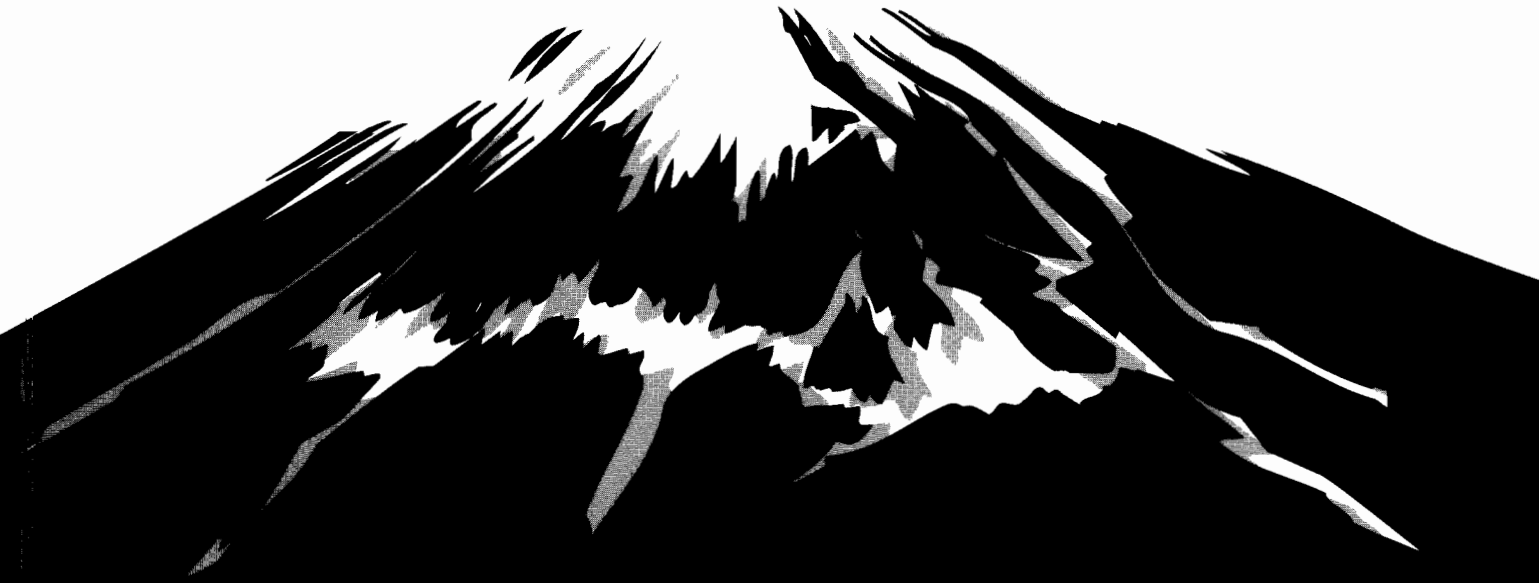
Mountains of
East Asia and the Pacific



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CONTENTS

Theme 4: Human impacts on mountain areas

Theme 5: Mountain hazard management

Theme 6: Sustainable land use in New Zealand mountain lands

Theme 7: Management issues in mountain protected areas

Ecology and recreation in park management

Notes from the field trip to Arthur's Pass National Park, Flock Hill Station and Craigieburn Research Area, Canterbury, New Zealand

Compiled by Rob Allen

Epilogue

Foreword

Mountains of East Asia and the Pacific is the proceedings of the East Asia Pacific Mountain Association symposium, held at Lincoln University in May 1993. The symposium was organised by Lincoln University, the International Mountain Society and the East West Centre, Honolulu, with the cooperation and support of the United Nations University, the World Conservation Union, the New Zealand Department of Conservation and the High Country Committee of New Zealand Federated Farmers.

Papers were presented on a wide range of mountain issues; from the cultural attachment people have to mountains, to issues of sustainable resource use in mountain areas and to the consequences of physical phenomena in mountainous regions. We have grouped the papers according to the common theme they illustrate.

In the three years since the symposium, progress has been made in many areas of mountain research, the management of mountainous areas and in the promotion of the concept of sustainability in mountain environments. In the epilogue, the editors have attempted to discern the common threads in the papers presented at the symposium, considered the progress made since 1993 and discussed what may be the key themes of the future.

