THE STRATIGRAPHY AND PALAEONTOLOGY OF THE ORDOVICIAN TO DEVONIAN ROCKS OF THE AREA NORTH OF DORNES (NEAR FIGUEIRÓ DOS VINHOS), CENTRAL PORTUGAL.

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Appendix 1; Grid references of fossil localities

No.	Grid reference		No.	Grid reference	
1	18595	32723	35	19236	31250
2	18515	32723	36	19227	31664
3	18429	32695	37	19028	31055
4	18398	32572	38	19016	31201
5	18680	32368	39	19027	31213
6	18676	32364	40	19043	31200
7	18676	32362	41	19121	31216
8	18676	32359	42	19189	31118
9	18678	32333	43	19140	31178
10	19018	31208	44	19190	31118
11	18998	31357	45	19178	31077
12	19085	31316	46	19181	31063
13	19085	31320	47	18977	31226
14	19090	31328	48	18800	31304
15	19075	31339	49	18855	31230
16	19059	31339	50	18854	31243
17	19085	31332	51	18804	31267
18	19099	31321	52	19020	31333
19	19074	31216	53	19024	31343
20	19181	31285	54	19026	31354
21	19155	31287	55	19037	31383
22	19151	31278	56	19033	31394
23	19271	31306	57	19048	31389
24	19301	31282	58	19083	31320
25	19196	31226	59	19128	31389
26	19173	31152	60	19152	31434
27	19198	31115	61	19158	31419
28	19239	31166	62	19098	31475
29	19276	31138	63	19112	31310
30	19191	31264	64	19342	31279
31	19208	31202	65	19313	31285
32	19234	31045	66	19112	31361
33	19231	31043	67	19108	31365
34	19215	31033	68	19104	31216

69	19204	31335
70	18992	31368
71	18987	31381
72	18985	31389
73	19006	31388
74	19014	31374
75	19022	31362
76	19022	31383
77	19020	31470
78	19007	31410
79	18983	31385
80	18977	31367
81	18997	31326
82	18848	31167
83	19126	31378
84	19125	31389
85	19117	31366
86	18843	31295
87	18915	31123
88	18884	31105
89	18881	31059
90	18887	31045
91	18774	31202
92	18787	31247
93	18823	31311
94	18787	31247
95	18724	31286
96	18755	31380
97	18763	31387
98	19180	31600
99	19176	31603
100	19157	31636
101	19080	31559
102	19066	31555
103	19127	31577
104	19064	31783
105	19059	31788
106	19059	31788
107	19059	31788
108	19063	31794
109	19009	31924
110	18988	31858
111	18979	31872
112	18971	31882
113	18927	31888
114	18954	31929
115	18902	31929
116	18892	31847
117	18950	31393
118	18943	31407
119	18952	31420
120	18932	31440
121	18823	31443
122	19080	31382
123	18965	32223
124	18962	32222
125	18937	32062
126	18940	32055
127	18980	32052
128	18950	32038
129	18981	32045
130	18957	32024
131	18992	32051
132	18937	31940
133	18940	31935
134	18895	32293
135	18920	32275
136	18816	32257
137	18880	32173
138	18873	32116
139	18878	32096
140	18884	32051
141	18897	32027
142	18844	31998
143	18843	31994
144	18890	31943

145	18916	32177
146	18887	32188
147	18917	32212
148	18903	32223
149	19029	31809
150	19000	31800
151	19000	31802
152	18946	31870
153	18948	31843
154	18922	31857
155	19026	31737
156	19012	31728
157	19000	31631
158	19007	31653
159	19017	31681
160	19069	31680
161	19006	31555
162	18730	31669
163	18756	31561
164	18752	31518
165	18688	31558
166	18677	31603
167	18700	31588
168	18709	31596
169	18613	31350
170	18590	31364
171	18476	31615
172	18472	31741
173	18602	31804
174	18655	31807
175	18663	31911
176	18566	31898
177	18568	31857
178	18567	31871
179	18593	31739
180	18604	31734
181	18547	31787
182	18554	31680
183	18593	31677
184	18650	31612
185	18583	31655
186	18663	31690
187	18670	31716
188	18648	31824
189	18809	31732
190	19119	31650
191	19133	31628
192	19092	31644
193	18863	31613
194	18877	31588
195	19218	31153
196	18871	31342
85B	18833	31195
121X	18858	31409
122X	18840	31433

