

BAJOCIAN AMMONITES FROM ZERQA WADI, JORDAN

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ABSTRACT

Three ammonites; *Ermoceras* cf. *coronotoides* Douvillé, *Teloceras labrum* Buckman, and *Normannites* gr. *braikenridgii* (Sowerby); have been recorded for the first time from the latest early Middle, to Late Bajocian of Wadi Huni biomicritic marly limestone of Zerqa Wadi in the Dier-Alla area. This fossil fauna is comparable with other levant countries.

Keywords: Bajocian, Ammonites, Zerqa Wadi, Huni Limestone, Lithostratigraphy, Taxonomy.

RESUMEN

Se han encontrado, por primera vez, tres especies de ammonites: *Ermoceras* cf. *coronotoides* Douvillé, *Teloceras labrum* Buckman y *Normannites* gr. *braikenridgii* (Sowerby), en terrenos de edades Bajocienses medio, parte inferior terminal, a Bajociense superior en las margocalizas biomicricitas de Wadi Huni en Zerqa Wadi, área de Dier-Alla. Esta fauna fósil es comparable con otras de países del Levante.

Palabras clave: Bajociense, Ammonites, Zerqa Wadi, Calizas Huni, Litoestratigrafía, Taxonomía.

INTRODUCTION

Jurassic rock crops out in North Jordan, along the Western part of the Zerqa Wadi between the old Jerash bridge, which is now covered by the King Talal Dam Pool, and the town of Dier-Alla to the West. Exposures extend some 20 km southwards passing through Ain-Khuneizir, Subeihi, and Arda road. Two small exposures of Jurassic dolomites and limestones occur in the depression of Baqa and near the intersection of Wadi Mahis and Wadi Shuieb (Fig. 1).

The Jurassic rocks of Jordan have been studied and investigated by many geologists and paleontologists, such as Cox (1925), Muir-Wood (1925), Blake (1936), Blake and Ionides (1939), Avnimelech (1945), Quennell (1951), Burdon (1959), Bender (1968), Basha (1980, 1983), and Bandel (1981). However, after Cox (1925), and Muir-Wood (1925), no reports on new Jurassic macrofossils from Jordan have appeared. Authors used to publish lists of Jurassic fossils, e.g. Wetzel and Morton (1959), while the biostratigraphic value of these macrofossils was never further investigated except by Bandel and Zeiss (1987) who found the Bathonian *Micromphalites jordanicum* in the upper part of the studied section.

Jurassic fossils from the Zerqa Wadi were first reported by Wetzstein (1859), then followed by Libbey and Hoskins (1905), and Blanckenhorn (1912) who failed to re-discover the exposure. However, the first reports on the Jurassic fossils from Jordan were published by Cox (1925) and Muir-Wood (1925) on material collec-

ted from the mouth of the Zerqa Wadi and they correctly assigned Bajocian-Bathonian ages to the identified macrofossils.

Blake (1936) sketched and described a thick section about (200 m) from the Wadi Huni to Burma village; composed of shales, sandstones, limestones, dolomites and marly limestones. Its fossil contents were determined by Cox (1925) and Muir-Wood (1925) as Bajocian-Bathonian.

Wetzel and Morton (1959) measured about 350 m of Jurassic rocks and named them the Huni Formation.

Blake and Ionides (1939) referred the fossils collected by Damesin (1963) from a 73 m section in the Wadi Zerqa to Bajocian-Bathonian and ?-Callovian ages.

Hoffman (in Bender, 1968) assigned a Bathonian age to the fossils collected by Van den Boom and Lahloob from the Zerqa bridge.

Gramman (in Bender, 1968) identified the microfauna of the Zerqa bridge and erroneously assigned ages up to the Oxfordian.

Jordan (in Bender, 1968) referred the fossils, collected by Wiesemann, from the upper five meters of the 50-70 thick limestones of the Wadi ed Dafali at the Wadi Zerqa, to Aalenian-Early Bathonian ages.

Micropaleontological studies were carried out by Basha (1980, 1983) on the Jurassic outcrops of Jordan at the Wadi Zerqa, and the Ain-Khuneizier-Arda road and subdivided the successions into five formations equivalent to those reported in Israel. Also Bandel (1981) divided the Jurassic rocks in Jordan on lithostratigraphic grounds into six formations.

