Course Structure and Content

Initially, year-long courses (Geology I, Geology II and Geology IIIA) were offered, which included short sessions on different topics. More specialist units (Geol IIIB) were added in 1964. There was great flexibility of course content. Professor Brown took much of the responsibility for first-year teaching. Lectures and practicals were augmented by weekly films and television instruction items, and by numerous weekend field excursions. Some mapping practicals were conducted on the grass outside the building using wooden models of dipping rocks for students to measure and plot. Most staff also ran voluntary tutorials for small groups to assist with understanding course and practical work. They also helped integrate students into the department. These were continued with varying degrees of success for many years.

Cooperation with RSES was mostly good; Professor Jaeger insisted that all RSES non-geology graduates in geochemistry and geophysics took the Geology first-year course, and this kept our staff on their toes! RSES staff taught most of the geophysics courses for many years. Professor Anton Hales accepted our students’ invitation to be patron of the students’ Geological Society and attended their seminars regularly. Many RSES staff have contributed to lectures, and allowed staff and students access to their equipment and assisted with supervision of honours and graduate students.

Arthur Holmes’ text on the *Principles of Physical Geology* was the basic first-year text in the early years. This was replaced with the magnificent *Perspectives of the Earth*—a text with an Australian emphasis produced for secondary school students by a team organised by the Academy of Science. It missed its intended mark; nevertheless, it was an excellent first-year text. With the recognition and acceptance of plate tectonics, many large American universities produced their own texts and the market was flooded.

Individual specialists shared teaching of second and third-year courses. Plate tectonics was a newly developing concept in the 1960s, replacing the
continental drift hypothesis that was not widely accepted. Many geologists were ‘fixists’ and believed in island-chain connections between continents to account for similarity of fossils. Even our own petrologists were unconvinced, arguing that Professor Ted Ringwood’s work on the mantle precluded drift! We first introduced the topic as lively evening seminars. Professor Brown was one of the few advocates in Australia (see Chapter 5). After several sessions, the students asked to hear the case against the theory, so we arranged seminars with outside lecturers. Professor Brown threatened to introduce one famous academician, a Fellow of the Royal Society (FRS), as ‘fixed, rigid, and stationary’. Later, a new course on tectonics, taught by Mike Rickard, was added to the syllabus and an amateur film of plate movements was made in the first practical sessions. Students sabotaged the moving sea-floor-spreading model we had constructed by inserting a Playboy centrefold that emerged from the spreading ridge. Palaeo-magnetic and age-dating studies carried out in the Research School of Physical Sciences (RSPhysS) by Ted Irving, Ian McDougall, Ron Green, Don Tarling, Mike McElhinny, and others placed the ANU at the forefront of this new concept. From 1970 onwards, plate tectonics dominated tectonic theories and became the new, all-embracing paradigm. Together with an exploration boom, it gave a great boost to student interest and enrolments.

The introduction of the semester system in 1969–70 was useful for us, although it circumscribed our course structure. We experimented with different combinations. The 20-point degree comprised eight points in first year (normally four two-point units) and six points in each of second and third year (Table 4.1). This unit system allowed students failing in one unit to avoid repeating a whole year. Our problem was fitting all the introductory material into four second-year points; structural geology was paired at different times with sedimentology or economic geology until it finally settled in third year. Unlike some departments, Geology wished to keep two points in second year open for students to take other subjects in science (for example, chemistry) or even arts options. One student took Old Norse and ended up working for the Geological Survey of Finland. Another took Fine Arts.
Table 4.1 The 1990 course structure serves as an example of the Geology Degree course structure and the subject offerings for several years

<table>
<thead>
<tr>
<th>First year</th>
<th>Geol A11 The Earth Works (various)</th>
<th>Geol A02 Evolution Planet Earth (various)</th>
<th>Geog A13 Landscape Evolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second year</td>
<td>B03 Mineralogy (Eggleton)</td>
<td>B02 Palaeontology/Stratigraphy (Campbell)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B06 Sedimentology (Crook)</td>
<td>B04 Petrology (Ellis)</td>
<td></td>
</tr>
<tr>
<td>Option</td>
<td>Option</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third year</td>
<td>C02 Structure/Tectonics (Rickard)</td>
<td>C01 Field Mapping (Rickard et al.)</td>
<td>C03 Palaeontology* (Campbell)</td>
</tr>
<tr>
<td></td>
<td>C05 Geochemistry* (Chappell)</td>
<td></td>
<td>C04 Petrology* (Chappell)</td>
</tr>
<tr>
<td></td>
<td>C06 Geophysics* (Lilley)</td>
<td></td>
<td>C07 Economic Geology (Walshe)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Seminar options C08 or C10 or C11, etc. (see below)</td>
</tr>
</tbody>
</table>

