RADIOLARIAN BIOSTRATIGRAPHY OF THE JURASSIC CHERTS IN THE KARMA AND FUSHE LURA AREAS, NORTHERN ALBANIA

Marta Marcucci*, **Mensi Prela****, **Giuseppe Cortese*** and **Alaudin Kodra****

**Dipartimento di Scienze della Terra, Firenze, Italy*
***Institute of Geological Researches,Tirana, Albania*

Keywords: *radiolarians, Jurassic. Albania*

ABSTRACT

Radiolarian assemblages from chert levels intercalated in carbonatic successions at Karma and Fushe Lura (Rubik Complex, Northern Albania) are examined. The base of the cherts in the Karma section has an early-middle Bajocian age, their top is late Bajocian-early Bathonian. The cherts of the Fushe Lura section are late Bathonian-middle Callovian.

INTRODUCTION

This study examines the radiolarian assemblages from cherts intercalated in two carbonate successions exposed in the Karma and Fushe Lura areas (Fig. 1), Northern Albania.

These successions are part of the Rubik Complex of Bortolotti et al. (1996),which lies at the base of large ophiolitic masses with a tectonic contact. According to these authors this complex can be interpreted either as a mélange unit including very large blocks (olistoliths), or as a complex pile of thrust sheets comprising the Simoni Melange and carbonate margin slices. The Simoni Melange, largely developed at the top of the ophiolites, contains the same type of olistoliths but in much smaller sizes. The olistoliths/thrust sheets are mainly composed of: 1)- prevalently carbonate Middle Triassic to Middle Jurassic formations ("Carbonate perifery" of Shallo (1992)and bibliography therein), probably pertaining to the continental margin which bounded the Tethyan oceanic basin to the west; 2)- basalts with intercalations of radiolarian cherts of Triassic age ("volcano-sedimentary sequence"); 3) serpentinites; and 4) a flysch formation (Firza Flysch) attributed to the Late Jurassic-Early Cretaceous.

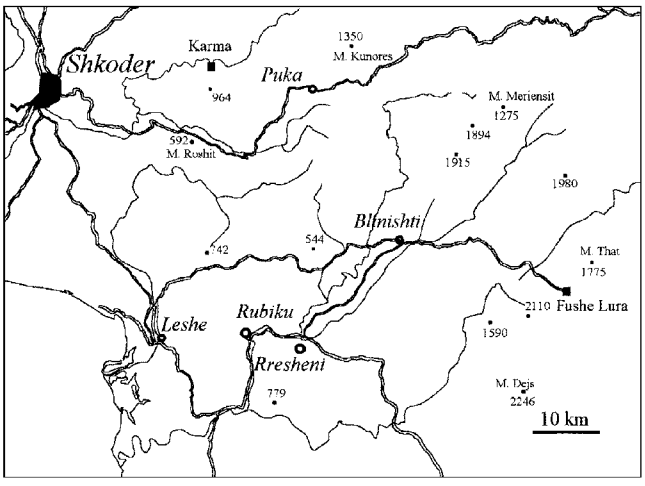

Fig. 1 - Schematic map showing the studied localities.

