COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

RECORDS:

1963/168

ANNUAL REPORT, RESIDENT GEOLOGICAL SECTION, NORTHERN TERRITORY.

July 1, 1962 - June 30,1963.

by

P.W. Crohn

ANNUAL REPORT

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RESIDENT GEOLOGICAL SECTION, NORTHERN TERRITORY

ANNUAL REPORT : JULY 1, 1962 - JUNE 30, 1963

The Resident Geological Section consists of officers of the Bureau of Mineral Resources, seconded to the Northern Territory Administration in order to supply geological advice and services to Government Departments, the mining industry and the general public.

STAFF

A number of staff changes took place during the year. P. Rix resumed duty with the Darwin Section in October, 1962, and new appointees to the Section were W. Morton (October, 1962) J. Shields and A. Vanderplank (February, 1963), and I. Youles (March, 1963). During the period December, 1962 to February, 1963, J. Hays acted as Senior Resident Geologist and I. Faulks as relieving geologist while P. Crohn, J. Barclay and D. Woolley were on recreation leave. Subsequently J. Hays was transferred to Canberra; J. Barclay was promoted to the Grade III position in Darwin and P. Dunn to the Grade II position in Tennant Creek. K. Rochow resigned in January, 1963.

As a result of these changes, the Resident Geological Section now has its full authorised strength of ten professional officers, comprising:

Darwin:	P. W. Crohn	Senior Resident Geologist
	J. Barclay	Geologist, Grade III
	P. Rix	Geologist, Grade II
	J. Shields	Geologist, Grade II
	A. Vanderplank	Geologist, Grade I
Tennant Creek:	P. G. Dunn	Geologist, Grade II
Alice Springs:	T. Quinlan	Geologist, Grade III
	D. Woolley	Geologist, Grade II
	W. Morton	Geologist, Grade I
	I. Youles	Geologist, Grade I

Part-time clerical assistance was provided by the Northern Territory Administration for the Alice Springs Office throughout the year, but there is still urgent need for similar assistance for the Darwin Office in order to relieve the professional staff of routine clerical duties. There is also need for a drafting officer in the Alice Springs Office.

The Darwin Section moved into new office quarters in a building adjoining the Mines Branch in March, 1963.

WATER SUPPLY INVESTIGATIONS

Water supply investigations continued to make up a large proportion of the projects handled by the Resident Geological Section. As in previous years, the bulk of this work was undertaken at the request of the Water Resources Branch, N.T. Administration, and most of it was carried out in close co-operation with officers of that Branch.

Selection of Bore Sites

A total of 162 bore sites were selected, and the majority of these were covered by reports under the Water Supply Development Ordinance.

These bores were distributed as follows:-

Jervois	5	Hermannsburg	1
Anningie	4	Barkly Stock Route	1
Mt. Piddock	3	Murray Downs	7
Mt. Allen	1	Mt. Dennison	2
Temple Bar	4	Simpson's Gap	2
Andado	1	Santa Theresa	3
Areyonga	7	North West Stock Route	6
Glen Helen	1	Horseshoe Bend	7
Jinka	6	Lake Nash	13
Ambalindum	8	Plenty River Downs	1
Lilla Creek	2	Petermann Ranges	8
Milton Park	2	Wave Hill	1
Marqua	1	Victoria River Downs	7
The Gardens	1	Oenpelli Mission	4
Indianna	4	Birrindudu	4
Mt. Cavenagh	4	Camfield	1
Utopia	2	Inverway	21
Mucketty	2	Kildurk	3
		Noble's Nob Mine	2

Cuttings from about 190 bores were logged.

Town Supply Investigations

Alice Springs

Alice Springs Town Basin - Geological investigations associated with the drilling programme by the Commonwealth Department of Works were continued. Seven six-inch diameter test holes were drilled and one production hole (62/9) was completed. This bore, situated in the middle of the Todd River approximately 800 feet south of the East Side Causeway, was designed to withdraw groundwater from shallow aquifers in the vicinity of the river for a minimum period of about three months following river flow.

Aquifer performance tests were conducted on bores 61/24, 59 and 61/33.

