TABLES

Table I The fauna of the Vegamián Formation. [1])

loc.:	3	W1162	Tourn.	Viséan			Nam.
				Pe	Go	Aprath	
RADIOLARIA	×						
OSTRACODA		×					
CONODONTA		×					
TRILOBITA		×					
CEPHALOPODA							
Ammonellipsites? (Pericyclus) sp.		×					
LAMELLIBRANCHIATA							
Euchondria cf. *densistria* (Sandb.)		×					
Posidonia? sp.		×					
BRACHIOPODA							
INARTICULATA							
Lingula mytilloides Sow.		×					
L. squamiformis Phill.		×					
Orbiculoidea sp.		×					
ARTICULATA							
Spiriferidina							
Crurithyris e.g. *urii* (*Fleming*)		×	×	×	×		×
Productidina							
Irboskites? culmica (Nicolaus) [2])		×		×	×		
Chonetipustula plicata (S., em. K.)		×		×	×	×	
C. concentrica (S., em. K.)		×		×	×	×	
C. carringtoniana (Davidson)		×			×	×	
Chonetidina							
Tornquistia polita (McCoy)		×	×	×	×	×	?
T. schmiereri Paeck.		×			×	×	
Rugosochonetes laguessianus angustus (Paeck).		×	×	×	×	×	
Plicochonetes kayserianus (Gallwitz)		×	×	×	×	×	
P. tricornis? (v. Smenov)		×			×		
P. waldschmidti (Paeck.)		×			×	×	
PISCES		×					

[1] The fauna from loc. W1162 has been provisionally described by Wagner (1963, p. 54). The data for comparison are from the works of Paeckelmann (1930, 1931), Gallwitz, (1932) and Nicolaus (1963).

[2] *Leptaenisca culmica* Nicolaus, 1963 certainly does not belong to the genus *Leptaenisca*, as defined in the Treatise (Muir-Wood & Williams, 1965, p.H391), and is here provisionally assigned to the genus *Irboskites*. Johnson (1967) convincingly showed that the genus *Irboskites* should be placed in the family Strophalosiidae of the suborder Productidina, notwithstanding its lack of spines. It is also less strange that a Lower Carboniferous species would belong to an Upper Devonian genus, than to the Lower Devonian genus *Leptaenisca*.

Table II Fauna of the Alba Formation

	Gete Mbr.				La Venta Mbr.							
							Bed A		Bed B			
	4	8	W1162	9	1	2	4	8	1	2	18	W1069
CONODONTA			×							×		×
CRINOIDEA	×	×	×	×						×		×
TRILOBITA [3])												
Griffithides sp.				×								
Liobole castroi (Barrois)		×	×	×								
ANTHOZOA [4])												
Rotiphyllum e.g. *axiferum* Hudson		×		×								
Amplexocarinia sp.		×										
Cryptophyllum sp.				×								
Plerophyllum (*Ufimia*) sp.		×		×	×							+
Cyathaxonia sp.		×		×								
Pseudofavosites? sp.	×											
GASTROPODA				×								×
CEPHALOPODA [5])												
Goniatites (*G.*) *granofalcatus* Kullm.								×				
G. (*G.*) e.g. *granosus* Portlock					×							
G. (*G.*) *stenumbilicatus stenumbilicatus* Kullm.						×	×	?				
Muensteroceras hispanicum Delépine			×									
M. sphaeroidale (McCoy)				×								
Proshumardites delepinei Schindew.												+
Prionoceras (*Irinoceras*) *schulzei* Kullm.						×						
Delepinoceras thalassoide (Delépine)											×	+
Tympanoceras getinoi Wagner-Gentis												+
Eoasianites (*E.*) cf. *ibericus* Kullm.										×		
Eoasianites (*Zephyroceras*) *asturicus* Kullm.									×	×		
E. cadiconiformis Wagner-Gentis												+
Kazakhoceras hawkinsi (Moore)									×			
Merocanites subhenslowi Wagner-Gentis			×	×								
Katacanites quadratoides Kullm.						×						
Metacanites primitivus Kullm.					×							
Praedaraelites culmiensis (Kobold)						×						
Stenopronorites uralensis (Karpinsky)												+
S. arkansensis (Smith)												+
Orthoceras sp.		×		×			×					×
BRACHIOPODA												
Spiriferidina						×						×
Crurithyris e.g. *urii* (Fleming)				×								
Chonetidina												
Rugosochonetes laguessianus laguessianus (de Koninck)		×	×	×								

[3] The trilobites have been identified by Dr. G. Hahn (pers. com.).
[4] The corals have been identified by Dr. G. E. de Groot (pers. com.).
[5] The cephalopods have been identified by Dr. J. Kullmann (1962, 1963; pers. com.). The fossils from literature (Wagner-Gentis, 1963) are marked with a plus sign.

Table III Fauna of the Escapa Formation.

	Member: Vegacervera			Valdeteja														Mudá
ALGAE [6])	Loc. [7]):	3	5	1	Cl.	C.F.	Ch.	E.	L.	10	10′	11	12	16	17	6	W925	En	35	
Donezella lutugini Maslov						×										×				
D. lunaensis Rácz																×				
Ortonella myrae Rácz						×			×											
Ungdarella uralica Maslov						×										?				
Anthracoporella spectabilis Pia																×				
FUSULINIDAE						×		×	×							×				
TRILOBITA							×			×									×	
LAMELLIBRANCHIATA								×		×									×	
GASTROPODA								×	×	×									×	
CEPHALOPODA											×									
CRINOIDEA		×	×		×	×		×				×							×	
ECHINOIDEA								×				×								
BRYOZOA			×			×		×		×									×	
ANTHOZOA [4])																				
Rotiphyllum sp.			×		×							×								
Amplexocarinia sp.					×															
Plerophyllum (*Ufimia*) sp.					×															
Cyathaxonia sp.												×								
Leonardophyllum sp.					×															
aulophyllids						×														
cyarcinophyllids								×		×										
Lithostrotionella sp.					×															
Pseudofavosites sp.					×															
Michelinia sp.												×								
Cladochonus sp					×															
auloporids				×		×										×				

Table IV Fauna of the San Emiliano Formation

Loc.:	W905	13	R43	14	15	20	21	22	23	24	25	26	27	28	29	30	30'
ALGAE [6])																	
Donezella lunaensis Rácz								×							×		
Mellporella anthracoporellaformis Rácz			×											×			
Parachaetetes sp.								×									
FUSULINIDAE		×	×					×						×			
TRILOBITA									×								
GASTROPODA		×								×	×			×	×		
BRYOZOA		×													×		
CRINOIDEA	×	×	×					×	×		×			×			
ECHINOIDEA	×	×															×
ANTHOZOA [4])																	
Fasciculiamplexus? sp.							×	×		×							
Cyathaxonia sp.			×		×			×		×						×	
Zaphrentites sp.								×							×		
"*Stuckenbergia*" sp.			×														
aulophyllids								×									
cyathopsids		×	×					×				×					
Chaetetes sp.			×		×							×					
Pseudofavosites? sp.								×									
auloporids			×		×									×			
BRACHIOPODA																	
Spiriferidina	×	×	×	×		×	×	×		×	×	×	×	×	×	×	
Chonetidina														×			×
Chonetinella flemingi crassiradiata (D. & C.)						×								×			
Neochonetes acanthophorus (Girty)						×											
Productidina																	
Avonia (*Quasiavonia*) *aculeata* (Sow.)																×	
Krotovia granulosa (Phill.)									×		×			×		×	
Alitaria nasuta (Paeck.)							×			×	×					×	
Eomarginifera lobata (Sow.)							×				×						
E. cf. *praecursor* (M.-W.)								×									
E. setosa (Phill.)	×									×					×	×	
Karavankina wagneri sp. nov.							×		×		×	×					
Reticularia moelleri (Stuck.)							×									×	
Linoproductus continentalis (Tornquist)												×					

BRACHIOPODA																	
Spiriferidina	×	×	×	×	×		×	×	×				×		×	×	
Rhynchonellidae					×												
Rhynchopora nikitini Tschern.																×	
Productidina																	
Plicatifera cf. *plicatilis* (Sow.)											×					×	
Productina pectinoides (Phill.)																×	
Avonia (*Quasiavonia*) *aculeata* (Sow.)				×	×	×									×	×	×
Krotovia spinulosa (Sow.)							×										
Alitaria frechi (Paeck.)																×	
Eomarginifera praecursor (M.-W.)					×											×	
E. setosa (Phill.)								×	×	×							
Productus carbonarius de Kon.				×		×											
P. concinnus Sow.															×	×	×
Echinoconchus punctatus (Sow.)				×		×						×			×	×	
E. defensus (Thomas)												×				×	
E. elegans (McCoy)				×		×										×	
E. venustus (Thomas)																×	
Dictyoclostus? inflatiformis Ivanov					×											×	
Antiquatonia costata (Sow.)					×											?	
A. khimenkovi Sar.																×	
A. insculpta (M.-W.)																×	
Chaoiella gruenewaldti (Krotow)				×	×											×	
Reticulatia huecoensis (King)											×						
R. moelleri (Stuck.)					×											×	
Linoproductus continentalis (Tornquist)					×	×											
Fluctuaria undata (Defrance)							×							×			
Ovatia ovata (Hall)						×											

*) The algae have been identified by Dr. L. Rácz (pers. com., 1964) and Mr. G. J. P. Germs (pers. com.).

Table V Occurrence of the Productidina and Chonetidina.

