COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF NATIONAL DEVELOPMENT.

BUREAU OF MINERAL RESOURCES GEOLOGY AND GEOPHYSICS.

RECORDS.

1956/57

ANNUAL REPORT REGIONAL RADIOACTIVE PARTIES KATHERINE DARWIN REGION N.T.

by

B. P. Walpole

TABLE OF CONTENTS

ANNUAL REPORT

REGIONAL RADIOACTIVE PARTIES

KATHERINE DARWIN REGION 1955

SUMMARY

Fourteen geologists organised in three field parties were engaged in regional mapping in the Katherine-Darwin region during the 1955 field season. Mapping of eleven 1 mile sheets was completed. In addition parts of eight 1 mile sheets were mapped and reconnaissance traverses were carried out in other areas. The South Alligator Uranium Field was mapped on a scale of 1 inch = 1,000 feet. Airborne scintillograph anomalies in the Georgetown area of Queensland were examined and a reconnaissance map of the Georgetown 4 mile sheet prepared.

PERSONNEL

Three parties of up to five geologists each operated during the season. The parties were composed as follows:

1. Daly River Party:

D. A. White, Geologist Grade 3 (party leader)
O. N. Warin, Geologist Grade 1
J. Fowerakor Geolgoist Grade 1
M. A. Randal, Geologist Grade 1
E. J. Malone, Geologist Grade 1

(Malone was later transferred to the Goodparla party and then to the Randford party. He was replaced in the Daly River Party by J. Barrie ex Randford Party).

2. Goodparla Party:

W. C. White Geologist Grade 3 (party leader)
P. R. Dunn Acting Geologist Grade 2
J. Johnson Geologist Grade 1
F. de Keyser Geologist Grade 1

3. Randford Party:

C. E. Prichard, Geologist Grade 3 (party leader)
J. R. Stewart, Acting Geologist Grade 2
K. Hughes, Geologist Grade 1
J. Barrie, Geologist Grade 1.

The three parties were under the overall controll of B. P. Walpole, Senior Geologist. J. Taylor (U.K.A.E.C.) and later D. Dow (Darwin Uranium Group) were attached to the regional parties for part of the season to assist in mapping of the South Alligator Uranium Field.

WAGES EMPLOYEES

Three cooks, 3 mechanics and ten survey hands - a total of 16 wages employees, were employed during the field season. One cook, one mechanic and 3 survey hands were attached to each party. One survey hand was attached to the Senior Geologist.

VEHICLES

The vehicle allottment was based on a scale of one Land Rover per Geologist and one 3-ton-truck per field party. Details are given below.

Daly River Party		Goodparla Party		Randford Party	
Land Rover	No.C78463	Land Rover	No.C78461	Land Rover	No.C76433
" "	No.C78462	" "	No.C78457	" "	No.C78458 (burnt
" "	No.C76436	" "	No.C76435	" "	No.C78456
" "	No.C76423	" "	No.C73748	" "	No.C73750
				" "	No.C78455
International 3 ton truck	No.C78421	International 3 ton truck	No.C78399	International 3 ton truck	No.C78400
Jeep Trailer	No.C74682	Jeep Trailer	No.C74681	Jeep Trailer	No.C56644
Water Trailer	No.C56155	Water Trailer	No.C73716	Water Trailer	No.C56016

Senior Geologist	
Land Rover	No.C76435
Jeep Trailer	No.C57844

Totals: 14 Land Rovers
3 International 3 ton trucks
4 Jeep Trailers
3 Water Trailers

In addition each party was equipped with two standing motors comprising one billabong pump and one battery charger.

One Land Rover allotted to the Randford party was accidentally destroyed in a grass fire. For the second year in succession, no vehicle allotted to the regional parties was involved in a road accident which involved repairs beyond the capacity and equipment of the field mechanics.

CAMPING EQUIPMENT

All field parties used auto tents and marquees as tentage. This innovation proved highly successful and resulted in a marked saving in initial cost (about 45% for auto tents as against army type tents and flys) and a marked saving in the time and labour involved in establishing and breaking base camps.

VISITORS

Dr. H. H. Fisher, Chief Geologist, M. A. Condon, D. O'Driscoll, J. H. Lord, L. C. Noakes, W. B. Dallwitz, N. J. MacKay, A. A. Opik, Bureau of Mineral Resources and Professor R. Prider University of Western Australia, H. Newton, MAUC, S. L. Knight and L.MacAlister Mt. Isa Mines, visited the field parties during the year.