Determinations of electrical conductivity have been carried out on water samples taken at weekly intervals from the town supply bores, and for several bores close to the Todd River it has been found that variations in the conductivity can be correlated with periods of river flow. In Army Well No. 2, a marked increase in conductivity was noted between June and August, 1963, indicating that withdrawel of groundwater by the Bent Tree and Traeger Park Bores is greater than the quantity of groundwater moving down the western zone of high permeability. On the other hand, the conductivity of samples taken from bore 61/33 has decreased during the year, indicating that withdrawal in this area is inducing recharge into the southern endof the western zone of high permeability.

Mereenie Sandstone - Fifteen holes with a total footage of approximately 9,000 feet were drilled in the Mereenie Sandstone by Water Resources Branch. Cuttings from these holes were logged and tentative interpretations were prepared on the distribution of permeability in the Mereenie Sandstone. The construction of three production bores was commenced during the year. Composite logs are being prepared and detailed correlation is being attempted, using the gamma ray logs run by the Water Resources Branch, but considerable difficulty has been experienced in identifying zones of high permeability and predicting the distribution of these zones.

Alice Springs Farm Area - Thirty five holes were drilled in this area during the year, but the results of the Water Resources Branch drilling programme carried out in the last two years have still to be evaluated.

Tennant Creek

Development of a town supply from the Cabbage Gum Basin was commenced by the Commonwealth Department of Works in conjunction with the Water Resources Branch, but exploratory work was limited to the drilling of one additional hole in the western extension of the Cabbage Gum Basin, and one in the Seven-Mile area.

Darwin Area

Investigations for a supplementary water supply for the city of Darwin were concentrated on a proposed dam site and two pondage sites on the Darwin River, as described below. A reconnaissance survey was also undertaken in the Lower Darwin River - Berry Springs area, which contains at least two groups of aquifers : limestones and dolomites of Lower Proterozoic age, and sandstones of ? Upper Proterozoic age. In addition, the unconformity between the two formations and a number of quartz-breccia zones, probably indicative of faulting, play important parts in controlling the movement of groundwater in this area.

Dam Site Investigations

Darwin River Area

Investigations at the proposed Darwin River dam site were continued in conjunction with officers from the Bureau of Mineral Resources Engineering Geology Section and Geophysical Branch. A plane table survey of the main site and detailed mapping of the railway cutting and three bulldozed costeans were carried out; assistance was given to a geophysical party carrying out seismic surveys at the site, and specifications were prepared for three diamond drill holes totalling 650 feet.

Plane table surveys and seismic investigations, leading to diamond drilling recommendations, were also carried out at the two proposed pondage sites downstream from the main dam site, and at two saddles in the storage area of the main dam.

Other Areas

Preliminary reconnaissance by helicopter in the Mary - McKinlay and Daly River - Muldiva Creek areas has indicated a number of sites where topographical and geological conditions may be favourable for the construction of storage dams or weirs, but detailed surveys would be required to confirm this.

Native Settlements and Mission Stations

Yuendemu

Investigation for a source of domestic quality water at Yuendemu was continued. Only small supplies of groundwater have been obtained from fracture zones in the metamorphic rocks in the vicinity of the Settlement, and a sandstone at the base of the Upper Proterozoic sequence was found to contain water with 2,000 parts per million total dissolved solids. A recommendation has therefore been made to drill the granite which occurs approximately half a mile north-east of the Settlement, in an attempt to obtain water from sheeting joints, which may be present within 300 feet of the surface.

Petermann Ranges

Geological assistance was given to the Water Resources Branch in an investigation into the occurrence of groundwater in the Petermann Ranges. Five holes have been drilled to the west of Mount Skene. They intersected unconsolidated sediments up to 205 feet thick, resting on igneous and metamorphic rocks of Precambrian age, and limestone and quartzite of Upper Proterozoic age. The piezometric surface is approximately 70 feet below the surface of the ground, and fresh water was obtained in three of the holes.

Amoonguna

Investigation drilling for Amoonguna water supply continued during the year. Near Emily Gap, sandy aquifers occur within the Tertiary succession at depths of less than 200 feet. These aquifers contain water of domestic quality, but they are of very limited extent.

Shallow Tertiary aquifers also occur in the vicinity of the southern boundary of the Settlement, but supplies were less than 300 gallons per hour in all cases, and the deeper Tertiary aquifers in this area contain saline water.