	Cer.	Pe.	Cu.	L.C.	Lena	Sama	Esc.	Pa.	Corisa				Cr.
Productidina					Ca				S.C.	So.	Cas.	Ver.	
Avonia (*Quasiavonia*) *aculeata* (Sow.)	×												
A. (*Q.*) *echidniformis* (Chao)					×		×	×	×		×		
Krotovia granulosa (Phill.)		×											
Alitaria frechi (Paeck.)	×	×											
Eomarginifera lobata (Sow.)		×											
Kozlowskia aberbaidenensis (Ramsbottom)								×					
K. pusilla (Schellw.)					×			×					
P. concinnus Sow.	×												
Productus carbonarius de Kon.				×									
Echinaria e.g. *semipunctata knighti* (D. & C.)			×			×							
Levipustula breimeri sp. nov.							×	×					
Juresania juresanensis (Tschern.)						×							
J. mosquensis (Ivanov)													×
J. subpunctata (Nikitin)										×			
Karavankina praepermica Ramovš												×	
K. cf. *dobsinensis* (Rakusz)								×					
K. rakuszi sp. nov.					×		×	×	×				
K. wagneri sp. nov.	×	×	×										
Dictyoclostus? aegiranus B. & F.			×				×	×					
Antiquatonia gallatinensis (Girty)						×							
A. hindi (M.-W.)		×		×		×							
A. nerutshensis Sar.						?	×						
Chaoiella gruenewaldti (Krotow)					×	×							
Reticulatia huecoensis (King)		×						×					
R. moelleri (Stuck.)								×					
R. cf. *uralica* (Tschern.)						?						×	
Linoproductus cora (d'Orb.)						×	×		×				
L. latiplanus Ivanov								×					
Cancrinella craigmarkensis (M.-W.)							×	×					
C. retiformis (M.-W.)				×									
Fluctuaria cf. *undata* (Defrance)												×	
Proboscidella proboscidea (de Vern.)		×											
Proboscidella sp.	×												
Chonetidina													
Tornquistia diminuta (Demanet)				×									
Rugosochonetes acutus (Demanet)				×		×	×	×					
R. skipseyi (Currie)					×		×	×					
Lissochonetes? obtusus (Schellw.)												×	
Mesolobus sinuosus (Schellw.)													
Neochonetes acanthophorus (Girty)					×								

Table VI Bashkirian Productidina and Chonetidina. [1])

	Esc.		Mudá	S.M.	S.E.	Per.		Cer.	Vis.	Nam.	Westf.	Mosc.		Desm.
Formations:	35					A	B				C	L.	U.	
Plicatifera cf. *plicatilis* (Sow.)	×	×							×					
Productina pectinoides (Phill.)	×								×					
Avonia (*Quasiavonia*) *aculeata* (Sow.)	×	×	×		×				×					
Krotovia spinulosa (Sow.)		×							×	×				
K. granulosa (Phill.)					×		×		×	×				
Alitaria frechi (Paeck.)	×						×	×	×	×				
A. nasuta (Paeck.)					×				×					
Eomarginifera lobata (Sow.)					×		×		×	×				
E. praecursor (M.-W.)	×	×			?				×	×				
E. setosa (Phill.)		×			×				×	×		×		
Productus carbonarius de Kon.		×							×	×	×			
P. concinnus Sow.	×			×				×	×	×				
Echinoconchus punctatus (Sow.)	×	×							×	×				
E. defensus (Thomas)	×	×							×	×				
E. elegans (McCoy)	×	×							×	×				
E. venustus (Thomas)	×								×					
Karavankina wagneri sp. nov.					×	×	×							
Dictyoclostus? inflatiformis Ivanov	×	×											×	
Antiquatonia costata (Sow.)	?	×							×	×				
A. hindi (M.-W.)	?					×			×	×				
A. insculpta (M.-W.)	×								×					
A. khimenkovi Sar.	×									×				
Chaoiella gruenewaldti (Krotow)	×	×											×	
Reticulatia cf. *huecoensis* (King)		×					×							×
R. moelleri (Stuck.)	×	×			×								×	
Linoproductus continentalis (Tornquist)		×			×				×	×				
Fluctuaria undata (Defrance)		×							×	×		×		
Ovatia ovata (Hall)	×	×							×					
Proboscidella proboscidea (de Vern.)						×			×					
Chonetinella flemingi crassiradiata (D. & C.)					×									×
Neochonetes acanthophorus (Girty)					×									×

[1]) Esc. = Escapa Fm.

S.M. = Santa Maria Fm.

S.E. = San Emiliano Fm.

Per. = Perapertú Fm.: A = lower part, B = upper part.

Vis. = Viséan, Nam. = Namurian, Mosc. = Moscovian, Desm. = Desmoinesian. With Westf. C are the occurrences in the marine bands of a Westfalian B/C age and in the Westfalian C deposits of Hungary indicated.

Table VII Lower Moscovian Productidina and Chonetidina. [3])

Formations:	La Cam.	Cur.		Lena		Escalada	Pando	Vis.	Nam.	Westf.		Mosc.		Kasim.	Desm.
Members:	T. 10	A.	E.V.	R.						A.	C.	L.	U.		
Avonia (*Quasiavonia*) *echidniformis* (Chao)					×	×	×					×			
Kozlowskia aberbaidenensis (Ramsbottom)							×				×				
K. pusilla (Schellwien)				×			×					×			
Productus carbonarius de Kon.	×							×	×	×	×				
Echinaria e.g. *semipunctata knighti* (D. & C.)		×			×										×
Levipustula breimeri sp. nov.						×	×								
Juresania juresanensis (Tschern.)					×								×	×	
Karavankina dobsinensis (Rakusz)							×				×				
K. rakuszi sp. nov.				×	×	×	×				?				
K. wagneri sp. nov.			×												
Dictyoclostus? *aegiranus* (B. & F.)			×			×	×					×			
Antiquatonia hindi (M.-W.)	×							×	×						
A. khimenkovi Sar.						×			×						
A. gallatinensis (Girty)							×				×				×
Chaoiella gruenewaldti (Krotow)				×	×									×	
Reticulatia huecoensis (King)							×								×
R. cf. *uralica* (Tschern.)					×									×	
Linoproductus cora (d'Orb.)					×						×		×	×	
L. latiplanus Ivanov							×					×			
Cancrinella craigmarkensis (M.-W.)						×					×				
C. retiformis (M.-W.)	×										×				
Tornquista diminuta (Demanet)	×										×				
Rugosochonetes acutus (Demanet)	×					×	×				×				
R. skipseyi (Currie)					×	×	×				×				
Neochonetes acanthophorus (Girty)				×											×

[3]) La Cam. = La Camocha Fm.

Cur. = Curavacas Fm.: A = Albas Lst. Mbr., E.V. = El Vez Lst. Mbr.

R. = "Calizas" Mbr. of the Riosa area.

Kasim. = Kasimovian.

Table VIII Upper Moscovian Productidina and Chonetidina. [3])

Formations:	Sama Fm.					Corisa Fm.			Cr. F.	Vis. Nam.	Westf.	Mosc.		Kas.	Desm.
Members:	S.A.	Sot.	Sor.	Mod.	S.C.	Soc.	Cas.	V.	?		C	L.	U.		
Avonia (*Quasiavonia*) *echidniformis* (Chao)					×		×						×	×	
Juresania mosquensis (Ivanov)									×	×		×	×	×	
J. subpunctata (Nikitin)						×								×	
Karavankina praepermica Ramovš								×						?	
K. rakuszi sp. nov.					×						×				
Antiquatonia gallatinensis (Girty)				×							×				×
Reticulatia cf. *uralica* (Tschern.)								×						×	
Linoproductus cora (d'Orb.)		×			×						×		×	×	
Cancrinella craigmarkensis (M.-W.)	×	×	×								×				
Fluctuaria cf. *undata* (Defrance)								×		× ×		×			
Rugosochonetes acutus (Demanet)		×									×				
Lissochonetes? obtusus (Schellwien)								×						×	
Mesolobus sinuosus (Schellwien)									×					×	

[3]) S.A. = San Antonio Mbr., Sot. = Soton Mbr., Sor. = Sorriego Mbr.
Mod. = Modesto Mbr.
S.C. = Sierra Corisa Lst. Mbr., Soc. = Socavón Lst. Mbr.
Cas. = Casavegas Lst. Mbr., V. = Verdiana Lst. Mbr.

PLATES

PLATE I

Figs. 1-5. *Chonetipustula plicata* (Sarres, em. Kayser) p. 73

Fig. 1. Mould of the interior of a pedicle valve. WP. 014001, × 2½, loc. W1162, Vegamián Fm.

Fig. 2. Incomplete mould of the exterior of a pedicle valve, WP. 014009, × 2¼, same loc.

Fig. 3. Mould of the interior of a pedicle valve. WP. 014008, × 2¼, same loc.

Fig. 4. Mould of the interior of a pedicle valve showing the pedicle sheath and groove. WP. 014016, × 20, same loc.

Fig. 5. Detail of a mould of the exterior of a pedicle valve showing the groove and spines. WP. 014009, × 20, same loc.

Figs. 6-8. *Chonetipustula concentrica* (Sarres, em. Kayser) p. 74

Fig. 6. Incomplete mould of the interior of a brachial valve showing the cardinal process and breviseptum. WP. 014031, × 2½, same loc.

Fig. 7. Mould of the interior of a pedicle valve. Wa. 116502A, × 1, same loc.

Fig. 8. Mould of the exterior of a brachial valve. WP. 014041, × 3, same loc.

Figs. 9-12. *Plicatifera* cf. *plicatilis* (Sowerby) p. 75

Fig. 9. Decorticated pedicle valve. Br. L 1407, × 1, loc. 35, Valdeteja Mbr.

Fig. 10. Decorticated pedicle valve showing triangular muscle scars. Br. L 1406, × 1, same loc. Uncoated with ammonium chloride.

Fig. 11. Incomplete pedicle valve showing row of curved spines along the hinge, postero--ventral view. Br. L 1401, × 1, same loc. Uncoated with ammonium chloride for a better view of the spines.

Fig. 12. Mould of the exterior of a brachial valve. Br. L 1405, × 1, same loc. Uncoated with ammonium chloride.

Figs. 13, 14. *Productina pectinoides* (Phillips) p. 75

Fig. 13. Decorticated pedicle valve. D.7, × 1, same loc.

Fig. 14. Interior mould of a pedicle valve with some shell remains. D.8, × 1, same loc. 14a posterior view; 14b anterior view.

Figs. 15-20. *Avonia (Quasiavonia) aculeata* (Sowerby) p. 77

Fig. 15. Pedicle valve. D. 1, × 1, same loc. 15a posterior view; 15b anterior view.

Fig. 16. Pedicle valve. Br. L 1033, × 2½, same loc.

Fig. 17. Decorticated interior of a pedicle valve. WP. 16401, × 4, loc. 3, Valdeteja Mbr.

Fig. 18. Exterior mould of a brachial valve with some shell remains. Br. L 1055, × 1½ loc. 35, Valdeteja Mbr.

Fig. 19. Pedicle valve. Br. L 1001, × 1, same loc.

Fig. 20a. Incomplete mould of the interior of a brachial valve with the umbo of the pedicle valve. Br. L 1038A, × 3, same loc.

