OXFORDIAN OSTRACODES FROM THE KIDOD FORMATION OF THE MAJDAL SHAMS AREA, MOUNT HERMON, GOLAN HEIGHTS

Amnon ROSENFELD, Henri J. OERTLI, Avraham HONIGSTEIN and Ephraim GERRY

ROSENFELD, A., OERTLI, H.J., HONIGSTEIN, A. & GERRY, E. (1987). — Oxfordian Ostracodes from the Kidod Formation of the Majdal Shams area, Mount Hermon, Golan Heights. — *Bull. Centres Rech. Explor.-Prod. Elf-Aquitaine*, **11**, 2, 233-248, 2 fig., 3 pl.; Pau, November 13, 1987. — ISSN : 0396-2687. CODEN : BCREDP.

Twenty-two ostracode species are recorded from the Kidod Formation of the Jurassic exposures of Majdal Shams, Mount Hermon, Golan Heights. Five of them are described as new species : *Cytherelloidea atlantolevantiana, Eucytherura oxfordiana, Acrocythere dubertreti, Homerocythere hermonensis* and *Oligocythereis irregularis*. The ostracode fauna belongs to the *Exophthalmocythere ? kidodensis* (JJ-5) Assemblage Zone of Oxfordian age, suggesting a relatively deep, calm environment of deposition.

Amnon Rosenfeld, Stratigraphy and Oil Division, Geological Survey of Israel, 30 Malkhe Israel St., Jerusalem 95501, Israel; Henri J. Oertli, Société Nationale Elf Aquitaine (Production), 64018 Pau, France; Avraham Honigstein, Dept. of Geophysics and Planetary Sciences, Tel Aviv University, Tel Aviv 69978, Israel; Ephraim Gerry The Israel Institute for Petroleum and Energy, P.O.B. 17081, Ramat Aviv 61170, Israel. — April 21, 1987.

Key words : Ostracoda, Oxfordian (Kidod Formation), New taxa, Biostratigraphy, Israel, Golan Heights.

CONTENTS

1. — INTRODUCTION

Jurassic rocks make up the largest part of Mount Hermon (Fig. 1), which is about 2 800 m high. Its structure represents a NNE-SSW trending 70 km long and 15 km wide faulted anticlinorium. Early and Middle Jurassic strata occur on the SE flanks of the massive, whereas Late Jurassic outcrops are located at the southern plunge of Mount Hermon at Majdal Shams (Golan Heights). The Mount Hermon area was mapped and its megafauna was recorded by DUBERTRET (1955, 1963, 1966) and PONIKAROV (1967). GOLDBERG (1969) measured and sampled the Majdal Shams section (Fig. 2), and assigned Israeli formation names to the litholigical units J1-J7, described by DUBERTRET *(op. cit.)*. The succession was described by GOLDBERG *et al.* (1981) and PICARD & HIRSCH (1987 [*in press*]). The 155 m thick Kidod Formation in this section consists mainly of dark shales and marls,

0396-2687/87/0011-0233 $ 3.20

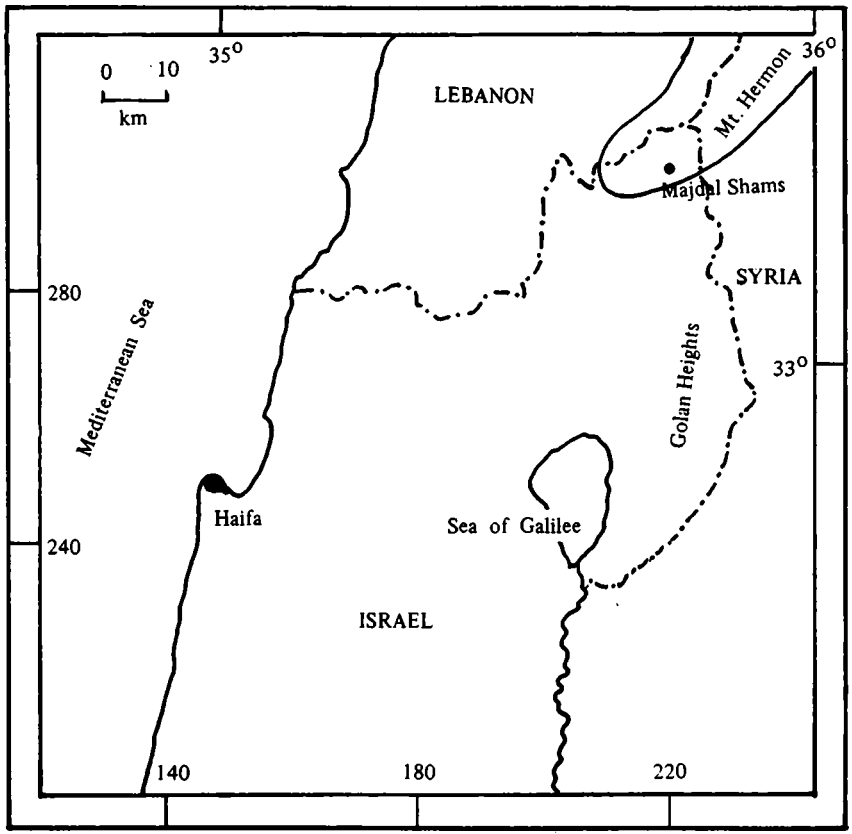


FIGURE 1
Location map

intercalated by some limestone beds. It overlies the mostly hard carbonates of the Callovian Zohar Formation and underlies the limestones of the Late Oxfordian Beer Sheva Formation (Fig. 2). The age determinations are based mainly on Ammonites and other megafossils (see also chapter "Biostratigraphic Zonation").

HAAS (1955) reported several ammonite species from Callovian-Oxfordian strata from Mount Hermon, but their exact stratigraphic levels are unknown. DERIN (*in* GOLDBERG, 1969) determined the Foraminifera in the Majdal Shams section, MOSHKOVITZ & EHRLICH (1981) the Nannofossils, and LEWY (1983) discussed Ammonites from the Mt. Hermon area.

Jurassic ostracode faunas from the Middle East were recorded by BISCHOFF (1964 : Lebanon), OERTLI (*in* MAYNC, 1966 : Israel), BASHA (1980 : Jordan) and ROSENFELD *et al.* (1987 [in press]) : Gebel Maghara, Sinai).

All the Ostracodes described in the present study were found in samples from the Kidod Formation in the Majdal Shams area. A relatively common to rare ostracode fauna was found in 42 out of 65 examined samples from this formation. About 30 samples from the Zohar and Beer Sheva Formations were without Ostracodes.

2. — SYSTEMATIC DESCRIPTIONS

Remarks : All the examined Ostracodes are deposited in the collections of the Geological Survey of Israel, Stratigraphy and Oil Division, Jerusalem, catalogued under Laboratory sign T-.

