Soviet regime, and the islands still bear the names of Wilczek, Rudolph (the crown prince of Austria during the Austro-Hungarian expedition), Northbrook (the First Lord of the Admiralty during Benjamin Leigh Smith's expedition of 1880), Hooker (by Smith for Sir Joseph Hooker, former director of Kew and president of the Royal Society), Eva–Liv (for Nansen's wife and daughter), Jackson (by Nansen after their meeting), Graham Bell (first explored by Baldwin on Wellman's expedition), and Ziegler. This multi-national approach has been very positively carried on in this book, which has summaries of its findings in Norwegian, German, Polish, Russian, and French.

In April 1994 Russian Prime Minister Viktor Cernomyrdjn signed a declaration creating a nature reserve of Franz Josef Land and its surrounding areas; this was a major step in the nature conservation of the Eurasian Arctic. The authors of *Franz Josef Land* hope that this book, in addition to providing much-needed information about this archipelago, will reflect a similar interest and concern, and will lead to a greater understanding of the need to protect one of the least-known areas on Earth. (Beau Riffenburgh, Scott Polar Research Institute, University of Cambridge, Lensfield Road, Cambridge CB2 1ER.)

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DYNAMICS AND MODELLING OF OCEAN WAVES. G.J. Komen, L. Cavaleri, M. Donelan, K. Hasselmann, S. Hasselmann, and P.A.E.M. Janssen. 1994. Cambridge: Cambridge University Press. xxi + 532 p, illustrated, hard cover. ISBN 0-521-47047-1. £40.00; $US59.95.

Serious research on the theory of ocean waves began during World War II and was motivated by an urgent military need: the requirement for accurate prediction of wave conditions on beaches where amphibious landings were planned. In the United States, the challenge was taken up at Scripps Institution of Oceanography by Harald Sverdrup (a polar oceanographer by origin) and Walter Munk. They came up with empirical relationships tying wave height and period to the velocity, duration, and fetch of the wind (the upstream distance over which the wind is blowing), and they also calculated how waves and swell are refracted by bottom topography as they approach the beach. These relationships were good enough to provide successful forecasts for South Pacific landings, and, most famous of all, the critical forecast of rough but acceptable conditions that allowed D-Day to proceed almost on schedule and just before a major storm.

After the war, intensive research began on trying to understand the mechanism of wave generation by wind in the ocean. Much of the work was done by a brilliant group gathered by George Deacon at the National Institute of Oceanography, Wormley: such men as Burling, Longuet-Higgins, Darbyshire, and Barber. The concept of the wave spectrum was introduced in the early 1950s to describe the way in which wave energy is distributed among a continuous range of frequencies and directions, and enormous efforts went into investigating the physical mechanisms by which energy is transferred from the wind to the ocean surface, and then lost by dissipation. Explanations were sought for the shape of the spectrum of a 'fully developed sea,' the sea state that results from a given wind blowing over an infinite distance for an infinite length of time. By the late 1960s adequate and plausible physical mechanisms were in place to describe and predict the major features of the sea surface.

It was at this point that Klaus Hasselmann's group entered the scene. Hasselmann, a distinguished oceanographer and climate modeller, had already worked extensively on wave observation and theory, especially in the JONSWAP (Joint North Sea Wave Project) experiments, but in 1984 he began a new wave modelling project in Hamburg with a group called WAM (Wave Modelling Group). After several years of work, the group came up with a third-generation wave model that takes account of many subtle effects neglected in earlier models, and that has been extensively tested against the vast new data sets now available from satellite radar altimeters. WAM has now been adopted world-wide as the preferred model for generating wave predictions from global surface pressure fields. This book, despite its misleadingly inclusive title, is, in fact, primarily a description of the different aspects of WAM, as told by the various members of the group. The lead author acknowledges that it is the final report of the WAM/SCOR (Scientific Committee for Oceanic Research) Working Group 83.

So far, so good. However, in one vital respect of special interest to polar readers, the book fails dismally. The section on the propagation of waves in icefields is very short, acknowledges none of the major work done on the subject, and is also quite misleading. The reader will find on pages 171–174, section II.7, 'Interactions with ice,' by Diane Masson of the University of British Columbia, a member of the WAM group. This section simply discusses the situation where the wind is attempting to generate wave energy in an open icefield consisting primarily of open water dotted with ice floes. It considers the balance between wave generation in the open-water phase of the mixture and wave dissipation and refraction by the ice floes. The treatment of wave–floe interaction is incorrect and has been outdated for at least two decades, since it considers a disturbance potential under the ice floe that is a sum of diffraction of a wave incident on the floe as if it were a fixed body, and a scattering by a body forced to oscillate in still water. It has been shown by many authors that such a treatment seriously over-estimates the disturbance caused by a floe, since it is essentially treating the field of floes as a set of moored floating islands, each of which is oscillating up and down. The act of fixing a floe

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in place enormously increases its disturbance potential, and there is a vast difference between a real field of ice floes free to respond to the sea by heave, tilt, and surge, and what is essentially a floating breakwater.

