

Head Office Library Copy

COPY FOR DIRECTOR

File 64/1049

Folio 56.

COMMONWEALTH OF AUSTRALIA.

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

UNCLASSIFIED

*Copy 2
3*

RECORDS:

1964/136

EARLY ORDOVICIAN AT CLARAVALE IN THE FERGUSON RIVER AREA,
NORTHERN TERRITORY

by
" A. A. Opik



The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

EARLY ORDOVICIAN AT CLARAVALE IN THE FERGUSON RIVER AREA,
NORTHERN TERRITORY

by

A. A. Öpik

Record No. 1964/136

CONTENTS

	Page
SUMMARY	1
INTRODUCTION AND ACKNOWLEDGEMENT	1
POSITION AND SECTION	1
THE AGE OF THE FOSSILS	1
SAMPLE SN 106	1
SAMPLES SN 103 AND SN 104	2
CORRELATION	2
CONODONTS (Communicated by P. J. Jones)	2
REFERENCES	3

The information contained in this report has been obtained by the Department of National Development, as part of the policy of the Commonwealth Government, to assist in the exploration and development of mineral resources. It may not be published in any form or used in a company prospectus without the permission in writing of the Director, Bureau of Mineral Resources, Geology and Geophysics.

EARLY ORDOVICIAN AT CLARAVALE IN THE FERGUSON RIVER AREA,
NORTHERN TERRITORY

by

A. A. ^UOpik

SUMMARY

Fossils collected by the Australian Aquitaine Petroleum Pty. Ltd. at Claravale, Fergusson River area, Northern Territory are Tremadocian in age; the possibility of a lower Tremadocian age is discussed.

According to P. J. Jones, the conodonts independently establish the Tremadocian age of the Claravale sequence, which contains species occurring in the Pander Greensand of the Joseph Bonaparte Gulf area, Western Australia, and the Ninmaroo Formation of Western Queensland.

INTRODUCTION AND ACKNOWLEDGEMENT

In 1964, geologists of the Australian Aquitaine Petroleum Pty. Ltd. collected fossils in the Fergusson River area; the Chief Geologist of that Company, Mr. R. Guillaume, sent these fossils to the Chief Geologist, Bureau of Mineral Resources, Canberra for identification; field data and a measured section were also supplied by Mr. R. Guillaume. The material consists of friable sandstone and was received on August 7th.

POSITION AND SECTION

The material was collected at about seven miles south-west from Claravale Homestead, latitude 14°25', longitude 131°32', Fergusson River 1:250,000 sheet area (Randal, 1962). The sequence, in brief, consists of two parts: a lower part represented in the collection by samples SN 103 and SN 104 and consisting of a friable glauconitic red sandstone, and an upper essentially calcareous part which begins below with a buff coloured sandstone coquinoid represented by the sample SN 106. The contact between the two parts is, however, not exposed.

THE AGE OF THE FOSSILS

The early Ordovician age of the fossils is obvious and needs no further comment. Furthermore, the fossils, as discussed below, are Tremadocian, and early Tremadocian is considered a fair probability.

SAMPLE SN 106

This sample contains the youngest fossils collected from the sequence; these are:

Brachiopods: (1) Lingulella and (2) the orthoid Apheoorthis Ulrich and Cooper; Trilobites: (3) Asaphellus Callaway, (4) Dactylocephalus Hsu, (5) a richardsonellid, and (6) a small indeterminate form of Ptychopariina.

Apheoorthis is a late Upper Cambrian and Tremadocian genus. Asaphellus and Dactylocephalus are essentially Tremadocian trilobites unknown in the Upper Cambrian. Many species of Asaphellus occur in the early Tremadocian, and Dactylocephalus (known only from China) starts with two species at the beginning of that epoch.