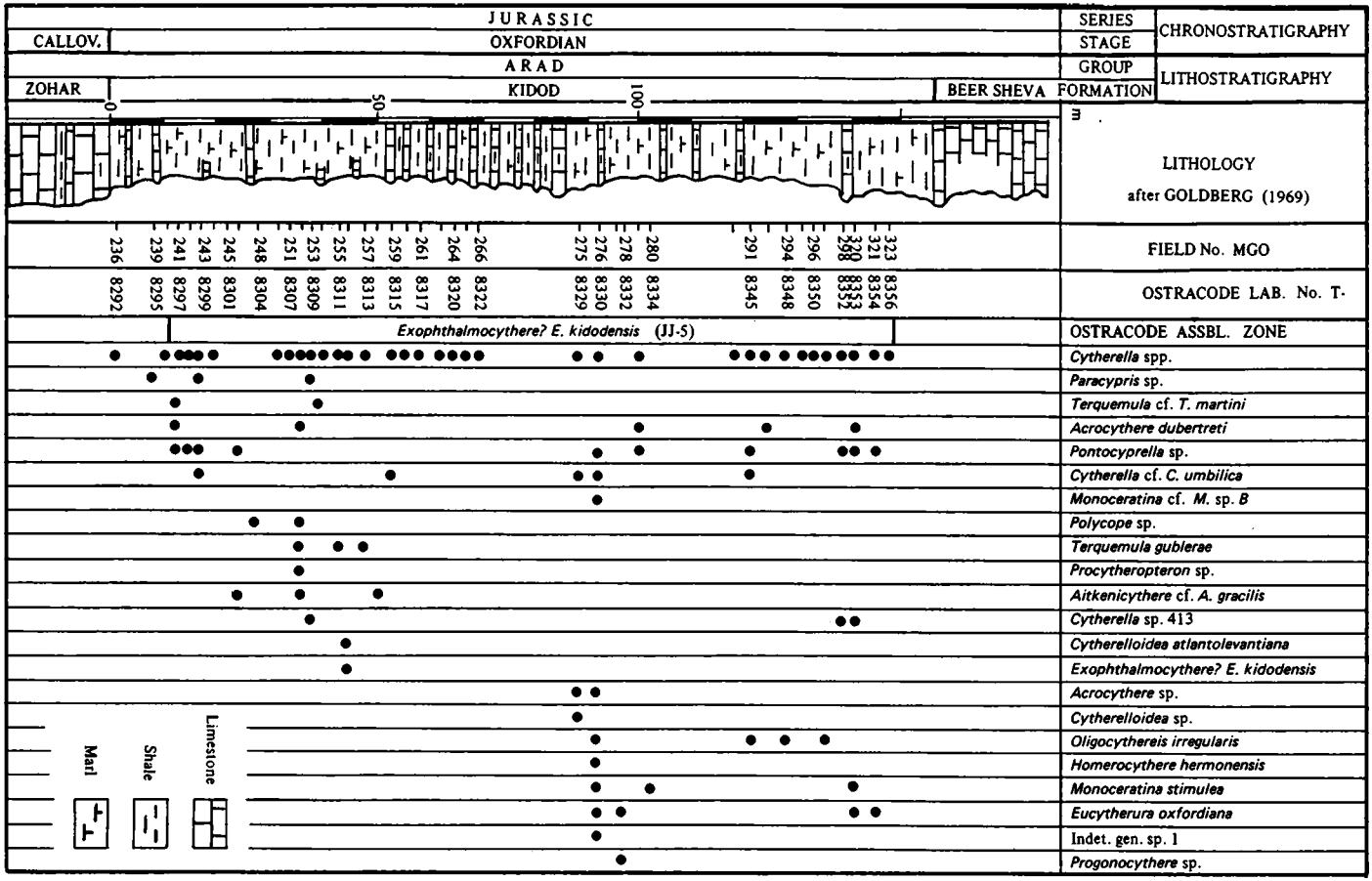


FIGURE 2
Distribution chart of Oxfordian Ostracodes from the Majdal Shams area, Mt. Hermon

The MGO numbers refer to the field numbers of the Majdal Shams section (GOLDBERG, 1969). The abbreviations l, h, w in this chapter relate to length, height and width, respectively, of the representative G.S.I. types.

Genus *Cytherella* JONES, 1849

Cytherella* cf. *umbilica BATE, 1975
Plate 1, figure 4
(Type No 410)

Cf. 1975 *Cytherella umbilica* BATE, p. 173, pl. 1, figs. 12-14.

Measurements (mm) :

l	h	w
0.33	0.22	0.15
0.38	0.25	0.17

Remarks : Our specimens are markedly smaller than the type species of *Cytherella umbilica* BATE, 1975 (Oxfordian of Tanzania).

Material : Five carapaces.

***Cytherella* sp. 413**
Plate 1, figure 3
(Type No 413)

Measurements (mm) :

l	h
0.58	0.32
0.58	0.35

Remarks : This elongate species is characterized by its sinusoidal dorsal and ventral margins.

Material : Three valves.

***Cytherella* spp.**
Plate 1, figure 1
(Type No 412)

Measurements (mm) :

l	h	w
0.62	0.38	—
0.51	0.35	0.27
0.64	0.33	0.28

PLATE 1

Fig. 1. — *Cytherella* sp.
Left valve, T-8344, MGO 290 × 100.

2. — *Pontocyprella* sp.
Carapace, left side, T-8333, MGO 279 × 86.

3. — *Cytherella* sp. 413
Right valve, T-8352, MGO 278 × 96.

4. — *Cytherella* cf. *umbilica* BATE, 1975
Carapace, right side, T-8299, MGO 243 × 150.

5. — *Paracypris* sp.
Carapace, right side, T-8295, MGO 239 × 63

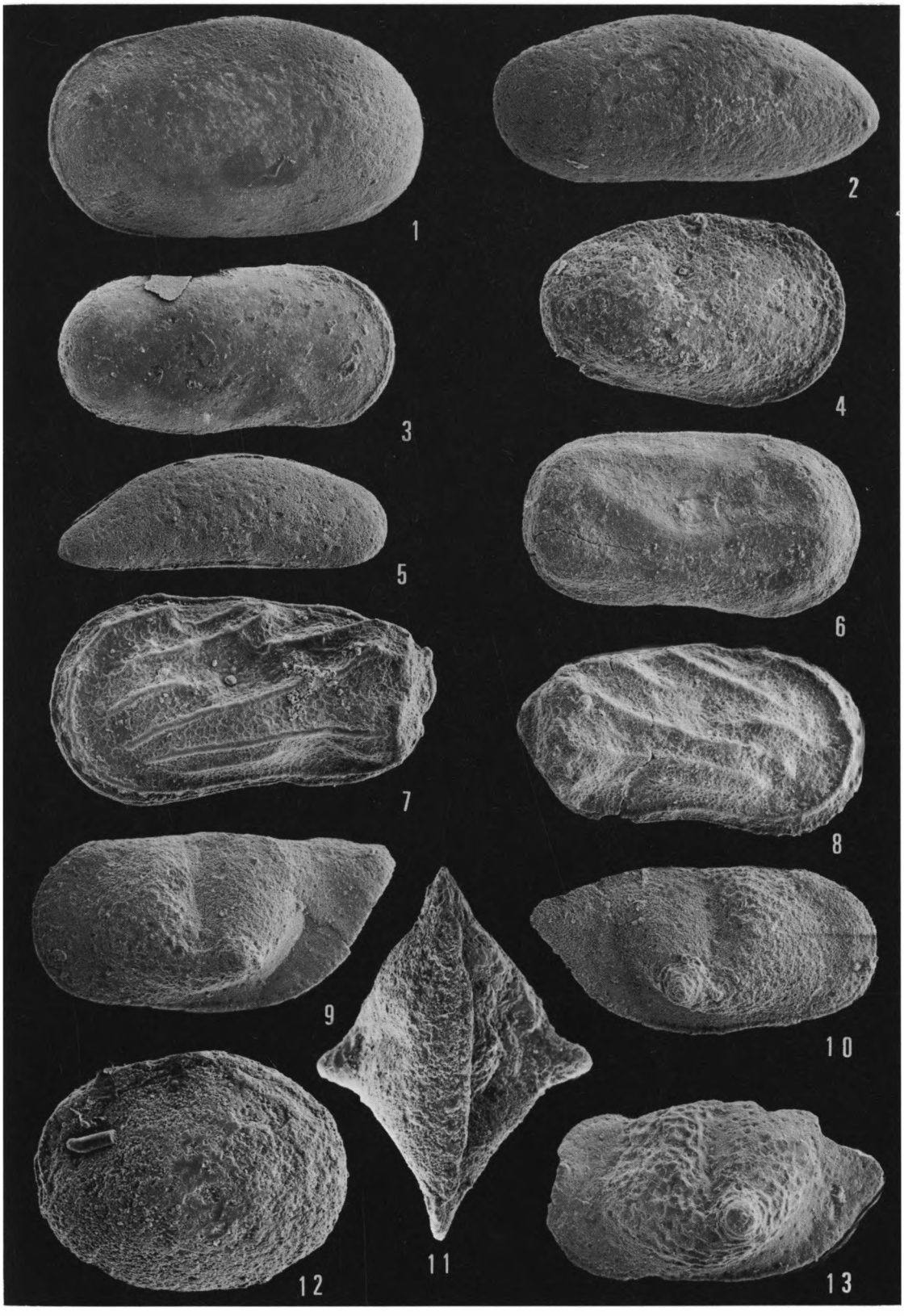
6. — *Cytherelloidea* sp.
Right valve, T-8329, MGO 275 × 90.

