DEPARTMENT OF MINES AND ENERGY
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REGIONAL GEOLOGICAL MAPPING AND CARTOGRAPHIC PROCEDURES

GEOLOGICAL SURVEY

BY

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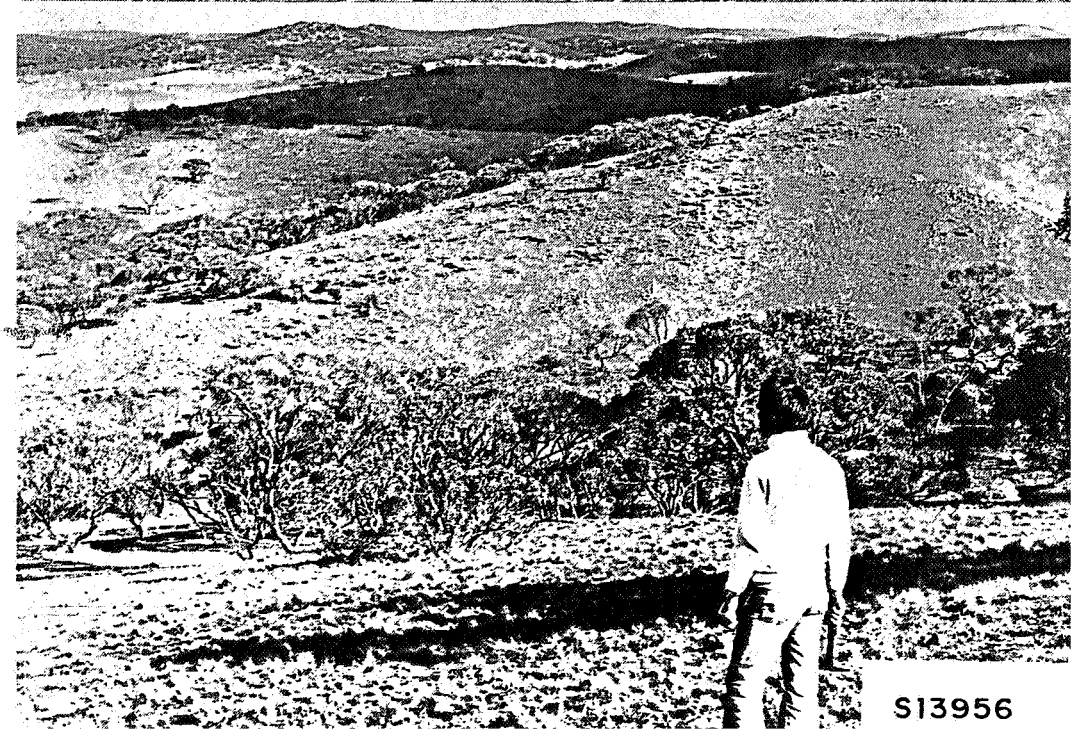

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(R.J. Noble, R.E. Adams; G.J. Ambrose, M.C. Benbow, S. Howles; A.J. Parker.)

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ABSTRACT

The Geological Survey Branch of the South Australian Department of Mines and Energy began systematic production of standard geological map sheets in 1949. This work continues and is an important contribution to the development of the mineral, energy and water resources of the State. Base maps at a number of scales are prepared in the Map Compilation Section and regional geological mapping is carried out by various sections of the Survey and, in particular, the Regional Geology Division, which also co-ordinates the mapping programme.

Using the recommended mapping procedure, the geologist records data on the central part of alternate air photos. These are commonly at scales of 1:15 000 to 1:80 000. Black ink is used for field information and red for office interpretation. Most field notes are written on the back of each air photo. After the completion of field mapping and air photo interpretation the annotated photos are returned to the Map Compilation Section for preparation of a preliminary geological map, first in the form of six 1:100 000 - scale sheets, then at 1:250 000 scale. After checking, a colour manuscript map is completed with legend, cross-sections, tectonic sketch map and rock relationship diagram and passed to the Map Publication Section for scribing and other cartographic work. Lithography is carried out by the Government Printing Department. Concurrently, the geologist writes a report on the geology of the area; field data are supplemented by the use of colour air photography, Landsat imagery, geophysical surveys, subsurface information, exploration company reports, biostratigraphy, and geochronology and petrology carried out by the Australian Mineral Development Laboratories.

INTRODUCTION

Geological maps and reports are necessary to guide the orderly development and management of the State's natural environment and resources.

Although especially useful in mineral exploration and assessment of energy and water resources geological maps are also a valuable reference during the planning of engineering works or a study of the distribution of soils, fauna or flora. They have cultural applications at various levels of education from primary schools to academic research and have their own aesthetic value as a human achievement in observation of nature and drafting and printing skills. Geological mapping furthers our knowledge of earth history and, similarly to topographic mapping, is a basic aid to national development.

This report outlines present regional mapping and map preparation procedures in the Geological Survey of South Australia and is a revision of an earlier report (Forbes and Richards, 1975). Emphasis is still upon 1:250 000 scale mapping: at time of writing over 90% of the State is covered by geological maps at this scale, but about half of these maps are preliminary uncoloured editions of areas where additional field mapping is required before the maps are published in the 'Atlas' series, and some early maps in the Atlas series are being revised to incorporate new geological data. However, it is also evident that in addition geological maps at 1:50 000 and other scales are needed, particularly over more intensively developed areas.

The writers are indebted to C.R. Dalgarno and A.H. Blissett for contributions and to other colleagues for critical reading of the text.

HISTORICAL

The first geological map of the State (scale 16 miles to 1 inch or 1:1 000 000 approx.) was produced by the first Government Geologist, H.Y.L. Brown, in 1883. This was a great achievement for one man. The establishment of the Geological Survey and preparation of this first map resulted from the recognised

importance of the mineral industry to the economy of the State. A revised map was published in 1928 under L.K. Ward.

Systematic geological mapping did not begin until 1949 when R.C. Sprigg supervised fieldwork in the South East and around Adelaide and Radium Hill. The first publication resulting from this work was the Gambier-Northumberland 1:63 360 geological map which appeared in 1951. This was followed in the same year by the Adelaide, Robe and Kingston 1:63 360 maps and the PENOLA 1:253 440 (4 miles to 1 inch) map. Sections of the Survey other than Regional Mapping (later named Regional Surveys; now Regional Geology Division) have produced a significant share of the published maps from 1951 to the present. In 1954 supervision of regional mapping was taken over by B. Campana, later succeeded by B.P. Webb (1957), B.P. Thomson (1962) and C.R. Dalgarno (1978). The Regional Geology Division co-ordinates the Survey's regional mapping work.

A published geological map is a reflection of the current state of geological knowledge and available drafting materials and skill. Advances in geology and cultural development eventually render a map out of date and it thus becomes necessary in the future to revise the earlier mapping. Hence it has to be acknowledged that a geological map is only a temporary document which needs periodic revision in order that the community may benefit from scientific progress.

Equally as important as the geologist's work in the production of a geological map are the various stages of drafting carried out by the Map Compilation and Map Publication Sections of the Drafting and Survey Branch. Published maps indicate the successful co-operation between geologists and draftsmen and liaison with the Government Printer and Department of Lands.

STEPS IN MAP PRODUCTION

From the geologists' point of view, the main steps in map production are:

- decision, in the light of current government initiative, of the area to be mapped, at what scale, and a proposed timetable;
- receipt of basic materials - air photos and base maps - from the Map Compilation Section;
- preliminary literature survey and photo interpretation;
- field work;
- preparation of preliminary map and legend;
- progress report;
- checking of map by colleagues;
- field checking;
- returning of photos and base map with completed geology to Map Compilation Section for the drafting of the geological map;
- writing of report and Explanatory Notes;
- checking drafting and final proof of map and report.

Some of these steps overlap: literature survey and checking with colleagues should be continuing processes. Returning of completed photos and base maps may have to be delayed until sufficient information has been extracted for the report. Alternatively, photostat copies of photos may be made, or the draftsman may be able to release photos progressively to facilitate report-writing. A progress report is essential in assembling ideas partway through a long-term mapping project and also makes information more readily available.

Time taken to map a 1:250 000 area may vary considerably: one area in the Great Artesian Basin, containing much relatively similar terrain, took about 75 man-days. In the OLARY area, mapping of Adelaidean rocks would have covered only about one-eighth

of a 1:250 000 area in the same period (600 man-days for a 1:250 000 area).

BASIC MATERIALS

Prior to commencement of 1:250 000 mapping, topographic base maps at 1:100 000 scale are prepared by the Map Compilation Section from air photos and data provided by the Department of Lands, National Mapping Division or Army Survey Corps. Prints of the six 1:100 000 scale maps covering the 1:250 000 sheet together with the appropriate air photos are issued to the geologist and constitute his basic mapping materials.

Since 1969 the Department, in conjunction with other Surveys and the Division of National Mapping, has adopted the Australian Map Grid which is a metric system of rectangular co-ordinates based on the Australian Geodetic Datum (1966). The AMG (Universal Transverse Mercator Grid) replaces the old Australian Transverse Mercator Grid which was in yards. Conversion of old co-ordinates or grid references is difficult to do accurately because both the reference spheroid and grid system have been changed. PINNAROO was the first 1:250 000 geological map to be completely based on the AMG.

Air photos used are commonly Department of Lands RMKA or RC9 colour contact prints, approximate scale 1:80 000. If a larger scale is required to allow more detailed mapping, RC5 black and white contact prints, approximate scale 1:50 000, may be used. It is naturally advantageous to obtain in good time the best available air photography, which may not necessarily be the latest flown. Air photos should be checked on receipt to ensure that they are of satisfactory quality and that they adequately cover the map area stereoscopically. The map compilation section can outline on alternate air photos the recommended area in which to note geology.

PRELIMINARY OFFICE WORK

Information

An initial list of Departmental reports, both published and unpublished, and open file envelopes containing exploration company reports on relinquished E.L.s can be obtained as a computer print-out for the 1:250 000 area from the Systems Section. Envelopes or copies of reports may then be borrowed from the Technical Information Services Division and Library. Useful general references include the following (see bibliography also): South Australian Yearbook; Environments of South Australia (CSIRO Div. of Land Use Resources, 1977); Handbook of the Geology of South Australia (S.A. Geological Survey, 1969), excursion handbooks (eg. International Geological Congress, 1976), Transactions of the Royal Society of South Australia, Journal of the Geological Society of Australia; proceedings of the Australian Institute of Mining and Metallurgy; AESIS (Australian Earth Sciences Information System).

The latest list of Exploration Licences and a consultation with the Supervising Geologist, Mineral Exploration, will indicate what exploration companies have been recently involved in the area. This will allow initial and continuing consultation with company geologists so that there may be a useful exchange of information. Similarly, contact should be made with any academic geologists working in the 1:250 000 area.

Other sources of information are published geophysical, topographic and geological maps, and drill core stored at the Core Library, Glenside: an up-to-date print-out of the index to this is available. If a recent geophysical interpretation has not been made of the map area, the Geophysics Division should be approached regarding this. The Technical Information Services Division maintains a Bore General computer file, plans showing

positions of bores and partly indexed collections of colour slides and black and white photographs. Print-out of the photograph index is on a 1:100 000 area basis. For those rock specimens filed in the RS system plans showing locations are kept in the Drafting and Survey Branch and some details (RS forms) for each specimen are kept in files under 1:100 000 areas before being processed into the computer file.

Landsat

Landsat imagery should be used as a supplement to air photography. A brief background to Landsat applications is given by Simpson (1978). The satellite ERTS-1 (later named Landsat-1) was launched in 1972. Many Australian geologists studied fifth-generation (relatively poor quality) imagery from ERTS-1 in 1973. A list of some Department of Mines contributions was made by Forbes (1973). Landsat-2 was launched in 1975 and Landsat-3 on March 5th, 1978. Late in 1977 the CSIRO Division of Mineral Physics commenced production of high quality enchanced imagery of Landsat scenes. This computer-enhanced imagery can now be purchased from several commercial sources. Geology often shows best in Band 7. The kind of enhancement used by CSIRO was linear stretching, which increases contrast and provides more structural detail. Computer manipulation of satellite imagery may make this information even more applicable to mapping in the future. A copy of the NASA Landsat data users handbook is available from the Library.

Availability of Landsat coverage should be first checked with the Map Compilation Section. If it is necessary to purchase material, enhanced diapositives at scale 1:1 000 000 (right reading emulsion up) are currently recommended. These allow the making of contact negatives (right reading emulsion down) from which numbers of positive enlargements may be made. The Regional

Geology Division at present holds, for example, fifth generation material covering the State, excellent enchanced imagery for the region west-southwest of Lake Eyre to the W.A. border and enhanced enlargements of the Lake Frome and Olary areas made by the Ecology Unit, Department for the Environment.

Photo Study

A stereoscopic study of the air photos is essential in gaining a preliminary appraisal of the map area, in locating areas of best outcrop and in planning field work. A helpful background to photointerpretation techniques is given by Pitt (1974). Currently a recommended stereoscope for office work is the Zeiss N2 mirror stereoscope with optional 3 x magnification and moving base plate with magnets. For field and brief office inspections a pocket stereoscope may be used. For extended study of air photos and simultaneous examination by two people the Zeiss (Jena) Interpretoscope is available in the Regional Geology Division. This also facilitates height measurements. There should be little marking of the photos at this stage and subsequent annotation should be done in a way that obscures the minimum of detail. However, any unwanted wax pencil or ink mark can be removed by careful light wiping with a soft cloth moistened with methylated spirits.
If it is unlikely to obscure areas of geological interest, marking of such features as homesteads, names of creeks, bores, hills and other geographical features can be done. Similarly, isolated points of potential geological significance can be encircled with wax pencil. Some sets of colour air photos, especially those not intended for a standard mapping projects, should not be marked, but be covered by a transparent overlay. Marking should be done only on alternate photos, avoiding the marginal area of the photo, where there is greater distortion. Except where the background colour or shade of the photo renders it impractical,

black ink is recommended for showing actual field observations and red ink for office photointerpretation. A fine line, such as that produced by a 0.1 or 0.15 rapidograph nib, is desirable, to avoid unnecessary obliteration of detail. If not already typed or written on the backs of photos supplied, the air photo number, run number and survey number should be entered there for future convenience. Notes on the preliminary interpretation can be conveniently entered in the field note book and locations of special interest marked on a 1:100 000 base map.

Since some place names may be prone to mis-spelling it is useful to list these in their correct form. Correct spelling is usually found on Department of Lands Pastoral or Hundred plans, but if necessary, recourse may be had to the State Nomenclature Committee in the Department of Lands. A gazettier is available.

The Map Compilation Section should be asked whether additional topographic information is required.