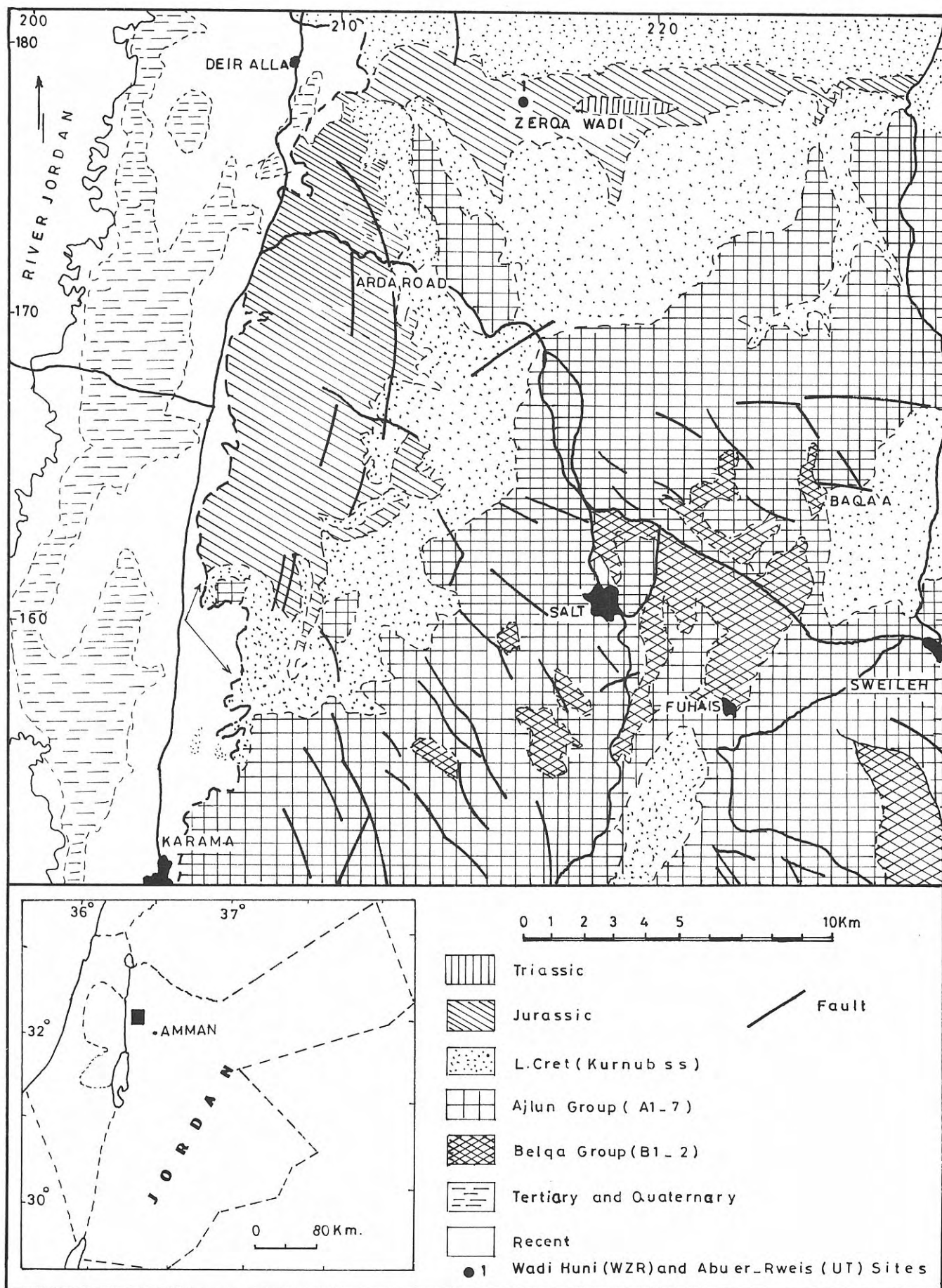


Figure 1. Geologic map of the study area (after Bender 1968).

NOMENCLATURE AND LITHOSTRATIGRAPHY OF THE JURASSIC ROCKS OF JORDAN

DISTRIBUTION OF JURASSIC AMMONITES IN LEVANT COUNTRIES

The Jurassic system of Jordan has been subjected to many different nomenclatures as indicated in Fig. 2.

The area of study lies within the course of Zerqa Wadi. The sequence is a composite of the Wadi Huni at the base represented by the samples WZR14-WZR32, and the Abu er-Rweis, samples UT1-UT29 (Fig. 3). The sequence was divided by Basha (1980) into two formations: the Huni Limestone Formation and the Huni Dolomite and Dolomitic Limestone Formation (Fig. 2).