Appendix 2; Fossils present in each formation and member

	DORNES FM.	SERRA DO LUAÇÃO FM.	SERRA DA MENDEIRA FM.	VALE DO SERRÃO FM.	POZ DA SERTA FM.	VALE DA URSA FM. & Serra dos Aguilhões M.	MONTE DO CARVALHAL FM.				MONTE DA SOMBADEIRA FM.	BREJO FUNDEIRO FM.	SERRA DO BREJO FM.
							Serra do Amial M.	Serra da Cadaveira M.	Bryosoa beds	Lameiros M.			
ARTHROPODA													
Dysplanus sp. indet.	.	.	.	.	.	.	.	.	X	.	.	.	.
Ectillaenus cf bergaminus Whittard	.	.	.	.	.	.	.	.	.	.	.	X	.
Onnia grenieri (Bergeron)	.	.	.	.	.	.	.	.	X	.	.	.	.
Onnia cf. grenieri (Bergeron)	.	.	.	.	.	.	.	X	.	.	.	.	.
Eccoptochile (Eccoptochile) cf. clavigera (Beyrich)	.	.	.	.	.	.	.	.	X	.	.	.	.
Calymenella (Calymenella) boisseli Bergeron	.	.	.	.	.	.	.	X	.	.	.	.	.
Neseuretus (Neseuretus) tristani (Brongniart)	.	.	.	.	.	.	.	.	.	X	X	X	.
Colpocoryphe cf. lennieri (Bergeron)	.	.	.	.	.	.	.	.	X	.	.	.	.
Colpocoryphe rouaulti Henry	.	.	.	.	.	.	.	.	.	.	.	X	.
Plaesiacomia oehlerti (Kerforne)	.	.	.	.	.	.	.	.	.	X	.	X	.
Crozonaspis armata Hammann	.	.	.	.	.	.	.	.	.	X	.	X	.
Crozonaspis morenensis cf. morenensis Hammann	.	.	.	.	.	.	.	.	.	.	X	.	.
Crozonaspis morenensis mayensis Clarkson & Henry	.	.	.	.	.	.	.	.	.	.	.	X	.
Mucronaspis cf. macrophtalma (Brongniart)	.	.	.	.	.	.	.	.	.	.	.	X	.
Mucronaspis chillonensis Hammann	.	.	.	.	.	.	.	.	.	.	.	X	.
Kloucekia (Kloucekia) cf. tacuzensis Destombes	.	.	.	.	.	.	.	X	.	.	.	.	.
Selenopeltis cf. macrophthalmus (Klouček)	.	.	.	.	.	.	.	.	.	.	.	X	.
BRACHIOPODA													
Drabovia cf. redux (Barrande)	.	.	.	.	.	.	.	.	X	.	.	.	.
Horderleyella cf. plicata Bancroft	.	.	.	.	.	.	.	.	.	X	.	.	.
Svobodaina armoricana Babin & Melou	.	.	.	.	.	.	.	X	.	.	.	.	.
Tissintia sp. indet.	.	.	.	.	.	.	.	.	.	X	.	X	.
Cacemia ribeiroi (Sharpe)	.	.	.	.	.	.	.	.	.	.	.	X	.
Acrospirifer fallax (Giebel)	X	.	.	.	.	.	.	.	.	.	.	.	.
Chonetes cf. sarcinulata	X	.	.	.	.	.	.	.	.	.	.	.	.
Platyorthis cf. circularis	X	.	.	.	.	.	.	.	.	.	.	.	.
Plebejochonetes plebejus (Schnur)	X	.	.	.	.	.	.	.	.	.	.	.	.
?Leptostrophia sp. indet.	.	X	.	.	.	.	.	.	.	.	.	.	.
TRACE FOSSILS													
Cruziana goldfussi (Rouault)	.	.	.	.	.	.	.	.	.	.	.	.	X
Cruziana aff. goldfussi (Rouault)	.	.	.	.	.	.	.	.	.	.	.	.	X
Cruziana furcifera d'Orbigny	.	.	.	.	.	.	.	.	.	.	.	.	X
Cruziana sp. indet.	.	.	.	.	.	.	.	.	.	.	.	.	X
Rusophycus sp. indet.	.	.	.	.	.	.	.	.	.	.	.	.	X
Merostomichnites sp. indet.	.	.	.	.	.	.	.	.	.	.	.	.	X
Planolites cf. virgatus (Hall)	.	.	.	.	.	.	.	.	.	.	.	.	X
Skolithos linearis Haldeman	.	.	.	.	.	.	.	.	.	.	.	.	X
Arthrophycus sp. indet.	.	.	.	.	.	.	.	.	.	.	.	.	X
Palaeophycus sp. indet.	.	.	X	.	.	.	.	X	.	.	.	.	.
Monocraterion sp. indet.	.	X	X	.	.	.	.	.	.	.	.	.	.

