

the site of an important vertebrate fauna, including a dolphin, suggest temperatures significantly higher than today's (Quilty). The presence of late Pliocene-early Pleistocene tillites (Sirius Group) at altitudes of 1800–2600 m in the Dominion Range area of the Transantarctic Mountains was

interpreted by McKelvey *et al.* as recording more than 1300 m of uplift since their deposition by the ancestral Beardmore Glacier. Fossil plants (including *Nothofagus*, the southern beech) in the Sirius Group also indicate a much more temperate climate (possibly 15–20°C warmer) than that of today.

JOHN W. SHERATON.

## Recent meetings

### **Eighth International Symposium on Gondwana, Hobart, Tasmania, Australia, 24–28 June 1991**

This symposium was organized under the auspices of the IUGS Subcommittee on Gondwana Stratigraphy, and included a number of workshops and meetings of IGCP project groups; there was much to interest Antarctic earth scientists. Comparisons and correlations with areas once adjacent to Antarctica are essential for understanding the geological evolution of Antarctica, and of Gondwana as a whole. Hence, virtually all of the symposium's ten sessions contained something of relevance to Antarctic geology.

Sessions on Precambrian mobile belts/sutures and Proterozoic assembly of Gondwana, late Proterozoic/early Palaeozoic tectonics, Gondwanaland basin development and break-up, magmatism and associated tectonics, and Gondwana floras had high proportions of papers dealing specifically with Antarctic topics. A number of these discussed correlations between Antarctica and other Gondwana fragments, including southern Africa, Sri Lanka, India, and south-eastern Australia. It is, of course, very difficult to determine in detail the pre-break-up positions of Gondwana fragments on the basis of geological correlations alone. Marine geophysical data show that break-up and subsequent spreading were tectonically complex processes, involving considerable continental crustal extension, and commonly with an oblique, but variable, extension direction; this point was considered by Stagg & Willcox and Willcox *et al.*, in relation to the Australia–Antarctic region.

Other contributors dealt with aspects of the geological evolution and reassembly of Gondwana in more general terms, for example, Schmidt (Palaeomagnetism and the Palaeozoic geography of Gondwana), Li & Powell (Review of the late Proterozoic to late Palaeozoic palaeomagnetism of Gondwanan continents), Unrug (The Gondwana supercontinent — the middle Proterozoic building blocks, late Proterozoic assembly, and unsolved problems), Sadowski (Geometry of the accretion of Gondwana), Veevers (Gondwana facies of the Pangaeon supersequence), Grikurov *et al.* (Crustal provinces in the southern high latitudes in relation to Gondwana break-up), and Long (The rise of vertebrates in Gondwana). Particularly noteworthy was the

paper by Dalziel (Gondwana as the offspring of an Eocambrian supercontinent), who postulated that the Laurentian and East Antarctic–Australian cratons were continuous in the late Precambrian, before rifting of the Atlantic margin of Laurentia from the proto-Andean margin of South America in the earliest Cambrian; early Palaeozoic sea-floor spreading isolated Laurentia from South America and East Antarctica–Australia and led to the final amalgamation of the smaller Gondwana supercontinent about 500 m.y. ago. Also of particular interest was the contribution by Hill *et al.* (Last remnant of Antarctica's Cenozoic flora: *Nothofagus* of the Sirius Group, Transantarctic Mountains) describing the occurrence of (Southern Beech) leaf and wood fossils in upper Pliocene glacial sediments of the Sirius Group at an altitude of about 1800 m in the Dominion Range area. This was interpreted as indicating temperatures 15–20°C warmer than today's and rapid subsequent uplift of the Transantarctic Mountains (up to 500 m/m.y.), perhaps rather surprising in view of the apparent lack of significant present-day seismic activity in the area.

Several papers were presented at a one-day workshop on the geology of the Prince Charles Mountains. This area is of unusual interest, because it represents by far the best-exposed cross section of the East Antarctic Shield, extending some 800 km south of the Mac.Robertson Land coast. The region is drained by Lambert Glacier, the largest in the world, which flows into the Amery Ice Shelf. Much of the northern Prince Charles Mountains (and adjacent coastal outcrops) consists of c. 1000 Ma granulite facies metamorphics, which were the subject of several papers, whereas late Archaean to early Proterozoic medium to high-grade metamorphic rocks crop out to the south. Webb & Fielding discussed the evolution of the Lambert Graben, which probably began to form in the late Carboniferous, and Arne presented apatite fission track evidence that considerable uplift of the Prince Charles Mountains occurred during the Early Cretaceous and was probably associated with Gondwana break-up. Clearly, studies of the Mesozoic–Cenozoic geological evolution, as well as the glacial history, of the Prince Charles Mountains provide a valuable opportunity for comparisons with the Transantarctic Mountains.

JOHN W. SHERATON

## Antarctic Science — Global Concerns, Bremen, Germany, 23–27 September 1991

After this meeting no one can accuse Antarctic scientists of not trying to explain their work to politicians and the public. Nothing like this had been attempted before in the history of SCAR. With over 500 people and all scientific disciplines represented this was both the most expensive and most extensive SCAR meeting to publicise Antarctic science. There was even a technology exhibition running concurrently. Despite a surprising lack of adequate preparation by some keynote speakers, most of the invited lectures were of a high standard, thought-provoking and pitched to be intelligible to non-specialists. The inclusion of three different types of posters was a most unusual feature. Each SCAR country had a general poster illustrating its organisation and approach to Antarctic activities, whilst SCAR had commissioned the scientific community to contribute 40 posters illustrating the wide range of science undertaken through SCAR. These posters were commercially designed and produced and made a striking introduction to the conference. Finally, there were over 100 contributed posters by individual scientists on current projects.