The East Asia Pacific Mountain Association (EAPMA) was launched in 1993. With the Earth Summit in 1992 came Agenda 21, with Chapter 13 specifically dealing with mountains. A subsequent series of global and regional meetings has resulted in establishment of global, regional and sub-regional mountain networks. Many of the envisaged functions of EAPMA are now provided for by the Asia Pacific Mountain Network (APMN) based at ICIMOD (International Centre for Integrated Mountain Development) in Nepal. The Centre for Mountain Studies (CMS) at Lincoln University will coordinate activities as the Australasian/Pacific subregional focal point. With this development, the editors note with pleasure that the activities of EAPMA are subsumed by the APMN, Australasian/Pacific subregion, and the continued operation of the CMS.

We hope that readers will enjoy these proceedings and that *Mountains of East Asia and the Pacific* will continue to promote debate on mountain issues.

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Theme 2: Research on mountain protected areas

Mountain conservation in the Antarctic Treaty System

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MOUNTAIN ECOSYSTEMS IN ANTARCTICA

Antarctica, the fifth largest continent, covers almost 14 M km^2 and extends to 20 M km^2 as sea ice develops in the austral winter. Some 98 percent of the continent is covered by ice with an average thickness of 2450 m. The icecap gives Antarctica the greatest average elevation of all continents at 2300 m (the Australian continent averages 340 m). The highest elevation on the icecap rises to a height of 4100 m.

The continent is divided into two regions by the mainly exposed Transantarctic Mountains extending some 3500 km from Cape Adare to isolated ranges close to the Filchner Ice Shelf (Drewry 1987). East of the Transantarctic Mountains is East or Greater Antarctica, a Precambrian shield almost completely covered by an ice sheet. The Gamburtsev Mountains are the largest within the continental interior and rise to 3800 m.

West of the Transantarctic Mountains lies West or Lesser Antarctica, characterised by various mountain ranges such as the Ellsworth Mountains, mountain massifs found along the Pacific coast, and the rugged Antarctic Peninsula. It is here, adjacent to the Ronne Ice Shelf, in the Ellsworth Mountains, that the highest mountain, Mt. Vinson (4897 m), is located.

The Ellsworth region (discussed later) was considered in 1976 as "being perhaps the last extensive unexplored area on earth ... " with scientific studies at the time adding 38 000 km^2 to the land area of Antarctica (Swithinbank et al. 1976, p.295). The Rutford Ice Sheet which is dammed up and diverted around the northern end of the Ellsworth Mountains, consists of floating ice 1860 m thick; the thickest ice ever found floating on the sea. Within 60 km of Mt. Vinson a trench extends some 1600 m below sea level (Swithinbank et al. 1976).

THE ANTARCTIC TREATY SYSTEM

The Antarctic Treaty System (ATS), which dates back to 1961, governs almost 10 percent of the earth's surface. Today 41 nations adhere to the Treaty. The ATS provides for a zone of peace; a continent for cooperative science; an area where territorial claims are prohibited; a ban on the disposal of radioactive wastes; and a place committed to the conservation and preservation of nature (Triggs 1987).

The Protocol on Environmental Protection to the Antarctic Treaty (commonly known as the Madrid Protocol) was introduced following the demise of the Convention on the Regulation of Antarctic Mineral Resource Activities in 1989. Seen as a more acceptable environmental protection regime, the Protocol includes five substantive Annexes: (I) Environmental Impact Assessment; (II) Conservation of Antarctic Fauna and Flora; (III) Waste Disposal and Waste Management; (IV) Prevention of Marine Pollution; and (V) Area Protection and Management. The Protocol does not come into force until all Antarctic Treaty Consultative Parties (ATCPs) have completed ratification.

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Article 2 of the Protocol declares Antarctica, including the Southern Ocean, as a "nature reserve, devoted to peace and science", whereas Article 3 includes the protection of biological, intrinsic, wilderness, aesthetic and scientific values, to be of fundamental consideration when planning all activities in Antarctica. Article 11 will create a Committee for Environmental Protection (CEP) and under Article 7 "any activity relating to mineral resources, other than scientific research, shall be prohibited".

