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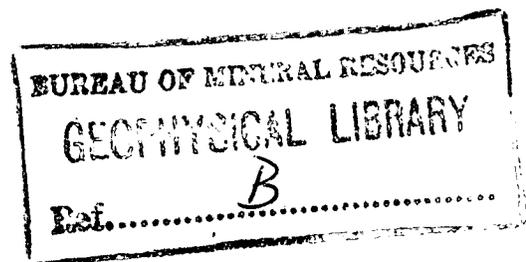
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COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS.

RECORDS.

1962/188



SUMMARY OF ACTIVITIES FOR 1962

MISCELLANEOUS INVESTIGATIONS, MAP COMPILATION AND MAP EDITING

by

E.K. Carter

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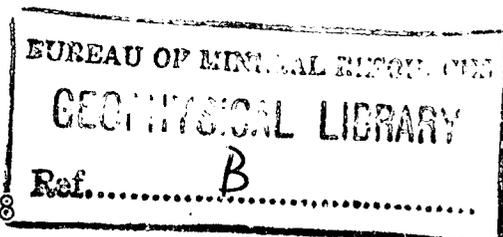
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Records 1962/188



The field work of the section covers major and minor engineering geology investigations in the Commonwealth Territories, underground water and drainage in the A.C.T.; the search for phosphate (including the investigations of the Rum Jungle phosphate deposits) and geological mapping not connected with the search for oil, uranium or metals. Office activities include compilation of special maps, editing of standard series geological maps for publication, preparation of stratigraphic indexes for publication and the maintenance of a register of stratigraphic names. A system of technical files to serve as a repository for geological information, and based on the 1:250,000 map series, is also being established. Records on engineering and groundwater investigations by Resident staff in the Northern Territory and Papua-New Guinea are also largely edited and processed by the section.

STAFF:

The following geologists worked in the section for all or part of the year:

- E.K. Carter, Supervising Geologist
- D.E. Gardner, Senior Geologist - engineering geology, A.C.T.; one investigation in N.T.
- G.M. Burton, Senior Geologist - engineering geology and underground water, A.C.T.; map editing.
- P.W. Pritchard, Geologist Grade 3 - Party Leader, Rum Jungle phosphate investigation.
- Mrs. F.I. Townsend, Geologist Grade 3 - Stratigraphic lexicons and indexing; initiation of technical files.
- Miss B.K. Graham, Geologist Grade 3 - Compilation of map of Australia and Oceania.
- J. Barrie, Geologist Grade 2 - Rum Jungle Phosphate party.
- E.G. Wilson, Geologist Grade 2 - A.C.T. drainage and minor engineering works; map editing.
- J.K. Hill, Geologist Grade 2 - engineering geology, A.C.T.
- E.J. Best, Geologist Grade I - engineering geology, A.C.T. and New Britain.
- W. Jauncey, Geologist Grade I - Rum Jungle phosphate party.

G.W. D'Addario, Geologist Grade I - Engineering geology, A.C.T., and map compilation (Canberra sheet).

Miss C. Mitchell, Geologist Grade I - Stratigraphic lexicons and indexing.

Miss B. Morganti, Geologist Grade I - Stratigraphic lexicons and indexing.

Mrs. C. Nicholls, Geologist Grade I - Compilation of geological map of Australia and Oceania.

N.E.A. Johnson, Geologist Grade I - Compilation of map of Australia and Oceania.

W.J. Perry, Senior Geologist - assisted with map editing at times; A.G. Fricker, Chemist Grade I, was a member of the Rum Jungle phosphate party; and M.N. White, Draftsman Grade 2, was engaged on the compilation of the geological map of Australia and New Guinea. In addition, several University students were employed by the Section during the University long vacation. A.W. Freebody and R.G. Winchester, Drafting Assistants Grade 2, worked with the Rum Jungle Phosphate Party.

AUSTRALIAN CAPITAL TERRITORY

ENGINEERING GEOLOGY:

Major Projects

Canberra Lake Dam

Construction of Canberra Lake Dam has continued throughout the year. All foundations have been mapped before placing of concrete and records kept of grouting results.