Fig. 20b. Incomplete interior of a brachial valve with remains of the trail of the pedicle valve. Br. L 1038B, × 2, same loc.

Figs. 21, 22. *Avonia (Quasiavonia) echidniformis* (Chao) p. 78

Fig. 21. Incomplete mould of the interior of a pedicle valve. Br. M 821, × 2, loc. M8, Escalada Fm.

Fig. 22. Mould of the exterior of a pedicle valve. Br. 1602, × 1, loc. 50, Sierra Corisa Mbr.

Figs. 23, 24. *Krotovia spinulosa* (Sowerby) p. 79

Fig. 23. Incomplete pedicle valve with a part of the brachial valve interior. WP. 13101, × 1½, loc. 10, Valdeteja Mbr.

Fig. 24. Mould of the exterior of a brachial valve. WP 13104, × 1, same loc.

Figs. 25-30. *Krotovia granulosa* (Phillips) p. 80

Fig. 25. Brachial valve interior. Sc. 101, × 1, San Emiliano Fm.

Fig. 26. Incomplete pedicle valve. Wa. 32301, × 1, loc. 54, Perapertú Fm. 26a ventral view; 26b lateral view.

Fig. 27. Incomplete pedicle valve. WP. 34903, × 1, loc. 24, San Emiliano Fm. 27a ventral view; 27b lateral view.

Fig. 28. Exterior mould of a brachial valve. WP. 36501, × 1, loc. 30, San Emiliano Fm.

Fig. 29. Pedicle valve, posterior view. WP. 33902, × 1, loc. 25', San Emiliano Fm.

Fig. 30. Exterior mould of a brachial valve. Wa. 32305, × 1¾, loc. 54, Perapertú Fm.

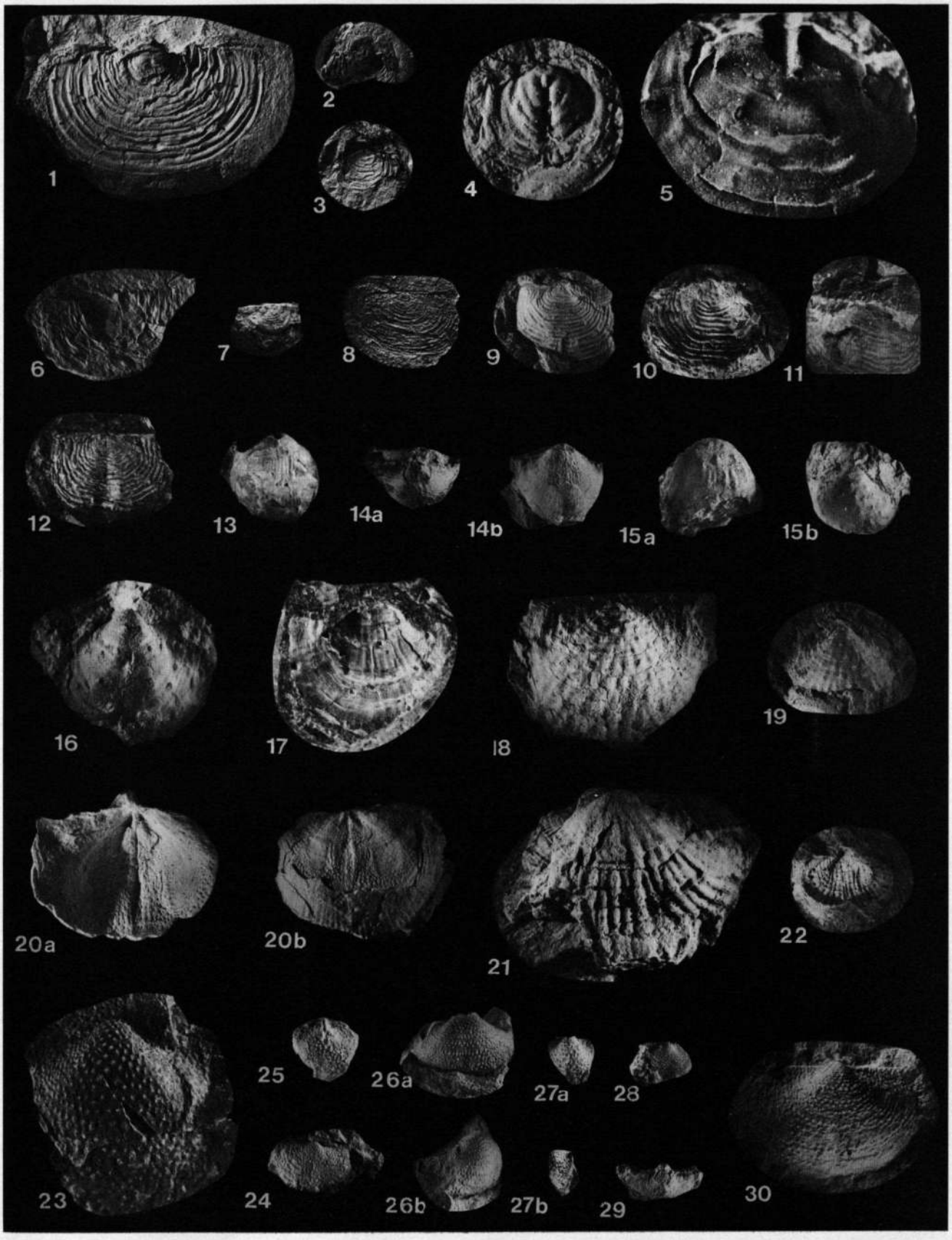

1
2
3
4
5
6
7
8
9
10
11
12
13
14a
14b
15a
15b
16
17
18
19
20a
20b
21
22
23
24
25
26a
26b
27a
27b
28
29
30

PLATE II

Figs. 1, 2. *Eomarginifera praecursor* (Muir-Wood) p. 83

Fig. 1. Decorticated specimen with a V-shaped antero-median extension. Br. L 1260, × 3½, loc. 35, Valdeteja Mbr. 1a lateral view of the pedicle valve; 1b anterior view of the pedicle valve; 1c dorsal view showing the brachial valve with a broad marginal rim.

Fig. 2. Pedicle valve of a more geniculated specimen, lateral view, D. 13, × 3½, same loc.

Figs. 3-6. *Eomarginifera lobata* (Sowerby) p. 83

Fig. 3. Pedicle valve showing the 8 halteroid spines and several small spines. Sc. 121, loc. 21, San Emiliano Fm. 3a posterior view, × 1¼; 3b anterior view, × 1.

Fig. 4. Pedicle valve. WP. 32802, × 1¼, same loc.

Fig. 5. Pedicle valve. Sc. 123, × 1, same loc. 5a posterior view; 5b anterior view.

Fig. 6. Pedicle valve with an extremely deep median sulcus. WP. 32801, × 1, same loc. 6a anterior view; 6b posterior view.

Figs. 7, 8. *Eomarginifera setosa* (Phillips) p. 84

Fig. 7. Interior of a brachial valve. WP. 14101, × 1¾, loc. 10′, Valdeteja Mbr.

Fig. 8. Interior of a brachial valve. WP. 14102, × 2, same loc.

Figs. 9-13. *Alitaria frechi* (Paeckelmann) p. 81

Fig. 9. Mould of the interior of a pedicle valve with the shell posteriorly preserved. Wa. 32320, × 2½, loc. 54, Perapertú Fm. 9a posterior view; 9b anterior view.

Fig. 10. Decorticated pedicle valve showing the "cincture" on the decorticated part but not on the right-hand side where the shell is preserved. Br. L 1204, loc. 35, Valdeteja Mbr. 10a lateral view, × 2; 10b anterior view, × 2; 10c posterior view, × 2½.

Fig. 11. Pedicle valve with a distinct triangular outline showing the two diverging halteroid spines at the hinge and the marginal rim. Br. L 1223, × 1¾, same loc. Uncoated with ammonium chloride.

Fig. 12. Interior mould of the brachial valve showing the crenulated marginal ridge curving along the interior side of the ears, as well as other internal features. Br. L 1247, × 1¾, same loc. Uncoated with ammonium chloride.

Fig. 13. Mould of the exterior of a brachial valve. Br. L 1202, × 2¼, same loc.

Figs. 14-19. *Alitaria nasuta* (Paeckelmann) p. 82

Fig. 14. Pedicle valve showing the cincture and the antero-median fold, anterior view. WP. 32862, × 1, loc. 21, San Emiliano Fm.

Fig. 15. Pedicle valve, WP. 32865, × 1, same loc.

Fig. 16. Pedicle valve, posterior view. WP. 32863, × 1½, same loc.

Fig. 17. Pedicle valve, posterior view. WP. 36522, × 1, same loc.

Fig. 18. Exterior mould of a brachial valve. WP. 32866, × 1, same loc.

Fig. 19. Pedicle valve, anterior view, WP. 32864, × 1, same loc.

Figs. 20, 21. *Kozlowskia aberbaidenensis* (Ramsbottom) p. 85

Fig. 20. A transverse specimen. Si. P 825, × 2½, loc. 40, Pando Fm. 20a mould of the interior of the pedicle valve, posterior view; 20b interior mould of the pedicle valve, anterior view; 20c interior mould of the brachial valve showing a rim around the visceral disc.

Fig. 21. Mould of the interior of a complete specimen showing the posterior part of the pedicle valve with muscle scars and a long spine on the right an the anterior half of the brachial valve showing prominent brachial ridges and endospines. Si. P 521, × 1½, same loc.