7-8. — *Cytherelloidea atlantolevantiana* n. sp.
7. — Holotype, carapace, left side, T-8312, MGO 256 × 106.
8. — Paratype, right valve, T-8312, MGO 256 × 96.

9-11. — *Monoceratina stimulea* (SCHWAGER, 1866)
9. — Left valve, T-8330, MGO 276 × 93.
10. — Right valve, T-8330, MGO 276 × 93.
11. — Carapace, dorsal view, T-8353, MGO 320 × 116.

12. — *Polycope* sp.
Carapace, left side, T-8304, MGO 248 × 143.

13. — *Monoceratina* cf. sp. B BATE, 1975
Left valve, T-8330, MGO 276 × 100.


1
2
3
4
5
6
7
8
9
10
11
12
13

Remarks : Our specimens include several forms which can barely be differentiated and differ from each other in slight variations of shape and proportions. The illustration shows one of the most common "species".

Material : About one hundred carapaces and valves.

Genus *Cytherelloidea* ALEXANDER, 1929

Cytherelloidea atlantolevantiana ROSENFELD & HONIGSTEIN **n. sp.**

Plate 1, figures 7-8

(Type No 404)

1972. — *Cytherelloidea* sp. A, OERTLI, p. 650, pl. 2, figs. 29-30.

Derivation of name : From its occurrence in the western Atlantic as well as in the Levant.

Holotype : Carapace, T-8312, MGO 256; Pl. 1, fig. 7.

Paratype : Right valve; Pl. 1, fig. 8.

Type locality : Majdal Shams (Mt. Hermon), coord. 2211/2954 (Israeli grid)

Type stratum : Kidod Formation.

Diagnosis : Cytherelloidea with six oblique ridges, fine interridgeonal reticulation and truncated posterior end.

Measurements (mm) :

l	h	w	
0.59	0.33	0.29	Holotype
0.59	0.32	—	Paratype

Description : Medium sized carapace. Anterior end broadly rounded, posterior end truncated and compressed. Dorsal margin convex, ventral margin concave. Pronounced anteroventral rim. Ornamentation consists of six prominent, oblique, subparallel ridges. Third ridge from above intercepted by deep subcentral sulcus. Fine, polygonal reticulation between the ridges and anteriorly.

Remarks : Cytherelloidea atlantolevantiana n. sp. was formerly recorded from the Late Jurassic of the Western Atlantic, DSDP Leg 11 (*Cytherelloidea* sp. A OERTLI, 1972). It is somewhat similar to *Cytherelloidea longicostata* SHEPPARD, 1961 (see DÉPÊCHE, *in* OERTLI, 1985, p. 130, pl. 29, fig. 5; Bathonian of France and England), but the latter has less ridges and a continous peripheral rim.

Material : One carapace and one right valve.

Stratigraphic range : Oxfordian.

Zone : Exophthalmocythere ? kidodensis (JJ-5) Zone.

***Cytherelloidea* sp.**

Plate 1, figure 6

(Type No 402)

Measurements (mm) :

l	h
0.61	0.30

Remarks : The single specimen from Mt. Hermon shows a sinusoidal median rim. The fine, netlike ornamentation may not be true, but artificial.

Material : One right valve.

Genus *Paracypris* SARS, 1866

***Paracypris* sp.**

Plate 1, figure 5

(Type No 406)

Measurements (mm) :

l	h	w
0.85	0.29	0.25

Material : Ten carapaces.

Genus *Pontocyprella* LYUBIMOVA, 1956

***Pontocyprella* sp.**

Plate 1, figure 2

(Type No 407)

Measurements (mm) :

l	h	w
0.74	0.32	0.26
0.63	0.30	—
0.69	0.32	0.24

Material : About twenty carapaces and valves.

Genus *Monoceratina* ROTH, 1928

Monoceratina stimulea (SCHWAGER, 1866)

Plate 1, figures 9-11

(Type No 409)

1866. — *Cythereis stimulea* SCHWAGER (*in* OPPEL & WAAGEN), p. 276, fig. 1.

1970. — *Monoceratina stimulea* (SCHWAGER), WHATLEY, p. 319, pl. 3, figs. 8, 11-17.

Measurements (mm) :

l	h	w
0.66	0.33	—
0.62	0.32	—
0.55	0.27	0.39

Remarks : A complete synonomy for this species is found in WHATLEY (1970), who reported *Monoceratina stimulea* (SCHWAGER, 1866) from the Oxfordian of Scotland. This species shows some affinities to *Monoceratina* sp. 1 MUSACCHIO, 1979 (pl. 3, fig. 6; Callovian of Argentina), and to *Monoceratina* aff. sp. A DONZE, 1964 (see DONZE, 1977, p. 208, pl. 2, figs. 22-23; Berriasian of Algeria).

Material : Nine carapaces and valves.

***Monoceratina* cf. sp. B** BATE, 1975
Plate 1, figure 13
(Type No 405)

cf. 1975. — *Monoceratina* sp. B BATE, p. 180, pl. 2, fig. 3.

l	h
0.56	0.30

Remarks : Our species, highly ornamented in its central part, is similar to *Monoceratina* sp. B BATE, 1975 (Callovian of Tanzania), but its posteroventral spine is more developed than in the latter.

Material : One left valve.

Genus *Eucytherura* MÜLLER, 1894
Eucytherura oxfordiana
ROSENFELD & HONIGSTEIN **n. sp.**
Plate 2, figures 8-12
(Type No 399)

Derivation of name : From its stratigraphic range, the Oxfordian.

Holotype : Carapace, T-8353, MGO 320; Pl. 2, fig. 8.

Paratypes : Four carapaces, Pl. 2, figs. 9-12.

Type locality : Majdal Shams (Mt. Hermon), coord. 2211/2954 (Israeli grid).