THE PROTECTED AREA SYSTEM

Annex V on Area Protection and Management is a significant departure from the existing protected area system. The existing system largely served to protect natural areas and ecosystems, areas of cultural significance and scientific opportunity. Area management is narrowly defined and nations operate independently of one another.

With increasing human activity (Kriwoken 1991; Harris 1991), efforts aimed at protecting these areas have intensified. Following international trends, the protection of small discrete, largely terrestrial, ecosystems has been augmented by giving greater recognition to managing larger terrestrial and marine areas (Shafer 1990). Antarctic conservation, however, still does not extend to include the peripheral geographical area that nevertheless is affected by human intrusion and scientific activities.

Two additions to the Protocol could remedy this problem. The first is the Antarctic Specially Protected Area (ASPA), designated to protect outstanding environmental, scientific, historic, aesthetic or wilderness values, any combination of those values, or ongoing or planned scientific research. Within a systematic environmental-geographical framework ASPAs can include: (a) inviolate areas; (b) terrestrial, glacial, aquatic and marine ecosystems; (c) areas with important or unusual assemblages of species; (d) any type locality or only known habitat of any species; (e) areas important for scientific research; (f) examples of geological, glaciological or geomorphological features; (g) areas of aesthetic and wilderness value; and (h) sites of monuments or recognized historic value.

The second category is an Antarctic Specially Managed Area (ASMA), defined as "any area, including any marine area, where activities are being conducted or may in the future be conducted, may be designated as an ASMA to assist in the planning and coordination of activities, avoid possible conflicts, improve cooperation between Parties or minimize environmental impacts". ASMAs may include: (a) areas where activities pose risks of mutual interference or cumulative environmental impacts; and (b) sites or monuments of recognized historic value.

With respect to Antarctic mountain ecosystems both categories are significant advances. ASPAs can now include terrestrial, glacial, aquatic and marine ecosystems, examples of geological, glaciological or geomorphological features, and areas of aesthetic and wilderness value. The promotion of cooperative planning and the coordination of activities is supported to reduce the likelihood of cumulative environmental impacts. This is particularly important for selected Antarctic mountain ecosystems where human use is concentrated.

INCREASED HUMAN IMPACT ON ANTARCTIC ECOSYSTEMS

Antarctica is subject to increasing human pressure and associated environmental impact. National scientific and logistic personnel now number approximately 4000 per year and in the 1990-91 season 4852 tourists visited Antarctica (Enzenbacher 1992). Estimates of 6500 for the 1993/94 season have been made by scientists studying tourist impacts (Aguirre 1993). The types of nongovernmental activities, outnumbering national scientific and logistic personnel, include large-scale tourism, private yachts, adventure tourism, private research cruises, and activism and public-interest work. Of the 39 000 tourists that have visited Antarctica more than 40 percent visited since the 1986/87 season (Enzenbacher 1992).

Some Antarctic tourist operators have shared in the concern about increased environmental impact and have responded accordingly. In 1991, seven Antarctic tour operators founded the International Association of Antarctic Tour Operators (IATTO). These tourist operators see conservation of the Antarctic environment as integral to their long-term commercial survival. IAATO has established its own Guidelines of Conduct for Antarctic Tour Operators and Guidelines of Conduct for Antarctic Visitors.

The guidelines for tour operators include: (1) abide by the Antarctic Conservation Act (1978) (USA); (2) abide by restrictions for protected areas, including historic sites; (3) enforce IAATO Guidelines to Antarctic visitors; (4) operate with a professional expedition staff; (5) ensure a proper staff-to-passenger ratio (20 to 25 passengers to 1 qualified naturalist/lecturer guide); (6) limit passengers ashore to 100 at any place at any one time; (7) communicate voyage itinerary to the other passenger vessels to avoid over-visitation of any site; (8) give notice to all research stations and respect the science conducted; and (9) follow the marine pollution guidelines (IAATO 1992/93). As a result, the tourism industry largely supports self-regulation of activities through these codes of conduct.

The focus of most nongovernmental activity is on the Antarctic Peninsula where there is the greatest numbers in seaborne tourism. From the perspective of mountain ecosystems seaborne tourism poses little environmental impact. The mountains of the Peninsula afford spectacular photographic opportunities, diverse and abundant wildlife, and relatively easy landing sites. The greatest impact is on coastal communities where tourism operators frequent. For instance, Whalers Bay, Deception Island was the most popular site visited by 3178 tourists from 1989 to 1991 (Enzenbacher 1992).

