprehensively with the north today *must* be automated, it must be flexible in design to cater to the varied and changing needs of the diverse interests of those interested in the north, and it must, to survive, be economical. It may be that ASTIS has the capability of forming a substantial part of the foundation of a major hemisphere information system which will, in the modern world, prove a worthy successor to *Arctic Bibliography*.

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ARCTIC ANIMAL ECOLOGY. By H. REMMERT. Berlin, Heidelberg, New York: Springer-Verlag. 1980. 280 p., 157 illus., 28 tables, bibliography, index. Paperbound, \$24.80.

For years, results of high latitude research appeared in widely scattered, separate articles often in specialized journals. Helpful collations were rare. In 1966 a fairy godmother, IBP-PT, appeared and blessed the Tundra Biome with co-ordinated enthusiasm and increased funding. The years 1972-74 were scheduled as Phase III: Synthesis and transfers. National and international synthesis volumes on the Arctic were to be produced. They were, but behind schedule and lacking some of the integration initially envisaged. Three years was insufficient time for effective synthesis.

In his preface to *Arctic Animal Ecology*, July 1980, Prof. Remmert noted "A large number of comprehensive publications has been devoted to the Antarctic. . . Nothing comparable is available for the Arctic." He con-

tinued, reporting that *Arctic Animal Ecology* evolved from an attempt to synthesize 15 years of ecological and physiological research work in the Arctic (mostly at Spitsbergen) and to compare the findings with other arctic regions. I thus read *Arctic Animal Ecology* with interest. First, Spitsbergen is a fascinating place. Second, Remmert was obviously aware of the synthesis volumes of the IBP Tundra Biome (he cites 12 of them), and was apparently going to do a better job (because nothing was available for the Arctic). Third, I had shared in the agony and the infamy of several IBP Tundra Biome volumes and had some misgivings about the amount of time they had taken. Perhaps one author could create a more consistent synthesis than the 32 of *An Arctic Ecosystem: The Coastal Tundra at Barrow, Alaska* (Brown *et al.* (eds.), 1980, Stroudsburg, Pa: Dowden, Hutchinson and Ross), or the 50 of *Tundra Ecosystems: A Comparative Analysis* (Bliss *et al.* (eds.), 1980, London, New York: Cambridge University Press). Shared conventional wisdoms of IBP-PT might be challenged. A different body of literature might be incorporated; I was particularly interested to see how the circumpolar literature would be integrated. Perhaps a myth shrouding some of our worst climates would be penetrated. Remmert's book met these expectations, but in an unanticipated fashion.

Consider first the literature. My quick count yielded 313 references cited; 221 (71%) in English, 79 (25%) in German, the remaining 13 in Norwegian, Icelandic, Swedish, Russian and Danish (descending order). For those studies where specific location might significantly influence findings, 56 were North American, 50 Norwegian (most from Svalbard or Spitsbergen), 22 from the Antarctic (despite the book's title and concern with the polar circle), 18 Finnish, six from Greenland, five from Sweden, four from Iceland, three from the Soviet Union and one from Germany (Kieler Bucht). The orientation is largely Fennoscandian (47%). Canadian Wildlife Service publications account for 19 references. For comparison, I arbitrarily chose the first three chapters dealing with animals from Bliss *et al.* (1981). These chapters (11 through 13) total 124 pages compared to the 250 of *Arctic Animal Ecology*; five more chapters dealing specifically with animals are present in Bliss *et al.* There are six authors for the three chapters, four of whom are North American. I found 334 different references; 306 (92%) in English, 19 (6%) in Russian, the remaining nine in Norwegian (6), German (2) and Danish (1). Where study area was important, studies were largely North American (197, 62%), followed by Norway (32, 18.5%). Other countries represented, in descending order, were: Soviet Union, Finland, Poland (microtine research), Sweden, Greenland and the United Kingdom (red deer). In fairness to Remmert, he noted in his preface to *Arctic Ecology* that "It is not meant as an exhaustive survey of the relevant literature." It isn't.

One can find more in these numbers than catharsis for a quantitative ecologist confronting a book review. First, few but Germans read German. Second, North Americans remain parochial in their reading. Third, multiple authorship produces a more comprehensive, if not more integrated, discussion.

Numbers themselves are objective, subjective appraisal follows. My initial expectations are the bad news, the unexpected features are the good news. Expectations: Remmert does incorporate a body of literature different from other volumes dealing with the Arctic, he confronts some conventional wisdoms, his approach is more unilateral but not necessarily more coherent than multiple-authored volumes, and he further enshrouds or perpetuates myths as often as he penetrates them. I expand this appraisal by a brief review of the volume's content and a caveat - I found more errors, logical and otherwise, than are presented in this review.