# subjects offered in alternate years
* alternative options
Note: Staff leaders are in parentheses.

Student exam performance has generally been very good (Distinctions, 10–30 per cent; Credits, 10–50 per cent; Passes, 25–50 per cent; and Failures, 5–10 per cent). The introduction of a Pass 2 (P2) grade allowed poor students to continue their studies in other areas, rather than fail. Occasionally, some first-year performances were unsatisfactory, with up to 25 per cent failures. Our first-year course was subjected to a major review by the ANU Office of Research in Academic Methods (ORAM) in 1986 and it was well received. Faculty requirement for departmental committees (1970–80) was unpopular. Later, our students were invited to open staff meetings for a while; however, Geology maintained good contacts with students through labs and fieldwork.

In 1977, a general second-year course, Geology BO9, was introduced to serve and attract Prehistory, Geography and other Arts or Economics students. It was dropped with the introduction of the general Geology AO2 unit in 1980. Some joint courses with Chemistry and Zoology were also mooted, but only briefly accomplished—for example, the introduction of a second-year course in solid-state chemistry in 1983, which lasted for only five years.

Geomorphology had been accredited as a Science B point since 1980, and it was taught in Geography by two of our graduates: John Chappell followed by Brad Pillans. Several of our students took this unit. Initially in the Arts
Faculty, Geography moved to Science in 1990, and, with Forestry, was later joined in a School of Resource and Environmental Science (SREM) with which we somewhat reluctantly associated. From 1990, we adopted a Y-structure with Geography for first year—with a first-semester joint course AO1 (The Earth Works) and separate second-semester offerings, AO2 (Evolution of Planet Earth) and A13 (Landscape Evolution). Several staff contributed to these lectures, but research priorities made it difficult to organise topics in logical order. Some students, especially from Geography, enrolled in Geology units with no high-school chemistry. To overcome this problem, Bruce Chappell gave a remedial crash course in introductory chemistry. Changes in first year resulted in dropping some of the more traditional material, such as crystallography and geological map interpretation, which had to be accommodated in later-year units. In 1996, students requested that lecture material be posted on the Web, so a Research Assistant, Colleen Bryant, undertook to transfer all first-year lectures.

Faculty criticism over offering courses to less than 10 students was countered by staff arguments that they needed to introduce their special expertise to students before honours year. In spite of heavy teaching loads, this system allowed most staff a semester free for research, and, by alternating some units, freed staff for occasional study leave. Specialist seminars were offered from time to time on topics including basin analysis (Tipper), marine geoscience (Crook), structural analysis (Rickard), vertebrate and theoretical palaeontology (Campbell and Tipper), surficial geology (Crook), Australian stratigraphy (Brown, Crook and Rickard), Australian sedimentary basins (Tipper), mathematical geology (Tipper), environmental mineralogy (Eggleton), thermodynamics and theoretical phase equilibria (Walshe), engineering geology (Rickard et al.), and petroleum and coal geology (Tipper). Field workshops to Heron Island and New Caledonia were run by Patrick De Deckker and later by Brad Opdyke. John Tipper was responsible for introducing computer work into the department with his basin analysis course and this was followed by a remote-sensing course taught by Prame Chopra. Half-point seminar units were largely abandoned by 1983. After 2004, when the department’s name was changed to Earth and Marine Sciences, the course structure changed markedly (see Chapter 9).