	DORNES FM.	SERRA DO LUAÇÃO FM	SERRA DA MENDEIRA FM.	VALE DO SERRÃO FM.	POZ DA SERTA FM.	VALE DA URSA FM. & Serra dos Aguilhões M.	MONTE DO CARVALHAL FM. Serra do Anjal M.	Serra da Cadaveira M.	Bryozoa beds	Lameiros M.	MONTE DA SOUBADEIRA FM.	BREJO FUNDEIRO FM.	SERRA DO BREJO FM.
GRAPTOLITHINA													
Didymograptus acutus Ekström												X	
Didymograptus ?artus Elles & Wood												X	
Didymograptus aff. bifidus (J. Hall)												X	
Didymograptus geminus (Hisinger)												X	
Didymograptus murchisoni (Beck)												X	
Didymograptus murchisoni (Beck) s.l.												X	
Didymograptus ?speciosus Ekström												X	
Didymograptus spinulosus Perner												X	
Didymograptus cf. vacillanoides Perner												X	
Cyrtograptus sp. indet.					X								
Gothograptus nassa (Holm)					X								
Monoclimacis flumendosae (Gortani)					X								
?Monoclimacis vomerina (Nicholson)					X								
??Monograptus capillaceus Tullberg					X								
Monograptus flemingi (Salter)					X								
Monograptus ludensis (Murchison)					X								
Monograptus ?parapriodon Boucek					X								
Monograptus cf. priodon (Bronn)					X								
?Monograptus priodon (Bronn)					X								
Monograptus cf. retroflexus Tullberg					X								
Plectograptus sp.					X								
Pristiograptus dubius (Suess)					X								
Pristiograptus jaegeri Holland et al.					X								
?Pristiograptus nudus (Lapworth)					X								
Retiolites geinitzianus (Barrande)					X								
Saetograptus colonus (Barrande)					X								
Climacograptus sp. indet.						X							
?Glyptograptus sp. indet.						X							
Indeterminate biserial graptolites						X							
ECHINODERMATA													
Calix sp. indet. (two species)									X			X	
Corylocrinus sp. indet.									X				
?Rhombifera sp. indet.									X				
Camerate crinoid									X				
Inadunate crinoid									X				
MISCELLANEA													
Ctenobolbina sp. indet.											X	X	
Quadrijugator sp. indet.										X			
Tetradella? bussacensis (Jones)										X		X	
Deceptrix ciae (Sharpe)										X			
Bryozoa								X	X				
Conispiral gastropods									X				
Orthocones					X					X			

Microfossils identified by K. Dorning

S1. Vale do Serrão Formation (18927, 31127)

Chitinozoa- Conochitina sp.

Miospores- Ambibisporites sp.

Acritarchs- Proboleiosphaeridium spp.

Wenlock? or lower Ludlow?

S2. Serra do Luação Formation (18950, 31127)

Chitinozoa- Sphaerochibina sp.

Miospores- Ambibisporites sp.

Acritarchs- Proboleiosphaeridium spp.

Lophosphaeridium sp.

Micrhystridium sp.

Orondagella assymetrica (Deunff) Cramer

Salopidium cf. granuliferum (Downie) Dorning MS.

Probably Leintwardinian or Whitcliffian.

S3. Serra do Luação Formation (18920, 31119)

Chitinozoa- Conochibina sp.

Miospores- Ambibisporites sp.

Tasmanites sp.

Acritarchs- Proboleiosphaeridium sp.

Lophosphaeridium sp.

No diagnostic forms.

S4. Serra do Luação Formation (18897, 31114)

Acritarchs- Melanosclerites sp.

Proboleiosphaeridium sp.

No diagnostic forms.

S7. Serra do Luação Formation (18898, 3115)

Miospores- Ambibisporites sp.

Acritarchs- Proboleiosphaeridium spp.

Lophosphaeridium sp.

No diagnostic forms.

S8. Serra do Luação Formation (18798, 31114)

Acritarchs- Proboleiosphaeridium spp.

Lophosphaeridium sp.

Micrhystridium sp.

No diagnostic forms.

S9. Serra do Luação Formation (18895, 31113)

Miospores- Ambibisporites sp.

Archaeozonotriletes sp.

Acritarchs- Proboleiosphaeridium spp.

Lophosphaeridium sp.

Melosphaeridium sp.

Salopidium cf. granuliferum (Downie) Dorning MS.

Salopidium sp.

Ammonidium sp.

Tylotopalla traumatica (Cramer)

Veryhachium sp. (3 processes)

Forms not known from the type Ludlovian are present and the sample is probably of post Whicliffian (Pridoli) age.