Type stratum : Kidod Formation.

Diagnosis : Minute *Eucytherura* with three longitudinal ribs and relatively low posteroventral node.

Measurements (mm) :

l	h	w	
0.29	0.16	0.16	Holotype
0.28	0.16	0.14	Paratype
0.29	0.16	0.14	Paratype
0.28	0.15	0.14	Paratype
0.27	0.15	0.14	Paratype

Description : Minute carapace, subrectangular. Anterior end rounded, posterior compressed, pointed subdorsally. Dorsal and ventral margins straight, subparallel. Three ribs occur dorsally, centrally and subventrally. Last rib curved, others straight, subparallel. Relatively low posteroventral node. Dorsal view subovate. Carapace covered by coarse, irregular reticulation. Left and right valves nearly equal.

Remarks : Species of this genus were mostly described from Cretaceous to Recent strata, but occur already in the Jurassic. The first occurrence of *Eucytherura* sp. is recorded from the Liassic of England (*Eucytherura liassica* BATE & COLEMAN, 1975, p. 40, pl. 15, figs. 9-14). *Eucytherura oxfordiana* n. sp. differs from *Eucytherura* sp. BATE, 1975 (p. 204, pl. 11, figs. 5-6; Callovian of Tanzania) mainly by its more prominent reticulation and less subquadrate outline.

Material : Fifteen carapaces.

Stratigraphic range : Oxfordian.

Zone : Exophthalmocythere ? kidodensis (JJ-5) Zone.

Genus *Progonocythere* SYLVESTER-BRADLEY, 1948
***Progonocythere* sp.**
Plate 3, figure 11
(Type No 415)

Measurements (mm) :

l	h
0.29	0.18

Remarks : Our simple valve is badly preserved and probably represents a juvenile form. It does not allow a specific determination, but shows certain similarities to *Progonocythere* aff. *parastilla* WHATLEY, 1970 (ROSENFELD *et al.*, 1987 [in press], pl. 6, figs. 10-11; Oxfordian of Gebel Maghara, Sinai).

Material : One right valve.

Genus *Procytheropteron* LYUBIMOVA, 1955

***Procytheropteron* sp.**

Plate 3, figure 3

(Type No 396)

Measurement (mm) :

l	h
0.46	0.26

Remarks : The species figured here shows fine and regular reticulation with feeble ribs.

Material : One left valve.

Genus *Acrocythere* NEALE, 1960

Acrocythere dubertreti ROSENFELD & HONIGSTEIN, **n. sp.**

Plate 2, figures 1-5

(Type No 401)

Derivation of name : In honour of the late Dr. L. Dubertret, France, who mapped the Mt. Hermon area and recorded the megafauna.

Holotype : Carapace, T-8353, MGO 320; pl. 2, fig. 3.

Paratypes : Three carapaces, Pl. 2, figs. 1, 2, 4, 5.

Type locality : Majdal Shams (Mt. Hermon), coord. 2211/2954 (Israeli grid).

Type stratum : Kidod Formation.

Diagnosis : *Acrocythere* with seven to eight longitudinal ridges and fine reticulation between the ribs.

Measurements (mm) :

l	h	w	
0.38	0.20	0.15	Holotype
0.38	0.19	0.14	Paratype
0.41	0.16	0.12	Paratype
0.40	0.19	0.15	Paratype

Description : Minute carapace, elongate, subrectangular. Anterior end broadly rounded, posterior narrowly rounded. Dorsal and ventral margins almost straight and parallel. Anterior rim exists. Hinge ear in the right valve. Seven to eight longitudinal, striate, subparallel ribs, spaced almost evenly over the whole carapace, curved anteriorly and terminating towards the centroanterior part of the valve. Irregular, fine reticulation between the ribs. Dorsal view narrow subovate.

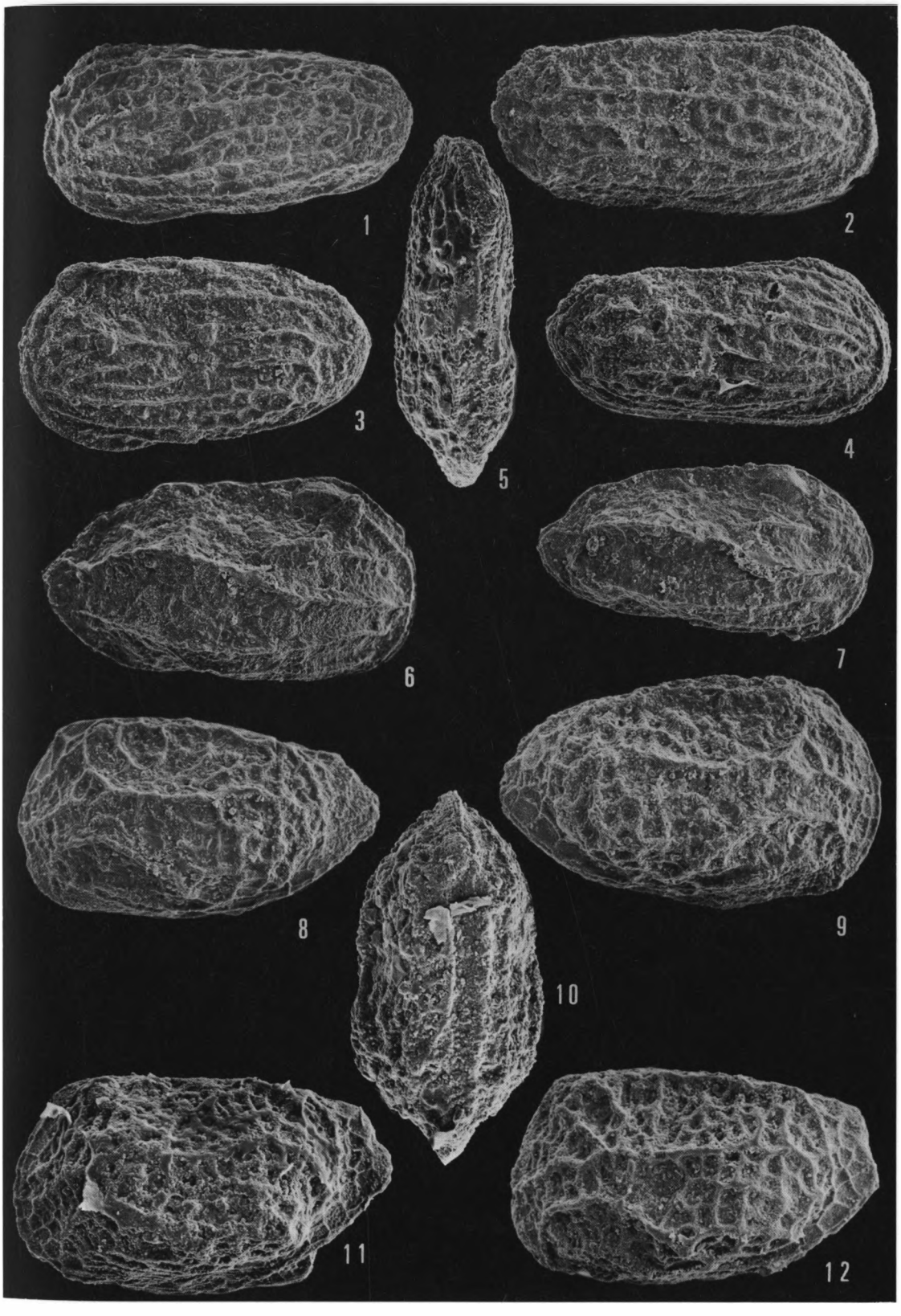
Remarks : *Acrocythere dubertreti* n. sp. shows similarities in the rib pattern with *"Cytheretta"* sp. BATE, 1975 (p. 200, pl. 10, figs. 1-2, Callovian of Tanzania), but differs from the latter by its smaller size, the shape of the posterior end and the reticulation between the ribs. *Acrocythere striata* KAYE, 1965 (p. 244, pl. 4, figs. 4-10; Albian of Britain) is more elongate, possesses more parallel riblets and smooth interridgeonal areas.