Outside assistance was obtained for teaching some of the optional units. Dr Ian Williams assisted with the geochemistry course. The lack of a lecturer in the important field of geophysics has always been a problem and the course was run in third year, alternating with geochemistry, and both were assisted by outside lecturers. Members of RSES and AGSO (G. Bassi, J. Braun, I. Jackson, G. Davis, G. Houseman and B. Barlow) assisted with the geophysics course,
Teaching

and Ted Lilley (RSES) kindly took responsibility for many years. Ted Lilley’s contribution deserves special mention as he ran or assisted with the course from 1977 to 1994, until Prame Chopra was appointed to the department. Prame was assisted by CRC-LEME Research Fellow Éva Papp in 1999–2006. Demonstrators for the course were graduate students from RSES (Dennis Woods, Steven Constable, Ian Ferguson, Nathan Bindoff, Richard Kellett, Graham Heinson, Paul Johnson, Dan Zwartz, Stuart Monroe and Michael Wingate). The research students who acted as demonstrators were a most important part of the course. They often brought in valuable ideas from the places from which they had come. Many also took away from the course ideas that they used subsequently when teaching geophysics elsewhere. Demonstrating was a valuable educational experience for them, and directly valuable on their own CVs. Of the students who took the course, many found geophysics enjoyable and satisfying, and later some were employed as geophysicists with oil companies, mining companies and government organisations such as Geoscience Australia (GA). A few became PhD graduates in Geophysics.

At the end of 1994, Ted Lilley’s ‘farewell gift’ was to set up a Geophysics Prize for the students who came first in the course. For this purpose, the ACT Branch of the Australian Society of Exploration Geophysicists (ASEG) and the university established a prize to be awarded biennially (1996, then alternate years). In the event, when the course was held in successive years, the ASEG was pleased to fund the prize every year that the course was held (Geology student prizes and recipients are listed in Table 8.2).

Canberra proved a very good place to teach practically based geology courses. The large departmental tectonic globe (Plate 2) proved a great piece of equipment for the purpose of locating earthquakes from the records of the world’s seismic observatories. A temporary pendulum set up in the department’s stairwell (in both the 1970s and 1990s buildings) was used not only to measure gravity, but also to demonstrate, as a Foucault pendulum, the Earth’s rotation. Outside the ANU, high-quality geophysical installations run locally by the ANU and BMR/AGSO/GA meant a wealth of places to visit to see geophysics in action. For example—visits were made to: the Canberra Magnetic Observatory, the Mount Stromlo Seismic Observatory and Heat-Flow Bore Hole, and the Black Mountain Palaeo-Magnetic Laboratory. The park-like grounds of the ANU and of Canberra in general provided excellent places for field measurements with geophysical instruments (generally provided by RSES and AGSO).
Other people contributed to expand our course offerings over the years. Max Gage, a visitor from New Zealand, gave a short course in Quaternary geology as early as 1963, but this did not become a popular part of the course until the 1980s. Roy Brewer (CSIRO) gave early soils lectures, and Sue Feary taught an introduction to statistics for the Australian geology course. Elizabeth Truswell (BMR), Donald Walker and Judy Owen (Research School of Pacific Studies/RSPacS) gave a course in palynology in 1980. During the late 1960s, Mike Plane (BMR) ran a course on Australian fossil mammals. Since 1978, Gavin Young (BMR, now ANU) has lectured and run practicals on early fishes in Ken Campbell’s and Patrick De Deckker’s palaeontology courses. David Ride lectured on fossil mammals. The advanced palaeontology course was offered in alternate years until the early 1990s (Table 4.1). Student field excursions in various years included trips to Forbes, Canowindra, Wee Jasper and Braidwood to study fossil fish, and the Monaro to study mammals.

Professor Shohei Banno, a visitor from Japan, assisted in teaching metamorphic geology. In 1971, the year Allan White left, metamorphic geology was replaced for a time by isotope geology taught by RSES staff. In 1974, the famous Germaine Joplin (RSES) taught the metamorphic geology course. Later, Wally Dallwitz (a retired BMR petrologist) helped with practicals in petrology before his untimely death in 1992. We had a hard fight to convince the Dean of Science that specialist courses could not be taught by other staff, and eventually we were granted a short-term Associate Lecturer (Warrington Cameron) to replace Allan White. Similar problems occurred later, especially with supervision of graduate students, as other staff left.