The conference aimed to provide a bridge between science activities and Antarctic policy. Dr R.M. Laws, President of SCAR, gave a “state of the nation” address making it clear that very difficult choices lie ahead for SCAR if it is to remain an effective international organization. This was followed by a remarkable speech from the German Federal Minister for Science and Technology. Instead of providing the usual political platitudes, he addressed the issues of global science and political responsibility in a well-informed address in English. The clearly articulated German commitment to polar science was refreshingly different, in view of the apparent lack of interest and expertise amongst government ministers of other countries. To take this further a series of three discussion panels on the final day offered opportunities to hear about and discuss the applications of new technologies, resources and Antarctic science, and the future relationship between science and the Treaty.

How can the success of this meeting be measured? Its obvious outputs will be a published volume of the keynote papers, and the opportunity to display the SCAR commissioned posters for display in other parts of the world. Despite timing the meeting to be just before the Antarctic Treaty Meeting in Bonn the Treaty delegates failed to attend – a depressing indication of the importance diplomats attach to science. The most positive feature of the meeting was the improvement in interdisciplinary interest and understanding between SCAR scientists. This alone, in my view, justified the meeting. SCAR yet again has made a major effort to allow the Treaty diplomats to be well informed. Any failings now must rest firmly with those diplomats and politicians who ignored this unique opportunity.

D.W.H. WALTON

## 6th International Symposium on Antarctic Earth Sciences, Ranzan-machi, Japan, 9–13 September 1991

For what is still a male-dominated community, the venue of this symposium, the National Women’s Education Centre, seemed a curious choice. However, its location 60 km from the centre of Tokyo, ensured that virtually everyone stayed together, enabling a much greater degree of contact and ‘out-of-hours’ discussions with colleagues than is possible when participants are scattered between several hotels. It was widely felt that this was one of the strong points of the meeting and one which contributed substantially to its success.

The symposium attracted 250 participants from 20 countries; there were 167 papers and 109 posters listed in a full programme, that required up to three parallel sessions for oral presentations and daily changes for the posters. A wide range of topics was discussed, as shown by the session titles: Cenozoic glacial history and geomorphology, Cenozoic volcanism, Phanerozoic tectonics magmatism and sedimentation, Precambrian–early Palaeozoic crustal evolution, Structure of the Antarctic lithosphere, Palaeontology and palaeoenvironment, Marine geology and geophysics, and Mapping, imaging and observatory geophysics. The poster sessions deserve special mention as an important contribution to the meeting. Although the time set aside for authors to stand by their posters was during part of the lunch break, these presentations nevertheless attracted enthusiastic audiences, and generated lengthy discussions impossible within the strict time constraints of an ‘oral’ session. My only criticism was the paucity of suitable space for the posters within the NWEC, a point organizers of future Antarctic Earth Science Symposia should note well — posters are here to stay.

The contributions clearly demonstrated a vigour and enthusiasm for Antarctic geoscience across a wide spectrum of problems. It was also heartening to see a substantial proportion of younger scientists taking part in the proceedings. However, it was also evident that, in some areas, there was a considerable overlap of effort. The Antarctic community needs to take urgent steps to curb this tendency. Antarctic research is expensive and poorly funded university colleagues at home might well ask why money should be spent to poor effect in Antarctica.

Many participants stayed on for the following weekend to attend workshops related to the activities of a number of SCAR initiatives, ANTOSTRAT (Antarctic Offshore Acoustic Stratigraphy), LIRA (Lithospheric Investigations in the Ross Sea Area) and COGS (Collaborative Geosciences in the South Shetland Islands). These meetings took place in the National Institute for Polar Research where our Japanese hosts ensured once again that we were well cared for.

6ISAES was an enjoyable and informative meeting which, I am sure, all participants will remember as a considerable success.

M.R.A. THOMSON

**BIOMASS Colloquium: Bremerhaven,  
September 18–20, 1991**

This was the formal conclusion of BIOMASS, initiated by SCAR in 1975 to further understanding of the Southern Ocean ecosystem and to develop a management strategy for its living resources. It was attended by representatives of some twenty nations and hosted, efficiently and generously, by the Alfred-Wegener-Institut. BIOMASS has been the largest biological programme yet mounted in the Southern Ocean and has resulted in many hundreds of published papers. These results were reviewed in sessions on physical oceanography, phytoplankton, zooplankton generally, krill, fish birds, lower and higher trophic levels and future developments, the two study areas, the Atlantic/Antarctic Peninsula region and Prydz Bay, being considered separately.

Specialized topics were presented in 32 posters. Major additions have been made to Southern Ocean ecology in general but much research concentrated on krill, as being of most economic importance. Although the acoustic method for estimating stocks has been refined and substantial grazing by krill on ice algae as well as on phytoplankton observed, no management model has yet been attempted. One great achievement has been the establishment of a data centre unique in its rigorous validation procedure and multidisciplinary scope. Another is the stimulus given to CCAMLR, the body responsible for conservation of the marine living resources. To an outsider the spirit of international co-operation evident at this meeting was remarkable and one hopes that this, as well as the data accumulated, will be carried through into future biological work in the Southern Ocean.

G.E. FOGG