In the course of excavation a 35° fault, dipping obliquely downstream and towards the centre line of the dam, was located. The fault zone is only about 2 inches wide near the right abutment but is progressively thicker farther east. Under Block 6 (original numbering) it meets a fault, roughly parallel to the centre line of the dam, that dips about 65° east. The high angle fault had been recognised in the course of the site investigation. At the junction of the two faults thoroughly shattered and weathered material had to be excavated to 40 feet below design level. Other subsidiary faults have added to the volume of material that has had to be removed. The spillway area, although fractured, has proved sound. In view of the attitude of the main (35°) fault, which is conducive to foundation failure, Blocks 4, 5 and 6 of the dam have been redesigned to provide pre-stressed anchor cables.

Geological services have been provided throughout the extensive exploration work needed to determine the extent of unsound ground and to ascertain that sound ground existed in which to anchor the cables. Drill holes were designed, core logged and photographed, and excavations were mapped as required. Close liaison was maintained with engineers and consultants throughout. A report (now being issued in the Record series) was written on foundation conditions. The effect of the major fault on water tightness beneath the eastern part of the dam remains to be tested.

The difficulties experienced emphasize the need for thorough pre-construction investigation of the sites for major engineering projects. Seismic testing would certainly have indicated the extent of the bad ground.

Googong Dam Site, Queanbeyan River

The investigation undertaken in 1961 (see Summary of Activities for 1961) was extended to determine the soundness of the saddle north-east of the dam site and to locate suitable rock and earth material for a rock-fill dam. Some detailed mapping was carried out near the dam site to determine the attitude and extent of faults and shears located by seismic testing.

Weathered rock extends in the saddle to a maximum of about 60 feet depth, but it is considered that little stripping will be needed. Grouting and a low earth embankment should enable the water impounded by a 150 feet high dam across the river to be stored without leakage from the saddle. Because of the danger of erosion downstream the saddle is not very suitable for a spillway.

Ample construction materials - rock-fill from granite and dacite; core material from the weathered mantle of granite or from scree slopes; and sand and gravel from the Queanbeyan River - are available close to the dam site. The river deposits require laboratory testing for suitability.

A report on the investigation, for the Record series, has been written.

Upper Cotter River Dam Site E.

Investigations to locate suitable construction materials were carried out, following testing of the dam site.

Subject to laboratory tests, it is considered that suitable rock fill is available from a body of quartzite sandstone exposed in White Sands Creek, and probably from igneous rocks in the Cotter Valley upstream of the dam site. Impervious core material is available both in the Cotter Valley one to two miles upstream of the dam site and from deeply weathered Murrumbidgee Granite in or near the Kangaroo Flats area, near which any access for construction purposes would probably pass.

Minor Investigations

Canberra Lake

Further mapping of the west basin of the Canberra Lake was undertaken to obtain a record of lithologies and structure of outcrops that will be inundated when the lake fills.

A record was written on the geology of the lake edge and bottom.

Commonwealth Bridge

Excavations for piers for the Commonwealth Bridge were mapped as completed and plans and advice were provided to the Department of Works.

Building Foundations

Excavations of the A.C.T. Courthouse Building were inspected, to determine the nature of the material excavated, at the request of the supervising architect and the contractor, because of a dispute as to rates of pay applicable.

Core was logged and advice given about foundation conditions on the National Library site, Parkes.

Proposed Aerodrome Site near Hall

To assist in the evaluation of foundation conditions, including volume of rock that would require excavation, the Bureau loaned its Mindrill diamond drill to the Roads and Aerodromes section of the Department of Works and advised the engineer-in-charge on probable rock conditions.

Yarralumla Creek Valley

The National Capital Development Commission is developing this area to provide for the main population growth of Canberra in the next few years. The area is being mapped geologically by this Section in stages, ahead of development, to guide planning, particularly with regard to location of the main engineering services to avoid costly excavation in rock and to ensure that drainage difficulties do not damage or add excessively to the cost of roads, services and buildings. Suburbs 1, 10 and 11 have been mapped, studied and reported on, and further work will shortly be undertaken.