David Lock (a Postdoctoral Fellow) taught a course in lithofacies in 1987 while Keith Crook was on study leave. David Lock ran a course on industrial minerals. Similarly, Chris Jenkins stood in for Professor Campbell in 1981 while he was Dean of Science, and he made seven videotapes for introductory palaeontology. An engineering geology course was organised by Mike Rickard and taught with the help of several outside lecturers from industry and AGSO, especially Professor David Stapleton (Coffey/SA Institute of Technology), whose guided tours of the Snowy Mountains Hydro-Electric Scheme were most instructive and popular. With the appointment of Eric Best to the University of Canberra, this option was dropped and students were encouraged to enrol in engineering geology there. After Eric Best’s retirement, Patrick De Deckker developed our first course in environmental geology.
In 1989, the ANU and the University of Canberra considered merging, and extensive discussions took place before the idea was dropped. In the meantime, the two geology departments had started joint teaching. Mike Rickard and Wolf Mayer taught a combined structural geology course successfully for several years. Teaching this course was made difficult by the differences in the structure and lengths of the courses at the two universities, which meant that the ANU students had to undertake extra work. Keith Crook and Graham Taylor taught sedimentology jointly, and John Walshe and Ken McQueen combined their economic geology courses. A highlight of the latter was a five-day ‘magmatic-hydrothermal short course’ that was run in the central west of New South Wales. The students were based in a caravan park in Cowra and a pub in Temora. Morning lectures were followed by visits to the Goonumbla (North Parkes) porphyry deposits, Browns Creek and Sheahan-Grants copper–gold skarns in the Blayney area and the Temora (Gidginbung) acid-sulfate-gold deposit. The final day examined the magmatic-hydrothermal breccias in the open pits of the Ardlethan tin deposits west of Temora. This short course gained much from the work of graduate students, and costs were defrayed by industry participation. University of Sydney staff and students also participated one year.

Despite having 13 postgraduate students in 1969, difficulty in attracting students in the 1970s endangered our staff positions. By 1979, we had only four honours students. In 1980, we had 39 first-year students, 18 second-year, 17 third-year and seven honours students. Note that by 2001 the number of honours students had increased to 16 (Plate 9.2).

The fourth-year honours course comprised a thesis based mostly on field mapping (50 per cent of marks), a seminar (10 per cent) and course work (40 per cent), of which Australian and world stratigraphy was a compulsory unit. David Brown, Ken Campbell and Keith Crook published in 1968 the first definitive text on Australian stratigraphy—*The Geological Evolution of Australia and New Zealand* (Pergamon, Oxford)—and, for many years, Professor Brown and Keith Crook taught this subject at third-year level. After they retired, the course was moved from third year to honours year and was taught by Mike Rickard and then David Ellis with several outside lecturers from AGSO and RSES, including one year by the visiting famous American tectonicist Warren Hamilton. This course was eventually dropped in 2008. Previously, a joint honours course with the Geography Department, as part of our SREM association, had given problems because the course formulae were different, as geography students were required to do less course work.
In the early days, a foreign language was required for honours and MSc candidates. Professor Brown ran a course in scientific Russian. There was also a compulsory exam on criticism of a published paper. After Professor Brown retired, these unpopular requirements were dropped. The honours year had a very heavy workload, especially as the date for thesis submission approached. The introduction of personal computers changed social habits somewhat as students no longer sought typing assistance. Honours graduates and their thesis titles are listed in Appendix 2.

In 1965, members of the department (David Brown, Ken Williams and Eric Conybeare) organised a national symposium on Undergraduate Geological Training to address concerns about the lack of practical work in topics related to future employment, especially in mineral exploration. Shortly after, a 1967 *Survey of Geoscientists in Australia* was published (K. A. Townley et al. 1968, Special Publication 1 of the Geological Society of Australia). Interestingly, this showed that many companies were happy to accept graduates with three-year degrees, as they provided on-the-job practical training for new employees.