The author of this section seems unaware of the large amount of analysis work done on the effect of floating rafts on wave fields. She also gives no mention or acknowledgement to the very large amount of research done on other vital aspects of wave–ice interaction, such as wave attenuation in the marginal ice zone; wave generation, propagation, and attenuation in the interior of the pack-ice zone; wave interaction with fast ice; and wave propagation in icefields composed of small cakes or crystal suspensions, such as the frazil–pancake ice mixtures found in the Greenland Sea and in vast expanses of the Southern Ocean in winter. A reader who wishes to be introduced to the very large body of literature on these subjects should read Wadhams (1986) and Squire and others (1995).

One ironic aspect of this big hole in the book is that the book's authors, who set a chummy and mutually congratulatory tone from the first chapter onwards, seem unaware that there is a hole, that is, that the 8% of the ocean covered by sea ice possesses at every point a wave spectrum in which the energy (however tiny) is determined by physical interactions of the greatest interest and importance. In the central polar pack, for instance, it is found that the wind can generate wave energy if it exceeds a speed equal to the minimum velocity for the propagation of flexural-gravity waves. This implies that the wind is exerting its influence via a pattern of pressure disturbances moving over a flat elastic sheet, rather than by wave-growth mechanisms whereby the wind pushes on the inclined surfaces of an already-growing wave field. Such a wave-generation effect, which is limited to one particular kind of interaction, should be studied in its own right as a contribution to fundamental wave-generation physics.

For a blue-water oceanographer this is an excellent book, setting out the principles of the WAM model in great detail and with clear physical explanations. But it is seriously deficient in the area of greatest interest to polar researchers, and it is to be hoped that this will be corrected in a future edition. (Peter Wadhams, Scott Polar Research Institute, University of Cambridge, Lensfield Road, Cambridge CB2 1ER.)

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THE NIGHT SIDE OF DICKENS: CANNIBALISM, PASSION, NECESSITY. Harry Stone. 1994. Columbus: Ohio State University Press. xxx + 726 p, illustrated, hard cover. ISBN 0-8142-0547-X. $US68.50.

For *Polar Record* to review a critical study of Charles Dickens might seem unusual. But *The night side of Dickens* bears considerable relevance to at least two areas of Arctic history. One such area is Dickens' dramatic effort *The frozen deep* and a few other literary works appearing in *Household Words*. Another is Dickens' strange relationship to the notion of cannibalism, a relationship he no doubt shared with many of his Victorian readers. Stone's persuasive analysis and documentation of cannibalistic allusions in Dickens' novels, while occasionally thorough in the extreme, lend useful insights into the fear and fascination that cannibalism held for Victorian society. This peculiar cultural obsession, of course, achieved its ultimate expression around the final expedition of Sir John Franklin and the disconcerting reports of its end.

Stone constructs a perspective from which the reader can view Dickens' 'night side' — 'a dark, slowly accreting cluster of emotions and ideas' (page xvii) — as it developed psychologically in the man, and as it shaped this extraordinarily popular novelist's work. Dickens' boyhood 'attraction of repulsion' (page 97) to the sensationally gruesome weekly periodical *Terrific Register*, his frequenting of public morgues, and other biographical manifestations of the somberness of Dickens' evolving personality are clearly delineated in *The night side of Dickens*. Having convinced his reader that Dickens' youthful character was emphatically more troubled and dark than superficial popular readings of his novels might suggest, Stone then smoothly turns to the novels themselves. Here, he reveals undeniable evidence of Dickens using art to confront and grapple with those same demons that haunted his personality from a very young age.

One can get a good sense of the contents of Stone's book by looking at the index, which, by the way, is an excellent one, undoubtedly created by the author himself; it is certainly too 'intelligent' and useful to have been computer-generated. The following list comprises those index headings that generally warrant the greatest number of page references: childhood fears; destructive love; disorders; dissection of corpses; dismemberment; humans as fodder; inability to cauterize the past; isolation; macabre; obsessions; predators and predation; psychological imprisonment; rats; roasting human beings; savages and savagery; secret life; sense of sin; sins and sinners; skeletons; suppression and expression; and wounds.

Organized chronologically, the book is divided into three parts: 'Dickens and cannibalism: the unpardonable sin'; 'Dickens and passion: the tangled web'; and 'Dickens and necessity: the long chain.' The final (and briefest) part deals almost exclusively with the little-known *George Silverman's explanation* and its relationship to earlier works by Dickens. Consequently, this part will bear interest to students of the Arctic only to the extent that they have been won over by Stone's thesis and want to follow it to its conclusion. The first part and the early section of the second part will hold the most direct interest for polar enthusiasts.

Part 1 begins with an extract from a letter that Dickens wrote in 1854 to one of his editors: 'I am rather strong on

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