PLATE **2**

Figs.1-5. — *Acrocythere dubertreti* n. sp.
1 : Paratype, carapace, left side, T-8353, MGO 320 × 160.
2 : Paratype, carapace, right side, T-8353, MGO 320 × 150.
3 : Holotype, carapace, left side, T-8353, MGO 320 × 150.
4 : Paratype, carapace, right side, T-8353, MGO 320 × 140.
5 : Same specimen as Fig. 2, dorsal view, × 140.

6-7. — *Acrocythere* sp.
6 : Right valve, T-8330, MGO 276 × 130.
7 : Right valve, T-8329, MGO 275 × 116.

8-12. — *Eucytherura oxfordiana* n. sp.
8 : Holotype, carapace, left side, T-8353, MGO 320 × 206.
9 : Paratype, carapace, right side, T-8353, MGO 320 × 226.
10 : Paratype, carapace, dorsal view, T-8353, MGO 320 × 213.
11 : Paratype, carapace, left side, T-8353, MGO 320 × 226.
12 : Paratype, carapace, left side, T-8353, MGO 320 × 220.


1
2
3
4
5
6
7
8
9
10
11
12

Material : Sixteen carapaces.

Stratigraphic range : Oxfordian.

Zone : Exophthalmocythere ? kidodensis (JJ-5) Zone.

***Acrocythere* sp.**
Plate 2, figures 6-7
(Type No 398)

Measurements (mm) :

l	h
0.48	0.26
0.48	0.26

Remarks : Our specimens show four long subparallel ribs, of which the uppermost rib is relatively weak and the second bifurcate anteriorly. The eye-spot is well developed. The bad preservation of the material and the lack of information on internal features do not allow the erection of a new species. *Acrocythere* sp. seems to be almost identical with *Acrocythere* ? sp. OERTLI, 1972 (p. 654, pl. 4, figs 61-66; Late Jurassic from the Western Atlantic, DSDP Leg 11). It is somewhat similar to *Acrocythere tricostata* BATE, 1975 (p. 211, pl. 13, figs. 11-14; Kimmeridgian of Tanzania) and *Acrocythere costata* BRENNER & OERTLI, 1976 (p. 493, pl. 4, figs. 1-6; Early Cretaceous of South Africa), but differs from them mainly in the rib pattern.

Material : Three right valves.

Genus *Homerocythere* SWAIN & ANDERSON, 1987 (in press)
Homerocythere hermonensis ROSENFELD & HONIGSTEIN **n. sp.**
Plate 3, figure 7
(Type No 397)

Derivation of name : From the type area, the Hermon mountain.

Holotype : Right valve, T-8330, MGO 276; Pl. 3, fig. 7.

Type locality : Majdal Shams (Mt. Hermon), coord. 2211/2954 (Israeli grid).

Type stratum : Kidod Formation.

Diagnosis : Homerocythere with six longitudinal, curved ridges.

Measurements (mm) :

l	h	
0.46	0.30	Holotype.

Description : Medium sized carapace, almond-shaped. Anterior end broadly rounded, posterior narrowly rounded at central height. Anterior rim and rib occur. Dorsal margin sinusoidal with pronounced oblique sulcus anterodorsally, ventral margin convex. Middorsal node exists. Uppermost and fifth ridge sinusoidal, second and lowermost straight. Third ridge short, starting in the median area, bent posteriorly and nearly connected there with the fifth ridge. Fourth ridge short and curved. Interspaces almost smooth, only a few minute, transversal riblets. Internal features not observed.

Remarks : Homerocythere hermonensis n. sp. resembles *Homerocythere woodwardi* SWAIN & ANDERSON, 1987 ([in press], pl. 13, figs. 3, 9; Late Jurassic of Louisiana, USA), but is shorter and has less longitudinal ridges.

Material : One right valve.

Stratigraphic range : Oxfordian.

Zone : Exophthalmocythere ? kidodensis (JJ-5) Zone.

Genus *Oligocythereis* SYLVESTER-BRADLEY, 1948
Oligocythereis irregularis ROSENFELD & HONIGSTEIN **n. sp.**
Plate 3, figures 4-6
(Type No 408)

Derivation of name : Irregularis — latin, irregular, from its coarse, irregular reticulation pattern.

Holotype : Carapace, T-8348, MGO 294; pl. 3, fig. 5.

Paratypes : Two carapaces; Pl. 3, figs. 4, 6.

Type locality : Majdal Shams (Mt. Hermon), coord. 2211/2954 (Israeli grid).

Type stratum : Kidod Formation.

Diagnosis : Oligocythereis with coarse, irregular reticulation.

Measurements (mm) :

l	h	w	
0.54	0.28	0.22	Holotype
0.62	0.32	0.25	Paratype
0.57	0.29	0.22	Paratype

Description : Medium sized carapace, subrectangular. Anterior end broadly rounded, posterior pointed centrally. Dorsal and ventral margins

straight. Posterodorsal ridge and subcentral tubercle prominent, posteroventral tubercle weak. Almost continuous peripheral rim. Eye-spot pronounced, round. Coarse, irregular reticulation with large meshes covers almost the entire carapace. Dorsal view narrowly subrectangular.

Remarks : *Oligocythereis irregularis* n. sp. differs from *Oligocythereis* aff. *fullonica* (JONES & SHERBORN, 1888) (OERTLI, *in* MAYNC, 1966, pl. 9, figs. 16-18; Bathonian-Oxfordian of Israel; ROSENFELD *et al.*, 1987 (in press), pl. 5, fig. 7; Bathonian of Gebel Maghara, Sinai) by its coarse reticulation and the centrally pointed posterior end.

Material : Eight carapaces.

Stratigraphic range : Oxfordian.

Zone : *Exophthalmocythere ? kidodensis* (JJ-5) Zone.

Genus *Exophthalmocythere* TRIEBEL, 1938

Exophthalmocythere ? kidodensis
ROSENFELD & GERRY, 1987
(*in* ROSENFELD *et al.*, 1987 [in press])
Plate 3, figure 1
(Type No 391)

1987 *Exophthalmocythere kidodensis* ROSENFELD & GERRY (*in* ROSENFELD *et al.* [in press], pl. 6, figs. 7-9).

Measurements (mm) :

l	h	w
0.54	0.28	0.24

Remarks : Hitherto, no internal features of this species could be determined. As a result of this and its strong reticulation, the generic position to *Exophthalmocythere* TRIEBEL, 1938, remains doubtful. *Exophthalmocythere ? kidodensis* ROSENFELD & GERRY, 1987, was originally described from Oxfordian sediments of Gebel Maghara, Sinai (ROSENFELD *et al.*, 1987 [in press]).

Material : Two carapaces.