Huni Limestone Formation

The sequence starts with alternating layers of sandy iron oolites and pisolites at the base; followed by dark grey-green shale; sandy iron oolites and pisolites; grey massive dolomite; dark grey-greenish shale; pinkish-violetish subrounded sandstone; greyish massive dolomite; brownish, ferruginous sandstone; biomicritic marly limestone, containing for the first time the ammonites *Ermoceras* cf. *coronatoides* (Douvillé), *Teloceras labrum* Buckman, and *Normannites* gr. *braikenridgii* (Sowerby) in the samples WZR28 and WZR29; dark grey thick bedded dolomite, partly sandy; greenish grey shale and quartzitic calcareous, brownish, massive sandstone of about 130 m thickness.

Huni Dolomite and Dolomitic Limestone Formation (Abu er-Rweis)

The succession starts with thick, massive, grey, spotted quartzitic dolomite, followed by biomicritic marly limestone, dolomitic sandstone, greenish shale, dolomitic limestone and tanish, thick bedded dolomite of about 110 m thickness.

Douvillé (1916) reported *Normannites* cf. *braikenridgii* from the Bir Mowerib Member of Middle Bajocian and *Ermoceras coronatoides* from Bir Maghara Member of Upper Bajocian; whereas Picard and Hirsch (1987) recognized the species *Normannites* cf. *braikenridgii*, from the Middle Bajocian of Gebel Maghara, Sinai Peninsula, Egypt.

The species *Teloceras* cf. *labrum* and *Normannites* cf. *braikenridgii*, were recorded from the Upper and the Middle Bajocian of the lower Dhurma Formation, Saudi Arabia respectively (Arkell, 1952 and Enay *et al.*, 1986).

On the other hand, Parnes (1981) identified *Normannites* spp. and *Teloceras* spp. from late Middle Bajocian and *Ermoceras* sp. from the Upper Bajocian of the Mahmal Formation, Makhtesh Ramon, Negev, southern Israel.

In Jordan the authors were able to identify the species *Ermoceras* cf. *coronatoides* Douvillé, *Teloceras labrum* Buckman and *Normannites* gr. *braikenridgii* (Sowerby) from the latest early Middle to Late Bajocian rocks of the Wadi Huni; a subsidiary of the Wadi Zerqa. It seems that the Mahmal Formation in the Negev of southern Israel is lithologically and faunally very close to that of the Huni Limestone Formation of Jordan, which might be due to the rotation of Jordan plate with respect to the Israeli one (Fig. 2). These uppermost Lower Middle and Late Bajocian ammonites are well correlatable with those of the Levant countries (Douvillé, 1916; Arkell, 1952; Powers *et al.*, 1966; Enay *et al.*, 1987; Parnes, 1974, 1981, 1988; Hirsch & Picard, 1988; Hirsch, 1988; Buckman, 1909-1930; and Sowerby, 1839). The broken skeletal, biomicritic, marly limestone associated with their faunal assemblages may indicate shallow shelf marine environment, possibly related to a nearshore shallow waters of rather high energy as indicated by the iron oolite and pisolite associations.

ERA	System	Series	Stage	Quennell 1951 Burdon 1959	Damesin 1963 Daniel 1963	Wetzel and Morton 1959	Parker 1970	Basha 1980	Bandel 1981	
MESOZOIC	Jurassic	Malm	Portlandian	Zerqa Group	Huni Formation	Zerqa Group	Zerqa Group	Huni Formation	Muaddi Formation	
			Kimmeridgian							
			Oxfordian							
		Dogger	Callovian							
			Bathonian							
			Bajocian							
	Liassic	Aalenian	Subeihi Sandstone			Zerqa Group	Huni Formation	Huni dolo.-dolo. LS. Fn.	Arda Formation	
		Toarcian						Huni Limestone Fn.	Umm Maghara Fn.	
		Pliensbachian						Huni Sandstone Fn.	Dhahab Formation	
									Zerqa Formation	
									Deir-Alla Formation	

Figure 2. Showing different nomenclature of Jurassic System in Jordan.