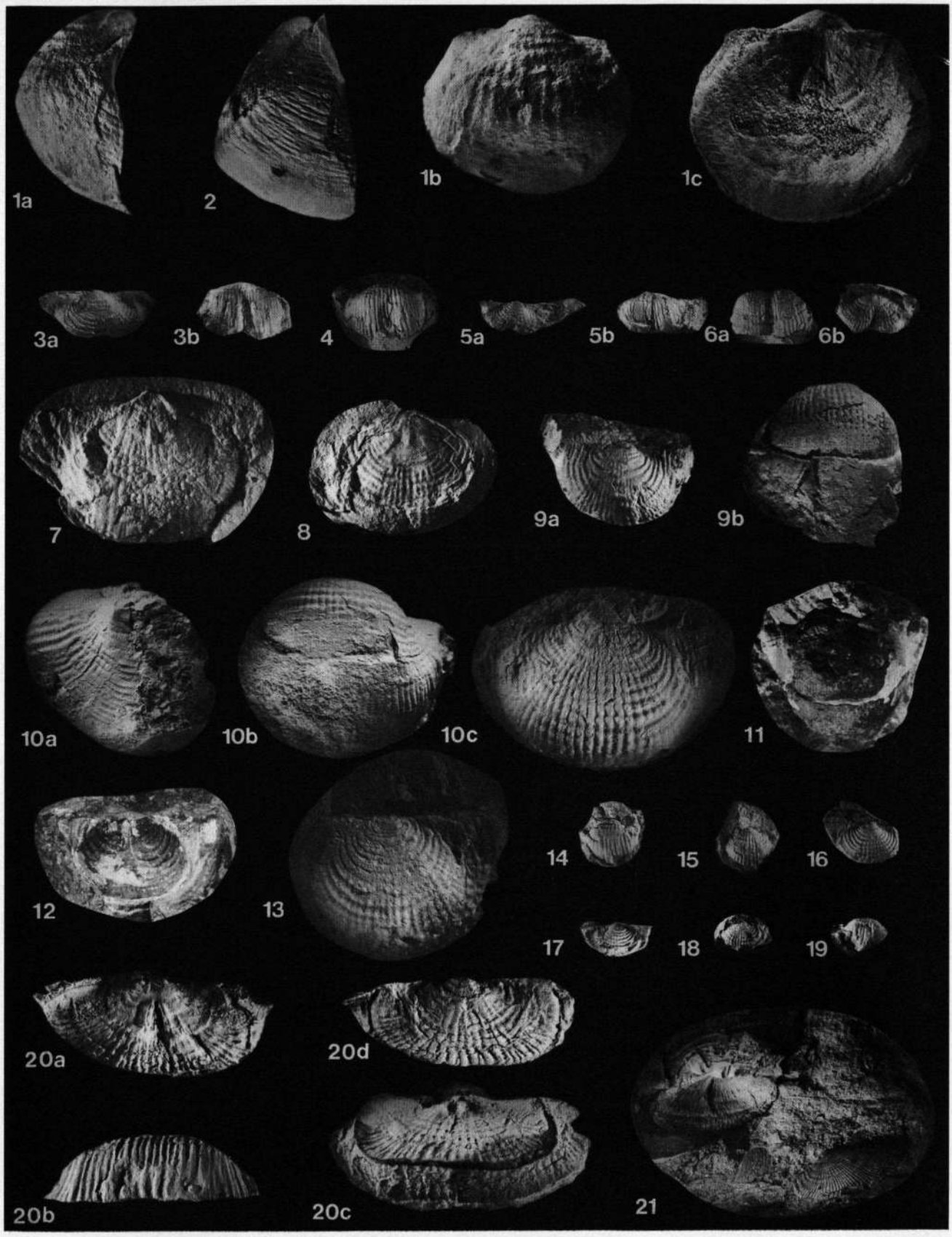

1a
2
1b
1c
3a
3b
4
5a
5b
6a
6b
7
8
9a
9b
10a
10b
10c
11
12
13
14
15
16
17
18
19
20a
20d
20b
20c
21

PLATE III

Figs. 1, 2. *Kozlowskia aberbaidenensis* (Ramsbottom) p. 85

Fig. 1. A sub-quadrate specimen. Si. 1124, × 2½, same loc. 1a mould of the interior of the pedicle valve, posterior view; 1b interior mould of the brachial valve; 1c exterior mould of the brachial valve showing the marginal rim and cardinal process.

Fig. 2. Mould of the interior of a brachial valve with part of the trail preserved, antero--dorsal view. Si. 1121, × 2½, same loc.

Figs. 3-6. *Kozlowskia pusilla* (Schellwien) p. 86

Fig. 3. Incomplete mould of the interior of a pedicle valve showing the halteroid spines, posterior view. Si. M 101, × 1½, same loc.

Fig. 4. Interior mould of a pedicle valve. Si. 1126A, × 2, same loc. 4a posterior view; 4b antero-lateral view.

Fig. 5. Interior mould of a pedicle valve. Si. P 822, × 3, same loc.

Fig. 6. Interior mould of a pedicle valve, posterior view. Si. M 1421, × 3, same loc.

Figs. 7-11. *Productus carbonarius* de Koninck p. 87

Fig. 7. Pedicle valve. WP. 14406, loc. 3, Valdeteja Mbr.; 7a posterior view showing the pointed ears with spines, × 2½; 7b anterior view, × 2.

Fig. 8. Incomplete pedicle valve, posterior view. WP. 16440, × 4, same loc.

Fig. 9. Incomplete interior of a brachial valve. WP. 16436, × 7, same loc. Uncoated with ammonium chloride.

Fig. 10. Mould of the interior of a brachial valve. WP. 16434, × 3, same loc.

Fig. 11. Mould of the exterior of a brachial valve with the posterior part of the brachial valve interior preserved. WP. 16430, × 2½, same loc.

Figs. 12-14. *Echinoconchus punctatus* (Sowerby) p. 89

Fig. 12. Mould of the exterior of a brachial valve. D. 17, × 1, loc. 35, Valdeteja Mbr.

Fig. 13. Brachial valve. D. 16, × 1, same loc.

Fig. 14. Detail of a brachial valve showing the spine arrangement. WP. 16411A, × 2, loc. 3, Valdeteja Mbr.

Figs. 15, 16. *Echinoconchus defensus* (Thomas) p. 90

Fig. 15. Detail of a pedicle valve. WP. 1201, × 1, loc. 17, Valdeteja Mbr.

Fig. 16. Decorticated pedicle valve. Br. L 1120, × 1, loc. 35, Valdeteja Mbr. 16a posterior view; 16b lateral view; 16c anterior view.

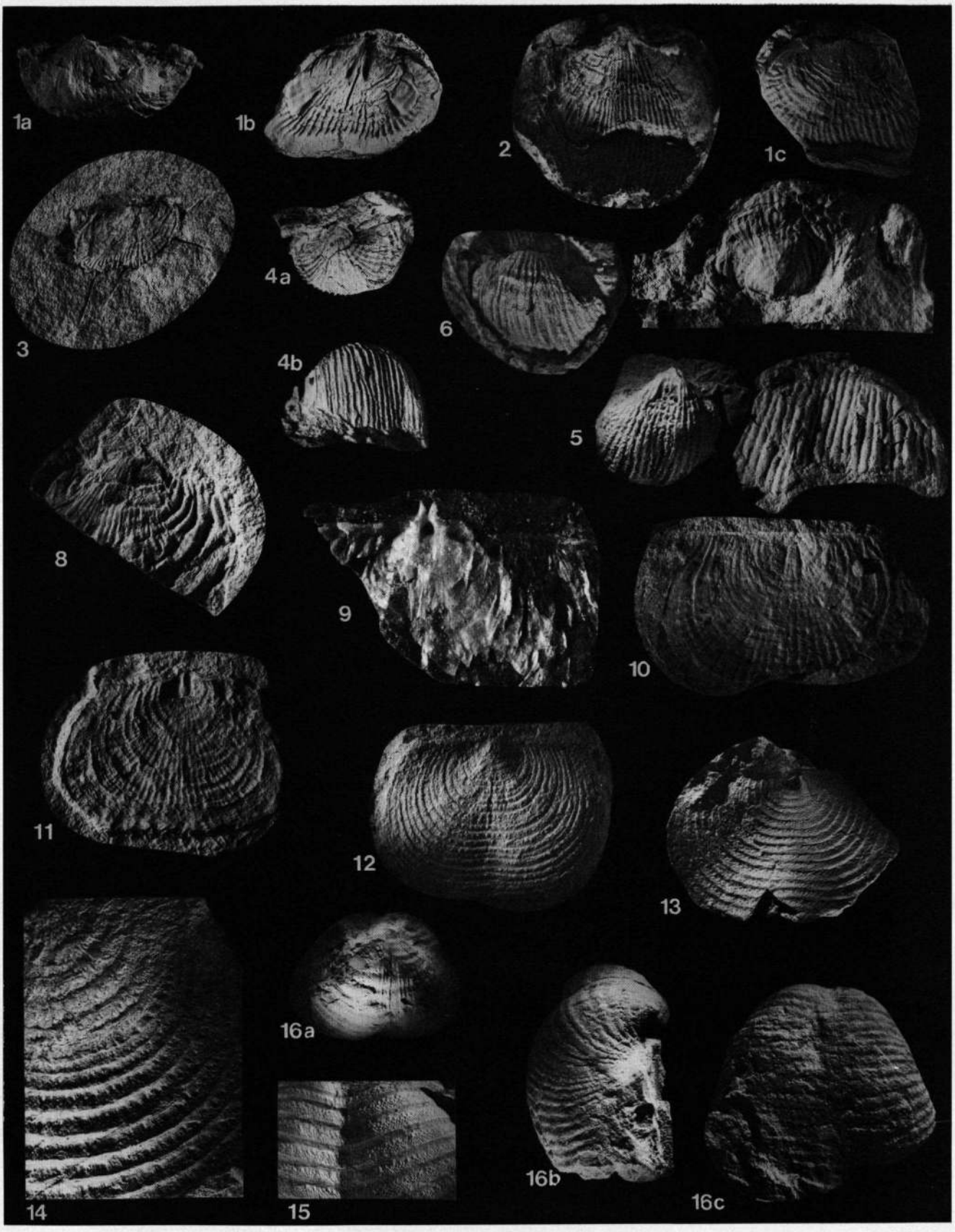

1a
1b
2
1c
3
4a
6
4b
5
8
9
10
11
12
13
16a
14
15
16b
16c

PLATE IV

Figs. 1-3. *Echinoconchus elegans* (McCoy) p. 90

Fig. 1. Pedicle valve. D. 21, × 1¼, same loc. 1a ventral view; 1b lateral view.

Fig. 2. Incomplete specimen. Br. L 1131, × 1, same loc. 2a lateral view of the pedicle valve; 2b dorsal view showing the brachial valve; 2c ventral view of the pedicle valve.

Fig. 3. Mould of the exterior of a brachial valve. Br. L 1004, × 1¾, same loc.

Fig. 4. *Echinaria* sp. p. 92
Fragmentary mould of the exterior of the pedicle valve. Br. 1601B, × 1, loc. 50, Sierra Corisa Lst. Mbr.