In response to these concerns about practical training, together with the mining boom of the 1960s, the ANU Geology Department tried to introduce a professional four-year pass degree (like the Forestry Department). Faculty rejected this scheme, however, so for several years pass graduates not eligible for honours were encouraged to undertake a Graduate Diploma. A merit pass for the diploma allowed entry to an MSc course. This also acted as a convenient means of assessment of potential overseas MSc students. Three students from the Geological Survey of Indonesia took advantage of this scheme. Sae-un Hardjoprawiro worked in Fiji for his MSc; Sufni Hakim proceeded to Royal Holloway College, London, for an MSc; and Priharjo Sanyoto worked with the BMR team in Kalimantan.

We had some altercations with the Australasian Institute of Mining and Metallurgy (AusIMM) in the 1990s. They criticised our lack of applied subjects and wished to accredit the ANU courses. The department refused to do this, as we maintained that our coverage of basic science prepared our students well for a wide variety of earth science careers, and many mining companies were keen to employ ANU graduates (see comments by alumni, Chapter 11). Moreover, in 1981, the Geological Society of Australia (GSA) had set up a professional body, The Australian Institute of Geoscientists, that could accredit geology graduates for professional work. By now there were two geology departments in Australia (at JCUNQ and the University of Tasmania) that offered MSc courses...
in exploration geology for students who wished to gain more applied training. Subsequently, the Department of Earth and Marine Science (DEMS) has been accredited by AusIMM (see Chapter 9).

The staff also contributed to outside teaching. Professor Brown, Dr Conybeare and Dr Rickard, in turn, ran an introductory course for the ANU adult education program, until 1981. George Halford, the Museum Curator, ran an adult education course in gemology for several years. Professor Campbell arranged short courses for school science teachers when the Wyndham Scheme added geology to the NSW high-school curriculum in 1962. Ken Campbell and Mike Rickard also contributed an article on the state of geological teaching to *The Australian Bicentennial Project Bulletin* in 1987–88. The department hosted introductory sessions for prospective high-school students and CSIRO summer schools. Dick Barwick (then teaching in Zoology) ran a laboratory-based school program introducing fossils to primary school students as part of the 1988 Science Festival. Bruce Chappell and Keith Norrish (CSIRO) ran an X-ray course for industry for several years. Patrick De Deckker commenced the ‘University of the Sea’ program with colleagues from Sydney University, which has so far run two cruises involving 20 honours and postgraduate students on the French research vessel *Marion Dufresne*. Patrick was also involved with Peter Hancock (Visiting Fellow) and Sarah O’Callaghan (HTO) in running a student ‘Mineral Ventures Program’ for high-school students, which featured visits to local mining sites in New South Wales, as well as visits to Geoscience Australia (GA) and the University of Wollongong. In September 2006, Patrick organised a 10-day visit for 20 students and staff from Tokyo University. They made field excursions to Yass and the South Coast, where they were based at the ANU’s Kioloa field station. Bear McPhail has presented short courses on hydro-geochemistry and environmental geology to the Universities of Tasmania, Monash and Princeton, and the Minerals Tertiary Education Council. Mike Rickard gave short courses in tectonics at James Cook University in 1970, and the Geological Survey of Indonesia at Bandung, in 1989.

As could be expected with the complex matters of balancing teaching and research loads and study leave, staff meetings were occasionally acrimonious. Especially difficult were reluctance and differences of opinion over course changes, the forced move to the new building and budget allocations. Mike Rickard, as Head of Department, reported to the 1990 Review Committee that he viewed his job as akin to the ‘governor’ of a steam engine—attempting to stop the balls flying off in all directions!
Student Fieldwork

Early field excursions (1962) were combined with those of the University of New England (courtesy of Professor Alan Voisey) and the University of New South Wales, visiting localities in the Orange–Wellington area (Plate 4.1), New England, Yass and Tilba Tilba. Most courses included weekend fieldwork. Initially, Professor Brown insisted on taking first-year students to camp—mostly at Taemas in mid-winter. He also made a habit—based on his navy training—of waking everyone up at 6 am with a cup of tea. This worked well as a hydrostatic alarm clock! On one camp, a student caught a black snake that he intended taking back to CSIRO Wildlife, but it escaped from the sack and caused pandemonium in the bus. Fortunately, no-one was hurt and the snake escaped. Mark O’Connor (the poet, then an arts tutor living at Burton Hall, ANU) asked
to come on a first-year field excursion to Lake George. He amused us all by demonstrating his judo skills, throwing female students neatly over barbed-wire fences—a trick that led to ripped jackets when others tried it!