The area is generally undulating to hilly and lies to the west of the Red Hill - Mugga ridge. It is drained down the centre of the north-flowing Yarralumla Creek. Many of the rises have outcropping rock; greatest depth of soil is along Yarralumla Creek, and is about 15 feet. Extensive mantles of scree material, particularly along the flank of the Red Hill - Mugga line and around Taylor, have complex ground-water systems. These are indicated by springs, soaks and swampy areas and require detailed investigation by mapping, augering and piezometer studies.

Underlying rocks belong for the most part to the Deakin Volcanics and consist of crystal and lithic tuffs with interbeds of slate, calcareous siltstone and tuffaceous and quartzose sandstone. They are strongly folded and faulted. Lithology and structure do not appear to have controlled topography and soil cover to a marked extent; all rocks would provide satisfactory foundations for the type of buildings at present envisaged in the area. Weathered rock, joints and faults, however, control the movement of ground water to an important extent.

Northern Suburbs Sewer

A programme of testing was designed to locate the most satisfactory route for a Northern Suburbs outfall sewer. Auger samples were logged and the results interpreted.

Red Hill Road

Excavation requirements and the stability of a proposed link road from Melbourne Avenue to the new Yarralumla Creek Valley development were examined and reported upon.

Yarralumla Bridge Site

Three alternative alignments for a bridge across the Canberra Lake from Black Mountain Peninsula to Yarralumla have been tested under the direction of consultants to the National Capital Development Commission. At the request of the contractor assistance was given with the logging of drill core.

Construction Materials

Concrete Aggregate

Advice was given about known sources of limestone and igneous rocks in and around the A.C.T. suitable for use as concrete aggregate. Limestone deposits south of Queanbeyan were inspected.

Mugga Quarry was inspected to ensure that the product being quarried was similar to that previously tested and approved for use in the Canberra Lake Dam. The attention of the Department of Works supervising engineer, Canberra Lake Dam, was drawn to the flakiness of some of the material being delivered to the job.

Brick Shale and Clay

During the year a great number of enquiries have been received about the occurrence of shale and clay suitable for brickmaking, and particularly for clay suitable for blending with shale to produce an extrudable product for heavy clayware. Work by the Bureau and by private interests in this, and earlier, years has established the existence of adequate supplies of brick shale north of Canberra and in the Queanbeyan district. A deposit near Queanbeyan has recently been developed for a local brickworks, and the North Crace area, between the Barton and Federal Highways, was recently leased for a brickworks.

After the proving of the North Crace deposit most of the Section's activities in this field this year has been devoted to locating plastic clay. As a result material is known to exist in the Gungahlin, Bungendore and Hoskingtown areas. Tests by the Australian Mineral Development Laboratories have shown that the clays in these localities are suitable for blending with the Crace area shale. Further work is needed to establish that economic quantities exist. Geophysical work is at present being undertaken to aid in the delineation of the Gungahlin deposits.

Building Sand

The section has assisted in the search for building sand for Canberra; reserves of fine, plasterers' and bricklayers' sand, in particular, are small. A deposit was located near Pine Island, Murrumbidgee River, but was found on testing to be too small to warrant exploitation.

Areas on the Molonglo River and Jerrabombera Creek were also tested in the hope that useful sand could be excavated and the resulting holes could be used as silt traps to reduce siltation of the Canberra Lake. Unfortunately very little sand was found. Small deposits were found in the Duntroon and Pialligo areas by augering.

With the closing of the Royal Canberra Golf Links a previously-known deposit became available for exploitation and is now being worked. Augering has indicated resources of at least 200,000 cubic years, which can be worked in conjunction with fore-shore treatment. fys

Building Stone

Constant enquiries about local sources of building stone - mainly paving stone and rough facing stone - are received; several large interests have enquired about material suitable for working as dimension stone. No free stone is known in the area but

good supplies of igneous rocks suitable for use as dressed facing stone and building blocks are available; most of the material is either a biotite granite or a more sombre stone. Supplies of flaggy sandstone suitable for paving and walls are quite inadequate and investigations have so far failed to locate any substantial source.

Rip-Rap

A possible source of rip-rap for protection of the margin of the Canberra Lake was inspected and condemned. Advice was given to other enquirers about sources of suitable rip-rap and an outcrop of Mugga Porphyry in Narrabundah was examined.