S10. Serra do Luação Formation (18892, 31110)

Miospores- Ambibisporites sp.

Acritarchs- ?Gorgonisphaeridium sp.

Veryhachium sp. (3 processes)

Proboleiosphaeridium sp.

Negitive evidence possibly indicates a post Whitcliffian age.

S11. Serra do Luação Formation (18887, 31106)

Acritarchs- Proboleiosphaeridium spp.

Veryhachium sp.

No diagnostic forms.

Appendix 3; Measurements of fossils

i Neseuretus (Neseuretus) tristani (Brongniart, 1822)..... 409

ii Plaesiacomia oehlerti (Kerforne, 1900)..... 414

iii Horderleyella cf. plicata Bancroft, 1928..... 419

iv Svobodaina armoricana Babin & Melou, 1972..... 420

v Tissintia sp. indet. 423

vi Cacemia ribeiroi (Sharpe, 1853)..... 424

i *Neseuretus* (*Neseuretus*) *tristani* (Brongniart, 1822)

For orientation of measurements see figure 61; all measurements taken with the plane of the posterior margin vertical.

105/6	-	Locality and specimen number
in	-	Internal mould
ex	-	External mould
e	-	Length of occipital ring
b	-	Length of glabella
f_2+g	-	Length of preglabellar field
g	-	Length of anterior border
d_5	-	Length (exsag.) of eyes from posterior border
e+b+f_2+g	-	Length of cranidium
k	-	Maximum width of glabella
j	-	Width between eyes
i	-	Width of cranidium

Neseuretus (Neseuretus) tristani (Brongniart, 1822); mm

No	in/ex	e	b	f_2+g	g	d_5	e+b+ f_2+g	k	j	i
8	in	2.8	13.0	6.3	-	13.5	22.1	12.0	24.0	28.0
14	in	1.8	9.7	5.7	-	10.2	17.2	11.4	20.0	34.0
15	in	4.0	16.5	7.0	-	17.0	27.5	15.0	31.0	36.0+
17	ex	1.0	4.5	1.6	-	4.8	7.1	4.0	6.5	10.0
17	ex	1.2	5.5	2.5	-	-	9.2	6.5	-	16.0
17	in	1.1	4.5	2.4	-	-	8.0	4.0	-	11.5
17	in	1.4	7.5	3.7	-	-	12.6	7.5	-	19.0
17	in	1.0	6.0	2.4	-	-	9.4	6.0	-	18.0
20	in	1.2	4.5	2.8	-	5.2	8.5	7.4	10.8	21.0
20	ex	0.8	3.3	1.1	-	3.5	5.2	3.5	5.4	8.0
20	ex	0.6	3.9	1.7	-	-	6.2	4.0	-	10.0
29	in	1.2	6.0	2.5	-	8.0	9.7	6.0	12.0	-
35	in	-	21.0	10.0	-	-	-	21.0	-	-
35	in	1.9	6.8	3.6	-	8.0	12.3	18.0	16.0	33.0
36	ex	2.8	9.7	6.0	-	12.0	18.5	11.0	18.0	-
36	in	0.8	5.6	2.8	-	6.0	9.2	5.3	9.0	17.5
36	in	3.0	15.5	8.0+	-	19.0	26.5+	15.0	22.0+	-
36	ex	2.0	11.0	6.0	-	11.0	19.0	11.0	22.0	-
52	in	1.5	8.5	4.0	-	-	14.0	8.5	-	-
56/8	ex	2.0	7.9	3.1	-	8.1	13.0	8.2	13.0	18.0
67	ex	1.0	6.0	2.7	-	6.5	9.7	10.0	16.0	28.0
68	ex	2.1	10.2	5.5	-	10.3	17.8	13.0	22.0	31.0
68	in	2.0	8.4	3.0	-	9.5	13.4	9.0	16.0	26.0
76	in	1.3	4.6	2.3	-	5.4	8.2	5.5	11.0	14.6
76	in	2.1	12.5	5.8	-	14.0	20.4	10.2	20.0	32.0