Plate 4.2 First-year excursion, 2003. David Ellis and ‘Bear’ McPhail instruct students at the ANU’s field station at Kioloa, New South Wales.

Plate 4.3 David Ellis poses in front of the famous unconformity at Myrtle Beach

Photo: Gavin Young
When student numbers exceeded 50, we switched to a joint camp with Geography in the Snowy Mountains, led by Geoff Hope. Later, Henry Zapasnik rented a ski lodge in the off-season for an introductory Kosciuszko excursion. The 8 km round-trip walk to Blue Lake was a good test of stamina for budding geologists. There was also a weekend coastal excursion for first-year students run by Tony Eggleton and other staff members.

Second-year palaeontology classes regularly visited Ulladulla with Ken Campbell to study the major unconformity between Ordovician greywackes and Permian glaciogenic sandstones and Permian fossils (Plate 4.3). The structural geology course examined the famous complex structures at Bermagui with Mike Rickard and more recently with Stephen Cox (Plate 4.4). Broken Hill was a common destination for petrology, economic geology and structural geology courses (Plates 4.5 and 4.6). One of the first trips led by Ken Williams started with a spectacular breakdown in sight of the town. The oil in the VW Kombi van boiled dry, seizing the engine. It turned out that paper towel from the last oil check had been left in the engine compartment and this had blocked the air intake! This was some introduction for Shohei Banno, a Japanese visitor; but later the poker machines completed his education of Australian bush life.
On another trip, led by John McDonald, the students had been invited to a dinner in the Town Hall by AusIMM and the mine managers. Since they were camping, no-one had smart clothes, but by accident Mike Rickard had packed a dozen ties, so the students managed to appear reasonably presentable. Petrology students still tour the fantastic geology of Victoria and Broken Hill with David Ellis in third year (Plate 4.5). On one occasion, Ellis arranged for the Mayor of Broken Hill, Peter Black, to address the students at their final-night dinner. The Mayor delivered a risqué speech that insulted the female students, but Megan James (a geology/law student) took him to task in her reply. To make amends the following day, Black took some of the students out to see the International Sculpture Park and the famous double-fold locality. David Ellis has even organised camel rides to cap off the week-long stay in Silverton.
The earliest departmental major field-mapping camps were run alternately as hard-rock and soft-rock 10-day camps in the end-of-year vacation. For example, one studied granites (hard rock) at Moruya and Dalgety (1966) before settling on Berridale as the study area; the other worked on the fossiliferous limestone (soft rock) at Taemas and Boambolo. During a camp at Taemas, a Visiting Fellow, George Grindley, was sent out with a mapping party. At the end of the day, the students returned exhausted, for nobody had told them that George was a NZ alpine explorer. In 1963, two nuns took geology in preparation for their science teaching under the new NSW Wyndham Scheme. Climbing fences in their habits was a problem, so Professor Brown had a portable stile made. This proved to be too clumsy, so the students made a human stile for the nuns to leap over the fences. At night, as they had to be transported to the nearest convent, they were driven back to Yass by Ken Campbell in the vehicle, renewing our beer supplies.
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With the advent of the semester system in 1969–70, all fieldwork had to be related to a course and assigned points. The petrology camp was shortened to five days and was combined with the mineralogy course. Initially, John McDonald ran this camp at Cobargo. After he left the department, Tony Eggleton with George Halford, Ian Smith and other staff ran these camps at Tilba Tilba to map the Mount Dromedary volcanic centre (Plate 4.7). Ultimately, a scientific paper was produced as well as a pamphlet and map of the Golden Volcano for local tourists. Numbered plaques were erected around the mountain to guide tourists to the geological features.

