

T. L. PÉWÉ, ed. *The periglacial environment, past and present*. Montreal, McGill-Queen's University Press [and] Arctic Institute of North America, 1969. ix, 487 p. \$25, £11 5s.

THE term *periglacial* was introduced in 1909 to designate rigorous climates, associated frost-weathering processes, and distinctive products formed in belts of terrain marginal to Quaternary ice sheets. Its usage subsequently was extended, despite protests by some workers, to include cold climates of the past and present on a broader regional basis irrespective of glaciation. The expanded definition, although convenient in some respects, poses serious problems. Modern Arctic processes, for example, differ somewhat from those that once existed at lower latitudes peripheral to the great ice sheets of Europe and North America. Factors such as higher sun angles and greater diurnal temperature fluctuations would have affected freeze-thaw processes, moisture conditions, and related aspects of the mid-latitude periglacial environment. Abundant glacial melt water and deposition of pro-glacial sediments such as loess and outwash were associated with periglacial frost activity in many such areas. Modern Arctic and alpine processes, in contrast, often are most pronounced on tills and associated sediments of deglaciated terrain. These arguments aside, modern cold-climate processes and products often serve as useful models for interpretation of relict periglacial features in the Quaternary record.

*The periglacial environment, past and present* is one of a series of proceedings volumes of the seventh Congress of the International Association for Quaternary Research, held in the United States in 1965. Most of the papers published in the periglacial volume were presented at a symposium on cold climate environments and processes which convened in Alaska prior to the main INQUA congress. The authors represent 11 countries. Many are internationally recognized leaders in periglacial research.

An introduction by the editor is followed by 24 papers which range in subject from modern permafrost in Canada to processes and environments of the Brazilian Quaternary. The first 9 papers are devoted to aspects of the modern "periglacial" environment. Topics include permafrost, ice wedges, soils, soil structures and patterned-ground features. Particularly useful to this reviewer were S. Rudberg's comprehensive survey of high-latitude processes and landforms on part of Axel Heiberg Island, J. Brown's thorough study of soils in the Okpilak River area of north-eastern Alaska, J. W. Marr's analysis of a patterned-ground ecosystem in Greenland, and J. Lundqvist's brief review of earth and ice mounds. Some of the other papers deal with more limited topics or are expanded to unwarranted length.

The 15 reports in the remainder of the volume cover diverse aspects of former periglacial environments, now represented by relict surface forms or by features in the stratigraphic record. The poorly defined limits of the term *periglacial* are appallingly evident here. Four papers are concerned with glacial history rather than with the periglacial record. Two others deal with effects of climatic changes under conditions where periglacial processes appear insignificant. The remaining papers cover a wide range of pertinent topics: periglacial wind abrasion, loess stratigraphy, permafrost indicators, frost fissures and solifluction deposits. Several discuss periglacial relics infrequently reported in the literature (e.g. relict pingos; thermal erosion along former stream banks). Papers by A. Cailleux, R. Gruhn and A. L. Bryan, and J. Dylík serve as excellent models for approaches to interpretation of the periglacial record. Other reports include comprehensive regional reviews of periglacial stratigraphy, former permafrost limits, and the distribution of specific periglacial indicators. One cursory paper on ice-wedge casts and involutions along the Seine river adds little to the abundant literature on these common features. Such a report is hardly of international interest.

*The periglacial environment* shows many of the ills characteristic of proceedings volumes. Its high price is due to the specialized topic, limited market and assured sales to university libraries. It contains a substantial amount of honest text, but includes some unnecessary full-

page photographs, blank pages (as all papers begin on a right-hand page), and descriptive accounts of common features. Publication post-dates the INQUA conference by 4 years, owing to problems of co-ordinating the efforts of authors representing many countries and several languages. Individual papers are erratic in quality. Repetitious overlap between individual papers is minimal compared to many proceedings volumes. The editor has co-ordinated the efforts of his authors very well in this respect.

The volume's title is deceptive. Despite many excellent papers, it does not provide a complete or well-balanced survey of periglacial environments. Students seeking a thorough introduction to this subject would profit more from reading other recent texts such as J. B. Bird's *Physiography of Arctic Canada* (Baltimore, Johns Hopkins Press, 1967) or Embleton and King's *Glacial and periglacial geomorphology* (London, Edward Arnold; New York, St Martin's Press, 1968). Many reports in *The periglacial environment*, however, provide substantial contributions to our knowledge of modern and ancient cold climates. These outstanding papers make the volume worth its cost to professionals working in the field of periglacial research.

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