AREA COVERED

An area of approximately 6,500 square miles was mapped. The mapping was carried out on the Burnside, Reynolds River, Mt. Hayward, Daly River, Muldiva Creek, Mundogie Hill, Goodparla North, Goodparla South, Randford Hill and Mt. Evelyn sheets of the Australian 1 mile series. Field work on these sheets was completed. In addition, parts of the Mt. Tolmer, Tumbling Waters, Southport, Batchelor, Woolwonga, Spring Peak, Mt. Partridge and

Jim Jim Creek sheets were mapped. Reconnaissance traverses were carried out on unmapped sections of the Darwin, Pine Creek Fergusson River and Alligator River 4 mile areas.

An area of about 350 square miles in the South Alligator River region was mapped on a scale of 1 inch = 1,000 feet.

The regional parties laid out the route, provided guides and camp facilities and made density measurements and geological sections for the regional gravity survey of the Pine Creek Geosyncline.

Field work was carried out as follows:

Daly River Party: This party completed mapping on the Burnside, Reynolds River, Daly River, Mt. Hayward and Muldiva Creek sheets; part of Mt. Tolmer and Batchelor sheets were mapped at 1 mile scale and a large area on the western side of the Pine Creek 4 mile sheet was reconnoitred. A reconnaissance was made by aircraft down the western part of the Fergusson River 4 mile sheet. Part of the Darwin 4 mile sheet was reconnoitred, in particular, sections of the Humpty Doo, Marrakai Tumbling Waters and Southport 1 mile sheets.

Goodparla Party: This party completed mapping of the Mundogie Hill, Goodparla North and Goodparla South sheets, part of the Spring Peak, Woolwonga and Mt. Partridge sheets. Those sections of the above sheets which lay in the South Alligator River area were mapped on a scale of 1 inch = 1,000 feet. Part of the Alligator River 4 mile area was reconnoitred.

Randford Party: This party mapped the Mt. Evelyn and Randford Hill 1 mile areas.

Senior Geologist: The Senior Geologist in charge of the regional parties investigated airborne scintillograph anomalies in the Georgetown area of Northern Queensland. A reconnaissance map of the Georgetown 4 mile sheet was prepared. For the remainder of the season the Senior Geologist was occupied in mapping of the South Alligator Uranium field in conjunction with one member of the Darwin Uranium Group and with the Goodparla Party; reconnaissance of the areas to be mapped in the 1956 field season; general supervision and co-ordination of the field parties.

PROSPECTING

Radiometric prospecting was carried out in conjunction with the geological mapping. No new prospects were discovered.

GEOLOGICAL MAPS.

The procedure of distributing field compilations of one mile sheets as the geological mapping progressed was continued during the year. The field compilations are on uncontrolled photomosaics and were distributed through the Canberra and Darwin offices of the Bureau. The geological data on the field compilations have been since replotted onto controlled base maps, produced by the National Mapping Section, Department of the Interior, and fair drawing of the final 1 mile series maps put in hand.

Field compilations distributed during the year include the Burnside, Reynolds River, Mt. Hayward, Daly River, Muldiva Creek, Mundogie Hill, Goodparla North, Goodparla South, Randford Hill and Mt. Evelyn Sheets of the Australian 1 mile series.

Two field compilations of the South Alligator River area were distributed. One compilation is on a scale of 1 inch = 1,000 feet and covers the known area of the South Alligator Uranium Field. The second compilation is on a scale of 1 inch = 1 mile and covers a strip about 64 miles long and 14 miles wide from Sleisbeck

north west along the South Alligator valley. Both these Sheets are to be redrawn when controlled base maps become available.

A progress map on a scale of 1 inch = 9.2 miles (approx.), embodying all geological mapping carried out in the Katherine Darwin region to the end of 1955, was compiled and distributed early in 1956.

GEOLOGY

The regional mapping provided a great deal of further detailed information on the geology of the Katherine-Darwin region. The programme of mapping laid down was completed and a high standard of work was maintained throughout the season.

Archaean Rocks

The presence of rocks of probable Archaean age on the eastern edge of the Lower Proterozoic Pine Creek Geosyncline was confirmed. These rocks were first noted during a reconnaissance in 1954. A large belt of Archaean rocks was discovered on the western edge of the geosyncline. The area had previously been considered as part of the Litchfield Granite of Lower Proterozoic age. Archaean "greenstones" were mapped in the South Alligator-Mundogie Hill area.