FIELD WORK

Aim

The aim of field work is to identify and delineate in detail appropriate to the scale and purpose of the project sedimentary, igneous and metamorphic rock units, mineral deposits and their relationships, indicate the geological structure and gain sufficient knowledge of the area for the publication of a map and report. To adequately describe an area the geologist will need to have information on the subsurface through previous or newly recommended drilling and he will need to consult specialists such as the geophysicist, palaeontologist and petrologist.

Preparations

The opinions below were given during a discussion among members of the Geological Society of London in 1977 (Taylor, 1978, p. 475): "The training of a field geologist should aim

at objectivity and those flights of imagination, so tempting and at times valuable, should be reserved for special pages of a field notebook. This objective information was, therefore, to be recorded on field maps and in field notes in such a way that others could take the documents into the field, locate with ease the exposures listed and get the same answers to lithologies, geological boundaries, structural data and so on. It was common experience to find that data were recorded in such a random and chaotic manner that after a lapse of time not even the original observer could interpret the results satisfactorily. In such a case the ultimate publication or report must suffer. There was a place for imagination and intuition in field geology, and it was true to say that many major advances have been intuitive, but it could not be stated too strongly that this facet should not be interpolated with what, for want of a better expression, might be called the factual observation of a field map and notebook." Also: "In nature there are no rewards or punishments: there are consequences." (H.A. Vachell).

The following are notes on items associated with normal 1:250 000 mapping arranged in approximate order of action.

Programme: with colleagues, make out a tentative programme for field work, avoiding public holidays if possible. Prior approval is required for official work on Sundays and Public Holidays. For reasons of economy, normally periods of at least three weeks should be spent in areas over 400 km distance from the office. If Field Assistants, Technical Assistants or Drivers are to assist in field work, approval should be obtained for proposed hours to be worked (Docket DM 828/72). Maximum hours allowed are normally no more than 9 hours per day for 6 days per week.

Permission to enter: There are restrictions on work in Aboriginal Lands, National Parks and the Woomera prohibited area - permission should be sought well in advance of proposed field work. Application to enter the Woomera area should be made through Security File SR 1/10/2. Major (1977) has described the methods for applying to work on the North West Reserve. As far as possible, local property owners should be told of intentions - they may be helpful in giving information on camp sites, water and access.

Paper work (see Appendix C): forms are provided for most requisitions and to simplify accounting the Divisional and project numbers are required on many of these.

Transport: initial requirements for transport, caravan and equipment should be made known to the Transport Officer some weeks before departure. Check-lists of equipment are given in Appendix F and include first aid kit and fire extinguisher.

Heavy four-wheel-drive vehicles may be needed for shifting caravans or carting large quantities of gear, but in some areas these can be replaced or supplemented by small four-wheel-drives after establishment of a camp. Some lighter vehicles (eg. Suzuki 4 WD) are superior particularly in areas where turning space is minimal. Currently the Subaru 4 WD is proving of great value for most mapping purposes where a large carrying capacity is not needed. A small two-whell drive vehicle should be used where 4 WD is not necessary.

Fuel: in outlying areas it is generally convenient to order delivery to a suitable location within the area. Local permission may be needed for location of the dump. In estimating quantities, a heavy vehicle should be assumed to consume at least one 200 - litre drum of super petrol per week. The Suzuki uses a special oil and about a third of this consumption in standard petrol.

Radio: should be ordered through a Senior Geologist from the Geophysics Division which can provide instruction in use. Radio transceivers are licenced for Departmental business only and the normal Departmental rules of confidentiality should be observed. Calls should be made on or near the odd hours of the day and should be as brief as possible. There is an emergency monitoring service (see Appendix H).

Mapping and auxiliary equipment: requirements depend on personal preferences and terrain: See Appendix D. The Regional Geology Division holds a number of 35 mm SLR cameras with standard, wide angle and macro lenses and other auxillary equipment.

The scale of the Brunton compass can be rotated to read true bearings for a given magnetic declination. Where a unique direction is not required the value between 0 and 180 is most convenient to record in the field eg. record a strike of 090 rather than 270.

Expenses advance: an advance payment on travelling expenses may be obtained from the Accountant (Advance Account form).

Reservation: of seats on public transport or accommodation should be made in advance through the booking clerk.

Food purchase: a check list of food items is in the Appendix G.

Field location book: details of the proposed field work should be entered - date of departure, date of expected reappearance in office, pastoral/telephone/radio addresses, working area. Senior Geologist and colleagues should be informed of general plans.

Final check: a few days prior to Departure, arrangements should be made with the Transport Officer for loading and checking the vehicle and radio installation. In particular, the tool kit should be correct; tyre pump and hydraulic jack with jack handle should function properly and wheel braces should fit all wheel nuts. Emergency items such as tool kit,

shovel, first aid kit, fire extinguisher and radio aerial should be packed so that they are readily accessible. If there is a likelihood that roads will be impassable, do not depart without making enquiries.

Methods

Security, public relations.

It is well to have an eye to safety and good public relations as well as the technical approach during regional mapping. The geologist should make courtesy calls on all local people and keep them informed of his movements and should leave gates as he finds them. Before entering a quarry, permission must be obtained and arrangements made with the manager, who will require wearing of hard hats and also, possibly, safety glasses and boots.

It is desirable that at least two geologists (with two vehicles) map a 1:250 000 sheet to ensure greater security, reasonable speed in completion of the project and to allow discussion of results on the job. The head office should be contacted at least twice weekly in case of any enquiries or new instructions. As outlined in the Department's "Safety Booklet", a first aid kit and adequate food and water should be carried in all vehicles; bush fire regulations should be observed. The field geologist should maintain daily contact with a colleague in the map area. Care should be taken to keep a camp area tidy, to dispose of rubbish properly and to avoid disturbance of fauna, flora and cultural sites. Do not cut-up local dirt roads by driving on them when they are boggy. Location of the camp should be such that there is the minimum waste of time travelling to place of work and travelling for supplies.

Vehicles

Serviceable vehicles are important in field work: below

are some relevant notes. Local purchase of tyres, batteries and spare parts should be avoided since they can be provided much more cheaply from the Works Depot.

Check daily engine oil and coolant, battery, brake and clutch fluid. Make frequent visual inspection of road springs, tyres and wheel nuts: ensure that wheel nuts are tight after a wheel change. Apply handbrake only when vehicle is stationary. Avoid changing down gear while travelling at high speed. Engage front drive hubs before entering country that may require four-wheel drive, and disengage later when appropriate. Observe speed limits and treat vehicle with care at all times.

Avoid crossing narrow creek channels where deep.

Avoid crossing narrow creek channels diagonally.

Avoid sharp banks, rabbit or wombat burrows, tree stumps, logs, stakes. Check doubtful areas, such as damp mud, deep water or soft dry creek sand on foot before proceeding. Carbonate-cemented crusts can be hazardous around mound springs. Creek channels can often be crossed at junctions with tributaries.

Lock vehicle before leaving in a populated area or near a highway. In remote areas it is probably safer to leave the key in the vehicle, to avoid loss of key. The vehicle can be kept to a more comfortable temperature in warm weather if it is parked with the rear to the sun, if there is no shade available.

If the vehicle's battery is becoming flat it should be parked facing down hill so that a running start may be made. In a steep situation it may be necessary to have handbrake on, the gear lever in first position and the wheels chocked, for safe parking.

While travelling on dirt roads, entry of dust into the vehicle can be greatly reduced by closing all windows and having front vents open and fan on; this pressurises the interior of the vehicle.

Where possible, public transport should be used to travel to and from the field area, once a camp has been established. Vehicles not undergoing servicing should be left at a police station, government depot or where a responsible person can keep an eye on them. Caravans should be similarly left, although in some remote areas they can remain on site.

Reconnaissance, procedures.

Initially a general reconnaissance of the area should be helpful in gaining an idea of the full spectrum of mapping units, and problems of access, camp sites and water sources. Delineation of map units is made by a combination of traverses across the strike, photo interpretation and following map units along strike. Much walking may be needed in complicated areas such as crystalline basement where specially enlarged air photos of approximate scale 1:15 000 can be used to facilitate recording of adequate detail. Vehicles aid mainly in mapping along strike and traversing relatively featureless areas. All roads in the area should be traversed and data relevant to future access, such as fences, gates, should be noted in the course of mapping geology. Opportunity can be taken to collect water samples, if the Groundwater Section is not to do this. If only to show that a traverse has been made, frequent symbols should be shown of surficial deposits on route, where there are no outcrops to be noted.

On the face of the photo the following detail will thus be generally drawn finely and neatly, with reference to north at the top:

geological boundaries - fine, black lines (or, generally red if photo-interpreted);

unit symbol - e.g. Qpp, Olm, Eaw;

rock symbol - symbols for rock types such as granite, limestone or surficial gravels;

standard structural and facing symbol;

numbers referring to notes printed on the back of the photo;

symbols for roads, buildings, well, mine, quarry;

names of features such as homestead, earth tanks, peaks, wells (unless they are likely to obscure valuable detail).

Only alternate photos of a run should need to be used and marking should be kept away from the extreme margin of the picture. The unmarked photo of a stereo pair is particularly useful in providing needed detail that is obscured on the marked photo.

On the back of the photo the following items may be neatly, legibly and finely registered:

near top left (with reference to north at top), name of geologist and date;

numbered notes - if locality numbers are hard to find on the face of the photo, a rough grid reference abcde may help - eg., aa = left top, ea = right top, ee = right bottom;

specimen number - the field number may follow the style Mu2.08.3, which is a contraction for 1:100 000 area name (eg. Murnaroo) run number, photo number and locality number;

personal photograph reference - eg. photo 793.1 or R 3/79/1 (third 1979 film, exposure 1);

RS number of specimen, Departmental numbers for film and photo or frame - added alongside field numbers where the material has been stored in the Department (See Appendix for notes on the RS system).

Field note books should be used for extended notes, sketches and general memoranda such as rock specimen and photograph lists, detailed cross-sections and names and addresses of local people. In areas where it is appropriate, detailed stratigraphic sections should be measured by tape, Jacobs staff or on an enlarged air photo. An Abney level is invaluable in

measuring Cainozoic sections. Where greater accuracy is required the Field Surveys Section can make a rapid instrumental survey. Mandelbaum and Sanford (1962) have provided tables for conversion of traverse data to bed thickness.

The following is a check list of some things to note and do at localities of good outcrop:

topography;

vegetation;

rock type;

total thickness exposed;

rock colour - fresh and weathered (if possible refer to Munsell standard colour chart);

composition of rock;

grain size (medium-grained sand is ¼-½ mm, cobbles are 6-25 cm, medium-grained igneous rock about 1-5 mm, but preferably state actual measured size in mm);

primary structures (note orientation of pillow lavas, ripples, cross-beds, slumps etc. for palaeogeographic interpretations);

bed, laminae thickness;

bedding, layering attitude;

joints attitude, spacing, width;

cleavage, schistosity, attitude, character;

vergence, & attitude of minor folds - important in the study of gneissic terrains;

second or further foliations, folds;

photograph;

sketch;

specimen.

Published maps describe the total geology and thus every opportunity should be taken to note Quaternary rocks as well as the hard rock geology.

Taking of specimens or photographs should be restrained but sufficient for adequate discussion of petrology and illustration of a report. Rock specimens retained for petrologic description are allotted an RS number (based on the 1:100 000 sheet number) and their position is plotted on standard plans kept by the Map Publication Section. (This number is entered on the submission form to Amdel, via the Technical Information Services Division). An RS form is filled in for each rock and when completed, on receipt of the Amdel report, is given to the Systems Section for computer filing. Rocks on the RS file need not have been given specialist examination. Some haphazard rock collecting is inevitable during mapping, but it is helpful for filing, rock storage and petrologic interpretation to assemble rocks into logical, ordered groups before entering them in the RS file. Such a group would be rocks collected in order from bottom to top of one stratigraphic section on the same 1:100 000 sheet.

Details of photographs worth retaining are entered on a form as keywords and comments. If required, the film, prints, and copy of keywords can be retained for a short period on loan from the Technical Services Section. Some geologists find it useful to paste prints of all their photographs in a book and annotate them.

Procedures associated with helicopter geological surveys are described by Krieg (1973).

In Cainozoic geology it is essential to dig out contacts and sections because surface drift leads to serious errors if only surficial material is observed.

CHECKING

Concurrently with field work, information from the air photos is transferred optically by the Map Compilation Section to a 1:100 000 base map and progress is discussed with colleagues and supervisors. Although map generalization is unavoidable, the geologist should represent data as objectively as possible.

Choice of map units will be guided by previous local practice, but modifications must be made if they are an advance on previous ideas. The geologist should be familiar with the currently accepted code of stratigraphic nomenclature (see International Guide). A South Australian stratigraphic lexicon by L. Gerdes (Reference to RB 75/100) is available. Newly named units must not duplicate old units, must be mappable and have a properly described type section and reference section. Proposed new names must be submitted to the Central Register, Canberra, and a condensed description of the unit provided for consideration by the South Australian Stratigraphic Nomenclature Subcommittee (Geological Society of Australia).

After completion and checking the six 1:100 000 geological maps are used to make a preliminary 1:250 000 colour manuscript map. When the geologist is satisfied with this and its legend, tectonic sketch, rock relationship diagram and cross sections he should submit them to the Supervising Geologist, Regional Geology Division, for approval. The tectonic sketch may show faults, fold axes, sedimentary basins, structural contours, gravity contours, magnetic features, section lines, seismic lines and palaeodrainage against a very broad stratigraphic background. Work may then proceed on the colour manuscript which, after further checking, is accepted by the Map Publication Section.

While checking progress of the amp, the geologist may continue writing his report on the region. This will take the form of Explanatory Notes, and, for some areas, an additional more comprehensive report.

REPORT WRITING

The Editor has provided a guide which should be followed. When the draft report reaches a supervisor it should be in as final a form as the author can make it, but need not be typed.

Repeated typing should be avoided because of the extra typing and correcting time involved.

If the draft has been typed the author should have corrected any typist's errors. It is also the author's responsibility to check any doubtful points of spelling or grammar himself by using reference works. Handwritten drafts should be written completely in ink and double spaced. It is desirable that the author's original style and ideas be preserved, hence he may expect any proposed alterations to be discussed before the draft is finally typed. Never-the-less, early drafts should be edited by two or three peer-group colleagues and critically reviewed by the author before the text commences the approvals round.

The format of reports may differ with particular projects but in the normal case of the 1:250 000 Atlas Sheet Series, Progress Reports should be presented annually and a Final Report on completion. This will be a comprehensive Internal Report for reference purposes and will be assessed by Supervisor and Assistant Director for suitability for publication in the Report of Investigation or Bulletin Series.