Figs. 5-7, 9. *Karavankina wagneri* sp. nov. p. 99

Fig. 5. Pedicle valve. Ka. 7110, × 1, loc. 42, Cervera Fm.

Fig. 6. Incomplete specimen. Holotype, Wa. 32314, × 1¾, loc. 54, Perapertú Fm. Uncoated with ammonium chloride. 6a pedicle valve, ventral view; 6b dorsal view showing the umbo of the pedicle valve and the brachial valve etched with hydrochloric acid to show the internal features; 6c lateral view of the pedicle valve.

Fig. 7. Incomplete pedicle valve. Wa. 32312, × 1, same loc. 7a lateral view; 7b anterior view; 7c posterior view showing an interior mould of the adductor scars.

Fig. 9. Incomplete brachial valve etched with hydrochloric acid to show the internal features. Wa. 32315, × 10, same loc. Uncoated with ammonium chloride.

Figs. 8, 10. *Karavankina praepermica* Ramovs p. 97

Fig. 8. Pedicle valve. Wa. 7501, × 1½, loc. 46, Verdiana Lst. Mbr. 8a lateral view; 8b ventral view.

Fig. 10. Pedicle valve, lateral view. Wa. 7505, × 2, same loc.

Figs. 11-16, 18, 20. *Karavankina rakuszi* sp. nov. p. 97

Fig. 11. Rubber replica of a mould of the exterior of a brachial valve. Br. M 808, × 4, loc. M 8, Escalada Fm.

Fig. 12. Incomplete brachial valve. Br. G 102, × 6, loc. 48, Casavegas Lst. Mbr.

Fif. 13. Interior mould of a pedicle valve showing a group of spines around the anterior margin. Br. M 804, × 4, loc. M 8, Escalada Fm.

Fig. 14. Brachial valve. 14a interior mould, Br. 1601B, × 1¼, loc. 50, Sierra Corisa Lst. Mbr.; 14b exterior mould, Br. 1601A, × 2, same loc.

Fig 15. Mould of the interior of a pedicle valve with a group of long slender spines around the anterior margin. Cotype, Br. M 807, × 3, loc. M 8, Escalada Fm.

Fig. 16. Incomplete exterior mould of a pedicle valve. Si. P 202.2, × 3, loc. 40, Pando Fm.

Fig. 18. Interior mould of a brachial valve. Holotype, Br. M 801, × 2½, loc. M 8, Escalada Fm.

Fig. 20. Mould of the interior of a brachial valve. Br. M 811, × 5, same loc.

Figs. 17, 19. *Karavankina* cf. *dobsinensis* (Rakusz) p. 96

Fig. 17. Fragmentary mould of the exterior of a brachial valve. Si. P 201, × 4, loc. 40, Pando Fm.

Fig. 19. Exterior mould of a brachial valve. Si. P 202. 1, × 3½, same loc.

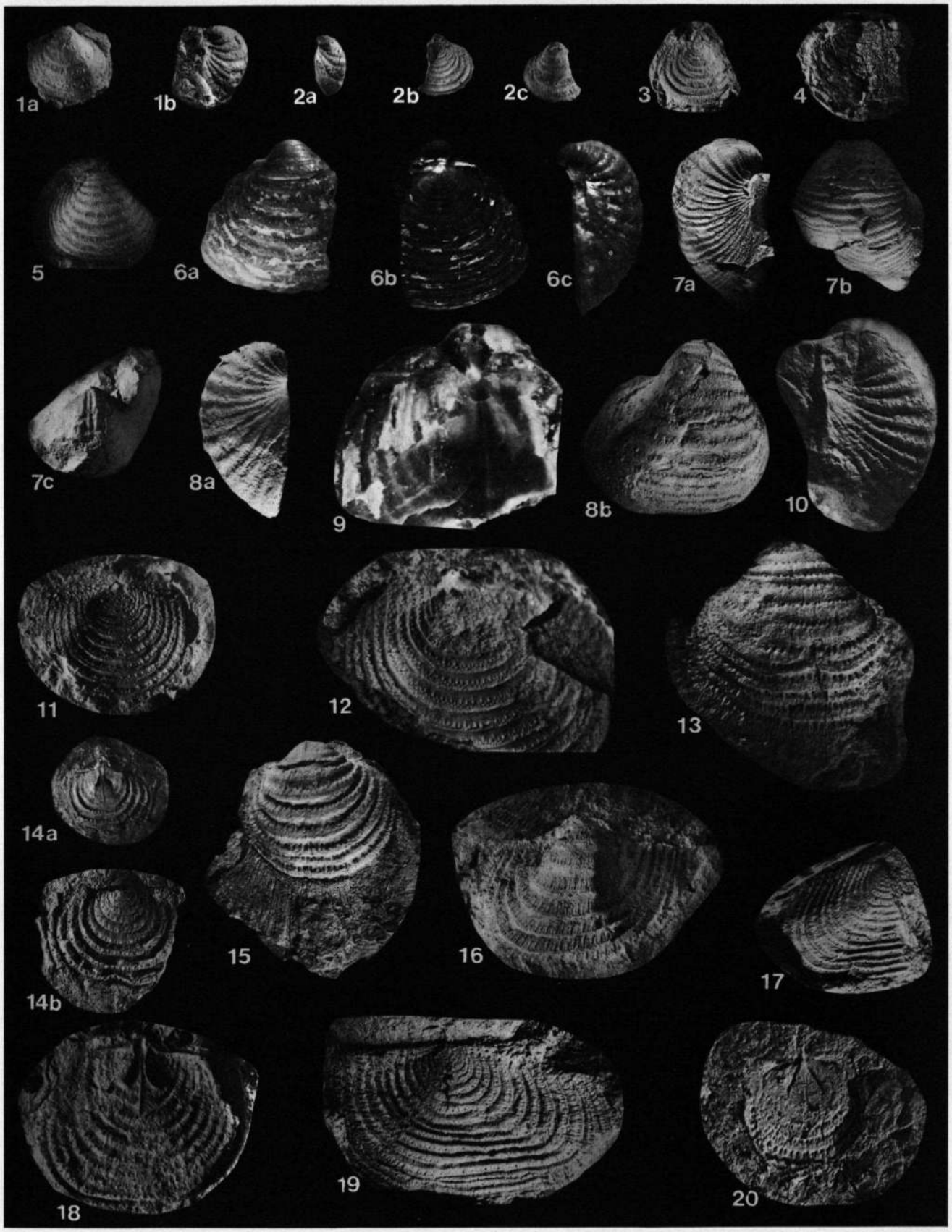

1a
1b
2a
2b
2c
3
4
5
6a
6b
6c
7a
7b
7c
8a
9
8b
10
11
12
13
14a
14b
15
16
17
18
19
20

PLATE V

Figs. 1, 2. *Levipustula breimeri* sp. nov. p. 92

Fig. 1. Pedicle valve, anterior view. Holotype, Br. M 711, × 2½, loc. M 7, Escalada Fm.

Fig. 2. Interior mould of a pedicle valve, anterior view. Br. M 701, × 2½, same loc.

Figs. 3-8. *Juresania juresanensis* (Tschernyschew) p. 93

Fig. 3. Completely flattened specimen. Bl. Fe. 12, loc. 32, Calizas Inferiores Mbr. 3a pedicle valve with the anterior part of the brachial valve interior, × 1½; 3b brachial valve with the umbo of the pedicle valve, × 2.

Fig. 4. Interior of a small brachial valve showing indistinct muscle scars. Bl. Fe 11, × 2, same loc.

Fig. 5. Interior of a large brachial valve with prominent internal features and a short geniculated trail. Bl. Fe 2, × 1½, same loc.

Fig. 6. Pedicle valve with spines, anterior view. Bl. Fe 5, × 1½, same loc.

Fig. 7. Pedicle valve. Bl. Fe 1, × 1½, same loc.

Fig. 8. Pedicle valve with some spines. Bl. Fe 6, × 1, same loc.

Fig. 9. *Juresania subpunctata* (Nikitin) p. 95
Specimen dG. 901, × 1½, loc. 52, Socavón Lst. Mbr. 9a brachial valve; 9b pedicle valve.

Fig. 11. *Juresania mosquensis* (Ivanov) p. 94
Fragmentary pedicle valve. Br. 101, × 1, loc. 45, Cristóbal Fm. 11a posterior view; 11b ventral view.

Fig. 12. *Dictyoclostus? inflatiformis* Ivanov p. 100
Pedicle valve. Br. L 1535, × 1¼, loc. 35, Valdeteja Mbr. 12a lateral view; 12b posterior view.

Fig. 10, 13, 14. *Dictyoclostus? aegiranus* Böger & Fiebig p. 100

Fig. 10. Brachial valve interior. Br. M 322, × 2, loc. M 3, Escalada Fm.

Fig. 13. Mould of a brachial valve exterior. Si. M 323, × 1½, loc. 40, Pando Fm.

Fig. 14. Mould of a pedicle valve exterior. Si. M 322, × 1¼, same loc.