A bore was therefore constructed to test the deep Quaternary deposits south of the Settlement, and a supply of approximately 1,000 gallons per hour of very good quality water was obtained from the unconformity between the Quaternary and Tertiary deposits. The bores originally constructed for the Settlement (No. 3 and No. 7) are thought to have used this aquifer at a much shallower depth.

Bathurst and Melville Islands

Investigations into supplementary water supplies for Settlements on Bathurst and Melville Islands were continued. Possible additional sources comprise additional wells, earth dams and perennial water holes and springs at Bathurst Island and Paru Settlements and bores at Garden Point Settlement.

Settlements in Arnhem Land

Umbakumba - At Umbakumba mission on Groote Eylandt, the testing of a major shear or joint zone in massive ? Upper Proterozoic sandstones is expected to provide adequate water supplies, suitable for domestic and agricultural purposes.

Elcho Island - Increased supplies for Elcho Island Mission are expected to be available from a silt aquifer underlying a seasonal water hole, from shallow wells sited on fault lines, or from bores tapping the Marchinbar Sandstone at a depth of about 100 feet.

Millingimbi - At Millingimbi Mission, limited additional supplies are expected to be available from shallow wells sited on fault zones in laterite, and by development of a natural water hole which may be a meteorite crater. Larger supplies could probably be obtained from bores tapping the Marchinbar Sandstone, but this might involve drilling to a depth of about 1,750 feet.

Maningrida - At Maningrida Settlement, supplies of good quality groundwater should be obtainable from bores drilled into the Marchinbar Sandstone at depths of not more than 150 feet.

Goulburn Island - On Goulburn Island, shallow wells sited on fault zones in laterite and development of natural water holes are recommended.

Irrigation Projects

Willowra

The investigation into the occurrence of groundwater suitable for irrigation was continued, and geological assistance was given to the Water Resources Branch in their drilling programme. Thirty holes have been drilled to shallow depths in the area between Willowra Homestead and a point sixteen miles to the south, and between the Lander River and Ingallana Creek.

In this area, the basement complex, consisting of Pre-Cambrian metamorphic and granitic rocks, has been subjected to deep weathering (to depths greater than 100 feet) and lateritisation, probably during Tertiary times. Fluvial sands, silts and clays of probably Pleistocene age have been deposited in channels cut into this "Deep Weathering Profile". Away from the Recent rivers and creeks, the present-day surface is covered by aeolian sand.

Aquifers exist in the pallid zone of the Deep Weathering Profile, and in fluvial sands of probably Pleistocene and Recent age. The best quantity and quality of groundwater for irrigation purposes occurs in the ? Pleistocene fluvial sands; an aquifer exists south of the Homestead which is

15 miles long in a north - south direction and at least one mile wide. The thickness is unknown, but in one hole it is at least 50 feet thick.

Recharge into this aquifer comes from concentration of run-off in shallow drainage depressions and from the Lander River through Recent river gravels. The dissolved solids in the water vary from 3,500 ppm. in the area of Willowra Homestead to 530 ppm. eight miles to the south. It is considered that the high salinity is caused by encroachment of the saline groundwater which is moving down Ingallana Creek. A barrier of impermeable basement rock immediately west of Ingallana Creek prevents this from moving into the area south of the Homestead.

Regional Investigations

Sandover River 4-mile Sheet

A regional geological study of this area was carried out in connection with water supply investigations on Lake Nash Station. Massive and bedded crystalline dolomites, "pellet" and oolitic dolomites crop out over the greater portion of the area, and it is considered that much of this carbonate sequence is equivalent to the Arinthrunga Formation. Lower Middle Cambrian fossils were found in a core taken at 586 feet from Amalgamated - Lake Nash No. 1 Well, and it is considered that much of this carbonate sequence is equivalent to the Arinthrunga Formation. In the south-western portion of the 4-mile sheet these dolomites are overlain by a red quartz sandstone of the Tomahawk Beds, of Upper Cambrian age.

The sediments have been deformed into low amplitude folds with dips of one to two degrees. The fold axes and the main joint pattern have a distinctly north-easterly trend. The distribution of permeability and porosity within the sedimentary rocks is both stratigraphically and structurally controlled. Interstitial porosity occurs in beds of calcareous silt and marl interbedded with the dolomite, and vuggy porosity is present in some sections within massive beds of coarse crystalline dolomites. The combination of interstitial and vuggy porosity with zones of close jointing in favourable structural positions results in aquifers with good coefficients of transmissibility. The thin-bedded aphanitic and fine-grained crystalline dolomites are considered to be aquicludes.