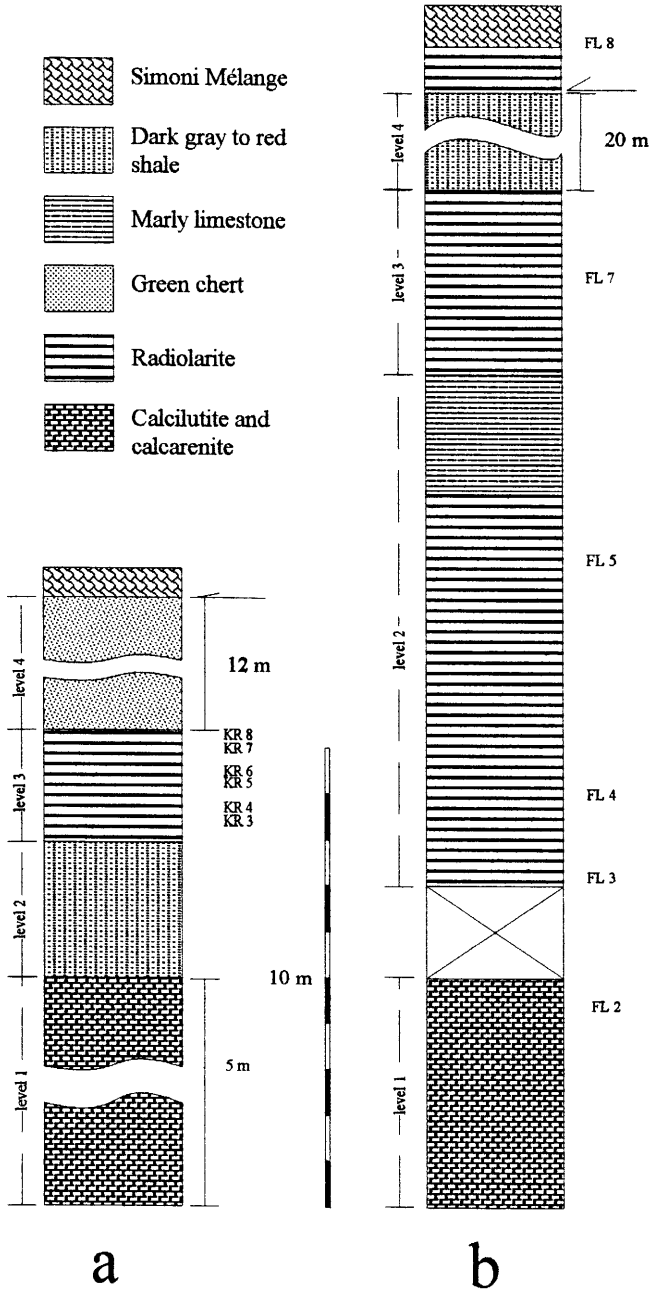

Fig. 2 -Lithological column of the Karma (a) and Fushe Lura (b) sections.

°Mirdita Ophiolite Project, contribution N°12

Karma Section					
	Samples				
Species	KR 3	KR 4	KR 5	KR 7	KR 8
Acanthocircus sp.	X				
Archaeodictyomitra sp.	X				
Canutus sp.	X				
Dictyomitrella sp. cf. *D. kamoensis* Mizutani & Kido	X				
Eucyrtidiellum sp.		X			X
Eucyrtidiellum quinatum Takemura	X	X			
Eucyrtidiellum sp. cf. *E. quinatum* Takemura				X	
Eucyrtidiellum unumaense (Yao)					X
Eucyrtidiellum sp. cf. *E. unumaense* (Yao)	X	X			
Gorgansium spp.		X			
Higumastra sp.		X			
Hsuum sp.	X				
Hsuum sp. aff. *H. hisuykoense* Isozaki & Matsuda		X			
Hsuum matsuokai Isozaki & Matsuda				X	
Hsuum sp. cf. *H. matsuokai* Isozaki & Matsuda		X			
Hsuum sp. cf. *H. mirabundum* Pessagno & Whalen	X				
Jacus (?) sp.		X			
Mesosaturnalis sp.		X	X		
Parahsuum sp.	X	X			
Parahsuum sp. in Sashida (1992)			X		
Parahsuum (?) *grande* Hori & Yao	X		X		
Parahsuum (?) sp. cf. *P. grande* Hori & Yao	X				
Parahsuum sp. cf. *P. izeense* (Pessagno & Whalen)		X			
Paronaella sp.	X				
Paronaella kotura Baumgartner	X				
Paronaella sp. cf. *P. kotura* Baumgartner	X				
Protunuma sp.					X
Protunuma sp. cf. *P. paulsmithi* Carter		X			
Stichocapsa sp.		X	X	X	X
Stichocapsa japonica Yao					X
Stichocapsa robusta Matsuoka					X
Stichomitra (?) *takanoensis* group					X
Transhsuum sp. cf. *T. medium* Takemura	X	X			
Triactoma jakobsae Carter				X	
Triactoma jonesi group (Pessagno)				X	
Trillus elkhornensis Pessagno & Blome		X			
Unuma latusicostata (Aita)					X
Unuma sp. cf. *U. latusicostata* (Aita)					X
Xiphostylus sp.	X				
Yamatoum (?) sp.					X
Zartus dickinsoni group Pessagno & Blome		X			

Fig. 3 - Occurrence chart, Karma section.