MISCELLANEOUS INVESTIGATIONS

Ground water

Bores were sited at Fyshwick, Australian Blue Metal Ltd.'s Federal Highway quarry, Hall and Gungahlin. Pumping tests were done on the A.B.M. bore on completion; capacity of the bore is probably about 800 gallons per hour. A proposed bore site at Narrabundah was condemned and the possibility of finding adequate supplies of groundwater at Yowani Golf Course and Michelago were investigated.

Routine measurements of bore and surface water levels and salinities (including Lake George) were maintained throughout the year. Lake George reached a maximum reading of 14.3 feet in February - the highest level since 1956.

Groundwater measuring instruments were designed, tested and installed.

As a result of representation by the Bureau, the Department of the Interior and Crown Law officers are considering legislation to control the use of groundwater in the A.C.T. Advice was given on technical aspects of the problem.

Drainage

Drainage problems in the Yarralumla Creek Valley are described under "Engineering Geology". Advice, based on mapping and piezometer studies, was also given on areas in Watson, Hackett, Griffith and Red Hill. Most of the difficulties are associated with mantles of scree material, areas concerned are small, and relief is obtained by use of additional rubble drains. There are some extensive areas, requiring special treatment, in the two northern suburbs.

A testing programme was designed and supervised to ensure that the rise in water table when the Canberra Lake fills would not harm the Olympic swimming pool.

Mapping and Map Compilation

Geological mapping, other than for engineering, groundwater or drainage purposes, was carried out in the Coppin's Crossing - Kambah and Kambah - Letchworth areas. Some mapping was also carried out in other areas west of Canberra.

Work was started on the compilation of a second edition of the Canberra 1:250,000 geological map sheet and the unpublished explanatory notes to the Canberra sheet were revised.

PAPUA - NEW GUINEAENGINEERING GEOLOGYPort Moresby Hydro-electric Project

Geological work has been done mainly by the Port Moresby resident staff, with some assistance by Canberra staff.

Sirinumu dam, at present under construction, is a rock-fill dam, the rock for which is being excavated from the spillway. The rock is a ?Pleistocene agglomerate with some tuff bands (Astrolabe Agglomerate). It is a rather weak rock and tends to break into fragments too small for use in the rock-fill dam. At present, by widening the spillway, it is hoped to get enough rock to complete the dam without seeking an additional source. Geological services have included advice on the likely suitability of the agglomerate for rock-fill, mapping of foundations and design of the curtain grouting.

At Sogeri the preliminary investigation of the No. 2 underground power station scheme has been completed and the design investigation should be complete before the end of the year. The underground power station layout, with a low-pressure tailrace tunnel, was adopted because of slope instability and the presence of a shear near the Rouna Falls. A site for the power station was selected to avoid major joints apparent at the surface. Drilling has confirmed the suitability of the site, subject to detailed drilling during construction. The weir site has also been tested by drilling and costeaming. Drilling near the proposed outlet of the tailrace tunnel has established that the shear that was mapped at the surface is about 30 feet wide and dips at about 60°; a second, flatter, shear has also been located. The sheared area and the portal area will require extensive support and lining, but most of the tunnel should stand unlined. No serious water flow problems are expected during construction and rock temperatures are acceptable. Fifteen drill holes, totalling 4300 feet, were drilled during the year.

Towanokoko - Pondo Hydro-electric Scheme, New Britain

Seismic and resistivity testing is at present being undertaken by the Compagnie Generale de Geophysique and a geologist from Miscellaneous Investigations Section is on the site to provide geological advice to the geophysicists and to carry out further mapping. Preliminary results of the geophysical work indicate that conditions are, as expected, probably less favourable for the construction of the scheme than surface evidence indicated.

A geological reconnaissance of part of the Toriu River has been carried out to seek a possible alternative to the Towanokoko scheme. Results have not yet been received.

Rabaul Geothermal Energy

Available evidence for the existence of an adequate supply of geothermal energy in the Rabaul areas was reviewed and it was concluded that further testing was not warranted.