Precambrian Metamorphic and Igneous Rocks

In recent years, a considerably number of bores have been drilled in metamorphic and igneous rocks, but many of these have failed to intersect significant aquifers.

A review of this work indicates that the main aquifers to be sought under these conditions comprise faults and open joints, large well-jointed quartz veins, and zones of deep weathering.

In selecting drilling targets on faults, joints or quartz veins, resistivity methods have proved useful in predicting the depth to the target. However, open fractures

and joint systems are generally restricted to hard rocks, which cannot readily be drilled by percussion plants, and quite a number of holes have been abandoned because of hard drilling before they reached their target. Aquifers within weathered igneous and metamorphic rocks generally yield only small quantities of groundwater unless they are interconnected with zones of porosity associated with jointing, e.g. in fault zones or large quartz veins. Water stored in metamorphic rocks is usually of a higher salinity than that obtained from igneous rocks.

MINES AND MINERAL DEPOSITS

Prospecting activity throughout the Northern Territory was maintained at a high level during the year. There was important progress in the evaluation and development of several major deposits, but some slackening in the rate of discovery of new occurrences.

Major investigations by the Resident Geological Section during the year comprised Mount Bundey (iron ore), Iron Blow (gold and base metals), and several prospects at Tennant Creek (gold and copper), - most of them associated with diamond drilling programmes by the Mines Branch, Northern Territory Administration. In addition, investigations at Frances Creek (iron ore), Groote Eylandt (manganese), and Gove Peninsula (bauxite), were carried out in conjunction with mining companies, and a re-survey of the old Union Reefs gold field was begun in conjunction with a Canberra-based field party of the Bureau of Mineral Resources.

Iron Ore

Pritchard's Lode, Mount Bundey

Thirteen diamond drill holes, totalling 2,042 feet, were put down on this deposit by the Mines Branch under an agreement with the lease-holder. To an average depth of 80 feet below the outcrop, the lode consists essentially of martite, assaying about 64% iron, with low phosphorus, copper and sulphur content. Below this, the lode is largely magnetite with blebs and veinlets of pyrite and minor chalcopyrite. The lode probably resulted from the replacement of a large sedimentary inclusion in the Mount Bundey Syenite.

Frances Creek

The testing programme on the Frances Creek iron ore deposits by New Consolidated Goldfields Pty. Ltd. was terminated at the end of 1962, and the results of their investigation were made available to the Mines Branch, N. T. Administration. On the basis of this information, a complete re-assessment of the potential ore reserves in these deposits was carried out, and recommendations for a limited amount of additional diamond drilling were made, but no work is being carried out on these deposits at the present time.

Other Occurrences

Further investigations were carried out on iron ore occurrences in the Mount Tolmer, Darwin River, Beetson's Creek and Mount Paqualin areas, but none of these deposits are comparable in size or grade with those at Mount Bundey and Frances Creek. An occurrence of sandy hematite on Elcho Island was also investigated, and it appears that a small quantity of direct shipping ore may be available from this locality.

Manganese

Groote Eylandt

Following a preliminary investigation by the Resident Geological Section in 1961, the further evaluation of the Groote Eylandt manganese deposits is being undertaken by the Broken Hill Pty. Company Limited under an agreement with the Church Missionary Society and the Northern Territory Administration.

Close liaison was maintained with this project. To date, work by the Company has substantially confirmed the earlier conclusions that these deposits contain substantial quantities of fair quality manganese (better than 45% manganese content) and very large tonnages of low grade manganiferous material. The possibility of beneficiating this low grade material is now being investigated by the Company.

Other Areas

In conjunction with the investigation on Groote Eylandt, a helicopter reconnaissance of the Blue Mud Bay area in eastern Arnham Land was undertaken by the Broken Hill Pty. Company Limited, with participation of an officer from the Resident Geological Section. However, no other major deposits of manganese were located.