Neseuretus (Neseuretus) tristani (Brongniart, 1822); mm

No	in/ex	e	b	f_2+g	g	d_5	e+b+ f_2+g	k	j	i
85/51	in	2.2	8.5	5.0	-	10.5	15.7	9.0	14.0	-
85/58	ex	3.0	10.0	5.0	-	11.0	18.0	10.2	16.0	-
85/91	ex	2.8	7.7	4.5	-	11.5	15.0	11.0	14.0	
85/108	in	-	8.5	4.5	1.2	10.0	-	8.5	16.0	32.0
85/114	in	1.6	7.5	5.2+	-	10.0	14.3	9.0	16.0	22.0
85/115	in	2.0	9.0	4.0	-	-	15.0	8.0	-	-
85/118	ex	2.6	9.0	5.7	-	11.5	17.3	11.0	14.5	-
85/130	in	3.3	12.5	5.5+	-	-	20.8	16.0	-	-
85/135	in	1.5	6.0	2.7	-	4.5	10.2	5.5	9.0	16.0
85/157	in	2.2	8.0	4.8	-	8.5	15.0	8.7	15.0	28.0
85/168	ex	2.0	7.0	-	-	8.5	-	8.0	14.5	26.0
85/172	in	2.2	7.0	4.3	-	9.0	13.5	8.0	15.0	36.0
85/174	in	3.0	9.5	5.0	-	11.0	17.5	10.0	15.5	26.0
105	in	2.6	8.4	6.0	-	11.0	17.0	6.4	21.0	33.0
105	in	2.2	9.5	4.5	-	11.2	16.2	11.5	17.0	30.0
105	ex	3.5	15.0	7.5	-	17.0	26.0	18.0	26.0	40.0
105	in	3.0	14.5	9.0	-	16.0	26.5	12.0	26.0	39.0
106	in	2.4	12.0	5.6	-	11.2	20.0	12.5	25.0	30.0
113/1	in	1.8	8.0	3.8+	-	-	13.6	8.0	-	-
113/1	in	2.0	10.0	5.0	-	9.5	17.0	10.8	18.0	28.0
113/1	ex	1.8	8.0	3.2	-	9.0	15.0	9.0	16.4	22.0
113/2	in	2.1	10.3	5.7	-	12.0	17.1	11.0	20.0	32.0
113/3	in	1.1	6.0	-	-	6.1	-	4.3	12.0	-
113/3	in	2.0	9.0	-	-	-	-	11.0	-	-
113/5	in	2.2	10.0	6.2	-	11.0	18.4	9.5	16.8	-

Neseuretus (Neseuretus) tristani (Brongniart, 1822); mm

No	in/ex	e	b	f_2+g	g	d_5	e+b+ f_2+g	k	j	i
113/8	in	-	10.2	6.5	-	8.2	-	14.0	22.0	-
113/9	in	-	7.9	5.3	-	10.0	-	14.0	22.0	32.0
113/13	in	2.7	13.0	6.5+	-	15.0	22.3	12.0	25.0	33.0
113/14	in	-	12.2	6.3	-	-	-	12.5	-	30.0
113/14	in	2.3	12.0	-	-	-	-	11.0	-	-
113/15	in	2.6	11.0	6.4	-	12.0	20.0	12.2	20.0	34.0
113/16	ex	1.3	6.8	3.8	-	7.0	11.9	8.9	16.2	21.6
113/17	in	2.0	8.6	-	-	7.2	-	12.0	28.0	34.0
113/17	in	1.9	8.0	4.7	-	8.3	14.6	11.0	19.0	-
113/17	ex	2.2	12.0	-	-	-	-	11.0	-	-
113/17	ex	1.5+	7.0	4.6	-	6.6	13.1	13.0	25.0	-
113/18	in	1.6	8.9	4.8	-	-	14.3	12.0	-	30.0
113/19	in	1.8	7.6	4.8	-	-	14.2	11.8	-	28.0
113/20	ex	1.2+	8.0	4.3	-	-	13.5	12.0	-	24.0
113/22	ex	1.3	6.8	2.8	-	-	10.9	9.0	-	-
113/22	in	2.0	8.8	-	-	12.0	-	10.0	19.0	-
113/22	in	1.7+	10.5	-	-	13.0	-	9.8	20.0	27.0
113/23	in	2.0	10.0	6.1	-	10.2	18.1	13.0	21.6	28.0
113/23	in	1.3	7.4	2.8+	-	-	11.5	9.8	-	28.0
113/23	ex	1.7	8.6	-	-	-	-	10.7	-	-
113	in	3.3	17.5	8.8	-	-	29.6	14.4	-	43.0
113	in	2.0	10.8	-	-	12.0	-	8.5	8.5	-
113	in	2.0	9.6	-	-	9.2	-	8.0	17.0	-
135	in	2.5	6.3	4.8	-	12.2	13.6	12.3	21.0	-
155	in	0.9	5.6	2.5	-	5.0	9.0	7.0	11.0	16.0