The preparation of a manuscript following the format of the Explanatory Notes for the Atlas Sheet Series is the responsibility of the geologist in charge of a mapping project and is the venue for explanation of the mapping units employed and brief definitions and descriptions. These notes are to be presented promptly, briefly and to editorial requirements. They are, as in their name, Explanatory Notes to the published geological map. Tables of stratigraphic units and summaries of lithology should be broken down into one-page presentations by era or depositional basins such that long lists are avoided.

In all reporting the author must aim to interest his reader, to collect his information, cull out irrelevant data, collate

No.	Instruction	Textual mark	Marginal mark*
1	Correction is concluded	None	/
2	Insert in text the matter indicated in margin	⌐	*New matter followed by* /
3	Delete	Strike through characters to be deleted	δ/
4	Delete and close up	⁀ / ‿ above and below letters to be taken out	⁀δ‿
5	Leave as printed	. . . . under characters to remain	stet
6	Change to italic	——— under characters to be altered	ital
7	Change to even small capitals	═══ under characters to be altered	s.c.
8	Change to capital letters	═══ under characters to be altered	caps
9	Use capital letters for initial letters and small capitals for rest of words	═══ under initial letters and ═══ under the rest of the words	c.& s.c.
10	Change to bold type	~~~~ under characters to be altered	bold
11	Change to lower case	Encircle characters to be altered	l.c.
12	Change to roman type	Encircle characters to be altered	rom.
13	Wrong font. Replace by letter of correct font	Encircle character to be altered	w.f.
14	Invert type	Encircle character to be altered	ϙ
15	Change damaged character(s)	Encircle character(s) to be altered	X

No.	Instruction	Textual mark	Marginal mark*
16	Substitute or insert character(s) under which this mark is placed, in 'superior' position	/ through character or where required ⌐	⌐ *under character* (e.g. x⌐y)
17	Substitute or insert character(s) over which this mark is placed, in 'inferior' position	/ through character or where required ⌐	¬ *over character* (e.g. x¬)
18	Underline word or words	——— under words affected	*underline*
19	Use ligature (e.g. ffi) or diphthong (e.g. œ)	⁀ enclosing letters to be altered	⁀ *enclosing ligature or diphthong required*
20	Substitute separate letters for ligature or diphthong	/ through ligature or diphthong to be altered	*write out separate letters followed by* /
21	Close up—delete space between characters	⁀ linking characters	⁀
22	Insert space†	⌐	#
23	Insert space between lines or paragraphs†	> between lines to be spaced	#
24	Reduce space between lines†	( ) connecting lines to be closed up	less # or close up
25	Make space appear equal between words	| between words	eq. #
26	Reduce space between words†	| between words	less #
27	Add space between letters†	ıı ıı between tops of letters requiring space	letter #
28	Transpose	⌐⌙ between characters or words	trs
29	Place in centre of line	Indicate position with ⌐ ¬	centre

No.	Instruction	Textual mark	Marginal mark
45	Insert omitted portion of copy		out - see copy
46	Substitute or insert comma	/ through character or  where required	
47	Substitute or insert semicolon	/ through character or  where required	
48	Substitute or insert full stop	/ through character or  where required	
49	Substitute or insert colon	/ through character or  where required	
50	Substitute or insert question mark	/ through character or  where required	
51	Substitute or insert exclamation mark	/ through character or  where required	
52	Insert parentheses	 or	
53	Insert brackets	 or	
54	Insert hyphen		
55	Insert en (half-em) rule		
56	Insert one-em rule		
57	Insert two-em rule		
58	Insert apostrophe		
59	Insert single quotation marks	 or	
60	Insert double quotation marks	 or	
61	Insert ellipsis		
62	Insert leader		
63	Insert diagonal stroke		
64	Refer to appropriate authority anything of doubtful accuracy	Encircle words etc., affected	

No.	Instruction	Textual mark	Marginal mark
30	Indent one em		
31	Indent two ems		
32	Move matter to right	 at left or right side of group to be moved	
33	Move matter to left	 at right or left side of group to be moved	
34	Move matter to position indicated	[ ] at limits of required position	move
35	Take over character(s) or line to next line, column or page		take over
36	Take back character(s) or line to previous line, column or page		take back
37	Raise lines*	 over lines to be moved under lines to be moved	raise
38	Lower lines*	 over lines to be moved under lines to be moved	lower
39	Correct the vertical alignment		
40	Straighten lines	 through lines to be straightened	
41	Push down space	Encircle space affected	
42	Begin a new paragraph	 before first word of new paragraph	n.p.
43	No fresh paragraph here	 between paragraphs	run on
44	Spell out abbreviation or figure in full	Encircle words or figures to be altered	spell out

or organise the facts and be consistent. He must gain acceptance of the ideas presented by the structure of his report and the force of presentation. He may have to rewrite several times to express exactly what he wishes to say with simple words and unambiguous sentences which are not too long. Supporting material should be provided in appendices as intelligibility will suffer if too much detail and passive writing appear in the text. Simplified diagrams, sketches and tables may prove more satisfactory and where possible should be prepared neatly on A4 format. A Bibliography Index should be prepared (see Fig. 3).

MAP COMPILATION, PUBLICATION AND PRINTING

The Map Compilation Section is responsible for the preparation of base maps for all Departmental mapping activities including geological mapping projects. Accordingly it is desirable that a drafting order be submitted to the Drafting Branch as soon as mapping projects are approved.

Once a request for base maps is lodged a check is made on all existing maps and future mapping activities to ensure that maximum use is made of maps produced or programmed by other mapping authorities.

If the search reveals that no existing or proposed mapping will be forthcoming this Department may request that our mapping requirements be put on programme or it may be desirable for expediency to produce maps by template assembly methods within this Department.

Regardless of the source, the Compilation Section compiles 1:100 000 maps giving consideration to nomenclature, drainage, cultural features etc. and prepares transparencies adopted to suit the general mapping activities of this Department. The geologist will receive six 1:100 000 map sheets covering a 1:250 000 map area along with a set of photographs sufficient

to give full stereoscopic coverage of the area. Photo scale varies but is generally between 1:78 000 to 1:82 000. Most areas of the state have been photographed in colour.

While field mapping proceeds the 1:100 000 topographic maps are reduced and generalized to produce a 1:250 000 map which is available for general use but particularly for geological map preparation.

When both field mapping and photo interpretation are completed all photographs should be returned to the Compilation Section to transfer geological detail onto copies of the 1:100 000 base maps. It is important that this function is carried out by the Compilation Section as photo scale base maps have generally been replaced by 1:100 000 scale maps and consequently an optical system must be employed to accommodate change of scale.

A dyeline copy of each completed geological compilation is supplied to the geologist for checking and he usually produces a pencil-coloured map to gain an appraisal of the mapping detail. At this stage it is preferable to supply a reduction of the compilation sheet (from (1:100 000 to 1:250 000) to demonstrate the intensity of detail that can be effectively retained at the published scale, although this should have been considered initially by the geologist before field mapping commenced. Using this system, decisions regarding generalizations and combination of units can be simplified and the preparation of the 1:250 000 drafted sheet should proceed with a minimum of change.

When corrections and amendments have been completed all detail is reduced and added to a 1:250 000 scale base map. Copies are made for checking and a pencil coloured copy may be requested to assist in checking and general assessment.

As soon as practicable the geological legend, sections,

rock relation diagram, tectonic sketch and other necessary details should be supplied so that the map can be compiled as a complete unit.

Discussion may be necessary for colour selection and overprint design, however in most cases standard colours and overprints used on previous standard maps must be adopted to allow continuity between maps. General layout of the colour rough may proceed once all exterior details etc. are completed. However, it should be remembered that this layout will probably be varied to satisfy the requirements of the published map.

One colour rough should suffice and provided that sufficient pre-planning is carried out the need for major corrections should not eventuate, and the colour copy can be completed promptly and resubmitted to the geologist for a detailed final check.

Approval for publication is required from the Director-General before further work is carried out after the final colour rough has been completed.

Map preparation for colour printing is entirely in the hands of the Map Publication Section and the colour rough and base map transparency is deemed to be accurate and final for all further processes.

The main steps involved are type listing, map layout, preparation of the type overlay sheet, scribing of topographic and geological details and overprint symbols, preparation of coloured masks for area colour and colour separation of type negatives. After checking, a photomechanical proof is produced and used to check both geological and cartographic presentation of detail. After checking, all necessary amendments are made to the various components and a composite negative for each colour is produced and used to make the final photomechanical proof and subsequent printing plates.

Lithography is carried out by the Government Printing Department and very limited access is available once the composite negatives and photomechanical proof have been submitted.

It is essential that all corrections and amendments are implemented before the composite negatives are completed as NO changes are normally considered once the plating and printing stage has been reached.

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APPENDIX A

List of published geological maps produced by the South Australian Department of Mines and Energy up to December, 1978 (with some projected maps for 1979, 1980).

Adelaide	1:63 360	1951
ADELAIDE	1:250 000	1969
ALBERGA	1:250 000	1959
Alexandrina	1:63 360	1958
Algebuckina	1:63 360	1954
ANDAMOOKA	1:250 000	1965
Angepena	1:63 360	1953
Anna	1:63 360	1955
Arno	1:63 360	1957
Arrowie	1:63 360	1961
Balcanoona	1:63 360	1967
Ballara	1:63 360	1952
BARKER	1:250 000	1962
Beltana	1:63 360	1966
BIRKSGATE	1:250 000	1971
Blinman	1:63 360	1964
Blinman Dome	1:24 000	1963
Boorthanna	1:63 360	1955
Braemar	1:63 360	1961
Burra	1:63 360	1964
BURRA	1:250 000	1964
Cadlareena	1:63 360	1955
Cadnia	1:63 360	1960
Callanna	1:63 360	1963
Chandler	1:63 360	1956
CHILDARA	1:250 000	1977
CHOWILLA	1:250 000	1978
Clare	1:63 360	1964
Conway	1:63 360	1955
Copley	1:63 360	1952
COPLEY	1:250 000	1973
Corunna	1:63 360	1952
Coulta	1:63 360	1958
Cowell	1:63 360	1957
Cultana	1:63 360	1964
Cummins	1:63 360	1958
Darke	1:63 360	1957
Davies	1:63 360	1964
Eateringinna	1:50 000	1979
Echunga	1:63 360	1954
Encounter	1:63 360	1959
Ernabella	1:63 360	1955
Eudunda	1:63 360	1966
EVERARD	1:250 000	1972
Farina	1:63 360	1956
FOWLER	1:250 000	1975
FROME	1:250 000	1975
Gambier and North-umberland	1:63 360	1951

GAIRDNER	1:250 000		1977
Gardiner	1:63 360		1961
GASON	1:250 000		1973
Gawler	1:63 360		1953
Giles	1:63 360		1955
Glenorchy	1:63 360		1956
Glynn	1:63 360		1957
Indulkana	1:63 360		1955
INNAMINCKA	1:250 000		1975
INVESTIGATOR	1:253 440		1961
Jervis	1:63 360		1954
Kalabity	1:63 360		1952
Kapunda	1:63 360		1957
Kenmore	1:50 000		1979
Kiana	1:63 360		1958
KINGSCOTE	1:250 000		1954
Kingston	1:63 360		1951
Kokatara	1:50 000		1979
KOPPERAMANNA	1:250 000		1974
LAKE EYRE	1:250 000		1975
Lincoln	1:63 360		1958
LINCOLN	1:253 440		1958
LINDSAY	1:250 000		1976
Lyndhurst	1:63 360		1956
MAITLAND	1:253 440		1960
Mann	1:63 360		1962
MANN	1:250 000		1962
Mannum	1:63 360		1957
Manunda	1:63 360		1960
Marree	1:63 360		1963
MARREE	1:250 000		1965
McGregor	1:63 360		1952
Middleback	1:63 360		1952
Milang	1:63 360		1960
Mobilong	1:63 360		1960
Moolawatana	1:63 360		1961
Mount Painter Province	1:125 000		1969
MURLOOCOPPIE	1:250 000		1976
Myrtle	1:63 360		1952
NARACOORTE	1:250 000		1969
Neill	1:63 360		1958
Nilpinna	1:63 360		1954
NOOLYEANA	1:250 000		1973
Olary	1:63 360		1954
Olary Province	1:170 000	approx.	1955
OODNADATTA	1:250 000		1967
Oraparinna	1:63 360		1965
ORROROO	1:250 000		1968
PARACHILNA	1:250 000		1966
Paralana	1:63 360		1961
PEAKE AND DENISON RANGE	1:253 440		1955
PENOLA	1:253 440		1951
PINNAROO	1:250 000		1979
Pinnaroo - Karoonda	1:126 770		1966
Plumbago	1:63 360		1956
POOLOWANNA	1:250 000		1973
PORT AUGUSTA	1:250 000		1969
Quorn	1:63 360		1956

RENMARK	1:250 000	1971
Robe	1:63 360	1951
Roopena	1:63 360	1952
Rudall	1:63 360	1957
Serle	1:63 360	1953
Sleaford	1:63 360	1958
State Map: stratigraphic	1:2 027 520	1953
State Map: structural	1:2 027 520	1953
State Map: geological	1:1 000 000	1980
Tomkinson	1:63 360	1962
TORRENS	1:250 000	1964
Truro	1:63 360	1959
Tumby	1:63 360	1958
Umberatana	1:63 360	1961
Umbum	1:63 360	1955
Verran	1:63 360	1957
Wakefield	1:63 360	1959
Wallaroo	1:63 360	1960
Wangary	1:63 360	1958
Willochra	1:63 360	1962
Wilpoorinna	1:63 360	1963
Witjuti	1:50 000	1979
WOODROFFE	1:250 000	1967
Yankalilla	1:63 360	1954
Yednalue	1:63 360	1968
Yeelanna	1:63 360	1958
Yorke Peninsula	1:506 880	1961

APPENDIX B

SYMBOLS FOR MAP UNITS

QUATERNARY

Holocene (on older maps shown as Qr for Recent)

Qh	Alluvium
Qha	Alluvial deposits of drainage lines and flood plains.
Qhb	Modern beach sands.
Qhc	COONAMBIDGAL FORMATION, COONARBINE FORMATION (upper).
Qhd	
Qhe	SEMAPHORE SAND
Qhf	FULHAM SAND
Qhg	Gypseous dunes, lunettes (or use Qg).
Qhh	
Qhi	
Qhj	
Qhk	
Qhl	Lake deposits.
Qhm	MOLINEAUX SAND and soil covered by thick mulga of NW.
Qhn	Undifferentiated soil mantles; pediment deposits.
Qho	ST. KILDA FORMATION, MOORNABA SAND.
Qhp	BUNYIP SAND.
Qhq	
Qhr	Reworked gypsite.
Qhs	Inland sand dunes; SIMPSON SAND.
Qht	Debris, piedmont alluvium and talus, gibber outwash.
Qhu	Lunette silts.
Qhv	Basaltic volcanics.
Qhw	
Qhx	
Qhy	YAMBA FORMATION.
Qhz	

PLEISTOCENE

Qp	Undifferentiated Pleistocene; POORAKA FORMATION: transitional sands.
Qpa	AVONDALE CLAY.
Qpb	BRIDGEWATER FORMATION.
Qpc	COOMANDOOK FORMATION.
Qpd	
Qpe	EURINILLA FORMATION.
Qpf	
Qpg	GLANVILLE FORMATION.
Qph	HINDMARSH and BLANCHETOWN CLAYS.
Qpi	TIRARI FORMATION.
Qpj	WIPAJIRI FORMATION.
Qpk	KESWICK CLAY and KATIPIRI SANDS.
Qpl	Ostracod- or gastropod-bearing limestone, including MANGATITJA LIMESTONE; PADTHAWAY FORMATION.
Qpm	MAMPUWORDU SANDS.
Qpn	NILPENA LIMESTONE.
Qpo	WOORINEN FORMATION; WIABUNA FORMATION.