Bauxite

Gove Peninsula

Close liaison was maintained with prospecting parties of Gove Bauxite Corporation Ltd. in the further evaluation of the deposits at Gove in eastern Arnhem Land. The leases have since been transferred to Gove Mining and Industrial Corporation Ltd., a subsidiary of the Rechiney Company of France, and detailed plans for the exploitation of the deposits are now under consideration.

Other Areas.

A reconnaissance survey was carried out in the Fog Bay area, where extensive laterite occurrences had been reported, but no material of commercial bauxite quality was found.

Tin

Surveys were made at Jessop's Lode, the Big Drum Mine and the Hayes Creek tin mine to advise the leaseholders on development programmes and keep information up to date.

Copper and Gold

Tennant Creek Field

Geological mapping and geochemical surveys were carried out at numerous mines and prospects on the field, and several diamond drilling programmes were laid out and supervised by the Resident Geologist.

Close liaison was maintained with geologists of Peko Mines and Australian Development N.L., who continued their search for new mineral occurrences throughout the year. In the case of Peko, the year saw the commencement of full - scale operations at the Orlando Mine and the announcement of the discovery of a payable ore body at the Ivanhoe prospect.

Pinnacles Mine - Three additional diamond drill holes were completed on this prospect by the Mines Branch. No. 6 hole (total length 301 feet) intersected malachite-impregnated lode material from 276 to 282 feet, but No. 5 and No. 7 holes (total lengths 198 and 621 feet respectively) encountered no defined lode formation and no further testing of this prospect is thought to be warranted.

Lone Star Mine - Diamond Drill hole No. 2 at this prospect, drilled under a subsidy agreement between the leaseholder and the Mines Branch N. T. Administration, was completed at 650 feet. Ironstone with low-grade copper mineralisation was intersected from 586 to 603 feet, and the drilling of a third hole is under consideration at the time of writing.

Cat's Whiskers Mine - Four diamond drill holes were completed at this prospect during the year, and a fifth was completed in August, 1963. All these holes were designed to test the body responsible for a magnetic anomaly situated about 400 feet north-east of the old Cat's Whiskers workings. Except for No. 1, which was vertical, all the holes were inclined to the south. Ironstone was encountered in these holes as follows:-

D.D.H.	1	Total depth	520'	Ironstone	113' - 212'
	2		410'		323' - 395'
	3		505'		402' - 472'
	4		431'		313' - 380'
	5		450'		396' - 424'

All these ironstone intersections except No. 1, which was leached, carried patchy low to medium grade copper mineralisation, but gold values were consistently low.

Porphyry Prospect - A diamond drill hole was put down to a depth of 300 feet on a porphyry outcrop half a mile south of the Pinnacles Mine by the Mines Branch, N.T. Administration. This was intended to test the downward extension of an outcropping zone of ? boxworks,,but no evidence of mineralisation was encountered in the hole.

B.M.R. 3 Area - At the end of the year, a diamond drill hole was in progress at the B.M.R. 3 locality, 20 miles south-west of Tennant Creek township. This hole, which is being drilled by the Mines Branch under an agreement with Australian Development N.L., is intended to test an area of geophysical anomaly delineated by magnetic and I.P. surveys. It had reached a depth of 174 feet at the end of the year.

Northern Star Mine - The vertical diamond drill hole to test the magnetic anomaly at the Northern Star Mine (D.D.H.15) was completed at 1,107 feet by Metals Exploration N.L. early in 1963. Core from this hole was assayed for copper only, and when disappointing results were obtained the Company relinquished the lease. The core was subsequently stored with the Mines Branch, N.T. Administration, and the Resident Geologist decided to have the core assayed for gold. These assays indicated a high gold content over the 20-foot section from 895 to 915 feet.

A reservation has since been placed over this prospect by the Northern Territory Administration, and the drilling of a deflected hole to obtain an additional intersection of the mineralised zone is now being undertaken by the Mines Branch.

Geochemical Surveys - A series of geochemical surveys over known prospects and other areas of interest on the Tennant Creek field was carried out by the Resident Geologist, using a Bureau of Mineral Resources Gemco Auger Drill. A total of thirteen localities were investigated by this method and several areas of abnormal copper concentrations were outlined by this work. At two of these localities - Mary Lane "B" and Golden Forty - diamond drilling programmes are now under consideration to follow up the favourable indications obtained.