WATER SUPPLY

The Senior Resident Geologist, Port Moresby, was advised on methods of investigation of the capacity of wells in coastal areas of the Central District of Papua, to prevent excessive use and consequent invasion by sea water.

NORTHERN TERRITORYENGINEERING GEOLOGYEngineering ProjectsDarwin Town Water Supply

Investigations were carried out by the Darwin Resident staff, and the sites were inspected and reports edited by the Supervising Geologist, Miscellaneous Investigations. Three weir sites and two dam sites were investigated. It has now been decided to proceed with the detailed investigation of the Darwin River site. The scheme provides for the diversion of the North Australia Railway and for a ponding weir several miles downstream of the dam site. The dam, if built, will be founded on complexly deformed quartzite and slate of the Acacia Gap tongue of the Lower Proterozoic Masson Formation. The site will require thorough geological and geophysical investigation and drilling.

Construction MaterialsDarwin Brick Shale and Clay

A two-months' investigation of possible sources of brick-making material, followed by preliminary firing tests of samples submitted to the Australian Mineral Development Laboratories, has shown that adequate material is probably available within 30 miles of Darwin. Suitable kiln feed can probably only be obtained by blending Lower Proterozoic Noltenius Formation shale from Stokes or Fort Hills, Darwin, with clay. Clay is available from swamps near Darwin, from several points near the North Australian Railway, and possibly in the Casuarina - Lee Point road area. Further testing is required.

Cement-making Material, Darwin

Possible sources of lime for cement-making near Darwin include calcareous sand beaches near Rapid Creek, and between Hope Inlet and Gunn Point, reef coral at Gunn Point and the nearby Vernon Islands, and parts of the Cambrian limestone, 90 miles south-east of Darwin. Samples were submitted to A.M.D.L. but results have not been received. Possible sources of alumina and ferric iron, which would be needed to blend with the lime-bearing material, were also sought. Vast quantities of calcareous sand occur in the beaches named above but the sand may contain too much silica and magnesium for cement manufacture.

MISCELLANEOUS INVESTIGATIONSRum Jungle Phosphate

Supervision of the Rum Jungle phosphate investigation (Party Leader P.W. Pritchard) became my responsibility in July, on the resignation of W.C. White.

The party consists of three geologists, one chemist, one drafting assistant and nine field assistants including one auger driller. Its object has been to delineate the extent of known phosphate deposits in the Rum Jungle area, to determine the geological environment and control of mineralization, and to search for other deposits. Facilities, techniques and equipment used include:

Geological mapping

Prospecting of outcrops, using an acid-ammonium molybdate solution as an indication of the presence of phosphate.

Examination of all drill core obtained in the Hundred of GOYDER by Territory Enterprises Pty. Ltd.

Bulldozing of costeans, and channel sampling.

Augering to bedrock by Gemco auger around Castlemaine Hill and Buckshee phosphate deposit.

Diamond drilling of the breccia in which the phosphate occurs.

Chemical analysis in the field, using a mobile laboratory. Two types of analysis were made:

1. Fine grinding, solution in nitric acid, addition of ammonium molybdate and centrifuging the precipitate.
2. The quantity of precipitate produced by ammonium molybdate in excess acid is determined by solution of the washed precipitate in caustic soda and titration to neutrality with hydrochloric acid.

Diamond drilling was, and continues to be, done by Atlantic Drillers. At time of writing the eighth hole was being drilled and a total footage of about 1950 feet had been drilled. Core recovery generally was excellent; except in unconsolidated ground few lifts showed less than 80% and only a few percent of the lifts showed less than 90% recovery. All drilling to date has been on or near outcrop of Castlemaine Hill.

Augering was done with two Gemco augers, one operated by Monier Earth Pty. Ltd. and the other by Bureau wages hands. Total footage augered is not at present available but would considerably exceed 20,000 feet. Most of the drilling was in soil around the flank of Castlemaine Hill, at centres 200 feet apart and extending upwards of 600 feet from outcrop. Where phosphatic material was encountered augering was closed to 100-foot centres. Considerable augering was also done around the Buckshee deposit, in the Embayment area. Holes were drilled to bedrock. Average depth was from 20-25 ft.