Qpp POORAKA FORMATION.
Qpq
Qpr Gypcrete.
Qps Fluviatile sediments of uncertain correlation.
Qpt TELFORD GRAVEL; high level gravels.
Qpt BUNGUNNIA LIMESTONE.
Qpv Basaltic volcanics.
Qpw WONDILLINA LIMESTONE and MOUNT WILLOUGHBY LIMESTONE; mound spring deposits.
Qpx
Qpy
Qpz ARROWIE FORMATION.
Qp1 COONARBINE FORMATION.
Qp2 CALLABONNA CLAY in part.
Qp6 MILLYERA BEDS.
Qca Calcrete, kunkar.
Qcc Palaeosol.
Qcs Gypsum, gypseous material.
Qg Lunettes.
Qlo LOVEDAY SOIL.
Qsi Fossil soil opaline material as near base of Blanchetown Clay.

TERTIARY

T-Q MOUNT WILLOUGHBY, MANGATITJA LIMESTONES: DOONBARA FORMATION.

PLIOCENE

Tp Pliocene undifferentiated.
Tpa
Tpb BOOKPURNONG BEDS.
Tpc
Tpd DIAPUR SANDSTONE.
Tpe High level quartz conglomerate, laterized in part.
Tpf Fresh water gravels and sandstones.
Tpg
Tph HALLETT COVE SANDSTONE.
Tpi
Tpj
Tpk
Tpl LOXTON SANDS.
Tpm Marine fossiliferous limestones and sandstones.
Tpn NORWEST BEND FORMATION.
Tpo
Tpp PARILLA SAND.
Tpq
Tpr
Tps
Tpt
Tpu
Tpv
Tpw
Tpx
Tpy YARDINNA CLAYSTONE
Tpz

MIOCENE

Tma CADELGA LIMESTONE and ALBERGA LIMESTONE.
Tmb NAMBA FORMATION.
Tmc CECILIA CONGLOMERATE.
Tmd ETADUNNA FORMATION.
Tme MELTON LIMESTONE.
Tmf
Tmg GAMBIER LIMESTONE (Used for bulk of unit despite time range, say O-M).
Tmh
Tmi
Tmj
Tmk MIRACKINA CONGLOMERATE.
Tml
Tmm MORGAN LIMESTONE, PATA LIMESTONE.
Tmn NULLARBOR LIMESTONE.
Tmo DOONBARA PISOLITE.
Tmp PORT WILLUNGA BEDS.
Tmq
Tmr
Tms Silicified sands with silcrete pebbles.
Tmt
Tmu MANNUM FORMATION.
Tmv
Tmw
Tmy
Tmz

OLIGOCENE

To Oligocene undifferentiated.
Toa
Tob
Toc COMPTON CONGLOMERATE.
Tod
Toe ETTRICK FORMATION.

EOCENE

Te Eocene undifferentiated.
Tea
Teb BLANCHE POINT MARLS, Buccleuch Beds.
Tec
Ted
Tee EYRE FORMATION.
Tef
Teg
Teh
Tei
Tej
Tek KNIGHT FORMATION.
Tel
Tem
Ten
Teo
Tep PIDINGA FORMATION.

Teq
Ter
Tes SOUTH MASLIN SANDS.
Tet
Teu
Tev
Tew WILSON BLUFF LIMESTONE.
Tex
Tey
Tez
Tp-er RENMARK BEDS
Tfe Laterite
Tg) Maghemite gravel
TQg)
Tsi Silcrete

CAINOZOIC

CZsi Silcrete; younger ferruginous silcrete.
CZw WILLAWORTINA FORMATION.

CRETACEOUS

Ka MOUNT ALEXANDER SANDSTONE MEMBER of the Oodnadatta Formation.
Kc CADNA-OWIE FORMATION.
Kd WOOLDRIDGE LIMESTONE MEMBER of the Oodnadatta Formation.
Kel LOONGANA SANDSTONE.
Kem MADURA FORMATION.
Kk COORIKIANA SANDSTONE MEMBER of the Oodnadatta Formation.
Kl MONASH FORMATION.
Klt Transitional Unit.
Km MARREE SUBGROUP.
Kmb BULLDOG SHALE.
Kmi ATTRACTION HILL SANDSTONE.
Kml WILPOORINNA BRECCIA.
Kmo OODNADATTA FORMATION.
Kmt TRINITY WELL SANDSTONE.
Kn BLANCHEWATER FORMATION.
Kp PELICAN WELL FORMATION.
Kr PARABARANA SANDSTONE.
Kuh MOUNT HOWIE SANDSTONE.
Kw WINTON FORMATION.
J-K Jurassic-Cretaceous.

JURASSIC

Jua ALGEBUCKINA SANDSTONE.
Juv VILLAGE WELL FORMATION.
JRrm LEIGH CREEK COAL MEASURES.

TRIASSIC

R Undifferentiated.

PERMIAN-MESOZOIC

Pmb BOONGAR SANDSTONE

PERMIAN

Plb BOORTHANNA FORMATION.
Plt MT. TOONDINA FORMATION.
Pls STUART RANGE FORMATION.

CARBONIFEROUS

Clw WAITOONA BEDS.

DEVONIAN

Dum MINTABIE BEDS

ORDOVICIAN

Odb BUNGADILINA MONZONITE.
Odg Delamerian granite.
Oma CARTU BEDS.
Omb BLUE HILLS SANDSTONE.
Omi INDULKANA SHALE.
Omo MT. CHANDLER SANDSTONE.
Okv KULYONG VOLCANICS.
Olm MUDNAWATANA GRANITE.

CAMBRIAN

Ea ANDAMOOKA LIMESTONE.
Eb BILLY CREEK FORMATION.
Ei WIRRILDAR FORMATION.
Eu URATANNA FORMATION.
Ew WIRREALPA LIMESTONE.
Ey YARRAWURTA SHALE.
Er AROONA CREEK LIMESTONE.

CAMBRIAN
KANMANTOO GROUP

Eka
Ekb BRUKUNGA FORMATION.
Ekc
Ekd
Eke
Ekf
Ekh
Eki INMAN HILL FORMATION.
Ekj
Ekk
Ekl
Ekm MILENDELLA LIMESTONE MEMBER.
Ekn NAIRNE PYRITE MEMBER.
Eko
Ekp
Ekq
Ekr
Eks STRANGWAY HILL FORMATION.
Ekt
Eku
Ekv
Ekw
Ekx
Eky

LAKE FROME GROUP

Єfa
Єfb BALCORACANA FORMATION.
Єfg GRINDSTONE RANGE SANDSTONE.
Єfm MOODLATANA FORMATION.
Єfp PANTAPINNA SANDSTONE.

HAWKER GROUP

Єha ANGASTON MARBLE.
Єhb BUNKERS SANDSTONE.
Єhc
Єhd MIDWERTA SHALE.
Єhw NEPABUNNA SILTSTONE.
Єhf
Єhg
Єhh HEATHERDALE SHALE (n).
Єhi
Єhj AJAX LIMESTONE.
Єhk KULPARA LIMESTONE.
Єhl
Єhm MOOROWIE FORMATION.
Єhn NARINA GREYWACKE.
Єho ORAPARINNA SHALE.
Єhp PARACHILNA FORMATION.
Єhq
Єhr PARARA LIMESTONE.
Єhs
Єht MT. TERRIBLE FORMATION (n).
Єhs KOONUNGA PHOSPHORITE MEMBER.
Єhv TRURO VOLCANICS.
Єhw WILKAWILLINA LIMESTONE.
Єhx
Єhy AJAX LIMESTONE.
Єhz
Єmt TRAINOR HILL SANDSTONE.
Єmj MT. JOHNS CONGLOMERATE.
Єmo OBSERVATORY HILL BEDS.

(n : now Normanville Group, Є n).

WILPENA GROUP

Ewa A.B.C. RANGE QUARTZITE.
Ewb BUNYEROO FORMATION.
Ewc CORRABERRA SANDSTONE MEMBER.
Ewd
Ewe TREGOLANA SHALE MEMBER.
Ewf
Ewg BARUNGA SANDSTONE.
Ewh WHYALLA SANDSTONE MEMBER.
Ewi MOORILLAH SILTSTONE MEMBER.
Ewi
Ewk PUNKERRI SANDSTONE.
Ewl MOOLOOLOO SILTSTONE MEMBER.
Ewm WOOMERA SHALE MEMBER.
Ewn NUCCALEENA FORMATION.

Ewo ARCOONA QUARTZITE MEMBER.
Ewp POUND QUARTZITE.
Ewq
Ewr BRACHINA FORMATION.
Ews SIMMENS QUARTZITE MEMBER.
Ewt TENT HILL FORMATION.
Ewu ULUPA SILTSTONE.
Ewv
Eww WONOKA FORMATION.
Ewx YARLOO SHALE.
Ewy BAYLEY RANGE SILTSTONE MEMBER.
Ewz BILLY SPRINGS BEDS.

UMBERATANA GROUP

Eua WANTAPELLA VOLCANICS.

YERELINA SUBGROUP

Eea
Eeb BALPARANA SANDSTONE.
Eec MT. CURTIS TILLITE.
Eed
Eee
Eef FORTRESS HILL FORMATION.
Eeh
Eei
Eej
Eek
Eel
Eem
Een
Eeo
Eep PEPUARTA TILLITE.
Eeq
Eer
Ees
Eet
Eeu GUMBOWIE ARKOSE MEMBER.
Eev
Eew
Eex
Eey
Eez

FARINA SUBGROUP

Efa AMBEROONA FORMATION.
Efb BALCANOONA FORMATION.
Efc MT. CAERNARVON GREYWACKE MEMBER.
Efd TINDELPINA SHALE MEMBER.
Efe ENORAMA SHALE.
Eff
Efg
Efh BRIGHTON LIMESTONE.
Efi

Pfj
Pfk WAUKARINGA SILTSTONE MEMBER.
Pfl THORA DOLOMITE.
Pfm
Pfn
Pfo RODDA BEDS.
Pfp
Pfq
Pfr TARCOWIE SILTSTONE.
Pfs
Pft TAPLEY HILL FORMATION.
Pfu UROONDA SILTSTONE MEMBER.
Pfv
Pfw
Pfx EUDUNDA ARKOSE MEMBER.
Pfy YANKANINNA SILTSTONE MEMBER.
Pfz

WILLOCHRA SUBGROUP

Pha ANGEPENA FORMATION.
Phb
Phc
Phd
Phe ETINA FORMATION.
Phf
Phg
Phh
Phi
Phj
Phk
Phl ELATINA FORMATION.
Phm MARINO ARKOSE.
Phn
Pho
Php
Phq
Phr REYNELLA SILTSTONE MEMBER.
Phs
Pht WEETOOTLA DOLOMITE MEMBER) of Angepena Fmn.
Phu WUNDOWIE LIMESTONE MEMBER)
Phv
Phw WILMINGTON FORMATION.
Phx
Phy
Phz

UNNAMED SUBGROUP

Pua APPILA TILLITE.
Pub CALTHORINNA TILLITE.
Pue SERLE CONGLOMERATE.
Pum MERINJINA TILLITE.
Pus STURT TILLITE.
Puw WILYERPA FORMATION.

YUDNAMUTANA SUBGROUP

Pya
Pyb BOLLA BOLLANA FORMATION.
Pyc
Pyd
Pye BENDA SILTSTONE.
Pyf FITTON FORMATION.
Pyg
Pyh HOLOWILENA IRONSTONE.
Pyi
Pyj
Pyk
Pyl LYNDHURST FORMATION.
Pym "MALDORKY QUARTZITE".
Pyn
Pyo
Pyp PUALCO TILLITE.
Pyq
Pyr BRAEMAR IRON FORMATION.

BURRA GROUP

BELAIR SUBGROUP

Plg GILBERT RANGE QUARTZITE.
Plh
Pli MINTARO SHALE.
Plj
Plk KADLUNGA SLATE.
Pll "LEASINGHAM QUARTZITE".
Plm MITCHAM QUARTZITE.

BURRA GROUP

Pba AUBURN DOLOMITE.
Pbb BEAUMONT DOLOMITE.
Pbc COPLEY QUARTZITE.
Pbd CRADOCK QUARTZITE.
Pbe EMEROO QUARTZITE.
Pbf STONYFELL QUARTZITE.
Pbg WRIGHT HILL FORMATION.
Pbh WOOLSHED FLAT FORMATION, KALACHALPA FORMATION.
Pbi MINBURRA QUARTZITE.
Pbj
Pbk SKILLOGALEE DOLOMITE.
Pbi MINBURRA QUARTZITE.
Pbj
Pbk SKILLOGALEE DOLOMITE.
Pbl ALDGATE SANDSTONE: FOUNTAIN SPRING BEDS.
Pbm MYRTLE SPRINGS FORMATION.
Pbn NACKARA DOLOMITE.
Pbo MOUNT MARGARET QUARTZITE.
Pbp PINDYIN SANDSTONE.
Pbq
Pbr RHYNIE SANDSTONE.
Pbs SADDLEWORTH FORMATION.
Pbt WORTUPA QUARTZITE.

Pbu UNDALYA QUARTZITE.
Pbv WATERVALE SANDSTONE MEMBER.
Pbw WITCHELINA QUARTZITE.
Pbx BALHANNAH SHALE MEMBER.
Pby YEDNALUE QUARTZITE, BUNGAREE QUARTZITE.
Pbz BETHEL SHALE MEMBER.