Plate 4.7 The Golden Volcano, Tilba Tilba
Photo: Patrick De Deckker

The third-year stratigraphy camps remained at 10 days with one point credit (Geology CO1). These were held in several different localities throughout New South Wales (Plate 4.8), with different staff leaders—including: Boambolo (Crook, Feary, Opdyke); Nundle (Crook); Goodhope (Campbell, De Deckker, Rickard); Quidong (Campbell, Rickard, Opdyke); Michelago (Rickard); Tathra–Bunga (Rickard, Tipper); Rangari (Tipper); Eden (Crook, Rickard, Opdyke); Carcoar (Rickard, Walshe); Boorowa (Rickard, Opdyke); Wee Jasper (Opdyke, Rickard, Young); Gowan Green (Opdyke, Strusz); Wellington–Burrandong (Opdyke, Strusz); Broken Hill (Lister). Property owners and managers have always been helpful and amenable to having students working over their land and we acknowledge in particular Ken Kilpatrick, the property manager of Cavan Station, and Ian and Helen Cathles at Wee Jasper, who have allowed us access over many years.
Geology at ANU (1959–2009)

Plate 4.8 Map of field camp locations in New South Wales

Apart from good mapping training, these camps provided many memorable events. While mapping at Moruya, Tony Taylor showed students how to trace granites through unexposed fields by noting hornblende in the anthills, and Allan White found a new use for a G-pick when wading across part of Tuross Lake—we had a good feed of fish that night (Plate 4.9).

At Dalgety in 1968, we mapped sequential granite plutons. For evening entertainment, we organised a dance, but the band did not turn up, so it was a flop. The bar was kept open late by one of the demonstrators (Bob Day), while students flirted with the publican’s daughter. Then we were woken in the early hours of one morning by some irate local parents looking for their daughters. We denied all knowledge of their whereabouts!

During the camps at Rangari, we mapped Permian volcanics, and were treated to roast suckling pig courtesy of Henry Zapasnik, who had been out hunting the night before with the property owner. At Carcoar, we camped in a B&B run by two charming ex-actors, and two students were attacked and stomped on by a wild emu while mapping Ordovician volcanics and a granite pluton.
Students mapped the Quidongan unconformity and Silurian volcanics at Michelago. Here we camped in shearers’ quarters. Each night we visited the Bredbo pub for showers and to play on the small hexagonal pool table. Greg Harper, the draughtsman, turned up to barbecue a whole sheep for our last night’s campfire sing-along. This became a tradition, with Henry Zapasnik repeating the effort at Good Hope camps. Here, we used small boats to cross the
dam to map Devonian limestones. Tim Munson even managed to get marooned as one of the boats slipped its moorings and miraculously floated back to the caravan park.

At Mountain Creek (Taemas), where we mapped Devonian sediments and volcanics, Radi Popovic took to wrestling a large goat, which so enjoyed the exercise it made it difficult for students to run from the cookhouse to the sleeping quarters. During a camp at Good Hope, we were visited by Herman Jaeger and David Skevington, two world-famous graptolite experts. Herman went on to compare and correlate the eastern Australian faunas with those at type localities in Germany. The last Eden camp to map Devonian volcanics and sandstones was marred by coastal development, as we had to obtain permission from more than 200 property owners to enter their land! This camp, held in mid-winter, was based in caravans with map plotting in the open air. Naturally, the nearby Seahorse Inn with warming whiskey macs became a substitute base each evening. For several years, we mapped the spectacular Devonian limestones at Wee Jasper, on the property of Ian and Helen Cathles (Plate 4.10). We took advantage of low water levels in Burrinjuck Dam to trace stratigraphic units.

For three years (1995–97), the CO1 field-mapping camp held at Boroowa, New South Wales, was run jointly with the University of Canberra (led by Ken Mc Queen) and with the ANU Geography soils course (led by John Field). This cooperation between the bedrock and surficial student groups was most beneficial. Students also presented their results to the townsfolk at a popular evening seminar in the local pub. Late one night, some students caused a disturbance by climbing into the swimming pool and running about naked. The local cop, who was in his first week of duty, was not amused and remonstrated angrily with John Field, the camp leader. For the last-night dinner, students bought dress-up clothes ($10 maximum) from the local ‘op-shop’. The elderly female shop assistant was somewhat perplexed by the cross-dressing, but she was even more surprised when all the clothes were donated back the next morning.