Fushe Lura Section			
	Samples		
Species	FL 3	FL 5	FL 8
Archaeodictyomitra sp.	X	X	
Archaeodictyomitra (?) sp.		X	
Archaeodictyomitra (?) sp. A		X	
Archaeodictyomitra sp. A (Pessagno & Whalen)		X	
Archaeodictyomitra sp. aff. *A. amabilis* Aita		X	
Archaeodictyomitra sp. F	X		
Archaeodictyomitra sp. L		X	
Archaeodictyomitra labronica Chiari, Cortese & Marcucci		X	
Archaeospongoprunum sp. cf. *A. bispinosum* Kozur & Mostler			X
Bernoullius cristatus Baumgartner	X		
Cinguloturris carpatica Dumitrica		X	
Dictyomitrella (?) *kamoensis* Mizutani & Kido	X	X	
Dictyomitrella (?) sp. cf. *D. kamoensis* Mizutani & Kido		X	
Entactinosphaera (?) sp.			X
Eucyrtidiellum semifactum Nagai & Mizutani		X	
Eucyrtidiellum sp. cf. *E. semifactum* Nagai & Mizutani	X		
Eucyrtidiellum unumaense (Yao)		X	
Eucyrtidiellum sp. cf. *E. unumaense* (Yao)	X		
Gorgansium spp.	X		
Hozmadia (?) sp.			X
Hsuum (?) sp. cf. *H. inexploratum* Blome		X	
Paratriassoastrum (?) sp.			X
Parvicingula cappa Cortese		X	
Parvicingula dhimenaensis s. l. Baumgartner		X	
Protunuma sp.		X	
Protunuma turbo Matsuoka		X	
Quarkus sp.		X	
Saitoum levium De Wever	X		
Sethocapsa funatoensis Aita	X	X	
Stichocapsa sp.	X		
Stichocapsa convexa Yao		X	
Stichocapsa naradaniensis Matsuoka		X	
Stichocapsa robusta Matsuoka		X	
Stylocapsa oblungula Kocher	X	X	
Syringocapsa (?) sp.		X	
Theocapsomma cordis Kocher		X	
Transhsuum sp. cf. *T. maxwelli* (Pessagno)		X	
Tricolocapsa sp.		X	
Tricolocapsa conexa Matsuoka	X		
Tricolocapsa plicarum s.l. (Yao)	X	X	
Unuma sp.	X		
Unuma sp. A	X		
Vinassaspongus (?) sp.			X
Xitus sp.		X	
Zhamoidellum ventricosum Dumitrica	X	X	

Fig. 4 - Occurrence chart, Fushe Lura section.

The most common succession in the carbonate units (Shallo, 1992, 1994; Kodra et al., 1993; Bortolotti et al., 1996) consists of cherty limestones (Middle Triassic) grading upwards to platform carbonates (Middle Triassic to Early Liassic), on top of which lie a few meters of nodular limestones (Middle to Late Liassic) and pelagic marly and cherty limestones with *Protoglobigerina* (Dogger to Malm). This succession is stratigraphically overlain by pelites alternating with radiolarian cherts (Malm).

KARMA SECTION

The Karma section is located along the right side of the road from Shkoder to the Koman village, 2 kilometres south-west of Koman. This section belongs to a large carbonate block of the Rubik Complex, cropping out over a distance of some kilometres. These rocks are considered to be Middle Triassic to Middle Jurassic in age (Kodra et al., 1993b). The stratigraphic succession in the Karma section is overturned and the block is likely to be part of a recumbent anticline.