Neseuretus (Neseuretus) tristani (Brongniart, 1822); mm

No	in/ex	e	b	f_2+g	g	d_5	e+b+ f_2+g	k	j	i
160	in	3.5	14.5	7.0	-	-	25.0	16.0	-	43.0
160	in	-	13.0	8.0	-	-	-	15.0	22.0	-
160	in	2.0	10.0	5.0	-	11.5	17.0	11.7	18.0	30.0
173	in	3.0	15.3	-	-	-	-	13.8	-	50.0
175	in	1.8	11.5	4.0+	-	-	17.3	15.0	-	-
175/1	in	2.8	15.1	7.6	-	13.3	25.5	14.0	26.0	34.0
175/1	in	2.1	11.5	3.2+	-	-	16.8+	10.5	-	-
175/1	ex	2.4	14.3	6.6	-	-	23.3	11.4	-	34.0+
175/1	in	1.9	9.3	4.1	-	8.3	15.3	8.4	15.0	-
175/1	in	2.7	12.6	3.4+	-	9.5	18.7	14.5	24.0	-
175/1	in	2.8	13.2	6.0	-	11.5	22.0	10.5	18.0	34.0
175/2	in	1.2	5.0	3.3	-	5.7	9.5	9.3	14.0	24.0
175/3	ex	1.3	11.5	4.1	-	-	16.9	16.0	-	-
175/3	ex	2.1	9.9	4.4	-	-	16.4	8.0	-	-
190	in	1.1	5.8	2.6	-	-	9.5	7.0	-	21.6
190	in	0.7	3.6	1.2+	-	-	-	4.4	-	-

ii *Plaesiacomia oehlerti* (Kerforne, 1900)

For orientation of measurements see figure 67; all measurements taken with the normal projection of the sagittal cranidial length horizontal.

105/6	-	Locality and specimen number
in	-	Internal mould
ex	-	External mould
e	-	Length of occipital ring
b	-	Length of glabella
f_2	-	Length of preglabellar field
d_5	-	Length (exsag.) of eyes from posterior border
c	-	Length of eye
$e+b+f_2$	-	Length of cranidium
k	-	Posterior width of glabella
k_2	-	Anterior width of glabella
j	-	Width between eyes
j_2	-	Anterior width between facial sutures
i	-	Width of cranidium

Measurements of pygidium taken with plane of anterior margin vertical.

z_1	-	Length of pygidium
w	-	Width of pygidium
x	-	Width of axis

Plaesiacomia oehlerti (Kerforne, 1900); mm

No	in/ex	e	b	f_2	d_5	c	e+b +f_2	k	k_2	j	j_2	i
13/1	in	0.7	4.1	0.7	2.5	0.9	5.5	5.7	1.7	6.6	3.1	10.2
15/1	in	0.4	2.4	0.3	1.6	–	3.1	3.1	1.2	4.2	1.6	7.6
15/2	in	0.5	3.3	0.4	–	–	–	3.2	1.2	–	2.2	–
15/3	in	0.6	3.3	0.4	2.1	0.7	4.3	4.0	1.3	5.6	1.8	7.7
15/4	in	0.5	3.1	–	–	–	–	3.8	1.5	–	–	–
15/5	in	–	2.3	–	–	–	–	2.6	0.9	–	–	–
15/5	in	0.8	5.5	0.8	2.8	0.9	7.1	6.1	2.4	7.5	4.0	11.6
20/1	in	–	3.4	0.6	–	–	–	5.3	1.7	–	3.1	–
20/2	in	0.4	3.0	0.4	–	–	3.8	4.3	1.5	5.2	3.5	6.8
20/3	in	0.7	4.7	1.1	2.5	0.8	6.5	6.6	2.5	8.2	2.5	10.6
20/4	in	0.4	2.3	0.5	–	–	–	2.6	1.3	–	–	–
20/5	in	0.5	3.5	0.7	–	–	4.7	4.2	1.3	–	2.4	–
20/5	in	–	1.1	0.2	–	–	–	1.4	0.7	–	1.7	–
20/5	in	–	2.0	0.4	–	–	–	2.4	1.2	–	1.7	–
20/6	in	0.5	2.8	0.4	–	–	3.7	3.0	1.8	–	2.4	–
20/6	in	0.4	3.1	0.6	–	–	4.1	4.8	1.6	–	2.2	–
20/7	in	0.5	2.8	0.5	0.7	–	3.8	3.9	1.6	4.8	2.9	9.2
20/8	in	0.3	2.1	0.3	0.7	0.4	2.7	3.2	1.3	3.8	1.2	5.9
20/8	in	0.6	3.5	0.7	1.6	–	4.8	5.1	2.2	7.2	3.1	11.0
20/8	in	0.3	4.0	0.6	–	–	4.9	3.7	1.5	–	2.4	–
20/8	in	0.3	3.1	0.6	2.0	–	4.0	4.5	2.0	5.0	2.6	7.8
20/9	in	0.5	3.0	0.5	–	–	4.0	4.4	1.6	–	2.7	–
20/10	in	0.5	2.5	0.5	0.9	–	3.5	3.1	1.2	4.4	2.6	6.2
20/10	in	–	2.7	0.6	–	–	–	3.9	1.5	–	2.3	–
20/11	in	0.4	3.1	0.3+	–	–	–	3.5	1.4	–	–	–