Genus *Terquemula* BŁASZYK & MALZ, 1965

Remarks : The genus *Terquemula* represents, according to the description by BŁASZYK & MALZ, 1965 (p. 445, line 4), Ostracodes without eye-spot. But the type species of the genus, *Terquemula parallela*, shows a distinct thickening of the anterior rib in the right valve (*ibid.*, pl. 36, fig. 8). Several authors figure different species with eye-spot (mostly in right valves) and describe them as *Terquemula* spp. (BATE, *in* BATE & ROBINSON, 1978 : *Terquemula bradiana*, p. 238, pl. 7, fig. 6; p. 246, p. 11, fig. 7; KILENYI, *in* BATE & ROBINSON 1978 : *Terquemula flexicosta lutzei*, p. 286, pl. 12, fig. 1; for this species see also WHATLEY, 1970, p. 341, pl. 12, figs. 4, 10; DÉPÊCHE, *in* OERTLI, 1985 : *Terquemula bradiana*, p. 132, pl. 30, fig. 9; *Terquemula elegans*, p. 132, pl. 30, fig. 8; *Terquemula flexicosta lutzei*, p. 138, pl. 32, fig. 19; MALZ, 1985 : *Terquemula* cf. *septicostata*, pl. 5, fig. 48; ROSENFELD *et al.*, 1987 [in press] : *Terquemula gublerae*, pl. 6, fig. 4; *Terquemula goldbergi*, pl. 6, figs. 1-3). Therefore, we propose to emend the original description of the genus : "Eye-spot faint to moderate, best seen in right valves, developed as suboval, elongate thickening of the anterior rib."

Terquemula gublerae (BIZON, 1958)
Plate 3, figures 9-10
(Type No 382)

1958 *Procytheridea ? gublerae* BIZON, p. 28, pl. 4, figs. 14-16.
1959 *Procytheridea gublerae* BIZON, OERTLI, p. 38, pl. 6, figs. 172-177, pl. 7, figs. 178-180.
1985 *Procytheridea gublerae* BIZON, DÉPÊCHE, *in* OERTLI, p. 138, pl. 32, figs. 16-18.
1987 *Terquemula gublerae* (BIZON), ROSENFELD *et al.* [in press], pl. 6, fig. 4.

Measurements (mm) :

l	h	w
0.51	0.31	—
0.54	0.33	0.32

Remarks : The specimens figured here show a somewhat different network of reticulations than the type species, but this ornamental polymorphism may be due to paleoecological effects on the fine sculpture (HERRIG, 1966, p. 821; REYMENT, 1984, p. 93; HONIGSTEIN, 1984, p. 21; HONIGSTEIN & ROSENFELD, 1986, p. 456). *Terquemula gublerae* (BIZON, 1958) was recorded from Callovian-Oxfordian strata of France (BIZON, 1958; DÉPÊCHE, *in* OERTLI, 1985) and Sinai (ROSENFELD *et al.*, 1987 [in press]) and from the Oxfordian of Switzerland (OERTLI, 1959).

Material : Six carapaces and valves.

Terquemula* cf. *martini (BIZON, 1958)
Plate 3, figure 8
(Type No 411)

Cf. 1958 *Progonocythere ? martini* BIZON, p. 26, pl. 4, figs. 10-13.

Cf. 1959 *Procytheridea martini* (BIZON), OERTLI, p. 38, pl. 6, figs. 166-171.

Measurements (mm) :

l	h
0.53	0.32

Remarks : In *Terquemula* cf. *martini* (BIZON, 1958), the median and dorsal ridges are not connected and the anterior rim is less prominent than in the reference species, which occurs in the Callovian-Oxfordian sediments of France (BIZON, 1958) and in the Oxfordian of Switzerland (OERTLI, 1959).

Material : Two valves.

Genus *Aitkenicythere* BATE, 1976
Aitkenicythere* cf. *gracilis (BATE, 1975)
Plate 3, figures 12-14
(Type No 414)

cf. 1975 *Rhadinocythere gracilis* BATE, p. 202, pl. 10, figs. 11-14, pl. 11, figs. 1-4.

cf. 1976 *Aitkenicythere gracilis* (BATE), BATE, p. 489.

Measurements (mm) :

l	h	w
0.29	0.14	—
0.30	0.18	—
0.32	0.16	0.13

Remarks : Aitkenicythere gracilis (BATE, 1975) (Kimmeridgian of Tanzania) is somewhat larger and less reticulated than our specimens.

Material : Six carapaces and valves.

PLATE **3**

Figs. 1. — *Exophthalmocythere ? kidodensis* ROSENFELD & GERRY, 1987
Carapace, left side, T-8312, MGO 256 × 110.

2. — *Indet. gen. sp. 1*
Right valve, T-8330, MGO 276 × 147

3. — *Procytheropteron* sp.
Left valve, T-8308, MGO 252 × 126

4-6. — *Oligocythereis irregularis* n. sp.
4 : Paratype, carapace, left side, T-8345, MGO 291 × 100
5 : Holotype, carapace, right side, T-8348, MGO 294 × 110
6 : Paratype, carapace, dorsal view, T-8348, MGO 294 × 106

7. — *Homerocythere hermonensis* n. sp.
Holotype, right valve, T-8330, MGO 276 × 120

8. — *Terquemula* cf. *martini* (BIZON, 1958)
Right valve, T-8298, MGO 242 × 106

9-10. — *Terquemula gublerae* (BIZON, 1958)
9 : Left valve, T-8309, MGO 252 × 110
10 : Carapace, dorsal view, T-8311, MGO 255 × 100

11. — *Progonocythere* sp.
Juvenile ?, right valve, T-8332, MGO 278 × 200

12-14. — *Aitkenicythere* cf. *gracilis* (BATE, 1975)
12 : Left valve, T-8302, MGO 246 × 193
13 : Right valve, T-8308, MGO 252 × 190
14 : Carapace, right side, T-8308, MGO 258 × 186


1
2
3
4
5
6
7
8
9
10
11
12
13
14

Genus *Polycope* SARS, 1866

***Polycope* sp.**

Plate 1, figure 12

(Type No 400)

Measurements (mm) :

l	h	w
0.36	0.31	0.17
0.35	0.32	—

Remarks : The specimens from the Mt. Hermon area resemble *Polycope* sp. B OERTLI, 1972 (p. 652, pl. 3, fig. 34; Late Jurassic from the western Atlantic, DSDP Leg 11), but are smaller.

Material : One carapace and one right valve.

OSTRACODA INCERTAE SEDIS

Indet gen. sp. 1

Plate 3, figure 2

(Type No 395)

Measurements (mm) :

l	h
0.39	0.23

Remarks : This form may belong to the genus *Paranotacythere* BASSIOUNI, 1974, but possesses a uniform reticulation over the whole carapace without distinct ridges.

Material : One right valve.

3. — BIOSTRATIGRAPHIC ZONATION

All the herein described Ostracodes (Fig. 2) belong to one ostracode Zone, the *Exophthalmocythere ? kidodensis* (JJ-5) Assemblage Zone. This zone was first recognized as J-5 Zone in the Gebel Maghara section, Sinai (ROSENFELD *et al.*, 1987 [in press]). This symbol J-5 and the others of the Jurassic ostracode assemblage zones (J-1 to J-5) should be changed into JJ-1 to JJ-5, in order to avoid confusion with the Jurassic units of DUBERTRET (1966) : J1 to J7. The age determination of the JJ-5 Zone is based on the worldwide distribution of common ostracode species, as well as on ranges of coexisting micro- and megafauna.