Restored to its original position (Fig. 2a), the section comprises 4 levels from bottom to top: 1) 5 metres of grey cherty calcilutites and calcarenites; 2) 3 metres of dark grey to red shales with subordinate marls; 3) 2.5 metres of red radiolarian cherts with minor siliceous shales, rich in well preserved radiolarians; 4) 12 metres of green to black cherts, with scarce and strongly recrystallized radiolarians.

Radiolarian assemblages have been isolated from base and top of level (3) (samples KR 3, KR 4, KR 5, KR 6, KR 7, KR 8, (Fig. 3).

Sample KR 3 in the lowest part of this level is early-middle Bajocian (UAZ 3) due to the presence of *Parahsuum* (?) *grande* Hori & Yao and *Paronaella kotura* Baumgartner. The assemblage of sample Kr 4 can be attributed to the early-middle Bajocian - late Bajocian (UAZ 3-4) for the coexistence of *Zartus dickinsoni* Pessagno & Blome, *Gorgansium* spp. and *Eucyrtidiellum* (?) *quinatum* Takemura. In the assemblage of sample Kr 5 the presence of *Parahsuum* (?) *grande* Hori & Yao indicates an early-middle Aalenian to early-middle Bajocian age (UAZ 1-3). Considering both the assemblages and the stratigraphic position of the samples, the age of sample Kr 4 can be considered early-middle Bajocian (UAZ 3). The assemblage of Kr 7 is typical of a late Aalenian to late Bajocian age (UAZ 2-4) for the coexistence of *Triactoma jacobsae* Carter and *Triactoma jonesi* gr. (Pessagno). Considering both the assemblages and the stratigraphic position of the samples, sample Kr 7 has an early-middle Bajocian to late Bajocian age. The top of level (sample Kr 8) belongs to the late Bajocian-early Bathonian (UAZ 5), as indicated by the presence of *Stichocapsa robusta* Matsuoka and *Unuma latusicostata* (Aita).

FUSHE LURA SECTION

The Fushe Lura section crops out to south-east of the Fushe Lura village, at the western flank of Mount Borje, 500 metres south of the road from Fushe Lura to Peshkopi. This section is comprised in a slice of carbonate rocks, many kilometres in width. These rocks have been attributed by Shallo (1992) to a succession deposited on the continental margin. Bortolotti et al. (1996) interpreted it as an olistolith in the Simoni Melange.

This section (Fig.2b) consists of 4 levels, from bottom to top: 1) 5 metres of red nodular limestones (Ammonitico Rosso type); 2) 9 metres of red radiolarian cherts with red manganiferous shaly cherts; 3) 4 metres of gray marly limestones; 4) 24 metres of red manganiferous cherts. This succession tectonically underlies the Simoni Melange, here constituted by manganiferous shales and radiolarian cherts.

A sample (FL 2) coming from level 1 (red nodular limestones) yielded a foraminiferal assemblage including *Involutina liassica* (Jones), *Nodosaria* sp., *Lenticulina* sp., with ammonites embryos and crinoid plates and vertebras. Radiolarian assemblages have been isolated both from the base and middle part of level (3) (samples FL 3, FL 4, FL 5, FL 7) (Fig. 4).

The age of the lowest beds (FL 3) of level 2 is middle Bathonian (UAZ 6) for the coexistence of *Unuma* sp. *A* (in Baumgartner et al., 1995) and *Stylocapsa oblongula* Kocher. In sample FL3, *Zhamoidellum ventricosum* Dumitrica is also present. The first occurrence of this species is generally late Bathonian-early Callovian (Baumgartner et al., 1995), but here its coexistence with older species indicates that its range may be extended to the middle Bathonian. Sample FL 4 yielded a similar, but badly preserved, radiolarian assemblage. Sample FL 5 belongs to the late Bathonian-early Callovian (UAZ 7) for the presence of *Archaeodictyomitra* sp.*A* (in Baumgartner et al., 1995), *Dictyomotrella* (?) *kamoensis* Mizutani & Kido, *Eucyrtidiellum semifactum* Nagai & Mizutani, *Protunuma turbo* Matsuoka, *Stichocapsa naradaniensis* Matsuoka, *Stichocapsa robusta* Matsuoka and *Cinguloturris carpatica* Dumitrica.