Plaesiacomia oehlerti (Kerforne, 1900); mm

No	in/ex	e	b	f_2	d_5	c	e+b +f_2	k	k_2	j	j_2	i
20/11	in	0.5	3.4	0.7	-	-	4.6	5.1	2.0	-	2.6	-
20/12	in	0.4	2.4	0.4	1.2	-	3.2	2.6	1.0	3.6	1.8	4.6
20/12	in	0.7	-	-	1.7	-	-	4.0	-	5.4	-	11.0
20/12	in	0.3	2.8	0.6	1.4	-	3.7	4.2	1.6	5.6	2.5	7.0
20/13	in	0.2	1.7	0.3	-	-	2.2	1.5	0.7	-	1.2	-
20/15	in	0.3	1.4	0.2	-	-	1.9	1.3	0.6	-	0.9	-
20/16	in	0.5	3.1	0.8	1.4	-	4.4	6.6	1.3	5.4	2.1	8.0
20/16	in	0.6	3.5	0.8	-	-	4.9	4.1	1.4	-	2.6	-
20/16	in	0.2	1.7	0.3	-	-	2.2	1.7	0.7	-	1.2	-
20/16	in	0.6	3.3	0.7	1.7	-	4.6	4.3	1.9	5.0	2.9	7.4
20/16	in	0.2	1.6	0.3	-	-	2.1	1.7	0.8	-	1.5	-
20/17	in	0.5	2.4	0.4	1.5	-	3.3	2.7	1.2	3.9	1.8	5.2
20/17	in	-	2.0	0.3	-	-	-	2.2	1.0	-	1.6	-
20/20	in	0.4	2.8	-	-	-	-	3.2	1.4	-	-	-
20/20	in	0.7	4.0	0.7	-	-	5.4	5.7	2.1	-	3.3	-
20/21	in	0.4	2.8	0.6	-	-	3.8	3.4	1.2	-	1.7	-
20/21	in	0.5	2.9	0.5	-	-	3.9	3.2	1.3	-	2.8	-
20/21	in	0.5	3.0	-	-	-	-	3.1	1.2	-	-	-
20/21	in	0.5	2.6	0.5	1.2	-	3.6	3.0	1.3	4.0	2.2	5.8
20/21	in	0.6	2.8	-	2.0	-	-	4.2	1.8	5.6	-	6.8
20/21	in	0.7	-	-	-	-	-	3.8	-	5.6	-	7.2
20/22	in	0.4	2.2	0.5	1.3	-	3.1	3.0	1.0	3.2	1.5	4.6
20/22	in	0.5	3.3	0.6	1.5	0.6	4.4	3.8	1.7	5.4	3.0	7.2
20/23	in	0.5	2.5	0.4	1.5	0.5	3.4	3.0	1.3	3.6	1.7	5.6
20/23	in	-	3.5	0.6	-	-	-	3.8	1.6	-	2.8	-