RIVER WAKEFIELD SUBGROUP

Pra
Prb BENBOURNIE DOLOMITE.
Prc BOCONNOC FORMATION.
Prd
Pre
Prf
Prg
Prh
Pri INGOMAR QUARTZITE.
Prr
Prs STRADBROOKE FORMATION.
Prt
Prx
Pry BLYTH DOLOMITE.
Prz

BURRA GROUP OR CALLANNA BEDS

Paa MURRANA BEDS.
Pad ROCKWATER BEDS.
Paf DUFF CREEK BEDS.
Pan NILPINNA BEDS.
Paw WARLOAN BEDS.

CALLANNA BEDS

Pca
Pcb BACKY POINT BEDS.
Pcc CADLAREENA VOLCANICS.
Pcd WOODNAMOKA PHYLLITE (? Burra Group).
Pce
Pcf
Pcg
Pch HUMANITY SEAT FORMATION (? Burra Group).
Pci
Pcj
Pck COOMINAREE DOLOMITE.
Pcl WOOLTANA VOLCANICS.
Pcm
Pcn
Pco
Pcp PARALANA QUARTZITE, YOUNGHUSBAND CONGLOMERATE.
Pcq
Pcr
Pcs SHANAHAN CONGLOMERATE MEMBER.
Pct
Pcu
Pcv
Pcw

Ecx
Ecy WYWYANA FORMATION.
Ecz
P-b BACKY POINT BEDS.
E-p PANDURRA FORMATION.
E-v BEDA VOLCANICS

WILLOURAN

Ed DUFF CREEK FORMATION.

PRECAMBRIAN BASEMENT

E-r ROOPENA VOLCANICS.
AE Older metamorphics.
AEs SLEAFORD COMPLEX.
AEm MULGATHING COMPLEX.
E*b BALTA GRANITE.
E*d WHIDBEY GRANITE.
E*e ENGENINA ADAMELLITE.
E*g GLENLOTH GRANITE.
E*h HILTABA GRANITE.
E*k KIANA GRANITE.
E*n MOUNT NEILL GRANITE PORPHYRY.
E*o WATTLEOWIE GRANITE.
E*t TERRAPINNA GRANITE.
E*u BURKITT GRANITE.
E*w WIRRIECURRIE GRANITE.
E*y YERILA GRANITE.
Eβg GILES COMPLEX.
Eac CHITANILGA VOLCANIC COMPLEX.
Eag GLYDE HILL VOLCANIC COMPLEX.
Eak YANDOOLKA RHYOLITE.
Eal LAKE GAIRDNER RHYOLITE.
Ean CHANDABOOKA DACITE.
Eao MOONTA PORPHYRY.
Eau CULTANA GRANITIC COMPLEX.
Eax Rhyolite, rhyodacite dykes.
Eay YARDEA DACITE.
Eaz Dacite dykes.

Ed PEAKE METAMORPHICS.
Edb BALTUCOODNA QUARTZITE.
Edt TIDNAMURKUNA VOLCANICS.

Egc CORUNNA CONGLOMERATE.
Egm MOONABIE FORMATION.

Eh HUTCHISON GROUP.
Ehm MIDDLEBACK IRON FORMATIONS.
Ehw WARROW QUARTZITE.

EL LINCOLN COMPLEX.

Emm MUSGRAVE-MANN METAMORPHICS.
Emw WATARU GRANITIC GNEISS.

(*Greek gamma symbol)

Ep RADIUM CREEK METAMORPHICS.
Epa MOUNT ADAMS QUARTZITE.
Epc CORUNDUM CREEK SCHIST MEMBER.
Epf FREELING HEIGHTS QUARTZITE.
Epg YAGDLIN PHYLLITE.
Epp PEPEGOONA PORPHYRY.
Epr BRINDANA SCHIST.

Er BAROSSA COMPLEX.

Ew WILLYAMA COMPLEX.

APPENDIX C

PAPER WORK AND RELATED PROCEDURES

Authorisation:

Transport requisition by Senior or Supervisor as Officer Authorising; Assistant Director for Director.

Approval for air travel by Assistant Director for Director.

Supply Requisitions, up to $500, by Assistant Director for Director.

Recreation Leave by Supervisor.

Diary by Supervisor or Senior.

Expenses Claim by Supervisor.

Locality allowance by Supervisor.

Advance Account by Senior or Supervisor.

TRANSPORT REQUISITION.

Current debit order is 510701 for Regional Geology Division (stores, transport, workshop): add also the project number (eg. 0165 for TARCOOLA mapping).

Equipment may need to be listed separately; retain a copy of this.

Vehicle Log:

Should be filled in each day. Give the appropriate debit order, project number on each page. If possible, post in completed pages to Transport Officer during a prolonged field trip.

Diary:

Saturdays worked in the field should be shown. Before a long field trip diary forms may be entered in advance or may be posted back with expenses claims. For audit purposes hours worked should be entered each day in a diary notebook.

Amdel and other specialist examination:

Application forms are based on RS number. Forms for biostratigraphic work are obtainable from that Division. To assist the petrologist or other specialist it may be necessary to supplement the application form with further written or verbal information.

Relevant Amdel reference numbers follow the style below.

AMDEL Projects 11.07. (DM project number)
Service work 12.07. (DM project number)

eg. geochronology, Musgrave Block: 11.07.0355.
routine petrology, TARCOOLA : 12.07.0165.

Project, Debit Numbers

Below is a list of current numbers relevant to the Regional Geology Division.

510700	Division
510701	Stores, transport, workshop
510702	Travelling expenses
0001	Leave
0002	DME meetings
0003	Conferences
0004	Supervision
0005	Reading
0006	Service to public
0007	Industrial
0008	Professional
0009	General office
0010	Advice to Director
0075	Murray Basin Regional Studies
0077	Great Artesian Basin - Regional Studies
0143	State 1:1 000 000 geological map
0144	State 1:1 000 000 tectonic map
0145	RS form filling
0162	Stuart Shelf, Torrens Hinge zone regional studies
0163	WHYALLA
0164	Gawler Ra. Volcanics - regional geology
0165	TARCOOLA
0166	WARRINA
0167	BILLAKALINA
0168	CURDIMURKA
0169	OLARY
0170	CURNAMONA
0171	DALHOUSIE
0172	COOBER PEDY
0173	CALLABONNA
0174	PINNAROO
0176	TALLARINGA
0194	CORDILLO
0195	STRZELECKI
0196	Great Artesian Basin, Mesozoic
0197	Cainozoic
0198	Soils, stratigraphy
0199	Stratigraphic studies, Adelaide geosyncline
0200	Officer Basin, regional studies
0201	Lake Eyre Basin - regional studies
0202	Frome Embayment
0203	Pirie - Torrens Basin

0204	Otway Basin
0205	Adelaide region
0206	Eucla Basin
0207	Eyre Peninsula basins
0208	Tarkarooloo Basin regional studies
0209	Cainozoic palaeodrainage
0258	CHILDARA
0259	GAIRDNER
0260	YARDEA
0261	Gawler Craton - regional studies
0262	Musgrave Block
0269	Geochronology, general
0271	CHOWILLA
0272	Silcrete studies
0273	Tarkarooloo Basin radiocarbon dating
0322	Cainozoic clay mineralogy
0327	Olary Province Willyama Complex
0329	Adelaidean Bulletin
0331	State 1:1 000 000 Cainozoic map
0332	Outalpa 1:50 000
0333	Bulloo 1:50 000
0334	Continental shelf helicopter survey
0336	Regolith studies
0390	Rock sorting
0504	KINGOONYA
0505	State 1:2 500 000 geological map
0506	" " tectonic map
0508	Adelaide region 1:50 000 preliminary maps
0516	Geochronology, Stuart Shelf
0517	Geochronology, Officer Basin
0518	IGCP: Pre-Pleistocene tillites
0522	1:2 500 000 state geological map
0523	1:500 000 SE Province geological map
0524	Gawler Ranges excursion, 1978
0531	Officer Basin study

AMDEL PROJECTS
Geochron Projects

11.07.0354	Gawler Craton Summary Report 1977/78
0355	Musgrave Block
0356	Stratigraphically Significant Rocks
0357	Eastern Basement Blocks
0358	Ancient Basement-Gawler Craton
0359	Gawler Range Volcanics
0360	Fission Track Dating

General Projects

11.07.0361	Olary Province
0362	GRV Petrology and Silicate analyses
0363	Continental Shelf islands
0364	Curnamona Petrology
0365	Comparison of Archaean and Proterozoic Iron Formations

Some Dockets Relevant to Regional Geology

Adelaide region, prelim. 1:50 000	211/78
BARTON	248/79
Beryl	2142/61
BILLA KALINA	422/62
Broken Hill Region	415/69
BURRA	675/76
CHILDARA	119/73
COOBER PEDY	812/74
CURDIMURKA	252/72
CURNAMONA	669/75
Field Assistants	14/74
First Aid Kits	771/67
FOWLER	935/72
FROME	132/73
FROME CURNAMONA	1380/59
GAB Tertiary	425/73
GAIRDNER	334/72
Gawler Ranges	634/72
Geographical Names Board	180/72
Geological Mapping & related cartographic procedure	58^{II}/66
Helicopter 1973	477/73
KINGOONYA	395/72
KOPPERAMANNA	1146/70
Landsat purchase	467/76
Late Precambrian correlation	184/77
Map symbols	552/75
Mapping requests from other Dept.	1176/72
Metamorphic map	1176/72
MURLOOCOPPIE	534/75
New building requirements	715/77
OLARY	590/68 1302^{II}/71
Olary petrography	596/74
Olary pegmatites	645/74
ORRORO0	380/59
Outalpa 1:50 000	1021/74
PORT AUGUSTA	2056/62
Pre-Pleistocene Tillites	343/78
Regional Geology Programme	487/73
RS system	653/75
Roopena diamond drilling	100/78
Specimen processing	786/74
Student employment	10/78
TARCOOLA	338/72
WARRINA	302/72
WOODROFFE	639/66
World Map	1117/69
Zeiss Interpretoscope	1178/72

APPENDIX D

MAPPING AND AUXILLIARY EQUIPMENT

Light geological hammer
Heavy hammer
Miners pick
Shovel
Mattock
Trowels
Stiff brushes
Square-ended Spade
Plastic Specimen Bags
2H, HB pencils
Red and green wax (eg. Omnichrom) pencils
Pens with black and red ink (eg. 0.1 Rapidograph)
Ball-point pens
Marking pens
Pencil sharpener
Eraser
Methylated spirits
Dilute hydrochloric acid
Hand lens
Pocket knife
Magnet
50 m tape measure
Pocket tape measure
Square protractor
Standard rock colour chart
Brunton compass
Field note book
Air photos
Container for photo in use
Base maps
Air photo mosaics
Camera
Accessory lenses
Spare films
Pocket stereoscope
Adhesive tape
Binoculars
Departmental authority to enter
Local Order book (petrol, oil, emergency purchases)
Safety helmet (worn on engineering sites and in quarries)
Collecting bag
Matches
Barley sugar or glucose tablets
Water bottle

APPENDIX E

SPECIMEN COLLECTION

Rock specimens are collected during geological mapping mainly for visual comparison, thin section petrography and as an office record of rock units. Some other more specialised collections are for geochronology, geochemistry, geophysics and palaeontology.

Early in a mapping project in difficult terrain it is advisable to collect frequently, whereas later it should be possible to be more selective in the choice of specimens. Nevertheless, at all times it is preferable to collect too much rather than too little, since unwanted specimens can be discarded later. The number of specimens collected or finally retained is dependent upon the number of map units covered and the variability of those units. Probably over 200 specimens would be needed to represent the COPLEY area, but perhaps only half this number would be needed from OODNADATTA and even less from an area subsequently mapped adjacent to OODNADATTA. Special studies would of course necessitate larger collections. Collection from less accessible areas should be on a generous scale.

In small project areas that are readily accessible it may be preferable to delay systematic rock collection until a preliminary coverage has been made.

Normally the specimen collected should be as little weathered as possible, representative of the outcrop and no larger than necessary to adequately show features of interest. Many sedimentary rock specimens need be no larger than 10 x 7 x 3 cm, but coarse-grained or inhomogenous rocks may necessitate larger specimens. If there is a possibility that the orientation of the rock could be of future interest, this should be indicated by marking top or bottom of the specimen and a dip and strike on a suitable joint plane. If possible the field number of the specimen should be marked on it. To avoid bruising, the specimen should be wrapped preferably in a clear plastic bag into which a numbered metal tag can be stapled as the bag is sealed; the bag itself could also be numbered. An advantage of clear plastic is that it allows inspection of the contents; it may, however, suffer damage during rough transport. Careful note needs to be kept of geographic and stratigraphic positions of specimens. Where the location of a specimen is critical, its location should be photographed.

Main requirements of some special kinds of collecting are briefly indicated below. Advice should be sought from the relevant specialists before systematic collection of this nature is undertaken by non-specialists. Contact with the specialist is also advisable during his investigation.

Geochronology (K-Ar or Rb-Sr): collect about six rock fragments of hand specimen size from different portions of the same rock mass, sufficiently large to extract 3 gm of mica or hornblende if that is to be dated by K/Ar method. If mica or hornblende content is low a larger sample will be required. Biotite and hornblende must be free of chloritisation which causes loss of argon.

Samples for total rock Rb/Sr dating should weigh at least 10 gm. Larger samples are desirable.

Geochemistry: the normal precautions should be taken to collect an uncontaminated, fresh and representative sample.

Biostratigraphy: the main requirement is for fresh, uncontaminated material that has been properly located. For microfossil work, about 500 gm are sufficient. In Tertiary carbonate sequences, clayey layers in particular should be sampled. Fragile macrofossils should be carefully wrapped and protected. Potentially large vertebrate remains must generally be left for the specialist to extract after their position has been noted and photographed.

For stromatolite studies large joint blocks of the order of 30 cm cubed (or larger) are needed.

Palynology: near-surface or outcropping rocks are often too weathered to give satisfactory results, but carbonaceous material is worth collecting on the chance that it may contain identifiable plant remains; at least 20 gm of fresh sample are required. In South Australia this applies mainly to Permian and younger rocks.

Black cherts may yield traces of microscopic organisms and 1 or 2 kg should be collected.

APPENDIX F

ROCK SAMPLE DATA FORMS
(by A.H. Blissett)

These notes have been prepared as a guide to filling in and coding the "RS" forms, ready for the preparation of punched cards and input to the computer. The form was designed by M. Day (Systems Officer) to include the range of data on samples/specimens which the "RS" committee decided should be recorded, following its deliberations in 1976 and 1977.

The small numbers marked above the blocks of data ("fields") are the column numbers on a standard 80 column Hollerith punch card. The number printed in Column 15 is the "card type". It can be seen that there are 7 cards for each sample/specimen, each with 80 columns but with data fields arranged differently after Column 16.