Lower Proterozoic Rocks

A number of new groups and formations were mapped and defined. On the western edge of the geosyncline it was found that the previously (1954) defined Burrell Creek formation graded laterally and vertcially into sediments of the Finniss River Group. These sediments onlap onto the Golden Dyke formation and rocks of the Batchelor Group. They lap back onto the old western shelf area and were, in part, deposited in a secondary marginal trough formed in what is now the Daly River area. A subdivision of this Group - The Chilling Sandstone-was traced from the air to the Victoria River area where it forms part of the Victoria River Group as defined by Traves (1953) and considered by him to be composed of upper Proterozoic rocks.

Lateral gradations from slope type sediments to shelf type sediments were also mapped in the Coomalie Creek-Brodribb area where the Golden Dyke formation passes into rocks of the Manton Group. This transition will go a long way to explain some of the anomalous geology of the general Rum Jungle area.

The transition from slope and trough type sediments to shelf type sediments was studied in the Goodparla area. Here it was found that the shelf type Masson Formation interfingered with both the Golden Dyke Formation and the Burrell Creek Formation. Lenses of Golden Dyke rocks were mapped in the Burrell Creek Formation. The interfingering may have been due to the degree of slope of the basement on which the rocks were deposited and the results of gravity traverses across this area should throw considerable light on this point. The Masson Formation was mapped in more detail than in 1954 and the component quartz greywacke, siltstone-carbonaceous siltstone and banded iron formation members were traced. Small basement highs composed of greenstones and greenstone agglomerate crop out along the eastern boundary of the formation.

The South Alligator Group was mapped and defined and silicified dolomitic reef rocks traced to several miles north of the Coirwong area. Other formations including the Koolpin Formation, in which most of the uranium occurrences in this area are found, were mapped in outcrop detail. The position of this Group in space in the geosyncline is not yet definitely established, nor is that of a thick (10,00 feet) sequence of easterly dipping

coarse arkose, siltstone and sandstone which crops out in the Yomelba area, twenty miles east of the South Alligator River.

Further detail was also obtained in the trough zone of the geosyncline on the Randford sheet when numerous mineral occurrences were located and plotted.

Mapping in the South Alligator Uranium Field established that, while most of the uranium occurrences were located in rocks of the Koolpin Formation, a further important control is formed by the Lower Proterozoic-Upper Proterozoic unconformity in that area. In some places, the mineralisation crosses the unconformity and these occurrences prove the hypothesis advanced by Walpole and Drew in 1952 and 1953 that mineralization in this part of the Katherine-Darwin region could be Upper Proterozoic in age. The unconformity in the South Alligator Sleisbeck area was mapped for over 40 miles.

Upper Proterozoic

The stratigraphy of the Upper Proterozoic rocks was studied in detail in the South Alligator area and the results of this work applied to the definition of the whole Upper Proterozoic sequence on the western edge of the Arnhem Land Plateau in the Katherine-Darwin region. These rocks are now named as the Katherine River Group composed of the Edith River Volcanics and the Kombolgie Formation. Both formations have been further subdivided into a number of members.

The Buldiva Sandstone sequence on the Daly River Basin was further studied and is now included in the Mt. Tolmer Group. This Group consists of the Buldiva Sandstone formation with two members - the Depot Creek Sandstone and the Stray Creek member - and the Mt. Hinde Dolomite. It is considered to be Upper Proterozoic in age and to be the equivalent in part of the Chambers River Beds which crop out in the Waterhouse River - Roper River area. The Chambers River Beds unconformably overlie the Katherine River Group.

The Upper Proterozoic Mt. Tolmer Group and the Lower Proterozoic Chilling Sandstone together comprise the Victoria River Group as shown on Traves map of the Ord Victoria Region. In the Katherine Darwin region these rocks are separated by a regional angular unconformity.

Further data, including fossil collections, were obtained in both the Middle Cambrian Daly River Group and in the Lower Cretaceous Mullaman Group. The Daly River Group was split into formational units and these units mapped and defined.

OFFICE WORK

Work carried out in Canberra during the inter field season during 1955 was concentrated on bringing compilation of both field sheets and one mile series compilations on controlled base maps up to date. The progress map was revised and redrawn. Field sheets of all areas covered during 1955 were compiled and distributed before the commencement of the 1956 field season. A start was made on the petrography and petrology of the igneous rocks of the area, and all rock specimens collected were registered and stored in the museum.

ACKNOWLEDGMENTS

The three regional parties which operated in the Katherine-Darwin region during 1955 constituted the largest group of technical personnel the Bureau has put in the field to study a particular problem. At all times a very high standard of work and a remarkable degree of cohesion and co-operation between parties was maintained. This, and the care taken of camp equipment and vehicles reflects great credit on members of the three field parties.