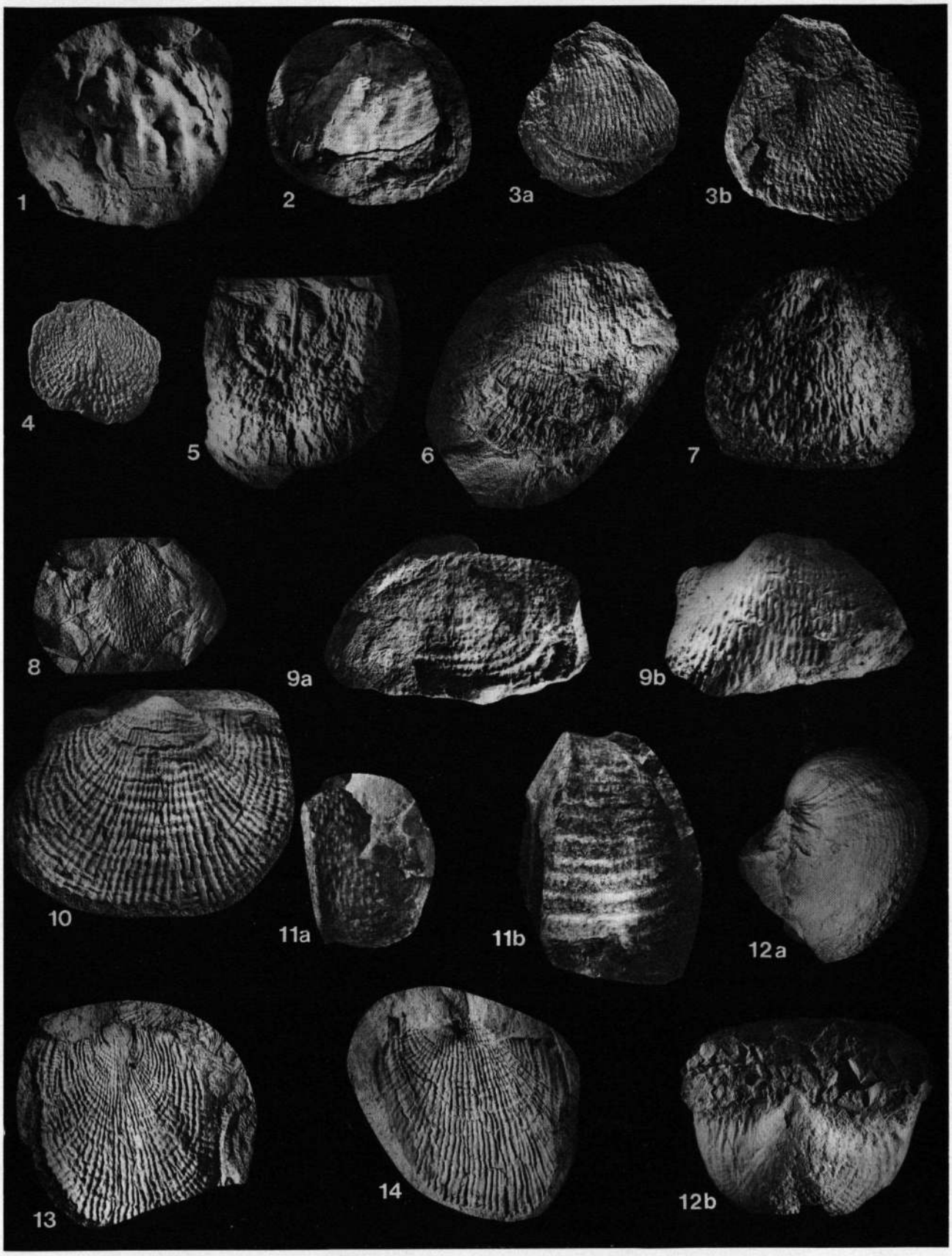

1
2
3a
3b
4
5
6
7
8
9a
9b
10
11a
11b
12a
13
14
12b

PLATE VI

Fig. 1. *Antiquatonia costata* (Sowerby) p. 101
Pedicle valve, anterior view. WP 15445, × 1½, loc. 3, Valdeteja Mbr.

Fig. 2, 3. *Antiquatonia hindi* (Muir-Wood) p. 102

Fig. 2. Incomplete pedicle valve with a distinct preaural ridge preserved on the left side. dG. 501, × 1, loc. 50, Perapertú Fm. 2a lateral view; 2b postero-ventral view.

Fig. 3. Pedicle valve. Bl. T 1010, × 1, loc. 39, La Camocha Fm.

Fig. 4-7, 9. *Antiquatonia khimenkovi* Sarycheva p. 103

Fig. 4. Pedicle valve. Br. L 1501, × 1¾, loc. 35, Valdeteja Mbr. 4a posterior view; 4b ventral view; 4c lateral view.

Fig. 5. Pedicle valve, posterior view. D. 25, × 1¾, same loc.

Fig. 6. Incomplete specimen. D. 26, same loc. 6a brachial valve, × 2; 6b pedicle valve × 1¾.

Fig. 7. Mould of the interior of an incomplete specimen. Br. M 830, × 3, loc. M 8, Escalada Fm. 7a brachial valve; 7b pedicle valve.

Fig. 9. Pedicle valve Br. M 832, × 1¾, same loc.

Figs. 8, 10. *Antiquatonia insculpta* (Muir-Wood) p. 103

Fig. 8. Mould of the brachial valve exterior. Br. L 1551, loc. 35, × 2, Valdeteja Mbr.

Fig. 10. Pedicle valve, posterior view. D. 35, × 2, same loc.

Figs. 11-15. *Chaoiella gruenewaldti* (Krotow) p. 104

Fig. 11. Pedicle valve showing left ear with spines, posterior view. In the upper left-hand corner is a specimen of *Avonia (Quasiavonia) aculeata* (Sow.) WP. 14433, × 1¼, loc. 3, Valdeteja Mbr.

Fig. 12 Interior of a brachial valve showing brachial ridges, anterior view. Wa. R 10010, × 1¾, loc. 38, Lena Fm.

Fig. 13. Decorticated pedicle valve showing the termination of the costae near the anterior margin, anterior view. WP. 14420, × 1¼, loc. 3, Valdeteja Mbr.

Fig. 14. Decorticated pedicle valve showing the adductor scars, posterior view. WP. 14421, × 2, same loc.

Fig. 15. Interior of a brachial valve. WP. 14425, × 1¾, same loc.


1
2a
2b
3
4a
4b
4c
5
6a
6b
7a
7b
8
9
10
11
12
13
14
15

PLATE VII

Figs. 1, 2. *Chaoiella gruenewaldti* (Krotow) p. 104

Fig. 1. Pedicle valve showing longitudinal folds below spine bases, anterior view. WP. 14430, × 1, same loc.

Fig. 2. Brachial valve. WP. 14423A, × 1¼, same loc.

Figs. 3-6. *Reticulatia huecoensis* (King) p. 105

Fig. 3. Fragmentary interior of a brachial valve showing the cardinal process (in dorsal view), lateral ridges and median septum. dG. 11, × ½, loc. 54, Perapertú Fm.

Fig. 4. Mould of the exterior of a brachial valve and the posterior part of the pedicle valve. Si. P 801, × 1, loc. 40, Pando Fm.

Fig. 5. Decorticated interior of a brachial valve showing the external ornamentation. Wa. 32340, × ¾, loc. 54, Perapertú Fm.

Fig. 6. Brachial valve. Si. 1121, loc. 40, Pando Fm. 6a interior mould, × 1¼; 6b exterior mould, × 1½.

Figs. 7, 8. *Reticulatia moelleri* (Stuckenberg) p. 106

Fig. 7. Interior mould. Br. 1201, × 1½, loc. 32, Lena Fm. 7a pedicle valve showing the muscle scars; 7b brachial valve.

Fig. 8. Incomplete specimen. Br. L 001, × 1½, loc. 35?, Valdeteja Mbr.? 8a pedicle valve, posterior view; 8b brachial valve.

Fig. 9. *Reticulatia* cf. *uralica* (Tschernyschew) p. 106
Incomplete specimen. Wa 7511, × 1, loc. 46, Verdiana Lst. Mbr. 9a decorticated pedicle valve, posterior view; 9b decorticated interior of the brachial valve (same as in fig. 9a, but with the visceral disc of the pedicle valve removed).

Figs. 10-12. *Linoproductus cora* (d'Orbigny) p. 107

Fig. 10. Pedicle valve. dM. 62181, loc. 34, Lena Fm. 10a lateral view, × 2; 10b ventral view, × 1½.

Fig. 11. Interior mould of a pedicle valve. Si. M 100, × 2, loc. 40, Pando Fm.

Fig. 12. Exterior mould of a brachial valve. Br. 901, × 2, loc. 50, Sierra Corisa Lst. Mbr.

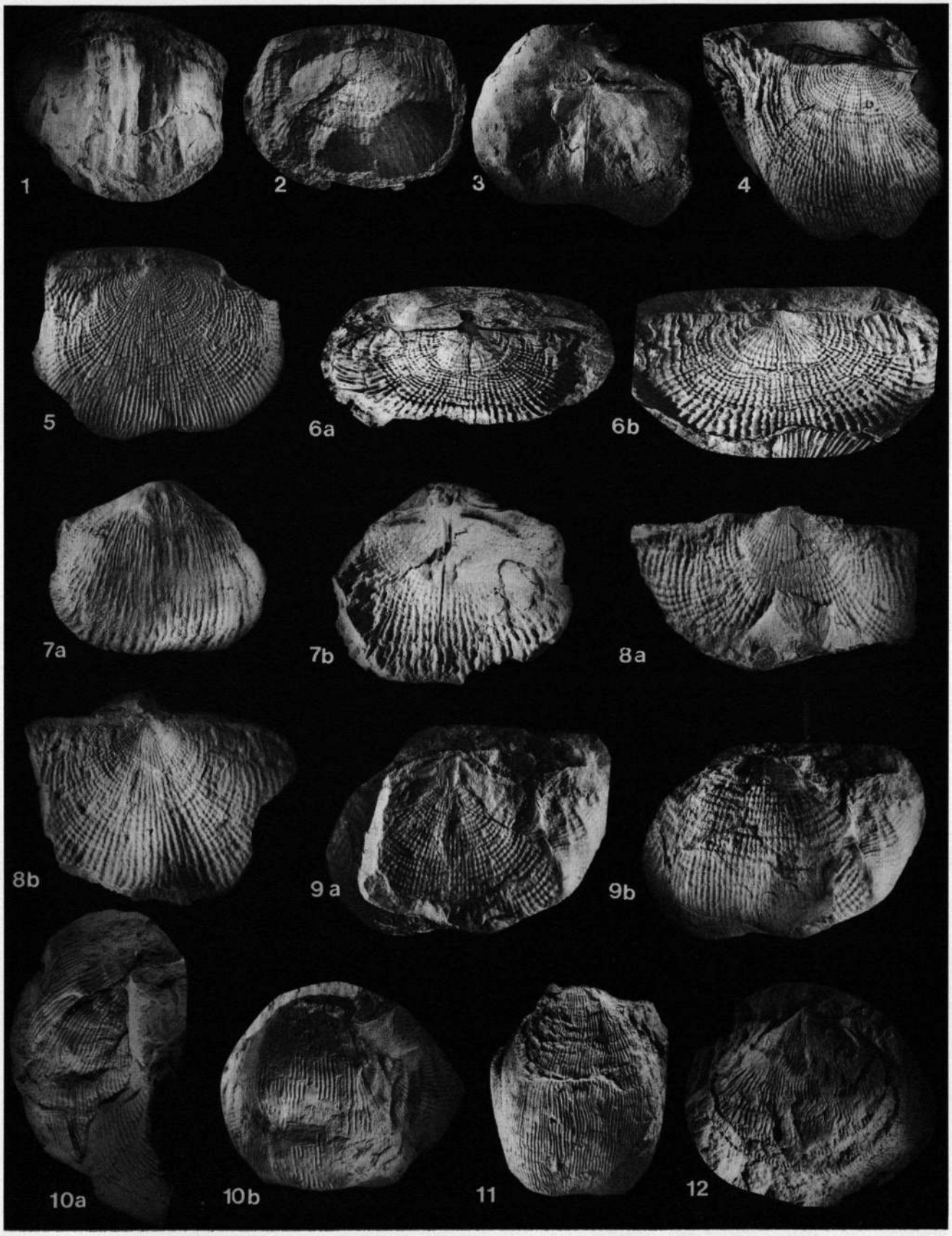

1
2
3
4
5
6a
6b
7a
7b
8a
8b
9a
9b
10a
10b
11
12

PLATE VIII

Figs. 1-3. *Linoproductus cora* (d'Orbigny) p. 107

Fig. 1. Incomplete interior of a brachial valve showing dendritic adductor scars. dM. 62182, × 1½, loc. 34, Lena Fm.