Sample FL 7 yielded a badly preserved radiolarian assemblage, with specimens often flattened and deformed. Its age is about the same as that of FL 5.

The Fushe Lura section is topped by the Simoni Melange with a tectonic contact (Fig.4). The radiolarian cherts (FL 8) in the Simoni Melange yielded the following forms: *Archaeospongoprunum* sp. cf. *A. bispinosum* Kozur & Mostler, *Entactinosphaera* sp., *Haeckelicyrtium* (?) sp., *Hozmadia* sp., *Pantanellium* sp., *Paurinella* sp. cf. *P. mesotriassica* Kozur & Mostler, *Triassospongosphaera* sp. These cherts can be attributed to the MiddleTriassic.

CHRONOLOGICAL CONCLUSIONS

The ages of both the upper part of the cherts in the Karma section, and of the cherts in the Fushe Lura section, are largely equivalent to those of the radiolarian cherts on top of the Albanian ophiolites (Marcucci et al., 1992, 1994; Prela, 1994; Chiari et al., 1994). Older ages are found in the lower part of the Karma section.

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Received, October 18, 1998
Accepted, November 23, 1998

Plate 1

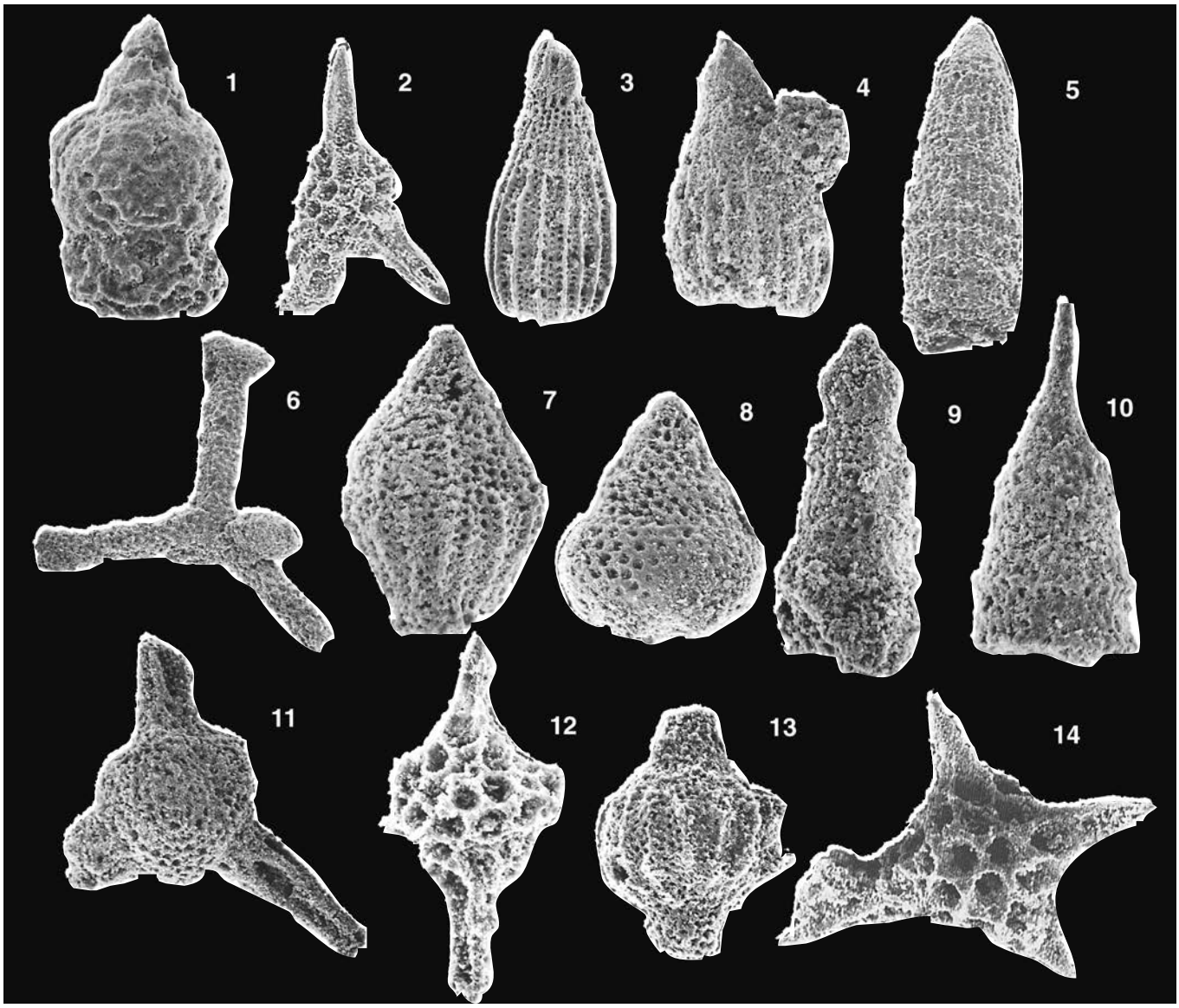

Plate 1 - Radiolarians of Karma section: 1) *Eucyrtidiellum quinatum*, Kr 3, x320. 2*) Gorgansium* spp., Kr 4, x220. 3) *Hsuum* sp. cf. *H. matsuokai*, Kr 7, x110. 4) *Hsuum* (?) *mirabundum*., Kr 3, x160. 5) *Parahsuum* (?) *grande*, Kr 3, x190. 6) *Paronaella kotura*, Kr 3, x60. 7) *Protunuma* sp. cf. *P. paulsmithi*, Kr 4, x270. 8) *Stichomitra japonica*, Kr 8, x270. 