Other Prospects - Surveys were made at a number of other mines and prospects in order to advise leaseholders on development programmes and bring information on workings and sampling programmes up to date. These included the Southern Cross, Curlew, Peter Pan, Mount Samuel, New Blood, Copper Skipper, Black Angel, Skipper Extended, Outlaw, Burnt Shirt and Last Hope prospects.

Iron Blow Mine, Grove Hill Area

Six diamond drill holes, totalling 2,333 feet were put down at the Iron Blow Mine by the Mines Branch, N.T. Administration, under an agreement with United Uranium N.L. Three of these holes (Nos. 1, 2 and 6) intersected the

downward extensions of the complex gold - base metal sulphide ore shoots exposed in the old workings, but these proved to be too narrow to warrant re-opening of the mine. Two other holes (Nos. 3 and 4), designed to test a magnetic and a turam anomaly respectively, failed to intersect any mineralised material. However, holes Nos. 5, 2 and 6 showed that the western shear, from which no production has been recorded to date, develops into a major pyrrhotite body in the southern part of the mine area - unfortunately with only low gold and copper values.

No further work is proposed on this prospect for the time being.

Other Areas

In the Rising Tide area, near Brock's Creek, and the Union Reefs area, near Pine Creek, surveys have been carried out in conjunction with Canberra-based parties of the Bureau of Mineral Resources. At Rising Tide, a 295-foot diamond drill hole, drilled under contract to the Bureau of Mineral Resources, failed to intersect any mineralised material. At Union Reefs, the first hole of a major drilling programme, planned to total about 3,000 feet, was in progress at the end of the year.

Since the end of the year, a drilling programme at the old Cosmopolitan Howley gold mine in the Brock's Creek area has been commenced by the Mines Branch, N.T. Administration. Five or six holes, averaging 250 to 300 feet in length, are proposed.

At the Enterprise Mine, Pine Creek, surface and underground surveys have been carried out in order to advise the leaseholder on development programmes.

Other prospects investigated during the year were at Burrell Creek and Frances Creek (gold) , in the Fenton area (copper), and the Arltunga - Hale River area (copper and lead).

Bismuth

Surveys were carried out at the Jubilee and Perseverance Mines, Tennant Creek, in order to assist the leaseholders in evaluating occurrences of bismuth minerals. Tailings dumps at the Whippet and Eldorado Mines and at No. 1 Government Battery were also sampled and samples sent to Australian Mineral Development Laboratories, Adelaide, for bismuth assays.

NON-METALLIC MINERALS

Raw Materials for Brick and Cement Manufacture

Further investigations into clay, shale, lime sand and limestone deposits in the Darwin area were carried out as opportunity arose, and a number of additional samples were forwarded to Australian Mineral Development Laboratories, Adelaide, for testing. A helicopter reconnaissance of the Victoria River estuary was also undertaken in the search for limestone deposits, but none were located.

Pottery Clay

A number of deposits were investigated as possible sources of pottery clay for local use, and samples were forwarded to the C.S.I.R.O. Division of Building Research for testing. Material from Melville Island and Nightcliff was found to be unsuitable, but a sample from Gunn Point was described by the C.S.I.R.O. as a valuable raw material for pottery manufacture, and preliminary surveys have indicated that substantial tonnages of this material may be available in this area.

Coal

Occurrances of low-grade lignite, probably of Tertiary age, have been intersected in several shot holes drilled by Namco International during seismic surveys in the search for oil to the south of Alice Springs, and it is considered that a limited drilling programme by the Mines Branch, N.T. Administration, is warranted to further investigate these occurrences.

Search for Oil

Close liaison was maintained with various companies and with Canberra-based field parties from the Bureau of Mineral Resources who were engaged in the search for oil in the Northern Territory. Background information on regional geology was supplied wherever possible, and several areas of interest were visited in company with geologists from these organisations.

Phosphate

Liaison was also maintained with Canberra-based field parties of the Bureau of Mineral Resources who were engaged in the search and investigation of phosphate deposits in the Rum Jungle and Amadeus areas.

REGIONAL INVESTIGATIONS

The collection and correlation of data for use in regional geological compilations was carried out whenever opportunities arose. Special attention was given during the year to the Victoria River and Inverway - Birrindudu areas, where a large number of bore site investigations were carried out, and the Millingimbi - Junction Bay area in Arnhem Land, which was the subject of a regional survey by a Canberra-based field party from the Bureau of Mineral Resources.