The unit number of the sample/specimen is repeated on all card types. Column 16 is used by the Systems Section.

The dotted lines are for writing in the information. Actual values or code numbers are entered in the appropriate "box". Lines without "boxes" are for any comments the collector cares to make, but will not be input to the computer. Thus the form itself will be a useful written record, especially if there is a delay in processing.

There are 4 types of data input involved.

1. Actual "values" eg. 1:250 000 sheet number; co-ordinates; photo-locations etc.

2. Numeric codes eg. 203 for Gawler Block (from list of geological provinces): 0138 for granodiorite (from list of rock names). In output the name, and not the code number, will be printed.

3. Alphabetic codes, eg. F=feet (Cards 1 and 2) M=metres (Cards 1 and 2); M=million (Card 6).

4. Alphanumeric codes. Output will be exactly as entered, including spaces left, eg. mine or borehole name (Card 2); Amdel numbers (Card 6), Departmental numbers and references (Card 7).

Alphabetic "O" "I" and "Z" are written as Ø, I and Ƶ respectively to distinguish them from numeric zero, 1 and 2.

The form should be written in red, which makes the data in the black "boxes" easier to read.

CARD 1

Cols. 1-14

Unit number. Made up as described by Selby & Day (1977). The first 4 digits are the number of the 1:100 000 sheet. Obtained from the register in the Cartographic Section, Drafting Branch.

Col. 15

Card type.

Col. 16

Used by Systems Section.

Col. 17

Security of data

1. Open file
2. Closed (Departmental use only)

Cols. 18-23

Name of 1:250 000 sheet on dotted line. Coded in the form of "SG5312". COPLEY (SH54-9) would be coded as SH5409.

Cols. 24-26

Geological province (from list - not attached).

Cols. 27-33

Latitude or Easting (See also Selby & Day, 1977)

Cols. 34-41

Longitude or Northing.

Cols. 42-43

Zone number.

If the metric grid is used, the zone number must be filled in. (This is shown on maps marked with the metric grid). Must be left blank if latitude and longitude are used.

Col. 44

Accuracy of co-ordinates

1. Unknown
2. $\pm$ 10 m
3. $\pm$ 100 m
4. $\pm$ 1 km
5. $\pm$ 10 km

Cols. 45-50

Elevation (if known)

Col. 52

Datum of elevation

1. Australian Height Datum
2. Mean sea level
3. E.W.S. Datum

Col. 53

Accuracy of elevation

1. Surveyed
2. Contour plan
3. Barometric

Col. 54

Reference point for elevation

1. Top of casing
2. Ground level

Cols. 55-57

Hundred name (if applicable), code numbers from list in Selby & Day, 1977.

Cols. 58-61

Section number (if applicable)

Cols. 62-72

Cols. 62-65

Survey number (marked on sets of photos). Run number can be entered on dotted line between cols. 65 & 66 for the record, but will not be processed.

Cols. 66-69

Photo number

Cols. 70-72

Location point on photo

CARD 2

(Cols. 1-14 Unit number - repeated)

Col. 15

Card type

Col. 16

Used by Systems Section

Cols. 17-26

Type of sample/specimen. From list - 5 allowed; eg. rock, thin section, powder.

Cols. 27-29

Length (if applicable) eg. for channel sample.

Col. 30

Unit of length
M=metres
F=feet
I=inches
X=mm (Millimetres)

Col. 31

Where collected

1. Outcrop
2. Slime dam
3. Stream, lake, swamp
4. Surface workings
5. Dump or stockpile
6. Float
7. Borehole
8. Sea; beach
9. Underground workings

Col. 32

Method collected

1. Selected specimen
2. Grab sample
3. Rock chip sample
4. Representative sample
5. Unspecified
6. Blasted
7. Bulk sample
8. Channel sample

Cols. 33-62

Mine/borehole name or number (if applicable)
Abbreviate if necessary;
eg. SADM, MT. MONSTER DDH 1 (Space between words). For un-named boreholes use the unit number recorded in the Bore General computer file.

Cols. 63-74

Depth range (if applicable)

Col. 75

Unit of depth
F=feet
M=metres

Description line. Not input to computer - can be used for notes on location if the collector wishes.

CARD 3

Cols. 1-14

Unit number - repeated

Col. 15

Card type

Col. 16

Used by Systems Section

Cols. 17-22

Where specimens/samples are held-up to 3 allowed

01 with collector
02 Amdel
03 Core Library
04 Paleo: museum
05 Discarded

Cols. 17-22

Location in core library, when finalised (if applicable)

Cols. 31-34

Organisation collecting - see list (not attached). Also includes Amdel, Universities, B.M.R. etc.

Cols. 35-38

Name of collector. (See list (not attached)).
Collectors number. Not input to computer.

Cols. 39-44

Date collected, in form 110877 (11/8/77)
020571 (2/5/77)

Cosl. 45-60

Other computer files referenced - up to 8 allowed. Refers to specialist files, some of which do not yet exist, for example, petrological & analytical files. However, an entry here will allow sorting or "RS" data. eg., it would be possible to print out a list of granites from the Gawler Block for which there are petrological reports, or conversely a list of rocks on file which have not had petrological work done on them.

*01	Bore general index	04	Petrology & mineralogy
02	Petroleum	05	Analytical
03	Biostratigraphy	06	Geophysical

* Fill in if material came from a borehole recorded in the Bore General File, see p. 5.

Cols. 61-76

Index numbers of slides or photos held in Records (if applicable)

Cols. 77-80

State of specimen - 2 allowed. (See list). Includes state of weathering, alteration, kaolinised, etc.

CARD 4

Cols. 1-14

Unit number - repeated

Col. 15

Card type

Col. 16

Used by Systems Section

Cols. 17-32

Major rock name

Cols. 29-32

Are for the rock name code (see list). The other 3 fields are for modifiers to build up composite names like "quartz-msucovite-biotite schist" or "crossbedded lignitic pebbly sandstone" if required (see list of modifiers). Work from right to left, eg. for "pebbly sandstone", use Cols. 25-32. Cols. 17-24 will be blank leaving a space.

Remarks line for comments on rock - not input to computer.

Cols. 33-34

Rock classification

01	Igneous (undifferentiated)	07	Igneous - intrusive
02	Metamorphic	08	Paleosol
03	Soil	09	Mineral (s)
04	Sedimentary (consol.)	10	Sediments (unconsol.)
05	Volcaniclastic	11	Duricrust
06	Igneous-extrusive		

Col. 35

Type of identification

1.	Field, or general name	5.	Acetate peel
2.	Petrology/mineralogy	6.	Silica percentage
3.	Biostratigraphy	7.	Not specified
4.	Analysis	8.	XRD

Remarks. Line for comments on mineralogy - not input to computer.

Cols. 36-44

Economic minerals or elements present in major amounts - up to 3 allowed. (See list). eg. copper, lead, zinc, talc, barite, jade.

Cols. 45-51

Economic minerals or elements present in minor amounts - up to 3 allowed.

Cols. 54-69.

Minor rock name. As for Cols. 17-32 (Two rock types are thus allowed for in the same specimen/sample).

CARD 5

Cols. 1-15

Unit number 0 repeated

Col. 15

Card type

Col. 16

Used by Systems Section

Cols. 17-24

Stratigraphic unit. The list has been coded in a hierarchical format so that only the smallest unit known is required - the computer will generate the higher elements of the grouping. eg. Simmens Quartzite Member (of the Tent Hill Formation in the Wilpena Group). If all that is known is that a specimen came from, say, the Burra Group, this would be entered on the appropriate line. Units such a Anabama Granite and Rathjen Gneiss should be entered on the Supergroup (or Unspecified) line.

Col. 25

Status of name of stratigraphic unit

1. Formal 2. Informal

Col. 26

Validity of stratigraphic unit

1. Valid 2. Invalid

Normally, only a formally-defined, published stratigraphic name should be used (see "Preliminary list of South Australian Stratigraphic names" by L.A. Gerdes RB 75/100-1975). A formal name refers to a valid rock unit which has been properly defined and complies with the conditions set out in the Australian Code of Stratigraphic Nomenclature, 1964 (Amended in 1973). The name should comply with the Code, and should have been approved by the Stratigraphic Nomenclature Committee. Publication of the name establishes its validity. Some old names published were never formally defined but have gained acceptance as valid units. An informal name can be published in order to place on record a new formation not previously recognised, though the unit may not be sufficiently well known to warrant defining. Until this is done the unit is "informal" and "invalid", although the name can be used in the literature. eg. the Wirrildar beds of R.B. Major (QGN 45-1973). The computer can print only capitals.

Col. 27

Confidence. ie. the confidence the collector has that the specimen/sample came from the stratigraphic unit given. This is somewhat subjective but should be placed in one of the following categories:

*1.	High	4.	Probable
2.	Possible	5.	Doubtful
3.	Low		

*Note that this is <u>not</u> a scale of degrees of confidence (Scale would be 1,4,2,5,3).

Cols. 28-35

Equivalence of stratigraphic unit (if required)

Cols. 36-43

Former name (if applicable)

Cols. 44-52

Stratigraphic age (see list - not attached).

Col. 44

1. Pre- 2. Post-

Allows for rocks of uncertain age; eg. Pre-Adelaidean, Post-Miocene.

Cols. 45-52

The 2 fields allow for overlapping ages.

eg. Cambrian - Ordovician
Pleistocene - Holocene
Otherwise, place code number in Cols. 45-48

Col. 53

Confidence, ie. the confidence the collector has that the specimen/sample is of the stratigraphic age given. Same code as Col. 27 but different concept. eg. a collector might have a high confidence that a specimen he collected came from the Pandurra Formation, but it is still not certain whether its age is Torrensian, which would be assigned as "probable" or "possible".

CARD 6

Cols. 1-14

Unit number - repeated

Col. 15

Card type

Col. 16

Used by Systems Section

Cols. 17-20
29-32

Geochronological age. 2 methods allowed for. See list (not attached)

Cols. 21-25
33-37

Y=Year
X=Tens of years
H=Hundreds of years
T=Thousands
D=Tens of thousands
C=Hundred of thousands
M=Millions

This will allow for all types of age determination, from young C^{14} ages up to 9999 Ma.

Cols. 22-24
34-36

Experimental variation. Similar.

Cols. 26-27
38-39

Method used. (See list; not attached)

Cols. 28-40

Security

1. Open file

2. Closed file (Departmental use only)

This refers only to the geochronological work, which may be temporarily restricted or closed prior to publication, while the rest of the information on the specimen/sample is on open file.

Cols. 41-80

Space for inserting thin section numbers; Amdel report number, etc.

CARD 7

Cols. 1-14

Unit number - repeated

Col. 15

Card type

Col. 16

Used by Systems Section

Cols. 17-56

Space for inserting P,A, numbers, etc.
Other numbers. If required - not input to computer.

Cols. 57-80

Space for inserting Departmental references, eg. R.B. numbers: QGN, R.I. number, Docket number, Envelope numbers.

REFERENCE

Selby, J., and Day, M., 1977. A data base system for the storage and retrieval of geological data. Mineral Resour. Rev. S. Aust., 140: 59-69.

Specimen only.

DEPARTMENT OF MINES AND ENERGY — SOUTH AUSTRALIA
GEOLOGICAL SURVEY

FORM DP 5

ROCK SAMPLES AND SPECIMENS

Unit Number: 5035 RS 271 (Repeated on each card)

15: 1

Security: 1

1 : 250000 Map: Gairdner — Province: Gawler Block — SH5315 — 205

Latitude/East: 311546 — Longitude/North: 1351417 — Zone: — Accuracy: ± 100m — 3

Elevation: — Unit: — Datum: — Accuracy: — Ref. Point:

Hundred: — Section: — Aerial Photograph *: 262 3 2519 5

15: 2

Type of Sample: Drill cuttings, powder, thin section — 110427 — Length: — Unit: F

Where Collected: Bore hole — Method Collected: Representative sample — 7 — 4

Mine/Borehole Name or Number: KOKATHA BORE 4

Depth: From 800 — To 900 — Unit: F

Descriptive: ¼ mile S of Kokatha HS

15: 3

Repositories: Core library, Core library, Amdel — 030302 — Core Lib. No.:

Organisation: Regional Geology Divn — Officer: B.P. Thomson — 0009 — 0007

Collector's No.: * BPT 72/69 — Date: 101169

Other Files Referenced: Petrological, Analytical, Bore general — 0405011

Slides/Photos: — State of Spec.: Altered, chloritised — 0209

15: 4

Major Rock Name: Graphic granite — 0209 — 0071

Remarks: Unsuitable for K/Ar dating

Rock Classification: Igneous intrusive — Type of Ident: Petrological — 07 — 2

Remarks: Biotite extensively chloritised. Accessory fluorite, zircon, apatite

Economic Minerals (Major):

(Minor): Fluorite — 023

Minor Rock Name:

15: 5

Member (or beds): — Formation (or beds):

Subgroup (or beds): — Group:

Supergroup (or Unspecified): Hiltaba Granite — 00000260

Status: Formal — Validity: Valid — Confidence: High — 1 — 1 — 1

Equivalent to: — Former Name: Kokatha Granite — 00000300

Stratigraphic Age: Carpentarian (high conf.) — Pre/Post: — 0050 – — Confidence: 1

15: 6

Geochron Age: 1478 — Unit: M — Range ±: 38 — Unit: M — Method: Rb/Sr (whole rock) — 01 — Security: 1

Geochron Age: — Unit: — Range ±: — Unit: — Method: — Security:

15: 7

AMDEL Nos.: * TS1977 MP1/1/122 PR3,911

Deptl. Nos.: 2230/69

Other Nos.: — Deptl. Refs. *: RB316/69

* Imaginary number — ORIGINAL WRITTEN IN RED

APPENDIX G

CAMPING, VEHICLE GEAR

As an example, the following equipment is suited to summer mapping by a party of three geologists in the Olary Region:

6 x 200 litre drums super petrol

Three Landrovers, each equipped with -

Water bag
18 litres drinking water; reading light; sun-shield
First-aid kit
Fire extinguisher
Pick
Shovel
Tool kit with hand tyre pump, hydraulic jack with handle
Extra spare tyre
1 Jerrycan petrol
4 Litres engine oil
1 Hand torch
1 Roll toilet paper
1 Drinking mug
1 box matches
1 Small billy
1 Towing cable
1 Steel jacking plate
4 Planks timber 60 x 5 x 13 cm
Radio transceiver

One trailer + spare wheel, wheel brace
3 kg hammer
Brake fluid
Distilled water
Transmission oils (gearbox, differentials)
Rubber tyre hammer, spare tube, 2 large, 2 small tyre gaiters
spark plug pump.
Two 2-berth caravans (each with gas refrigerator, gas stove, spare gas cylinder, electric light sockets fitted with 25 watt, 12 volt globes, spare gas mantles).
Spare torch batteries.
2 caravan front supports
4 spare 25 w 12 v globes
2 x plugs and flex for connecting caravan interior lights to L.R. batteries .
Petrol drum opener, petrol pump and measuring stick.
1 funnel for petrol
1 funnel for water
1 siphoning hose for petrol
1 siphoning hose for water
1 set jumper leads for starting vehicle on flat battery
4 sugar bags
300 plastic sample bags
Epoxy resin repair kit eg. "Plastibond"
1 large water bag (cylindrical) for camp

Spare tyre(s) for caravans
Spare tube for caravans
Wheel braces for caravans
Mattresses, pillow and covers for 4 people in caravans
Personal bedding
Winder for caravan legs
1 broom
1 mop)
1 mop buckets) or self-squeezing mop
2 plastic buckets
2 plastic washup bowls
Toilet rolls
Cooking and eating equipment for 4 people including saucepans, teapot, fry pan, milk jugs, dinner plates, soup plates, mugs, cutlery, bread knife, potato peeler, butchers knife, vegetable knife, egg slice, dish mop, tin openers, egg beater.