9) *Stichomitra takanoensis*, Kr 8, x220. 10) *Transhsuum* sp.cf. *T. medium*, Kr 4, x320. 11) *Triactoma jacobsae*, Kr 7, x 160. 12) *Trillus elkornensis*, Kr 4, x320. 13) *Unuma latusicostata*, Kr 8, x220. 14*) Zartus dickinsoni*, Kr 4, x360.
Plate 2 - Radiolarians of Fushe Lura section: 1*) Archaeodictyomitra labronica*, Fl 5, x200. 2) *Archaeodictyomitra* sp., Fl 5, x200. 3) *Archaeodictyomitra* sp. A, Fl 5, x270. 4) *Bernoullius cristatus*, Fl 3, x270. 5) *Cinguloturris carpatica*, Fl 5, x270. 6) *Dictyomitrella*(?) *kamoensis*, Fl 5, x200. 7) *Eucyrtidiellum semifactum*, Fl 5, x270. 8) *Protunuma turbo*, F l5, x220. 9) *Protunuma* sp., Fl 3, x260. 10) *Quarkus* (?) sp., Fl 5, x320. 11) *Saitoum laevium*, Fl 3, x320. 12) *Sethocapsa funatoensis*, Fl 5, x270. 13) *Stichocapsa convexa*, Fl 5, x220. 14) *Stichocapsa naradaniensis*, Fl 5, x200. 15) *Stichocapsa robusta*, Fl 5, x200. 16) *Stylocapsa oblongula*, Fl 3, x320. 17) *Theocapsomma cordis*, Fl 5, x320. 18) *Transhsuum maxwelli*, Fl 5, x220. 19*) Tricolocapsa conexa*, Fl 5, x200. 20) *Tricolocapsa plicarum*, Fl 5, x270. 21) *Unuma* sp., Fl 3, x320. 22) *Williriedellum* (?) sp., Fl 3, x200.23) *Xitus* sp.,Fl 5, x270. 24) *Zhamoidellum ventricosum*, Fl 3, x320. 25) *Archaeospongoprunum* sp. cf. A. *bispinosum*, Fl 8, x300. 26) *Entactinosphaera* sp., Fl 8, x220. 27) *Haeckelicyrtium(?)* sp., Fl 8, x 200. 28) *Hozmadia* sp., Fl 8, x200. 29) *Paurinella* sp. cf. P. *mesotriassica*, Fl 8, x160.

Plate 2