While the majority of tourism pressure is coastal and seaborne a significant new tourism market has changed the type and spatial extent of human impact in Antarctic mountain ecosystems. Airborne Antarctic tourism has changed the way that tourists visit and impact the Antarctic. Airborne tourism began in 1956 (Headland 1989) and continued during the 1970s with overflights. Most of these tourists never touched the Antarctic Continent. In the 1987-88 season, with Adventure Network International (ANI) using a DC-4 and two Twin Otters, airborne tourists began using Antarctic mountain ecosystems as destination points for extended periods. ANI uses a DC-4 primarily to ferry passengers, cargo and fuel from Punta Arenas, Chile to the Patriot Hills camp, Ellsworth Mountains (80°19'S, 81°20'W). The Twin Otters are used to ferry passengers from the Patriot Hills camp to the base of Mt Vinson, the South Pole and to a penguin rookery near the Dawson-Lambton Glacier. Mt. Vinson, the highest mountain in Antarctica, is one of the "Seven Summits", attracting expeditions and climbers from all corners of the world. ANI has conducted tourist activities for six seasons with less than 400 tourists visiting the Patriot Hills camp.

MANAGEMENT OF MOUNTAIN ECOSYSTEMS

With increasing human impact on mountain ecosystems, such as that outlined in the Ellsworth Mountains, there is an increasing need for practical and specific environmental planning and management at a regional level. The response incorporated in the ASMA designation would promote cooperation between Antarctic nations operating in high-use, environmentally sensitive regions. The ASMA designation recognizes that planning and coordination of activities is necessary to avoid conflict and improve cooperation between nations, thereby minimising environmental impacts. The position of the commercial tourist operator in this scenario is not clear. Considering that the present tourist operator is the de facto managing authority of the Patriot Hills, Mount Vinson area, there is no mechanism to force nations or commercial operators in the Ellsworth Mountain region to embrace cooperative regional environmental management. ANI, for instance, requires all climbers to sign a contract to remove all human and kitchen waste from Mt. Vinson. It does not have the legal right to force expeditions not associated with ANI to abide by these regulations.

This regulatory gap could be partially filled by the Scientific Committee on Antarctic Research (SCAR). SCAR encourages and assists in the dissemination of scientific knowledge derived from research carried out in the Antarctic and reviews scientific matters pertaining to the conservation of Antarctic terrestrial and marine ecosystems. While largely providing scientific information and advice, its structure supports scientific Working Groups. All ATCPs are empowered to select protected areas and implement management

arrangements; they need not accept SCAR advice and can seek specialist advice from SCAR when required. As such, SCAR would be the most useful body for initiating ASMA declarations between Antarctic users and user groups and coordinating their management.

In response to a growing concern for environmental matters, SCAR, in 1988, formed the multidisciplinary Group of Specialists on Environmental Affairs and Conservation (GOSEAC). GOSEAC advises SCAR on Antarctic environmental affairs and conservation related to research, logistics and commercial activities. It is, therefore, fitting that the GOSEAC experts could be closely involved in the development of ASMAs, provided it had adequate resources.

Support for ASMAs could be strengthened with the future development of the new specialist environmental body recommended under the Madrid Protocol. A Committee for Environmental Protection, established in Articles 11 and 12, will comprise representatives from all ATCPs and their expert advisers. The President of SCAR, the Chair of the Scientific Committee of CCAMLR and Non Consultative Parties will be allowed observer status. The CEP will "provide advice and formulate recommendations to the Parties in connection with the implementation of the Protocol" (Article 12.1). Responsibilities of particular importance include: (1) the means to minimise or mitigate the environmental impacts of activities; (2) procedures for environmental emergencies; (3) the operation and elaboration of the Antarctic protected area system; (4) the exchange and evaluation of environmental protection information; and (5) the state of the Antarctic environment and scientific research needs.

However, the function of the CEP is to provide advice and formulate recommendations to the Parties. Implementation of CEP recommendations will rely on voluntary compliance and national legislation from respective ATCPs. A CEP would have no formal regulatory authority. Given the voluntary nature of the CEP, the problems of practical implementation and enforcement of an ASMA may be encountered. Consideration should be given to including active independent members on the CEP, and provision for independent reviews of recommendations affecting existing or proposed ASMAs.