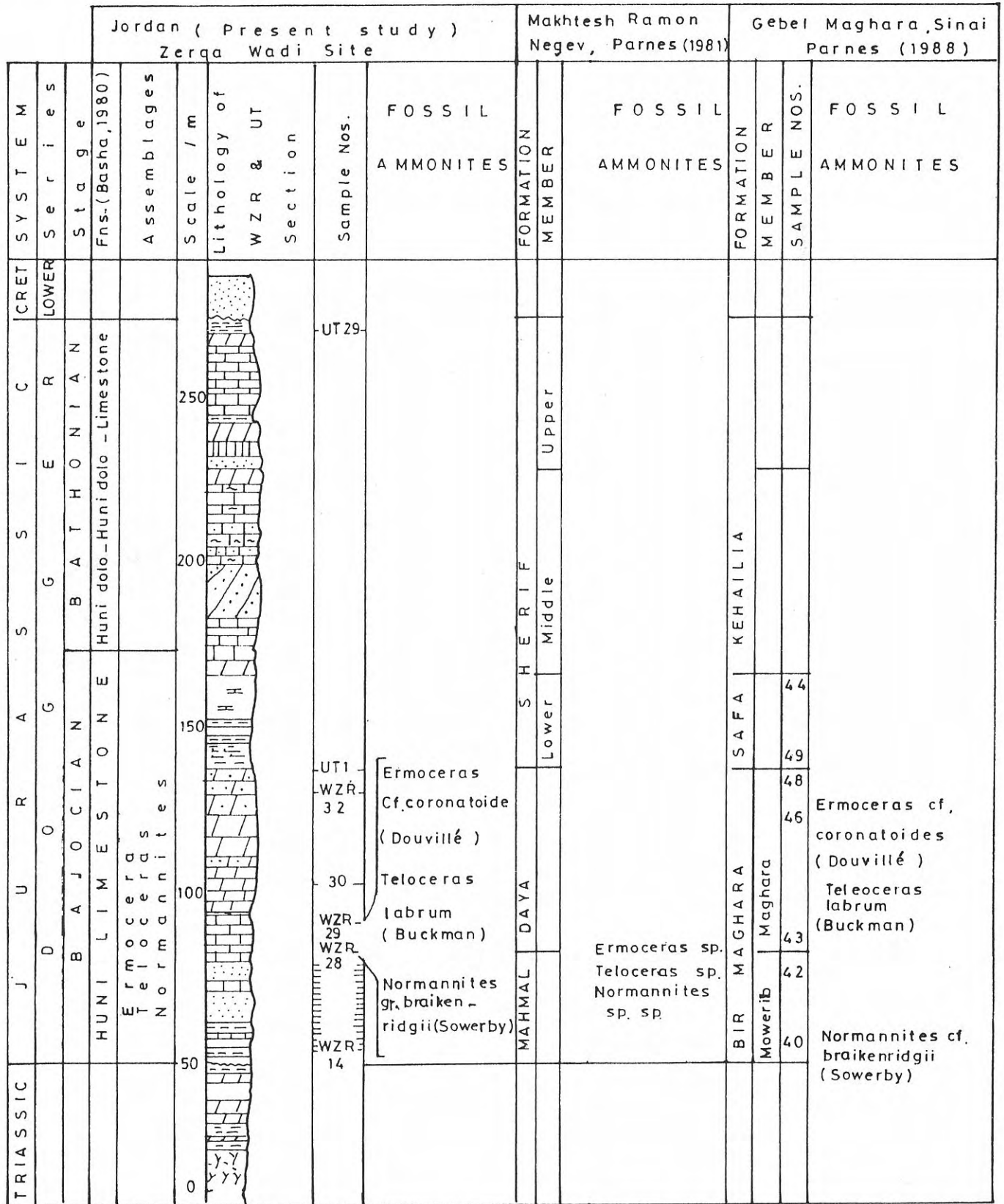
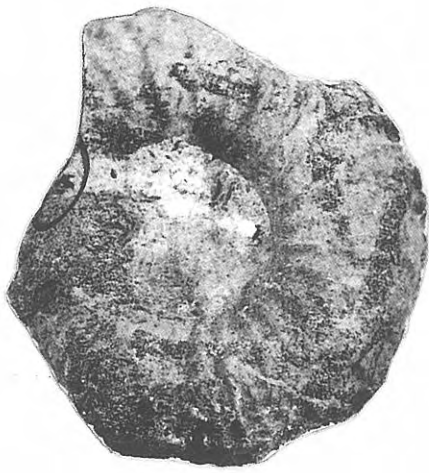


Figure 3. Tentative correlation of the Wadi Zerqa (WZR) and the Wadi Abu er Rweis Jurassic outcrops with those of the Negev and Sinai Peninsula sites.

- Plate I**
- 1-3 *Ermoceras cf. coronatoides* Douvillé. 1 Side view. 2 A par of a side view. 3 Ventral view. Three specimens recorded from the Bajocian of the Wadi Huni of the Zerqa Wadi, Sample WZR 29.
- 4-7 *Teloceras labrum* Buckman. 4 Side view of specimen. 5 Side view of a fragment. 6, 7 Ventral view of the specimen. One specimen with fragments has been reported from WZR 29 of the Zerqa Wadi.
- 8-10 *Normannites gr. braikenridgii* (Sowerby). 8 Side view. 9 Ventral view. 10 Apertural view. Two specimens recorded from WZR 28 of the Zerqa Wadi.