Exophthalmocythere ? kidodensis (JJ-5) Assemblage Zone

Remarks : Ostracodes are relatively rare to common in the samples from the Kidod Formation of Majdal Shams. All the species, occurring in the JJ-5 Zone at Gebel Maghara : *Exophthalmocythere ? kidodensis, Terquemula gublerae* and *Progonocythere* sp., were also found in the section studied here. Additional characteristic species in this Assemblage Zone are *Monoceratina stimulea, Eucytherura oxfordiana* n. sp., *Acrocythere dubertreti* n. sp. and *Oligocythereis irregularis* n. sp.

Age : Most of the Ostracodes indicate an Oxfordian age for the sediments of the Kidod Formation in the Mt. Hermon area. The ammonite fauna near the base of the formation is of Early Oxfordian age (DUBERTRET, 1966 : Oxfordian part of J5 Zone; RAZVALYAEV (*in* PONIKAROV), 1966, and LEWY, 1983 : *Creniceras renggeri* Zone). Ammonites *(Collyrites bicordata)* of Middle Oxfordian age were mentioned from the middle part of this formation (VAUTRIN, 1934; RAZVALYAEV (*in* PONIKAROV), 1966). DERIN (*in* GOLDBERG, 1969) by means of Foraminifera (*Brotzenia parastilligera* Zone) assigned a Callovian-Oxfordian (?) age to the Kidod Formation in Majdal Shams. MOSHKOVITZ & EHRLICH (1981) attributed a Late Callovian-Oxfordian age for these sediments on the basis of calcareous Nannofossils (*Watznaueria manivitae* Zone).

Paleobiogeography : Several taxa from the Mt. Hermon area are also known from Late Jurassic sediments of Sinai and western Europe, as well as from sites in the Western Atlantic (*Monoceratina stimulea, Terquemula* cf. *martini, Terquemula gublerae, Exophthalmocythere ? kidodensis, Cytherelloidea atlantolevantiana, Acrocythere* sp. and *Polycope* sp.). This may indicate a connection between these regions during Late Jurassic times. Faunal similarities can also be observed with species from North and East Africa (see *Cytherella* cf. *umbilica, Monoceratina stimulea, Monoceratina* cf. sp. B and *Acrocythere dubertreti*), along with material from Argentina (see *Monoceratina stimulea*) and North America (see *Homerocythere hermonensis*). On the other hand, distinct similarities cannot be found with Late Jurassic ostracode faunas from Russia (Ukraine (PYATKOVA & PERMYAKOVA, 1978), Ousbekistan (MASUMOV, 1972, 1973)), India (JAIN & MANNIKERI, 1975; GUHA, 1976; KULSHRESHTA *et al.*, 1985; NEALE & SINGH, 1986, and others) and western China (LI, 1985). This may be due to oceanic barriers and different paleobathymetries.

Environment of deposition : The assemblage, containing species of the genera *Monoceratina, Pontocyprella* and *Polycope*, in addition to minute, delicate forms and larval stages, points to a relatively deep water environment without cur-

rents, which remained stable during the deposition of the Kidod Formation. Our fauna resembles the deep water association with *Pontocyprella, Polycope* and *Acrocythere* from the Western Atlantic (Leg 11, Site 100; OERTLI, 1972, p. 605, pl. 5, fig. 2).

ACKNOWLEDGEMENTS

The authors wish to thank Dr. M. Goldberg for the samples and for helpful remarks; M. Dvorachek and Y. Levy, all of the Geological Survey of Israel, Jerusalem, for the SEM photographs.

4. — REFERENCES

BASHA, S.H. (1980). — Ostracoda from the Jurassic system of Jordan. — *Rev. españ. Micropaleont.*, **12**, 2, 231-254.

BASSIOUNI, M.A.A. (1974). — *Paranotacythere* n. g. (Ostracoda) aus dem Zeitraum Oberjura bis Unterkreide (Kimmeridgium bis Albium) von Westeuropa. — *Geol. Jb.* A, **17**, 3-111.

BATE, R.H. (1975). — Ostracods from Callovian to Tithonian sediments of Tanzania, East Africa. — *Bull. Brit. Mus. Nat. Hist. (Geol.)*, **26**, 3, 165-223.

BATE, R.H. (1976). — New name for *Rhadinocythere* Bate, 1975. — *Geol. Mag.*, **113**, 5, 489.

BATE, R.H. (1978). — The Jurassic, Pt. II : Aalenian to Bathonian. — *In* : BATE, R.H. & ROBINSON, E. (eds.) : A stratigraphical index of British Ostracoda, 213-258. Seel House Press, Liverpool.

BATE, R.H. & COLEMAN, B.E. (1975). — Upper Lias ostracoda from Rutland and Huntingdonshire. — *Bull. Geol. Surv. Great Brit.*, **55**, 1-42.

BISCHOFF, G. (1964). — Die Gattung *Cytherelloidea* im Oberen Jura und in der Unterkreide. Ostracoden-Studien im Libanon, 3. — *Senckenbergiana lethaea*, **45**, 1-22.

BIZON, J.J. (1958). — Foraminiferes et ostracodes de l'Oxfordien de Villers-sur-Mer (Calvados). — *Rev. Inst. franç. Pétrole*, **13**, 1, 3-45.

BŁASZYK, J. & MALZ, H. (1965). — *Terquemula* n. gen., eine neue Ostracoden-Gattung aus dem Oberbathonium. — *Senckenbergiana lethaea*, **46**, 4/6, 443-451.

BRENNER, P. & OERTLI, H.J. (1976). — Lower Cretaceous ostracodes (Valanginian to Hauterivian) from the Sundays River Formation, Algoa Basin, South Africa. — *Bull. Centre Rech. Pau — SNPA*, **10**, 2, 471-533.

DÉPÊCHE, F. (1985). — Lias supérieur, Dogger, Malm. — In : OERTLI, H.J. (ed.) : Atlas des Ostracodes de France. — *Bull. Centres Rech. Explor.-Prod. Elf-Aquitaine*, Mém. **9**, 119-146.

DERIN, B. (1969). — Foraminifera. — In : GOLDBERG, M. : The Jurassic of Majdal Shams area, Mt. Hermon. — Geol. Surv. Israel, 1 section.

DONZE, P. (1977). — Ostracodes des niveaux de la limite Jurassique — Crétacé dans le Sud-Ouest constantinois (Algérie). — *Ann. Min. Géol. Tunis*, **28**, 201-215.

DUBERTRET, L. (1955). — Carte géologique du Liban 1:200 000 avec notes explicatives. — Rapp. Liban, Min. Trav. Pub., 1-74.

DUBERTRET, L. (1963). — Liban, Syrie : Chaîne des grands massifs côtiers et confins à l'Est. — In : DUBERTRET, L. (ed.) : *Lexique stratigraphique international*, Asie, Fasc. 10, C 1, 1-155. Centre Nat. Rech. Scient., Paris.

DUBERTRET, L. (1966). — Liban, Syrie et bordure des pays voisins. Pt. 1 : Tableau stratigraphique, avec carte géologique au millionième. — *Notes Mém. Moyen-Orient*, **8**, 251-358.

GOLDBERG, M. (1969). — The Jurassic of Majdal Shams area, Mt. Hermon. — *Geol. Surv. Israel*, 1 section.