ENGINEERING GEOLOGY

Investigations into foundation conditions at the Venn and Tindall Airstrips near Katherine were continued.

Examinations were also made of the stability of a section of cliff near the Lameroo Baths, Darwin, and the foundation conditions of a section of the North Australian Railway Line near Katherine.

MISCELLANEOUS

Assistance was given to field parties from the University of California, the Bureau of Mineral Resources, and various oil exploration companies in making palaeontological collections and in several instances officers from these organisations were shown over areas of interest by geologists of the Resident Section.

Assistance was also given to various parties from the Bureau of Mineral Resources in collecting rock samples for age determinations.

ADMINISTRATION, OFFICE, ETC.

Petroleum Advisory Board

The Senior Resident Geologist attended fourteen meetings of the Petroleum Advisory Board, and J. Hays, as Acting Senior Resident Geologist, attended four meetings.

Visitors

A number of visitors, comprising representatives of mining companies, Government Departments, overseas Universities, etc., were escorted on visits to mines, mineral deposits and areas of geological interest.

Numerous enquiries for maps, air photographs, mineral identification and general geological advice were answered.

Meetings and Conferences

P. Crohn attended the Underground Water Conference in Perth in May, 1963.

P. Dunn attended a symposium on ore genesis, sponsored by Peko Mines and the University of Tasmania, in Hobart, also in May, 1963.

REPORTS

A large number of reports were prepared by officers of the Resident Geological Section during the year.

The most important of these were the following:-

Annual Report, Resident Geological Section, Northern Territory, 1961-62. (Subsequently incorporated in Bureau of Mineral Resources Record Series as Record 1962/156)	P. W. Crohn
Water Supply - Seven Mile Area, Tennant Creek.	J. Barclay
Power of Wealth Gold Mine, Kurundi.	J. Barclay
Water Supply - Western Extension of Cabbage Gum Basin, Tennant Creek.	J. Barclay

Darwin Water Supply - Supplementary Sources: Dam Site Investigations at Darwin River, Adelaide River and Acacia Gap. (Subsequently incorporated in Bureau of Mineral Resources Record Series as Record 1962/165)	J. Hays
Diamond Drilling - Cat's Whiskers Prospect, Tennant Creek. Progress Report.	P. Dunn
Diamond Drilling - Lone Star Prospect Tennant Creek, Progress Report.	P. Dunn
Water Supply Investigations - Flats East of Tennant Creek, (Subsequently incorporated in Bureau of Mineral Resources Record Series as Record 1962/155)	J. Barclay
Whippet Mine - Bismuth Content of Tailings Dumps.	J. Barclay
Water Supply:- Granites - Billiluna Stock Route.	D. Woolley
Water Supply - Inverway Station	J. Hays
Water Supply - Lake Nash Station.	W. Morton
Water Supply - Victoria River Downs Station.	J. Hays
Darwin River Dam Site - Progress Report.	J. Barclay
Enterprise Mine, Pine Creek.	A. Vanderplank

Reports which were in preparation at the end of the year, and which have since been completed, include the following:-

Water Supply - Bathurst Island, Garden Point and Paru Mission Settlements.	J. Barclay
Water Supply - Elcho Island, Millingimbi and Goulburn Island Mission Settlements.	P. Rix
Diamond Drilling Results - Iron Blow Mine, Grove Hill area.	P. Rix
Diamond Drilling Results - Pritchard's Lode, Mount Bundey.	P. Dunn

The following articles were prepared for inclusion in the Second Edition of the Volume on "Geology of Australian Ore Deposits", to be published by the Australasian Institute of Mining and Metallurgy early in 1965:-

Mineral Deposits of Central Australia,
by D. Woolley and K. Rochow.

The Tennant Creek Gold and Copper Field,
by P. W. Crohn

The Bauxite Deposits of Gove Peninsula, Arnhem Land,
By P. G. Dunn

The Katherine - Darwin Metalliferous Province,
by B. P. Walpole and P. W. Crohn

Several chapters were also contributed to a Prospectors' Handbook which is being compiled by the Mines Branch, Northern Territory Administration.