The volume has six parts, Part I (Introduction: Delimitation of the Arctic) begins with Remmert firmly on a hobby horse - the Arctic should be delimited by the Arctic Circle. Quixotic charges on a hobby horse can be informative to a reader, because they may penetrate an area of confusion. Remmert's six-page gallop is interesting and presents some telling points, but his steed falters — largely because of the rider. To make his point, data from McMurdo Sound, Quito, Irkutsk and Oxford are presented - the closest of these to the Arctic Circle is 14° 14' distant. The course becomes a steeple-chase of logical and biological barriers. Remmert negotiates it by overstatement (" . . . The Arctic climate is a purely seasonal one and undergoes no daily fluctuations. . ." (3); a closer reading of *Structure and Function of Tundra Ecosystems* (Rosswall and Heal (eds.), 1975, Ecol. Bull. (Stockholm) 20), which he cites, would have helped) and biological omission ("activity of poikilothermic organisms, such as the bacteria and fungi . . . is exponentially dependent upon temperature" (3); Flanagan and Scarborough in *Soil organisms and decom-*

position in tundra (Flanagan and Scarborough in Holding *et al.* (eds.), 1974, Swedish IBP Committee), which Remmert cites as 1973, reported the linear response with temperature of common tundra microorganism). Remmert recovers gracefully at the finish, through small print (an afterthought?). "Unfortunately, such a strict definition [the Arctic Circle] cannot be adhered to throughout. . . . the course taken by our boundary — the Arctic Circle — is full of surprises and may even appear at first sight to be unrealistic in places, but let us see where it will lead us" (6).

I like surprises and read on. The introduction to Part II (Ecological factors in the Arctic; 63 p.), clearly reveals the bloodlines of the hobby horse, 'Arctic Circle'. In Remmert's words (7): "By choosing the Arctic Circle to define the limits of the Arctic we have automatically brought diurnal rhythmicity [sic] and the factors depending upon it into the forefront of our discussion." Remmert's long-standing interest in diurnal rhythms is literally as well as figuratively foremost in the text; the first 17 pages deal with light; the next 34 with temperature; other factors take up seven pages; combination of factors the remaining five.

There are some initial nervous but stimulating moments (pages) as 'Arctic Circle' negotiates difficult terrain. Overstatement and biological omission again facilitate the ride: "Examples of this kind [contradictory] are of very little value." (9); "Almost nothing is known of the activity patterns of High-Arctic animals like reindeer (*Rangifer*). . ." (19), but White *et al.* in Bliss *et al.* (1981) cite six studies published prior to 1978. Remmert presents so many examples, several conflicting, that reasoned refutation is impossible in a simple review. I found the ride challenging to the reader/spectator, and thus enjoyable as well as frustrating. The section (Diurnal rhythm) should not be read passively. Professor Remmert himself must have had nervous moments in the saddle, for about this time (24) he exhibits his breadth as an arctic ecologist — he dismounts. With 'Arctic Circle' to pasture, he provides a useful synthesis that spans plants, microorganisms, insects, fish, avian and mammalian herbivores, and top carnivores. The treatment of microorganisms is most wanting. The treatment of permafrost (one page) is very superficial given its importance to the structure and function of arctic ecosystems (possibly because permafrost is lacking in Scandinavia). Snow also received remarkably short treatment (about two pages of text); neither of the classic treatments of Formosov or Nasimovich is cited. The value of Remmert's treatment is that it spans diverse taxa and introduces considerable German language literature. Specialists in specific taxa will likely find 'their creatures' slighted; I found the wide-ranging treatment interesting. The detailed treatment of diurnal rhythm is not found in other synthesis volumes, and is a welcome, albeit somewhat untidy, addition.

Part III ('(Almost) common characteristics of arctic animals'; 40 p.) is equally wide-ranging. Four-year (microtine), nine-year (Tetraonid) and 70-year (*Rangifer*) cycles are treated adequately, a cautious blend of speculation and fact. Seasonal migrations of birds and mammals benefit from the 'cross-taxa' treatment. The discussion of entrainment of animals to the yearly cycle also benefits from the 'cross-taxa' treatment and the fact that 'Arctic Circle' has wandered off, forgotten. The treatment of species problems may intrigue taxonomic 'splitters'; 'lumpers' will find straw men. Discussion of the ratio of productivity to biomass in the Arctic is inadequate; readers will do better to refer to relevant chapters and their references in Brown *et al.* (1980) and Bliss *et al.* (1981). This latter comment applies also to Part IV (Peculiarities of the system; 33 p.), with the important exception that Remmert's near-simultaneous treatment of terrestrial, limnic and marine ecosystems is helpful. Few new insights are provided, but diverse evidence is collated.