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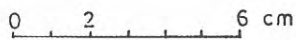
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SYSTEMATIC PALAEOLOGY

CLASS CEPHALOPODA Cuvier, 1795

Order AMMONOIDEA Zittel, 1884

Suborder AMMONITINA Hyatt, 1889

Superfamily STEPHANOCERATAEAE Neumayr, 1872

Family **Stephanoceratidae** Neumayr, 1875

Genus *Ermoceras* Douvillé, 1916

Subgenus *Telermoceras* Arkell, 1952

Ermoceras (*Telermoceras*) cf. *coronatoides*

Douvillé

Pl. I, Figs. 1-3

1916 *Ermoceras coronatoides* Douvillé, 24, Figs. 3-5.

1952 *Ermoceras* (*Telermoceras*) *coronatoides* Douvillé; Arkell, 276, Pl. 21, Figs. 3-6, 12.

1988 *Ermoceras* (*Telermoceras*) *coronatoides* Douvillé, Parnes, 725.

Material: Three specimens.

Description: Shell medium to large; involute, tabular venter early depressed whorls, with primary and secondary ribs; where the primary ribs are intercalated with short ventrolateral secondary ribs, the latter may approach the primaries and look as if they furcate from them. Tubercles are situated in a row on the whorl side across the ribs. The ventral groove is missing.

Distribution: The species was first reported from Gebel Maghara, North Sinai, from Late Bajocian Jurassic rocks (Douvillé, 1916; Arkell, 1952; and Parnes, 1988). Later it was reported from Bajocian rocks of Central Saudi Arabia (Powers *et al.*, 1966). In Jordan it is reported from the Late Bajocian Jurassic rocks of the Wadi Huni of the Zerqa Wadi, WZR 29.

Genus *Teloceras* Macke, 1907

Teloceras labrum Buckman, 1922

Pl. I, Figs. 4-7

1922 *Teloceras labrum* Buckman, Pl. 350 A, B.

1952 *Teloceras* cf. *labrum* Buckman; Arkell, 271, Pl. 21, Figs. 2, 11.

1966 *Teloceras labrum* Buckman; Powers *et al.*, D48.

Material: One specimen and fragments.

Description: Shell large sized, involute, widely spaced ribs with a row of medium tubercles on the whorl sides. Inner whorls are ornamented with continuous primary ribs which are separated by smaller grooves.

Distribution: The species was first reported from the *Ermoceras* beds of Gebel Maghara, North Sinai (Arkell, 1952); later it was reported from Central Arabia, Bajocian rocks (Powers *et al.*, 1966), from the Upper Bajocian of the lower Dhurma Formation, Saudi Arabia (Arkell, 1952 and Enay *et al.*, 1986), and from Late Middle Bajocian rocks of the Mahmal Formation, Negev, southern Israel. It was identified from Late Bajocian rocks of the Wadi Huni, WZR 29 along the Wadi Zerqa, Jordan.

Genus *Normannites* Munier Chalmas, 1882

Normannites gr. *braikenridgii* (Sowerby, 1852)

Pl. I, Figs. 8-10

1952 *Normannites* cf. *braikenridgii* (Sowerby); Arkell, Pl. 30, Fig. 3.

1981 *Normannites* spp.; Parnes, p. 3, Fig. 1.

1987 *Normannites* cf. *braikenridgii* (Sowerby); Enay *et al.*, 13.

1987 *Normannites* cf. *braikenridgii* (Sowerby); Picard and Hirsch, Fig. 3.

Material: Two specimens.

Description: Shell small, slightly compressed, and evolute; ornamentation consists of strong, sharp ribs, regularly biplicate without interruption on the venter. Whorls are subrounded in side view, and the inner whorls are ornamented with small, thin primary ribs with nearly equal grooves.

Distribution: The species was reported from uppermost Lower Bajocian rocks of Gebel Maghara, North Sinai, Egypt (Arkell, 1952), from Middle Bajocian, Gebel Maghara, Sinai, Egypt (Picard and Hirsch, 1981), from Middle Bajocian rocks of Central Saudi Arabia (Enay *et al.*, 1987). It is reported from the uppermost Lower Middle Bajocian rocks of the Zerqa Wadi, sample WZR 28, Jordan.

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