Fig. 2. Mould of the interior of a pedicle valve. Br. 902, × 2, loc. 50, Sierra Corisa Lst. Mbr. 2a posterior view; 2b lateral view.

Fig. 3. Incomplete interior of a brachial valve with indistinct adductor scars showing a shallow alveolus and endospines at the anterior margin of the visceral disc. Bl. Fe 342, × 1½, loc. 36, Soton Mbr.

Figs. 4-6. *Linoproductus continentalis* (Tornquist) p. 108

Fig. 4. Incomplete pedicle valve showing irregular costation in the lower left-hand corner. WP. 16453, × 1, loc. 3, Valdeteja Mbr.

Fig. 5. Exterior mould of a brachial valve. WP. 16455, × 1, same loc.

Fig. 6. Incomplete pedicle valve showing numerous small spine bases. WP. 16450, × 1, same loc.

Figs. 7, 8. *Linoproductus latiplanus* Ivanov p. 108

Fig. 7. Interior mould of a pedicle valve showing a row of spines on the left ear. Si. M 002, × 1½, loc. 40, Pando Fm.

Fig. 8. Exterior mould of a brachial valve. Si. M 001, × 1, same loc.

Fig. 9. *Ovatia ovata* (Hall) p. 110
Flattened pedicle valve showing row of spine bases along the hinge and irregular costation anteriorly, lateral view. WP 16461, × 2, loc. 3, Valdeteja Mbr. Uncoated with ammonium chloride.

Figs. 10, 11. *Cancrinella craigmarkensis* (Muir-Wood) p. 103

Fig. 10. Pedicle valve. Bl. Fe 45352, × 4, loc. 34, Soton Bajo Mbr.

Fig. 11. Incomplete pedicle valve. Br. M 711, × 3½, loc. M 7, Escalada Fm.

Fig. 12. *Fluctuaria undata* (Defrance) p. 110
Pedicle valve. Ra. 17, × 1, loc. 10?, Valdeteja Mbr. 12a posterior view; 12b antero-lateral view.

Fig. 13. *Proboscidella proboscidea* (de Verneuil) p. 111
Incomplete specimen. dG. 511, × 2, loc. 54, Perapertú Fm. 13a pedicle valve, lateral view; 13b postero-ventral view showing the pedicle valve and anterior part of the brachial valve.

Fig. 14. *Proboscidella* sp. p. 111
Pedicle valve. Ka. 7142, × 1, loc. 42, Cervera Fm.

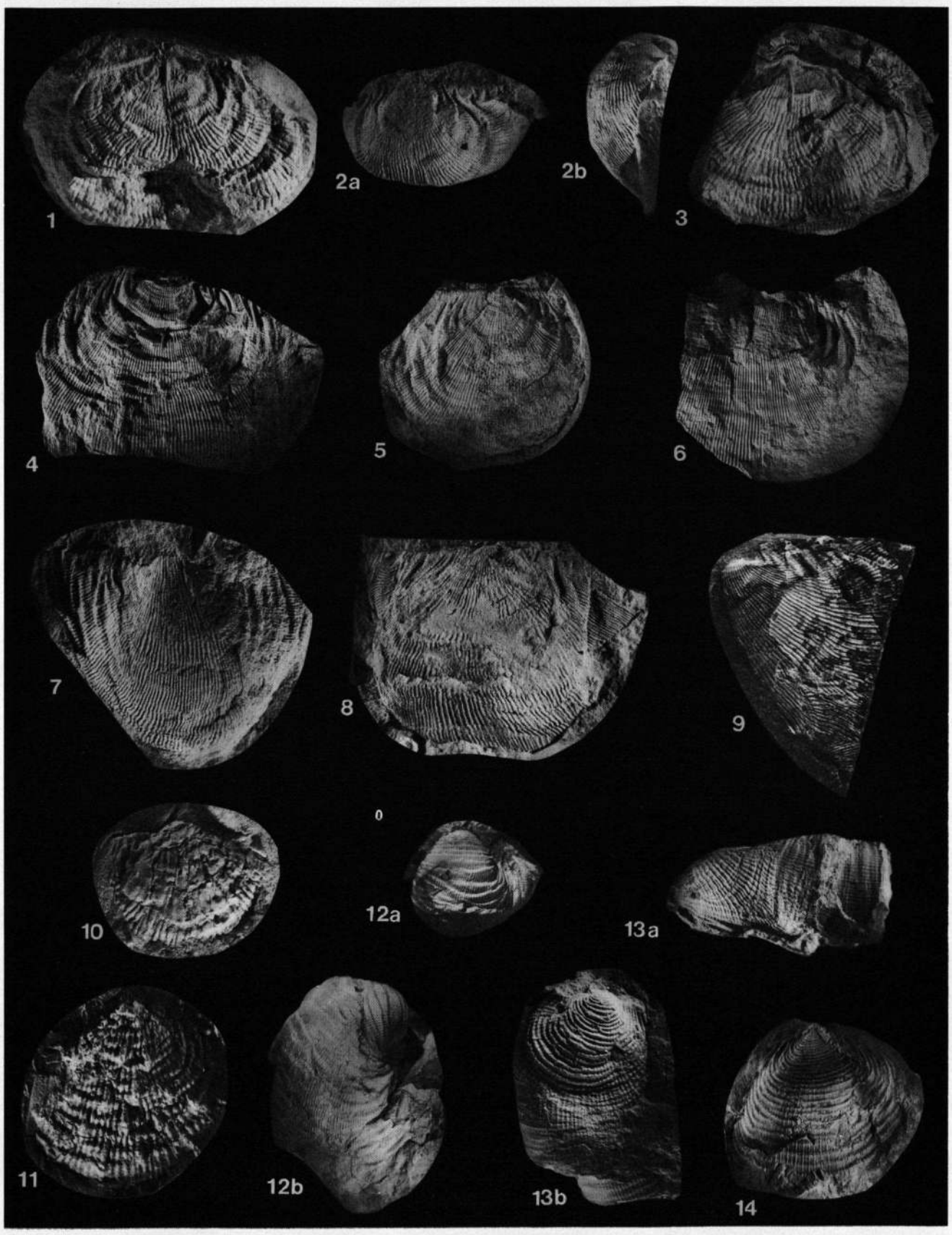

1
2a
2b
3
4
5
6
7
8
9
10
0
12a
13a
11
12b
13b
14

PLATE IX

Figs. 1, 2. *Plicochonetes waldschmidti* Paeckelmann p. 118

Fig. 1. Mould of the interior of a pedicle valve. WP. 014250, × 20, loc. W 1162, Vegamián Fm.

Fig. 2. Interior mould of a brachial valve showing the large diverging septa, alveolus and socket ridges. WP. 014230, × 20, same loc.

Figs. 3, 4. *Plicochonetes kayserianus* Gallwitz p. 117

Fig. 3. Mould of the exterior of a brachial valve. WP. 014263, × 5, same loc.

Fig. 4. Mould of the exterior of a pedicle valve with the exterior mould of a small brachial valve of *P. waldschmidti* adhering. WP. 014272, × 5, same loc.

Fig. 5. *Rugosochonetes laguessianus angustus* (Paeckelmann) p. 115
Interior mould of a pedicle valve. WP. 014305, × 12½, same loc.

Fig. 6, 7. *Rugosochonetes skipseyi* (Currie) p. 115

Fig. 6. Mould of a brachial valve exterior and a small part of the pedicle valve interior showing a row of spines along the hinge. Br. M 857, × 5, loc. M 8, Escalada Fm.

Fig. 7. Interior mould of a pedicle valve showing the median septum and the spine canals in the area. The median sulcus is shown exaggerated. Bl. 49230, × 3½, loc. 37, Calizas Inferiores Mbr.

Fig. 8. *Rugosochonetes acutus* (Demanet) p. 114
8a Incomplete exterior mould of a brachial valve. Br. M 851B, × 2½, loc. M 8, Escalada Fm.; 8b Interior mould of the same brachial valve. Br. M 851A, idem.

Figs. 9, 10. *Chonetinella flemingi crassiradiata* (Dunbar & Condra) p. 119

Fig. 9. Incomplete pedicle valve. WP. 33301, × 7, loc. 28, San Emiliano Fm.

Fig. 10. Incomplete interior mould of a pedicle valve. WP. 33850, × 6½, loc. 20, San Emiliano Fm.

Figs. 11-16, 18. *Neochonetes acanthophorus* (Girty) p. 119

Fig. 11. Pedicle valve. WP. 33808, × 2¾, same loc.

Fig. 12. Pedicle valve. WP. 33806, × 2¼, same loc.

Fig. 13. Pedicle valve. WP. 33803, × 2½, same loc.

Figures 11-13 are not whitened with ammonium chloride to show the lamellose surface and the spinule apertures as white bands and spots, respectively.

Fig. 14. Brachial valve and interarea of the pedicle valve showing the reflexed interarea and the cardinal process. WP. 33817, × 2¼, same loc.