Matches
Washing powder
Velvet soap, solvol soap
Toilet rolls
Steel wool
Rags
Detergent
Detergent hand cream
3 dozen clothes pegs
Clothes line
1 portable camp shower
Fly spray
Camp tables, chairs
Rubbish bags

Other gear and spare parts for vehicles are listed below but the Transport Officer should be consulted (or responsibility given to an accompanying driver/mechanic) before ordering.

EQUIPMENT FOR FIELD TRIPS
(This is a check list only)

Petrol pump
Drum measurer
Drum opener
Special spanners (for hub nuts etc.)
Hand winch and handle
Steel pegs, wire
Sledge and spawl hammers

Brake fluid
Distilled water
Oils - SAE 30
90
140

Metho
Kerosene
Grease
Gas cylinder
Distillate
Petrol

Sample Bags - small linen
large linen
small plastic
large plastic

Core sample bags
Sugar bags
Old super bags (packing)
Water bottles (in boxes)
Water bottles labels

Soap - tablet
solvol
velvet
ivy
Seagull
Gamophen (special)

Detergent
Ajax Cleaner (for stoves etc.)

Dish mop
Dish cloth
Cheese cloth
Hand cleaner
Globes - 240 v
32 v
12 v
Gas mantles
Flints
Matches
Fly spray
Fly repellant
Spare torch batteries
Spare torch globes
Toilet rolls
Nails
Screws
Aluminium tags (bore samples)
Tape - masking
durex
yellow, red, plastic
Rags
Clothesline and pegs
Paper towels
Aluminium foil
Plastic wash bowels - large
small
Buckets (Plastic)
Shower bucket (with ropes and pulleys)
Jerry cans - water
petrol
Syphon hose - water
petrol
Plastic funnel - water
petrol (with filter)
Copper
Mop bucket
Mop
Water bags - small
camp
Water bottles
Gas cooker
Gas cooker attachment
Camp oven
Griller
Meat saw
Gas gun and flints

Billies
Kettle
Teapot
Mixing enamel bowls
Broom
Butter dish
Bread board
Colander
Cups and saucers
Carving board
Enamel Pie dish
Plastic dishes
Fire Extinguisher
Egg slicer
Egg beater
Enamel mugs
Carving fork
Dinner fork
First Aid kit
Frying pan - large
small
Bread knife
Butchers knife
Carving knife
Dinner knife
Gas mantles
Pillows
Pillow slips
Enamel plates (deep)
Dinner plates
Bread and butter plates
Soup plates
Saucepans
Desserts spoons
Tea spoons
Sharpening steel
Salt shaker
Pepper shaker
Tin opener (cork opener)
Toaster
Galvanized tub
Tea towels
Vegetable peeler
Willow Roaster
Willow Boiler
Ladle
Meat bag
Pressure cooker

Camp table
Camp chairs
Box for kitchen gear
Doormat
Rubbish bin
Ground sheets
Tarpaulins
Tent legs
Tent poles
Mattresses
Stretchers
Sleeping bags - canvas
woollen
Pillows, covers
Blankets
Kero heater
Tilley lamp
Torch
Extension leads
(a) battery to battery
(b) battery to van lights
U bolt for caravan
Spare wheel, caravan
Winder for caravan
Wheelbraces for caravan
Jacking plates
Jacking boards
Pick
Shovel
Axe
Tool kit to suit
Towing cable
Spare hydraulic jack
Refrigerator
Haversack
Insect sprayer
Much of this equipment is included in normal list for caravans.
SPARE PARTS REQUIRED FOR VEHICLES (depending on type of trip)

Electrical

Distributor points
Condensor
Rotor arm
Distributor cap
Generator brushes
Coil
Set of spark plugs
Packet of 25 amp fuses
Head lamp bulbs
Front trafficator bulbs and covers
Rear trafficator bulbs and covers
Spare 12 volt glove for trouble lamp
Short range or SSB radio

Mechanical kit and miscellaneous gear

Brake cylinder kit
Carburettor kit
Fuel pump
Barsleaks (for radiator holes)
Copper tubing
Plastic hose (clear)
1 flexible brake hose-front
1 flexible brake hose-rear
Grease gun and grease
Quart measuring tin
Spare tubes, spare wheel
Epoxy resin repair kit
Plastibond, Bostik
Workshop manual
Bead breaker - drop hammer type
Box of assorted nuts, bolts, self tapping screws etc.
Tyre gaiters and rubber solution
Spare dry 12 v battery and acid (in kit)
Spare patches
Spare filters (on fuel line - IMPORTANT)

Chassis kit

2 front and back complete springs
U bolts for rear axle, nuts and lock plate
U bolts for front axle, nuts and lock plate to fit nearest the front differential
2 rear shackle bolts and nuts
2 front shackle bolts and nuts
1 hanger pin and nuts
1 shackle plate - plain
1 shackle plate - with thread
1 rear centre pin and nut
1 front centre pin and nut
1 main leaf spring with fitted bushes rear
1 main leaf spring with fitted bushes front
1 short rear axle) may require short
1 long rear axle) thick leaves

Extra tools possibly required

Hacksaw plus blades
Soldering iron, solder (resin cored) and flux
Multigrip pliers
Long nosed pliers
Feeler gauge
Rubber hammer
Wire brush
Centre punch
Phillipshead screwdriver
1 crescent adjustable spanner
5/16 W. spanner (ring) for hub nuts
Gasket material (cork)

APPENDIX H

FOOD

Bread
Rolls
Biscuits: dry
sweet
Cake
Buns
Flour: plain
S.R.
cornflour
Rice
Spaghetti
Breakfast cereals, muesli
Beef: steak
corned beef
Lamb:
chops
roast
Pork
Poultry
Sausages
Eggs
Bacon
Salami
Metwurst
Cabanas
Polish sausage
Meats: tinned
Butter
Margarine
Cooking oil
Cooking fat
Milk: powdered
evaporated
condensed

Cream tinned
Cheese
Vegemite
Peanut paste
Fish paste
Jam
Honey
Golden syrup
Salt, pepper
Sugar
Tea
Coffee
Cocoa
Milo
Sal vital
Cordials
Limejuice
Fruit juices

Potatoes
Onions
Carrots
Tomatoes
Beans
Peas
Sweet corn
Cabbage
Brussels sprouts
Cauliflower
Parsnips
Swedes
Pumpkin
Trombone
Beetroot
Capsicums
Celery
Parsley
Cucumber
Radish
Lettuce
Vegetables: dried
tinned
Apples
Oranges
Mandarins
Bananas
Lemons
Coconuts
Grape-fruit
Pineapple
Apricots
Peaches
Plums
Dried fruits
Nuts

Packets: soups
instant meals
mashed potato
Ice cream mix

Herbs
Vinegar
Pickles: mustard
onions
gherkins
Peppers
HP
Mayonnaise
Olives

Sauce: mint
worcestershire
tomato
soy
horse radish

Mustard
Curry
Gravox

Alfoil
Gladwrap

Tinned fish: tuna
sardines
salmon
herring

Tinned: soups
beetroot
potato salad
sauerkraut
vegetable salad
asparagus
sweet corn
fruit
mushrooms
rice cream
puddings
spaghetti
baked beans

APPENDIX I

Single Side Band Radio Communications Network - VL50N

Conditions Governing the Operation of the Network

The single side band network was established in 1970 with two frequencies being allocated by the Regulatory and Licencing Section of the Postal and Telecommunication Department, viz. 3716 and 7365 kHz. These frequencies are shared by other networks, in particular, VL5QX operated by the Highways Department.

Conditions under which the networks may operate are laid down by the above authority. It is now evident that some conditions are being persistently breached and it is desirable that a restatement of them should be made to avoid misuse of the system.

Because frequencies are shared, it was agreed with Highways Department in 1971 to reserve set time during the day for specific use of the separate Departments. VL5QX were "given exclusive use of the radio to call its mobiles daily 'on the hour' at the following 'even hours': 10 am, 12 noon, 2 pm and 4 pm. At the termination of message originating from the Port Augusta Base at those hours, the frequency would be open to any mobiles from either the Highways Department or the Mines Department to call their respective Bases. The same system to apply to the Mines Department at the 'odd hours' including 8 am."

Licence conditions governing the operation of VL50N radiocommunicatior network

1. Operators on the VL50N network must take note that these sets are licenced to communicate between the mobile and base only on the above frequencies and NOT between mobile and mobile except for emergencies affecting the safety of life or property. The frequency 2140 kHz has been allotted for Departmental communication between mobile and mobile and MUST be used to the exclusion of other frequencies where practicable, usually up to a radius of about 100 km.

2. Operators must listen to confirm that the channel is clear before commencing transmission.

3. Call signs must be transmitted at the beginning and end of each unbroken series of communication and at 5 minute intervals in the case of conversation occupying more than 10 minutes in transmission.

4. Communication transmissions must be kept as brief as possible. The licence conditions restrict traffic to urgent matters, which is interpreted to mean communications which would suffer from delays resulting from any other means of communication, such as the Royal Flying Doctor Service outpost radio.

It should be noted here that the convenience of the network system has resulted in traffic which could be dealt with by post, telephone, or the R.F.D.S. outpost radio without loss of efficiency, and that such traffic is a breach of licence conditions.

5. Mobile units must not be operated within 8 kilometres of available Post Office facilities.

6. Prior approval must be sought before operating a radio station at a fixed site, eg. a drilling site, where it is anticipated that operations are likely to exceed one month.

7. The Postal and Telecommunications Department reserves the right to withdraw the service in the event of provision of official facilities capable of meeting the Department of Mines and Energy requirement.

EMERGENCY CALL AND MONITORING SERVICE

AN EMERGENCY IS A SITUATION WHERE THERE IS A DANGER TO LIFE OR PROPERTY. THE TIMES INDICATED ARE FOR EMERGENCY CALLS ONLY. THESE TIMES AND 5 MINUTES EACH SIDE MUST NOT BE USED FOR OTHER THAN EMERGENCIES.

CALL SIGNS VNZ PT. AUGUSTA R.F.D.S. VL 5 QX HIGHWAYS DEPT. VL 5 FT ST. JOHN AMBULANCE

ALL TIMES Try the Emergency Button on the Transceiver on the R.F.D.S. frequencies.

Mon. to Friday

8 p.m. to 8.10 p.m.		3717.5 KHz	VL 5 FT
10 p.m. to 10.10 p.m.		3717.5 KHz	VL 5 FT

SATURDAY

9 a.m. to 9.30 a.m.	4010; 5145; and	6890 KHz	VNZ
4.00 p.m. to 4.10 p.m.		7366.5 KHz	VL 5 FT
6.00 p.m. to 6.10 p.m.	7366.5 KHz (Summer)	3717.5 KHz (Winter)	VL 5 FT
8.00 p.m. to 8.10 p.m.		3717.5 KHz	VL 5 FT
10.00 p.m. to 10.10 p.m.		3717.5 KHz	VL 5 FT

SUNDAY

9 a.m. - 9.30 a.m.	4010; 5145 and	6890 KHz	VNZ
4.00 p.m. - 4.10 p.m.		7366.5 KHz	VL 5 FT
6.00 p.m. - 6.10 p.m.	7366.5 KHz (Summer)	3717.5 KHz (Winter)	VL 5 FT
8.00 p.m. - 8.10 p.m.		3717.5 KHz	VL 5 FT
10.00 p.m. - 10.10 p.m.		3717.5 KHz	VL 5 FT

PUBLIC HOLIDAYS

As for Sundays

In addition, stations and outstations are often "on air" outside of normal hours. However, they often utilise frequencies not available on the S.S.B. transceivers eg. 2020 KHz. These frequencies can be utilised with Traeger TM3 transceivers and with most of the Codan (Eilco) Transceivers.

THE ATTENTION OF ALL OFFICERS IS DRAWN TO THE "PROCEDURES FOR USE OF RADIO TRANSCEIVERS" WHICH MUST BE FOLLOWED AT ALL TIMES.

A LIST OF SUPERVISORS AND DEPOT ADMINSTRATIVE OFFICERS WILL BE SUPPLIED TO VL 5 FT: IF COMMUNICATION WITH SUPERVISOR IS NECESSARY ASK FOR ST. JOHNS TO CONTACT PERSON REQUIRED.

APPENDIX J

SAFETY

This aspect is covered in the Department's "Safety Booklet" and in first-aid manuals and pamphlets such as those provided by the St. John Ambulance organisation. Important points are maintenance of communication, locally and with head office, and carrying of adequate supplies (especially food, water and fuel) and a suitable first aid kit.

In the event of injury, immediate help should be sought after ensuring that the patient's breathing is not obstructed and he is in a suitable position. Artificial respiration may have to be applied. Unnecessary movement of the patient should be avoided while as much as possible is learnt of the nature of the injury and relevant personal details of the patient such as name, age and medical history.

Burns can be effectively alleviated by immediate immersion in cold water. In the event of snake bite, the bite should be washed and the patient kept quiet while help is sought. If possible a pad should be placed over the wound and the affected limb firmly and completely bandaged.

Frequent exposure to the sun during field work can induce skin cancer, hence it is wise to wear a hat and make use of a UV filter lotion on the skin: hands and face are the most likely areas to suffer.

Absalom (1976) provides much good advice for outback travellers. Dunlevy (1978) advises on techniques for survival in emergency.

FIG. 1

SOME COMMON SYMBOLS FOR USE ON AIR PHOTOS

Where symbols obscure too much detail a locality reference number may be used instead and the information recorded on the back of the photo.