Part V (Types of arctic climates; 6 p.) presents a lucid, simple scheme unnumbered by data. More comprehensive discussions, which lack this attractive simplicity, can be found in the relevant chapters of *Arctic and Alpine Environments* (Ives and Barry (eds.), 1974, London, Methuen Publ. Co.) and Bliss *et al.* (1981). Part VI (Case studies; 74 p.) treats seven regions: "warm" arctic (Tromsø to Kevo), arctic Alaska, high-arctic continental (the Canadian Archipelago), high-arctic oceanic (Spitsbergen), arctic lakes, Old World arctic seas, and the Antarctic. 'Case studies' is an appropriate phrase. Observations from many study sites of the IBP Tundra Biome (Abisko, Devon Island, Kevo, Point Barrow and Prudhoe) as well as other areas are selectively summarized without attempts to explain the differences. Much more balanced and comprehensive treatments of many of the areas are found in Rosswall and Heal (1975) and Bliss *et al.* (1981).

Whatever its relative strengths and weaknesses in content, *Arctic Animal Ecology* does suffer severely from sloppy editing. One need not read far before several unconventional or distressing features are appar-

ent. They get worse. Four bothered me. First, scientific names are not italicized. Second, the attitude towards citation is somewhat cavalier. Authors are frequently and inconsistently presented without dates; e.g. Nordenskiöld in Fig. 1; Pappi, Hoffman and Remmert on p. 7; Demmel-meyer and Haarhaus and Demmel-meyer on p. 15; West and Norton on p. 22; Corbet and Tjonneland on p. 24; etc. Far too many authors cited in the text are missing from the literature cited; e.g. Scheer, 1952, p. 12; Hjorth, 1968, p. 12; Berset, 1957, p. 21; etc. Dates of authorship in the text and literature cited are not consistent; e.g. Ferenz is both 1955 and 1975. Authors are sometimes misspelled; e.g. Wielgolaski (p. 30) should read Wielgolaski; Kutty (p. 240) should read Kuyt; etc. Such failings are significant and detract from the volume's utility as a source of reference. Third, typographical errors are distressingly common. In many cases the reader can guess; some are more inconvenient - e.g. ". . ." (see p. 124) . . ." (p. 13) should read "(see p. 24)". Some of these errors may result from copy-editing after translation; e.g. the citation for Nuorteva (1963) is presented partly in English and partly in German. Fourth, the axes of graphs are not always labelled, but are left to the reader's interpretation; e.g. Fig. 7, the ordinate is presumably date, and the abscissa, time of day; Fig. 19, the ordinate is presumably latitude.

Despite these weaknesses I learned several things, in no particular order: 1) a man on a hobby horse can negotiate conflicting facts with remarkable alacrity, 2) Remmert commands an impressive breadth of knowledge of arctic ecology, 3) the book contains lots of interesting tidbits about Spitsbergen and diurnal rhythms, 4) arctophiles owe thanks to those individuals primarily responsible for the IBP Tundra Biome synthesis volumes (I name them willingly: L.A. Bliss, J. Brown, J.B. Cragg, O.W. Heal, T. Rosswall, and F.E. Wielgolaski).

I conclude that the volume is worth reading, I am uncertain by whom. Sloppy editing and Remmert's flamboyant gallops about 'Arctic Circle' will make *Arctic Animal Ecology* treacherous and frustrating for students, but challenging for 'old hands'. It is not a useful source of reference, other than to Spitsbergen, and then marginally (better general sources are noted above). Some weaknesses have been stated. Its strengths are the collation of data from Spitsbergen, the introduction of German literature to English-readers, and the presentation of an experienced ecologist's perception of the Arctic. Unexcitable old hands probably should read it — there are sufficient new facts and ideas to keep one interested, sufficient errors to keep one alert. Excitable individuals may find parts of the text, especially 'Literature Cited', aggravating to their health.

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THE FIRST AMERICANS: ORIGINS, AFFINITIES, AND ADAPTATIONS. Edited by WILLIAMS S. LAUGHLIN and ALBERT B. HARPER. New York, Stuttgart: Gustav Fischer, 1979. xii + 340 p. Cloth, n.p.

Archaeologists and physical anthropologists with eyes to the origin of America's aboriginal human groups have for decades followed the extensive and significant contributions of William S. Laughlin, who with numerous co-workers has made great strides in the understanding of Aleut/Eskimo prehistory and relationships. This volume is organized around such a theme, and that of biological relationships of the First Americans in more general terms. Researchers expecting proof of pre-Wisconsin peopling of the New World will be disappointed; but those in search of varied hypotheses and detailed biological data for modern and prehistoric populations will find much of value. The volume results from one of the last Wenner-Gren Foundation conferences to be held at Burg-Wartenstein, Austria (1976); but bibliographies reveal updating of articles with literature published as late as 1978. Twenty authors are represented by 15 papers, grouped in three subject areas with a general introduction. The volume is well edited, and few typographical errors are noted, all minor. Printing is good and diagrams and charts are readable. There are no photographs.

The introductory essay by Laughlin and S.I. Wolf is a pithy review of preconceptions and reality in the Arctic filter. It is well written and entertaining, though a bit glib, a drawback outweighed by the obvious energy — indeed, excitement — conveyed. The authors clearly believe that their symposium has made significant advances. They consider it