CONCLUSIONS

The adoption of the Madrid Protocol provides a new opportunity for environmental management and the development of a substantial protected area system. It should be noted that few Consultative Parties, and no commercial tourist operators, employ qualified environmental planning staff, thus resulting in little continuity in national and international consideration of regional environmental planning activities and the development of mountain protected areas. For this reason the continuing, and possibly increasing, involvement of SCAR, and particularly GOSEAC, would be warranted.

The Asia-Pacific Mountain Network, and the World Conservation Union, are both significant players in the advancement of environmental planning activities and the development of mountain protected areas. Their role is particularly important in drawing world attention to the Antarctic protected area system and strengthening the protection of environmentally sensitive areas like mountain ecosystems through environmental planning and management.

The past three years have been a period of rapid development in environmental requirements for Antarctic activities. Protected areas categories have moved from protecting small site-specific values to a natural resources tool incorporating regional environmental planning and management. This period of development does not signal an end to identifying and selecting small, discrete protected areas. However, the emphasis on these smaller protected areas is likely to shift, with greater emphasis being given to regional planning. With increasing human activity and overlapping impacts, a growing number of ASMAs will need to be declared in mountain ecosystems. The challenge now is how institutional arrangements under the ATS can respond to this new generation of protected areas.

There will be an increased onus on the tourist industry to promote selfregulation of its members. The tourist industry will therefore have a higher profile in environmental planning and management in all aspects of

Antarctic operations. While the tourist industry will have difficulty in providing prescriptive advice on issues such as protected areas and enforcement of regional plans, it could address issues of cumulative impact of human activity on ecosystems frequented by tourists.

An ASMA designation in the Ellsworth Mountains could focus international attention on the problems of cooperative environmental planning and management in Antarctic mountain ecosystems. Such a designation could be useful in determining the present role of SCAR and GOSEAC and in delineating future cooperative arrangements between SCAR, CEP and the growing role of the tourist industry. Such an ASMA could also function as a proactive environmental blueprint for other mountain ecosystems areas where national operators and the tourist industry must act to reduce environmental impact.

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REFERENCES

Aguirre, C. 1993. (personal communication). Instituto Antartica Argentino Buenos Aires, Argentina.

Blay, S.K.N. 1992. New trends in the protection of the Antarctic environment: the 1991 Madrid Protocol. *The American Journal of International Law 86* (2): 377-399.

Drewry, D.J. 1987. The Antarctic physical environment. In: *The Antarctic Treaty Regime: Law, Environment and Resources*, ed. G.D. Triggs, pp 6-27. Cambridge, U.K. Cambridge University Press.

Enzenbacher, D.J. 1992. Tourists in Antarctica: numbers and trends. *Polar Record 28* (164): 17-22.

Harris, C.M. 1991. Environmental management on King George Island, South Shetland Islands, Antarctica. *Polar Record 27* (163): 313-24.

Headland, R.K. 1989. *A Chronology of Antarctic Activity*, Cambridge University Press.

International Association of Tour Operators (cited as IAATO). 1992/93. Guidelines of Conduct for Antarctic Tour Operators, Seattle, Washington.

Kriwoken, L.K. 1991. Antarctic Environmental Planning and Management: Conclusions from Casey Station, Australian Antarctic Territory. *Polar Record 27* (160): 1-8.

Scientific Committee on Antarctic Research (cited as SCAR) 1992. The Protocol on Environmental Protection to the Antarctic Treaty, with Annexes, done at Madrid 4 October 1991, and an additional Annex done at Bonn 17 October 1991, SCAR Secretariat, Cambridge, U.K.

Shafer, G.L. 1990. *Nature Reserves: Island Theory and Conservation Practice.* Washington, D.C. Smithsonian Institution Press.

Swithinbank, C., Doake, C., Wager, A. and Crabtree, R. 1976. Major change in the map of Antarctica. *Polar Record 18* (114): 295-308.

Triggs, G.D. (ed.) 1987. *The Antarctic Treaty Regime: Law, Environment and Resources* Cambridge, U.K. Cambridge University Press.