LITHOLOGICAL

- Conglomerate ..... co
- Breccia or tillite .....
- Sandstone ..... ss
- Shale ..... sh
- Siltstone ..... sis
- Dolomite ..... dol
- Limestone ..... ls
- Calcitic siltstone .....
- Schist ..... sch
- Gneiss ..... gn
- Granite ..... g
- Crushed rock .....
- Basic volcanics .....
- Acid volcanics .....
- Silcrete ..... si
- Calcrete ..... ca
- Ironstone ..... fe
- Quartz ..... z
- Gypsum ..... y
- Red sand / sandy soil ..... s
- White sand ..... sw
- Slope gravels, thick gibbers; e.g. on Pooraka Formation .....
- Creek alluvium .....
- Higher level gravels e.g. Telford Gravel ..... p
- Quartz gravel ..... z
- Ironstone gravel ..... fe

STRUCTURAL

- Bedding: dip/bearing ..... 080 / 50
- " : vertical, horizontal .....
- Flow banding .....
- Metamorphic foliation ..... 135 / 70
- Cleavage dip ..... 170 / 70
- Vertical cleavage 030
- Top of bed: sedimentary/volcanic .....
- " : structural .....
- Plunge of lineation or fold: amount/direction 20/240
- Locality reference number 6
- Section line .....

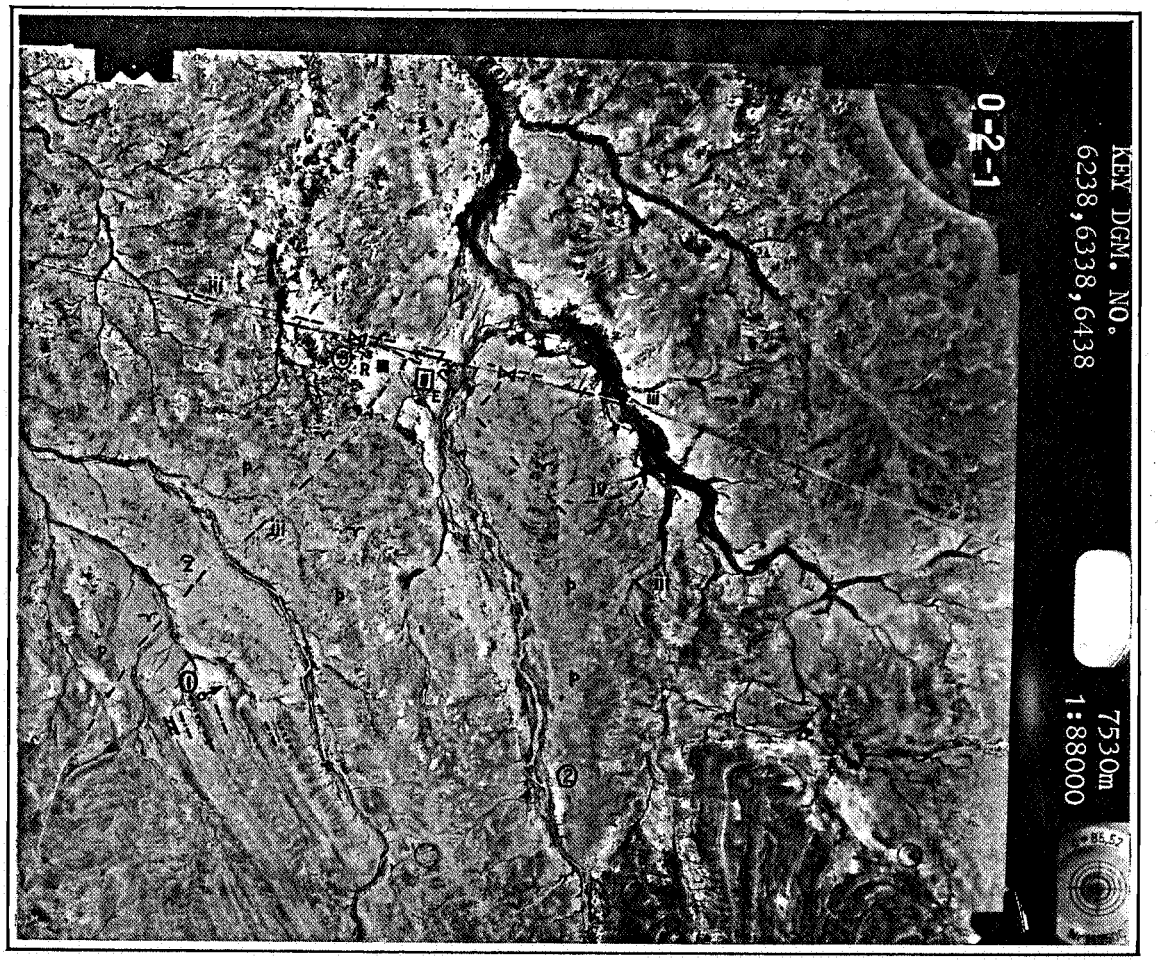
CULTURAL

- Main sealed road i
- Main unsealed road ii
- Tracks iii
- Poor tracks, not recommended for final map iv
- Fence .....
- Gate .....
- Bore .....
- Well .....
- Water tank ..... T
- Earth tank ..... E
- Ruin ..... R
- Mine .....
- Quarry .....

S 13852

FIG. 2
EXAMPLE OF PHOTO MARKING

FRONT:



BACK:

WANGIANNA 1:100 000 Survey 1074 Run 6 Photo 021 Scale 1:88 000

A.G. Smith 10.6.79 ① qte. feldspathic, med.-gr. beds 10-50 cms, 20 cm x-bed units show facing NE'ly, current → N'ly ? Subvert, S 140°. spec [Wa 6.21.1] (6238 RS 75) photos 793. 10, 11. (roll 408: 65124, 5.) To E. & W, siltst. green-grey, flaggy, lam. Sparse saltbush on low ridges.

② 5 m. cliff : top ~ 50 cm. gravel of rounded qte, qz, siltst. clasts 3-15 cm on 1 m. brownish pebbly x-b co. ss, 1·5 m covered, 2 m creek bank. ? Bulldog Sh. - dk greyish mudstone [Wa 6.21.2] (RS 76) with one reddish porphyry boulder [Wa 6.21.2a] (6238 RS 77) 50 cm. photos 793 12-15. (roll 408; 65126-8) Upper gravel unit (? Telford) extends sporadically to dam.

③ Ruins of Aynsley Outstation, flagstone. qz gravels, frags. up to 5 cm nearby netting fence. Dam ~ ½ full 11·6·79

GEOLOGICAL SURVEY SOUTH AUSTRALIA

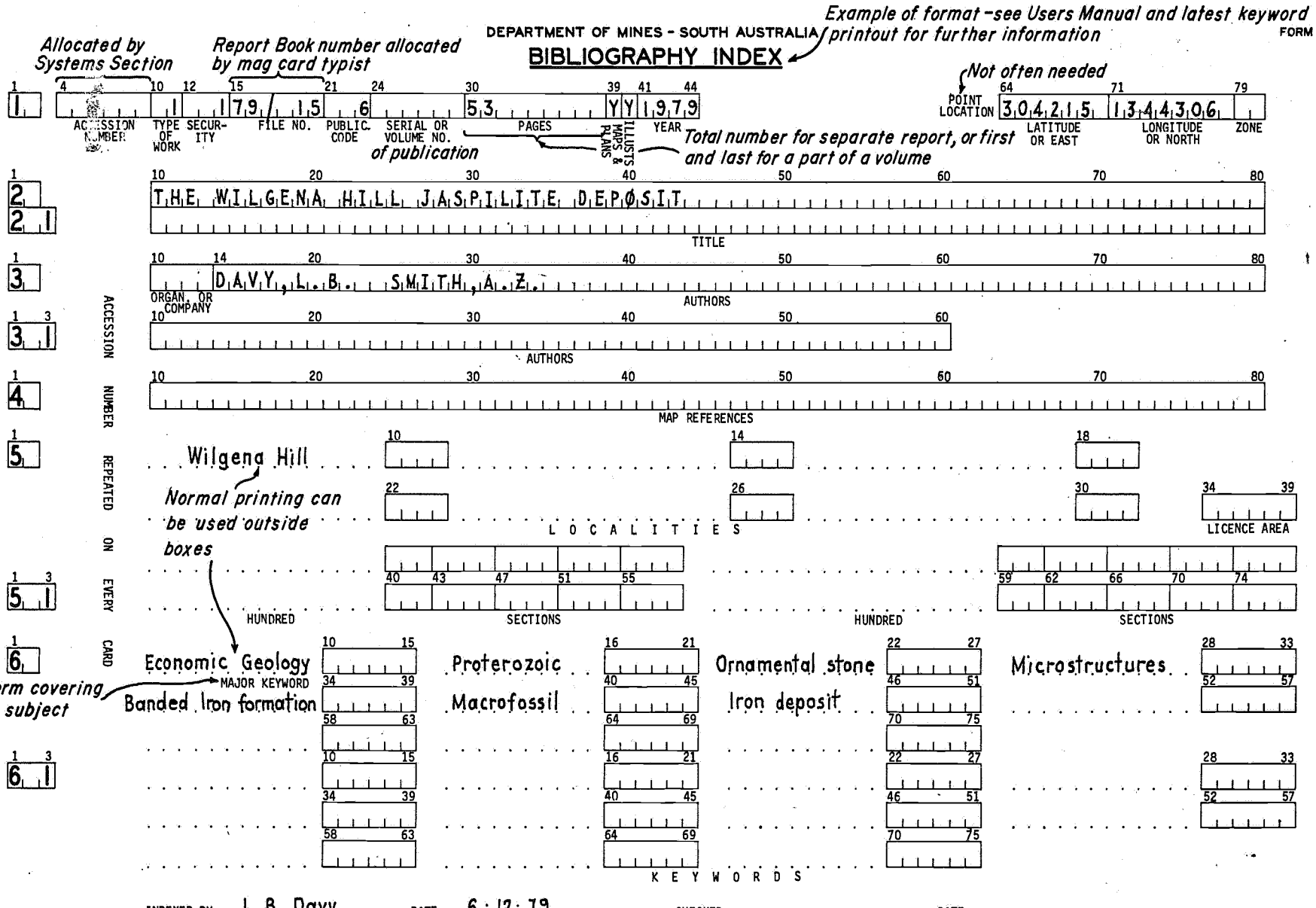
S 13853

DEPARTMENT OF MINES - SOUTH AUSTRALIA

BIBLIOGRAPHY INDEX

FORM DP 38

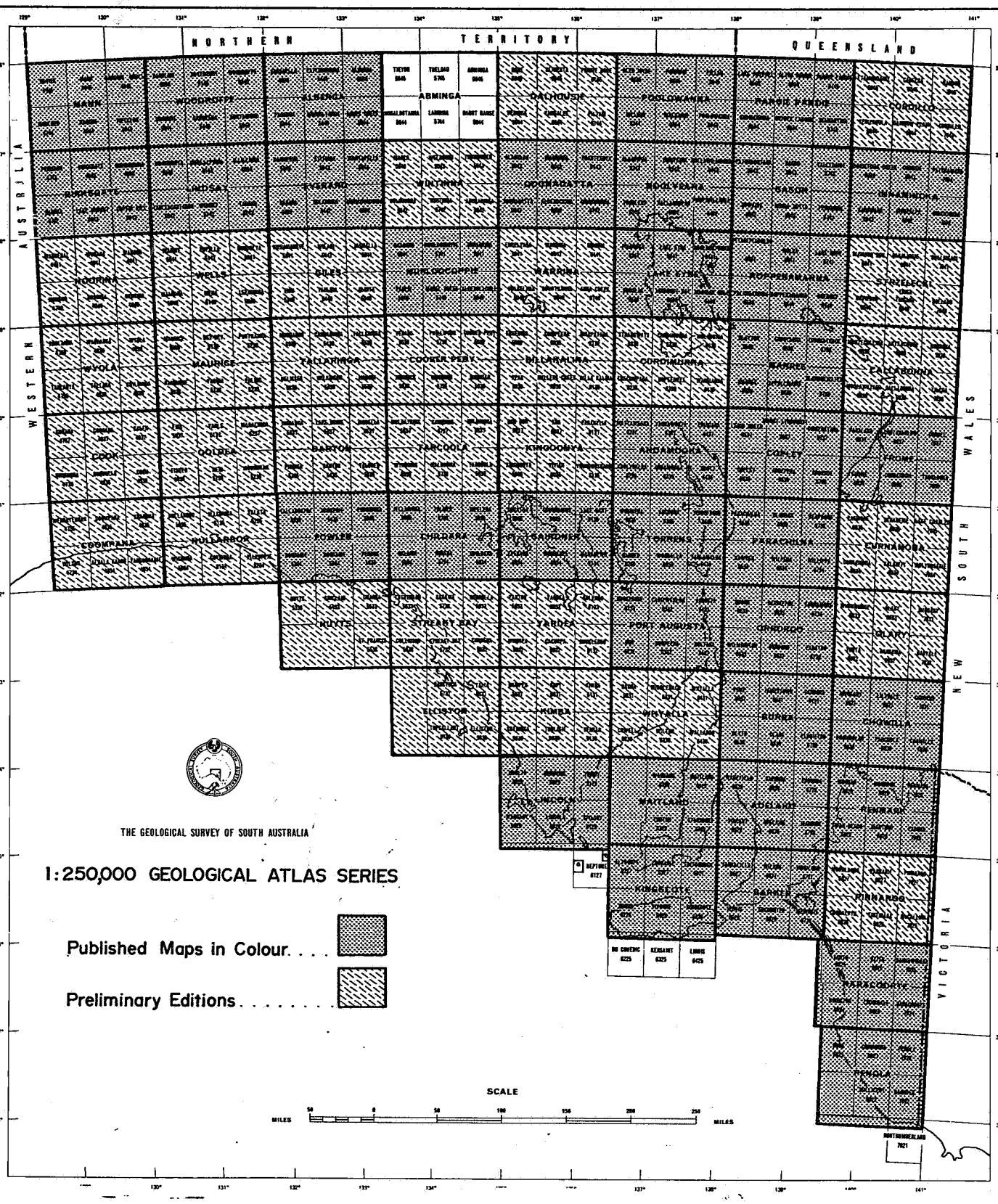
Example of format - see Users Manual and latest keyword printout for further information



INDEXED BY L. B. Davy DATE 6.12.79 CHECKED DATE

FIG. 3

S13915



	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE: 1:7,000,000
COMPILED: P.L.K	1:250,000 GEOLOGICAL ATLAS SERIES	DATE:
DRN: CKD:	INDEX TO PUBLISHED AND PRELIMINARY MAPS AS AT MAY 1979	PLAN NUMBER S14077

Job 1123