In south China (Lu, 1959) the earliest Tremadocian (as well as

Ordovician) Zone is the Zone of Asaphellus inflatus and Dactylocephalus dactyloides. Of course, a correlation with this zone would be premature because the specific identity of the Fergusson River forms is unknown; furthermore, the Dactylocephalus from SN 106 is rather fragmentary and unsuitable for specific identification.

The richardsonellids of SN 106 can be described as Richardsonellinae without a frontal brim. Such forms are Tremadocian or even early Tremadocian in age, and have been referred to in the literature as Richardsonella (Hukasawia) Kobayashi, 1953, or "Apatokephalus" (A. hoytan Kobayashi), or Pseudokainella?, or Praeptocephalus Lochman, 1964.

Finally, the late Upper Cambrian Siberian Aktokephalus (in Rosova, 1960) belongs, apparently, to the same group of forms.

The small indeterminate species of Ptychopariina is apparently related to the Clelandia of the early Tremadocian of North America.

SAMPLES SN 103 AND SN 104

These two samples from the lower part of the sequence can be treated together because the fossils are similar. The matrix, a glauconitic red sandstone, is identical with the late Upper Cambrian Clark Sandstone of the Joseph Bonaparte Gulf area. The fossils are large fragments of trilobites with concave border and ventrally fused free cheeks. These may represent Asaphacea or Dikelocephalacea (Dikelocephalidae or Dikelocephalinidae); Dactylocephalus also has fused cheeks and belongs to the Dikelocephalinidae; Furthermore, one form of the 'Richardsonellidae without a frontal brim' is also present. I assume that this part of the sequence represents either the top of the Upper Cambrian, or the base of the Tremadocian, although the available fossils cannot be interpreted conclusively.

CORRELATION

The discussion of the age of the fossils refers to the correlation of the sequence with the Tremadocian; furthermore a part of the Pacoota Sandstone of the Amadeus Basin is also contemporaneous with the Tremadocian sequence at Claravale.

CONODONTS (Communicated by P. J. Jones)

The samples SN 103, SN 104, and SN 106 were examined for conodonts. SN 104 contains species of conodonts belonging to the genera Acodus, Chosonodina, Drepanodus, Oneotodus, and Scandodus. These species occur in the Pander Greensand (Tremadocian-early Arenigian) of the Joseph Bonaparte Gulf area, and from the upper portion of the Ninmaroo Formation (late Tremadocian) at Black Mountain, Queensland. Furthermore, this assemblage indicates a relationship with the early Ordovician of South Korea (Muller, 1964), especially by the presence of the genus Chosonodina. SN 106 contains species belonging to the genus Drepanodus.

Thus, the conodonts, independently, establish an early Ordovician (Tremadocian) age of the Claravale sequence; the position within the Tremadocian cannot be determined, as no descriptions of early Tremadocian conodonts have yet been published. A full report on the conodont fauna of the Tremadocian sequence of the Pander Greensand, the Ninmaroo Formation and at Claravale will be published at a later date.

REFERENCES

- KOBAYASHI, T., 1953 - On the Kainellidae. Jap.J.Geol.Geogr. 23, 37-61.
- LOCHMAN, Christina, 1964 - Basal Ordovician faunas from the Williston Basin, Montana. J. Paleont. 38. (3), 453-476.
- LU, Yen-Hao 1959 - Subdivision and correlation of the Ordovician rocks of South China. Acad.Sinca.Inst.Geol. (Reprint, 1-113)
- MÜLLER, K. J., 1964 - Conodonten aus dem unteren Ordovizium von Südkorea. N.Jb.Geol.Palaont.Abh. 119 (1), 93-102.
- RANDAL, M.A., 1962 - Explanatory Notes, Fergusson River, N.T. Bur.Min.Resour.Aust.Geol.Ser. 1:250,000
- ROSOVA, A.V., 1960 - Upper Cambrian trilobites of Salair (Russian). Trudy 5, 1-94, Inst.Geol.Geophys.Acad.Sci. U.S.S.R., Siberian division.