GOLDBERG, M., HIRSCH, F. & MIMRAN, Y. (1981). — The Jurassic sequence of Mount Hermon. — Isr. Geol. Soc., Annual Meeting, Golan Heights, 14-19.

GUHA, D.K. (1976). — On some Mesozoic Ostracoda from subcrops of Banni, Rann of Kutch, India. — Proc. 6th Indian Coll. Micropaleont. Strat., 84-90, 3 pl.

HAAS, O. (1955). — Revision of the Jurassic ammonite fauna of Mount Hermon, Syria. — *Bull. Amer. Mus. Nat. Hist.*, **108**, 1-210.

HERRIG, E. (1966). — Ostracoden aus der Weissen Schreibkreide (Unter-Maastricht) der Insel Rügen. — *Palaeont. Abh.*, A **2**, 693-1024.

HONIGSTEIN, A. (1984). — Senonian ostracodes from Israel. — *Bull. Geol. Surv. Israel*, **78**, 1-48.

HONIGSTEIN, A. & ROSENFELD, A. (1986). — Late Turonian — Early Coniacian ostracodes from the Zihor Formation, southern Israel. — *Rev. españ. Micropaleont.*, **17**, 3, 447-466.

JAIN, S.P. & MANNIKERI, M.S. (1975). — Ostracoda from the Spiti Shales, Spiti Valley. — *Himalayan Geology*, **5**, 133-138, 1 pl.

KAYE, P. (1965). — Some new British Albian ostracoda. — *Bull. Brit. Mus. Nat. Hist. (Geol.)*, **11**, 5, 218-253.

KILENYI, T. (1978). — The Jurassic, Pt. III : Callovian to Portlandian. — *In* : BATE, R.H. & ROBINSON, E. (eds.) : A stratigraphical index of British ostracoda, 259-298. Seel House Press, Liverpool.

KULSHRESHTHA, S.K., SINGH, R.Y. & TEWARI, B.S. (1985). — Ostracode fauna from Kuldhar Beds, Jaisalmer, Rajasthan. — *Publ. Cent. Adv. Stud. Geol. Panjab Univ., Chandigarh*, n.s. **1**, 123-154, 8 fig. (= plates), 2 tables.

LEWY, Z. (1983). — Upper Callovian ammonites and Middle Jurassic geological history of the Middle East. — *Bull. Geol. Surv. Israel,* **76,** 1-56.

LI, Yuwem (1985). — Some marine Ostracods and Foraminifera from Lagongtang Formation in Denqen, Xizang (Tibet) and their geological age. — *Contr. Geology Qinghai-Xizang (Tibet) Plateau,* **17,** 291-209, 2 pl. [Chinese with Engl. Abstract].

MALZ, H. (1985). — Biostratigraphy of the Middle Jurassic in N.W. Sardinia by means of ostracods. — *Senckenbergiana lethaea,* **66,** 3/5, 299-345.

MASUMOV, A.S. (1972). — Some problems of sexual dimorphism of Jurassic Ostracoda. — *In* : MASUMOV, A.S. & ABDULLAEV, R.N. (eds) : New data on the Paleozoic and Mesozoic fauna of Uzbekistan, 126-141, pl. 50-52. *Acad. Sci. Uzbekistan, Tachkent* [Russian].

MASUMOV, A.S. (1971). — Jurassic Ostracoda of Koughitang and neighboring regions. — *In* : SHAYABUKOV, T.Sh., SIKSTEL, T.A. *et al.* : Paleontological justification of type sections of the Jurassic system of Uzbekistan and neighboring regions, 141-153, 3 pl. [Russian].

MOSHKOVITZ, S. & EHRLICH, A. (1981). — Distribution of the Jurassic calcareous nannofossils at Majdal Shams outcrops, Mount Hermon. — Isr. Geol. Soc., Annual Meeting, Golan Heights, 45-47.

MUSACCHIO, E.A. (1979). — Datos paleobiogeograficos de algunas asociaciones de foraminiferos, ostracodos y carofitas del Jurasico medio y el Cretacico inferior de Argentina. — *Ameghiniana,* **16,** 3-4, 247-271.

NEALE, J.W. & SINGH, P. (1986). — Jurassic Ostracoda from the Banni well No. 2, Kutch, India. — *Rev. españ. Micropaleont.,* **17,** 3, 347-372, 3 fig., 3 pl.

OERTLI, H.J. (1959). — Malm-Ostrakoden aus dem schweizerischen Juragebirge. — *Denkschr. schweiz. naturforsch. Ges.,* **83,** 1, 1-44.

OERTLI, H.J. (1966). — Ostracoda. — *In* : MAYNC, W. : Microbiostratigraphy of the Jurassic of Israel. — *Bull. Geol. Surv. Israel,* **40,** 10-22.

OERTLI, H.J. (1972). — Jurassic ostracodes of DSDP Leg 11 (Sites 100 and 105) - Preliminary account. — *Init. Rep. DSDP,* **11,** 645-657.

PICARD, L. & HIRSCH, F. (in press). — Synthesis of the Jurassic stratigraphy in Israel and the adjacent countries. — Isr. Acad. Sci. Human., Jerusalem.

PONIKAROV, V.P. (ed.) (1967). — The geology of Syria. Explanatory notes on the geological map of Syria, scale 1:500 000. Pt. 1. Stratigraphy, igneous rocks and tectonics. — S.A.R., Min. Indust., Dept. Geol. Min. Res., 1-229.

PYATKOVA, D.M. & PERMYAKOVA, M.N. (1978). — Foraminifera and Ostracoda from the Jurassic of Ukraine. — Ukrainian Academy of Sciences, Kiev [Russian].

RAZVALYAEV, A.V. (1966). — Explanatory notes. — *In* : PONIKAROV, V.P. (ed) : The geological map of Syria, 1:200 000, sheets I-37-VIII (Dimashq) and I-36-XII (Beirut). — S.A.R., Min. Indust., Dept. Geol. Min. Res., 1-122.

REYMENT, R.A. (1984). — Upper Cretaceous ostracoda of north central Spain. — *Bull. Inst. Univ. Uppsala,* **10,** 67-110.

ROSENFELD, A., GERRY, E. & HONIGSTEIN, A. (in press). — Jurassic ostracodes from Gebel Maghara, Sinai, Egypt. — *Rev. españ. Micropaleont.,* **19,** 3.

SCHWAGER, C. (1866). — In : OPPEL, A. & WAAGEN, W. : Ueber die Zone des Ammonites transversarius. — *Geogn. Palaeont. Beitr.,* **1,** 2, 205-318.

SWAIN, F.M. & ANDERSON, E.G. (in press). — Upper Jurassic ostracods from northern Louisiana.

TRIEBEL, E. (1938). — Ostracoden-Untersuchungen. 1. *Protocythere* und *Exophthalmocythere,* zwei neue Ostracoden-Gattungen aus der deutschen Kreide. — *Senckenbergiana,* **20,** 1-2, 179-200.

VAUTRIN, H. (1934). — Contribution à l'étude de la série Jurassique dans la chaîne de l'Anti-Liban et plus particulièrement dans l'Hermon (Syrie). — *C.R. Acad. Sci.* (Paris), **198,** 1438-1440.

WHATLEY, R.C. (1970). — Scottish Callovian and Oxfordian ostracoda. — *Bull. Brit. Mus. Nat. Hist. (Geol.),* **19,** 6, 301-358.