The CO1 (field mapping) course included a short laboratory-based course on photo interpretation, for which Mike Rickard had taken, in 1973, a photogrammetry course with the Australian Mineral Foundation in Adelaide. Also, for many years, a field day of plane-table mapping gave students a basic idea of surveying. Although old fashioned, this exercise was always enjoyed by students. One student (Garry Davidson, now lecturing in Tasmania) was so enthusiastic that he swam the sighting staff out to small offshore rocks to complete the map at Picnic Point.
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Plate 4.10 Field camp at Wee Jasper, 2005. Back row, left to right: Taylor Walsh, Jane Thorne, Helen Tait, Jenna Roberts, Mitchell Bouma, Graham Nash, Andrew Tankey, Tim Curran, Brad Opdyke, Brian Spall, Malcolm Mann, John McDonald, Claire Bennett, Max Collett, Jennifer Burke, Joshua Knight. Front row, left to right: Melissa Jinsberg, Rhiannon Mann, Alice Menyhart, Nicholas Rankin, Peter Meadows, Meryl Larkin, Antonia Bigault.

Photo: from B. Opdyke

For several years, voluntary excursions were also run to Heron Island as an optional seminar course. These trips were led by Patrick De Deckker with assistance from Tim Munson and Henry Zapasnik. The students contributed to ongoing research on coral reefs. These trips were continued later as a seminar offering under Brad Opdyke’s leadership.

An extra camp was run in 1967 to accommodate several students who had missed the main camp. A small group, with Mike Rickard and Brian Chatterton (a PhD student), mapped at Fowlers Gap in western New South Wales (with permission from the University of New South Wales, which owned the property). The planned early start was delayed by the non-appearance of one student, who was rushed into the Geology carpark in full evening dress still asleep. She was bundled into our van, waking up several hours later. The map the students
produced on this trip was used for many years as an exercise for the photo-interpretation class. On returning through Broken Hill, two students (the Arndt brothers) made a bargain purchase of some Pro Hart paintings.

John Tipper has written about fieldwork:

ANU was great experience—to see geology from a Gondwanan perspective and from an old and stable craton, to see how teaching and research can be put together in a (usually) positive way, and to have confirmed the fact that even the most magnificent of modelling efforts can crumble in front of some apparently insignificant little outcrop. Experience is what the geologist needs above all, preferably in the field with students. Sometimes, however, experience can be exasperating, as Ken Campbell found out during a Taemas camp. I have changed the student’s name but his interaction with Ken Campbell was as follows.

Theo belonged to a religious group who claim the Earth is 5000 years old—plus-or-minus 10 minutes…Ken, of course, was determined to show this young man the error of his ways, and to do so in an impeccably scientific way, based on field observations we could all make together. A soil profile was found and Ken asked how long it had taken to form: ‘This must have taken at least 3000 years, Theo, what do you say?’ ‘Yeah’, Theo agreed. Five minutes later, just round a track bend, were two such profiles occurring together, the second clearly superimposed on the first. ‘3000 years for the first profile, Theo, then 3000 years for the second?’ ‘Yeah!’ ‘So how old is the Earth, Theo?’—from an understandably triumphant Ken. ‘5000 years’, said Theo!

Most honours students made a major study of a field area for their theses and generally these were done with their own transport. Many of these projects were carried out in areas of interest to staff research, however, some honours students carried out research projects in the laboratory supervised by RSES staff. Staff have also been involved in supervising graduate research–student fieldwork in many locations throughout Australia—in several cases, attached to BMR/AGSO field camps. In addition to the scheduled fieldwork, students have organised their own end-of-year excursions with staff assistance. These are reported in Chapter 8.

There have been only one or two vehicle accidents on field trips over the 50 years; in one, a car was rolled and a trailer was jackknifed. The only serious accident occurred in 1973 on the return from a Tasmanian excursion when a vehicle collided with our van and Graham Taylor was hospitalised for more
than a year with a compound leg fracture. A minor collision also occurred in the Hunter Valley. Allan White is reputed to have avoided a collision by swerving and driving full-speed through a service station! Field accidents include a cliff fall, scalded legs and a dislocated shoulder. There have been several snake encounters but fortunately none serious. On one Taemas trip, John Brush, an avid cave explorer, jumped into a sinkhole on top of a snake; he was pulled up to safety by his mates, with his boots covered in venom. Several students have had painful contacts with electric fences—none serious, however.