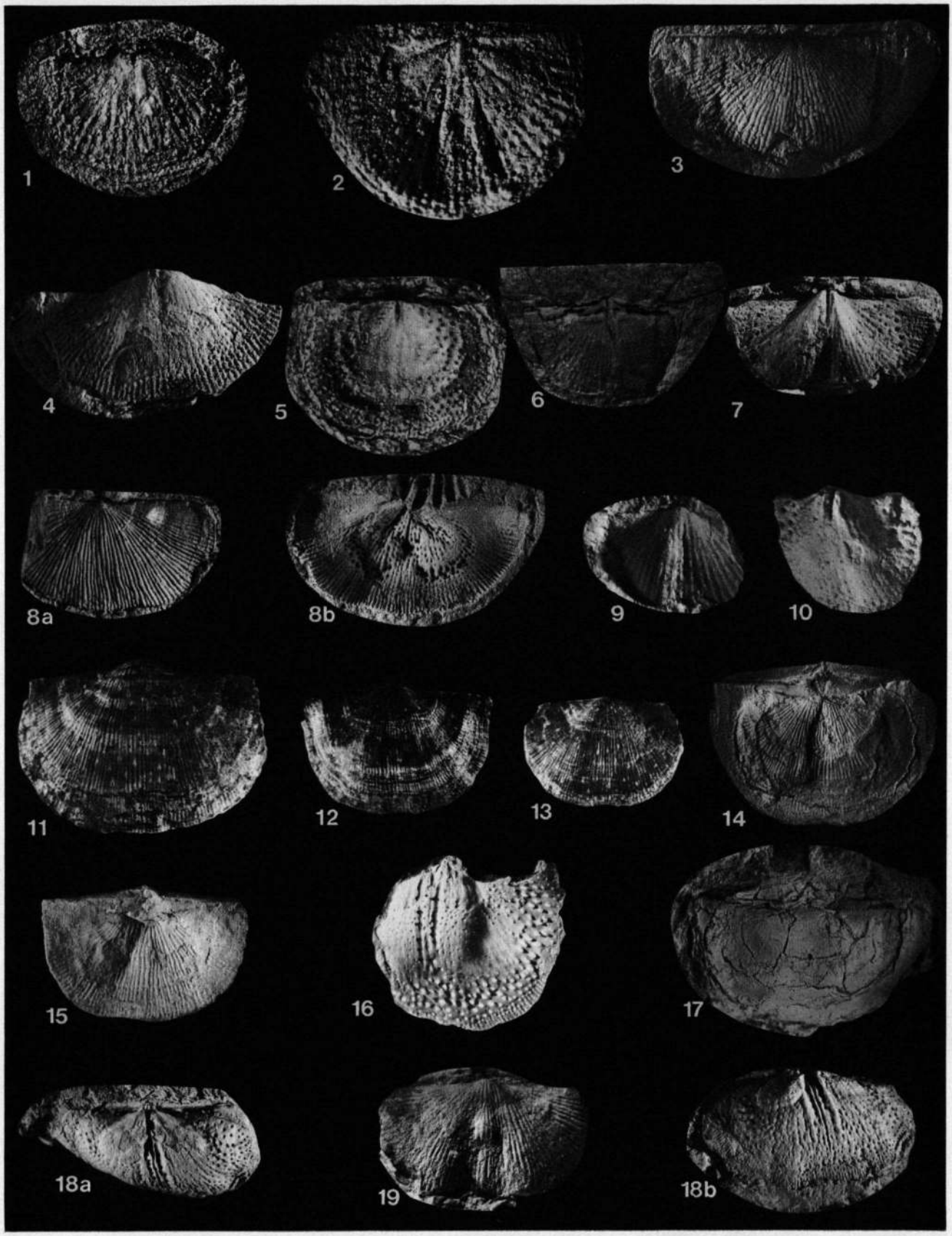
Fig. 15. Brachial valve showing spinule apertures. Note also the crushing of the brachial valves in this and the foregoing figure. WP. 33805, × 3, same loc.

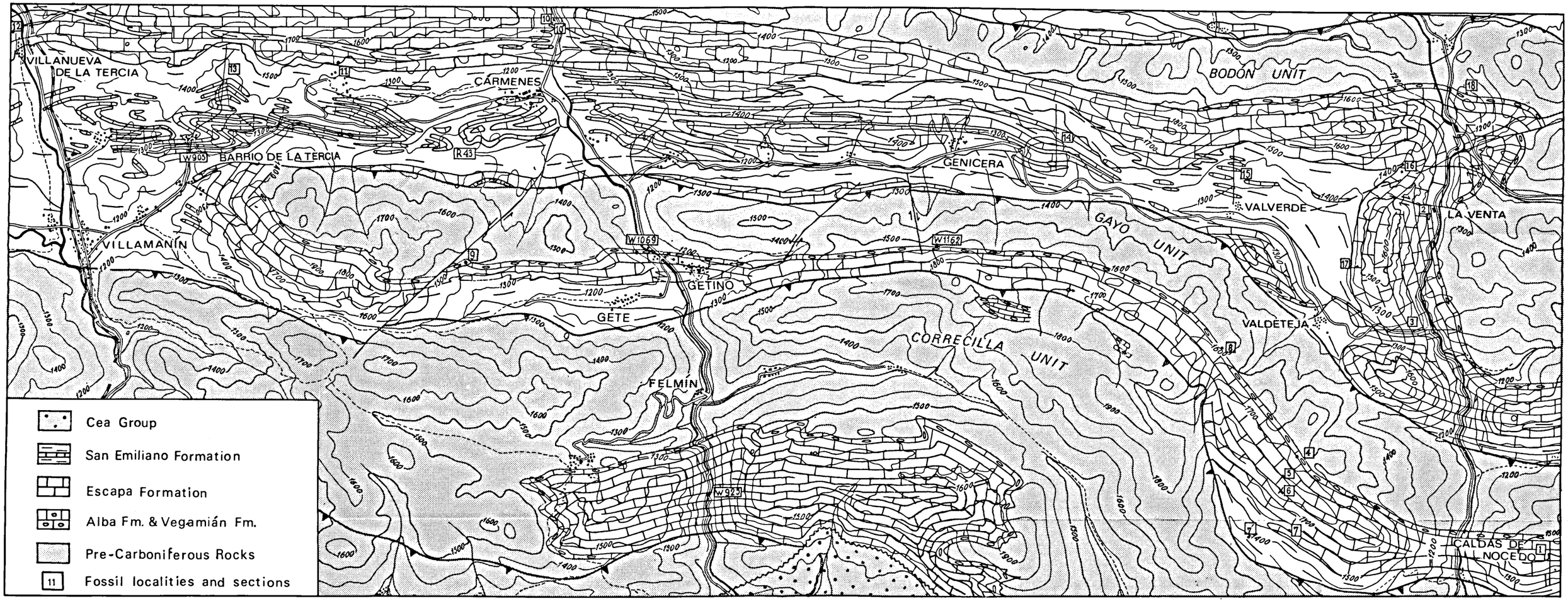
Fig. 16. Interior of a fragmentary pedicle valve showing the papillae, the median septum and the vascular trunks. WP. 33840, × 3, same loc.

Fig. 18. Interior mould of a pedicle valve. Wa. R 97, × 2½, Lena Fm. 18a posterior view; 18b anterior view.

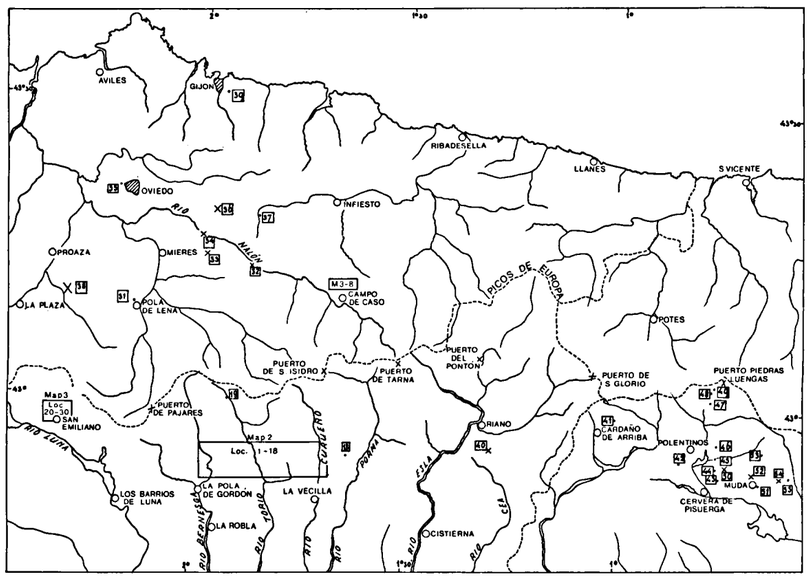
Fig. 17. *Lissochonetes? obtusus* (Schellwien) p. 116
Decorticated interior of a brachial valve showing the socket ridges, the teeth of the pedicle valve and a weak radial lineation of the surface. Wa. 7529, × 2½, loc. 46, Verdiana Lst. Mbr.

Fig. 19. *Mesolobus sinuosus* (Schellwien) p. 116
Pedicle valve. Br. 2101, × 2½, unknown loc., probably Cristobál Fm. or else Corisa Fm.

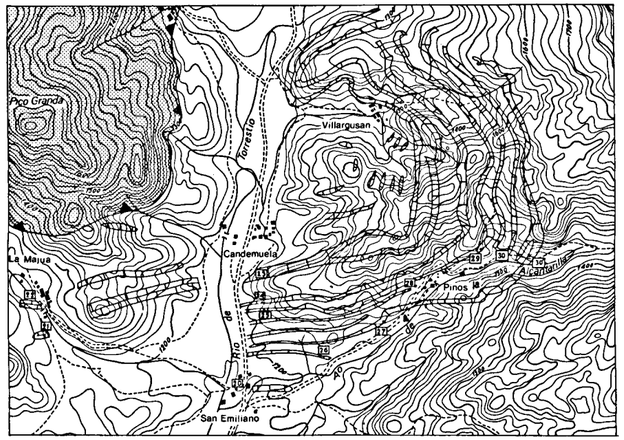

1
2
3
4
5
6
7
8a
8b
9
10
11
12
13
14
15
16
17
18a
19
18b



Map 2. Part of the Bernesga - Torío - Curueña - Porma Sheet prepared by H. J. Evers (1966) Scale 1 : 50.000



Map 1. Locality map prepared from the Firestone Map Scale 1 : 1.000.000



Map 3. San Emiliano Region Scale 1 : 50.000