A total of 3000 feet of costeans was also excavated. Although some continuous channel samples were obtained by this method the technique in general did not prove very useful as in many costeans bedrock was not exposed.

In the Rum Jungle area the main occurrences of phosphatic rock are in, or associated with, breccia at the base of the Upper Proterozoic succession and overlying the Lower Proterozoic Coomalie Dolomite (which is slightly phosphatic). (Phosphate rock at the margin of amphibolite - regarded by present field workers as metasomatic origin - has been recorded in one drill hole). Some of the better grade phosphate is in siltstone associated with the breccia.

The phosphate-bearing breccia has remarkably angular inclusions which show that practically no transport took place

after formation. It is regarded as essentially a detrital product of erosion (probably associated in part, at least, with a karst topography) of the Lower Proterozoic land surface in Upper Proterozoic time. The strand line of the Upper Proterozoic sea subsequently lay in the same area and contributed arenaceous sediment. Subsequent profound chemical corrosion, replacement and recrystallization, apparently of supergene origin, has produced the outcropping 'hematitic quartzite breccia' with concentrations of phosphate.

Appraisal of the likely extent of phosphate rock is difficult at present because drilling has not extended much beyond the areas of outcropping phosphate rock and the extent of outcropping phosphate rock on Castlemaine Hill is not fully known; further, not all field assay data are at present available. An attempt at an appraisal is made below on the following assumptions, which may not be valid:

1. Phosphate rock is assumed to occur only where it is known at the surface as it is not possible to estimate likely percentage of breccia that is phosphate-bearing. Drill holes DG7 and 8, which are collared in non-phosphatic breccia south-west of Geolsec deposit, have so far revealed only from low grade phosphate rock to trace phosphate.
2. At Castlemaine Hill phosphatic Upper Proterozoic breccia is assumed not to lie outside of the main body of the hill. This assumption is not strictly valid and may result in an excessively conservative figure; it is not, however, possible to form an opinion at present about the likely tonnage of phosphatic breccia lying around Castlemaine Hill. DG4 appears to pass directly from unconsolidated sediments into Lower Proterozoic dolomite; some unconsolidated breccia may, however, be weathered Upper Proterozoic breccia.
3. As phosphatic material - some of it containing more than 20% P_2O_5 - has been revealed by drilling and augering between the various outcrops of phosphate rock on the edge of Castlemaine Hill, at Geolsec, Easticks and Area 3, the area of phosphatic rock at each deposit has been taken to be continuous between outcrops. Augering between Geolsec and Easticks deposits and elsewhere along the eastern flank of Castlemaine Hill has failed to reveal significant occurrences of phosphate in unconsolidated sediments other than in association with the outcropping phosphatic rock.
4. For the purposes of estimation of possible tonnages of phosphate rock available, average grade and depth of phosphate rock intersected by drill holes within the Geolsec deposit have been calculated. In general, 5% P_2O_5 , has been taken as minimum grade but minor intersections of lower grade material within 5%+ material have been included.

Average grade obtained is 12.7% P_2O_5 , and average intersection is 75 feet (Hole DG1 was corrected to vertical intersection). These figures are probably too high as the drilling was through the middle of the Geolsec deposit - the largest in area of the outcropping phosphatic bodies. On the other hand it is reasonable to expect other concealed or outcropping, but undiscovered bodies.

Area of outcrop, as defined in 3. above, are:

Geolsec	263,000 square feet		
Easticks	55,000	"	"
Area 3	10,000	"	"

Applying the grade and depth figures obtained by the drilling at Geolsec, and assuming that 13 cubic feet weigh one long ton, a tonnage for the three deposits of about 1,900,100 tons is obtained for Castlemaine Hill. On available data Zeta, Rum Jungle Creek, Power Line North and Batchelor Laterites deposits cannot be included in any calculations.

It is pointed out that no valid geological grounds exist for assuming that useful bodies of phosphate rock do not underlie non-phosphatic breccia - there is simply no information on which to base calculations as to the probability of concealed bodies occurring, and future exploration will have to be directed towards obtaining the necessary information.

The calculations given above are for Castlemaine Hill only. On the basis of roughly comparable areas of outcrop the order of tonnage of phosphate rock that possibly occurs in Buckshee and Stapleton North deposits combined may possibly be comparable to that in Castlemaine Hill.

The amenability of the phosphate rock to beneficiation and utilization is at present being investigated by the Australian Mineral Development Laboratories and others. Preliminary indications are that much of the phosphate, which occurs essentially as apatite, is very fine-grained, and is intimately associated with hematite. Considerable obstacles to economic utilization may therefore exist. Specimens containing 10-20% P₂O₅ contain 3.5-25% acid soluble Fe₂O₃, 2-26% acid soluble Al₂O₃ and 0.7-1.9%F.

Other occurrences of Phosphate

Phosphatic rock has been recorded in the past year in the Sleisbeck, South Alligator, Mount Evelyn, Mount Mabel, Mount Todd, and Amadeus Basin (Stairways Sandstone) areas. Most of these occurrences appear to be small but the phosphate in the Stairways Sandstone, which is associated with thin beds containing angular rock fragments, occurs over a wide area. Analyses have revealed up to 15.5% P₂O₅. The Sleisback occurrence is, like the Rum Jungle deposits, at the Upper Proterozoic - Lower Proterozoic contact but overlies chloritic schist.

GENERAL

MISCELLANEOUS

About twenty-five additional specimens for age determination were collected from the Precambrian of north-western Queensland; they included granite, acid and basic lavas, and schist.

The Precambrian portion of the Duchess 4-mile sheet explanatory notes was written.

The standard geological symbols were further revised.

Discussions were held and advice given to officers of L.R.R.S. and Divisions of Soils Engineering, C.S.R.I.O. on geology in relation to beef and strategic roads in Queensland.

Ocean bottom samples from Moreton Island to Perth (via Bass Strait) are being obtained for spectrographic determination of the amount of phosphorus and other elements present.

MAP COMPILATION

Considerable progress has been made with the compilation of the four sheets of the map of Australia and Oceania that include Australia and Papua-New Guinea. The first compilation of Sheet 7 has been referred to the Geological Survey of Queensland (and returned) and the Senior Resident Geologist, Port Moresby, for comment, and the final compilation has just been started. The first compilations of Sheets 6 and 11 have been completed and Sheet 12 has been started.

MAP EDITING

During the year the editing of the final edition (colour edition) of eight 1:250,000 geological map sheets, six 1:63,360 sheets and two 1:500,000 sheet, was completed. In addition, thirty preliminary (black and white) editions of 1:250,000 map sheets were edited; the editing of other map sheets is in progress.

Considerable time was spent on assistance in preparing sheets for fair drawing and printing, and in helping field geologists to present map sheets in a form and condition acceptable for editing.

STRATIGRAPHIC INDEXING

Current literature was searched, as received, for stratigraphic names, and revision lists for lexicons and the central register of stratigraphic names were issued monthly to stratigraphic nomenclature sub-committees.

Compilation of the first draft of the Victorian Stratigraphic lexicon was completed. Editing is in progress. The introduction is being written by Dr. Thomas, of the Victorian Geological Survey.

Proofs of the Northern Territory lexicon were received, checked and returned to the editors in Paris.

A list of Australian limestones was compiled and reviews were made of stratigraphic names used in the Eucla and Officer Basins.

RECORDS

The following records written in the section were issued:

- 1962/1North Crace brick shale deposit, by D.E. Gardner.
- 1962/95.....Detailed geological investigation of the Upper Ramu hydro-electric project, New Guinea 1961, by J.K.Hill.
- 1962/120.....Geological investigation of the Towanokoko-Pondo hydro-electric scheme, New Britain, T.N.G., by E.K. Carter.
- 1962/140.....Geological investigation of Damsite E, Upper Cotter River, A.C.T., by E.J. Best and J.K. Hill.
- Two further records have been completed and are awaiting distribution.
- 1962/144.....Foundation conditions, Canberra Lake Dam, A.C.T. Interim report, August, 1962, by E.K.Carter and E.J. Best.
- 1962/166 Geological investigation of proposed Canberra Lake, western areas, by G.W. D'Addario.