Plaesiacomia oehlerti (Kerforne, 1900); mm

No	in/ex	e	b	f_2	d_5	c	e+b +f_2	k	k_2	j	j_2	i
20/23	in	0.6	2.8	0.5	1.6	-	3.9	3.9	1.7	5.4	2.2	7.6
20/23	in	0.6	3.8	0.5	-	-	4.9	5.2	1.8	-	2.7	-
20/25	in	0.5	3.3	0.5	1.5	0.5	4.5	4.3	1.7	5.2	3.3	9.4
20/26	in	0.6	3.6	0.5	-	-	4.7	4.5	1.8	-	-	-
20/27	in	0.3	2.3	0.3	-	-	2.9	2.6	1.2	-	3.6	-
20/28	in	0.3	2.6	0.4	-	-	3.3	3.4	1.4	-	2.2	-
20/30	in	0.4	2.9	0.5	1.4	-	3.8	3.4	1.3	3.4	1.7	6.6
20/30	in	0.7	3.4	0.6	-	-	4.7	4.2	1.7	-	3.0	-
20/31	in	0.6	2.8	0.5	-	-	3.9	4.2	1.6	-	3.2	-
20/31	in	0.5	2.3	0.2	-	-	3.0	2.8	1.0	-	1.5	-
147/1	in	0.8	4.0	0.9	2.0	0.8	5.7	4.2	1.3	5.4	2.8	8.2
147/2	in	0.4	3.2	0.7	2.5	-	4.1	3.8	1.2	4.0	-	8.0
147/2	in	0.6	3.0	0.6	1.4	-	4.2	3.2	1.6	3.8	-	6.1
147/3	in	0.7	3.5	0.5	1.8	0.9	4.7	4.2	1.6	6.2	2.1	8.3
147/4	in	0.6	3.0	0.5	-	-	4.1	3.3	1.4	-	-	-
147/5	in	0.4	2.7	0.7	1.6	-	4.8	3.3	1.3	3.9	1.9	6.5
147/6	in	0.6	3.2	-	2.3	0.5	-	5.8	1.4	6.0	-	11.5
147/7	in	0.6	3.1	0.5	1.9	-	4.4	5.0	1.3	6.2	-	9.5

Plaesiacomia oehlerti (Kerforne, 1900); mm

No	in/ex	z_1	w	x	No	in/ex	z_1	w	x
13/2	in	0.9	2.7	1.3	20/17	in	1.3	3.0	1.7
13/3	in	0.8	3.6	2.0	20/21	in	1.6	4.4	2.0
13/4	in	0.7	3.0	1.7	20/21	in	2.0	3.4	1.8
13/5	in	1.6	4.5	2.8	20/22	in	1.6	3.0	1.4
17/1	in	1.7	4.9	3.2	20/23	in	2.1	5.0	2.6
20/1	in	2.3	4.3	2.4	20/27	in	2.3	4.3	2.0
20/2	in	1.0	2.2	1.2	20/28	in	0.7	2.7	1.4
20/9	in	1.2	2.0	1.1	20/29	in	1.2	2.4	1.2
20/11	in	2.6	4.2	2.4	20/32	in	1.4	3.7	2.2
20/15	in	1.4	3.7	2.3					

iii Horderleyella cf. plicata Bancroft, 1928; mm

Locality and specimen number	Internal (in) or external (ex) mould	Valve; pedicle (P) or Brachial (B)	Length of valve	Width of valve	Height of valve (pl = planar)	Length of brachiophores or dental plates	Width of brachiophores or dental plates
20	in	B	6.2	8.0	pl	0.6	1.0
20/9	in	B	2.3	3.0	pl	0.4	0.7
20/12	in	B	8.0	11.0	pl	1.0	1.4
20/12	in	B	4.8	6.2	pl	0.8	1.0
20/23	in	B	5.0	8.0	pl	0.9	1.2
20/23	in	B	4.5	7.0	pl	0.5	1.3
20/31	in	B	2.3	2.8	pl	0.3	0.4
20/18	ex	B	1.5	2.0	pl	-	-
20/23	ex	B	4.0	6.2	pl	-	-
20/31	ex	B	6.0	7.0	pl	-	-
20/32	ex	B	5.5	7.0	pl	-	-
20/9	in	P	5.6	7.1	1.2	0.6	1.7
20/12	in	P	3.2	4.0	-	0.5	1.2
20/21	in	P	8.0	9.5	1.5	1.2	2.5
20/21	in	P	8.0	9.0	1.3	1.0	2.5
20/23	in	P	5.0	7.6	1.0	0.8	1.4
20/28	in	P	4.8	8.0	-	0.6	2.5
20/12	ex	P	6.0	8.2	-	-	-

iv *Svobodaina armoricana* Babin & Melou, 1972; mm

Locality and specimen number	Valve; pedicle (P) or brachial (B)	Length of valve	Width of valve	Median length of muscle field	Maximum length of muscle field	Width of interarea
25/3	P	15.0	15.5	6.5	8.5	10.0
25/5	P	17.0	19.0	6.0	8.2	9.0
25/6	P	16.0	18.0	8.9	7.0	7.0
52/3	P	13.0	20.0	4.0	7.0	13.0
52/4	P	18.0	28.0	10.0	8.0	18.0
52/6	P	12.0	18.0	3.5	6.5	10.0
52/13	P	10.0	16.0	-	4.0	-
52/16	P	8.5	8.0	2.5	3.5	6.0
52/18	P	14.0	20.0	6.5	9.0	9.5
52/19	P	15.0	24.0	4.5	7.0	11.0
52/20	P	13.0	20.0	4.0	6.0	11.0
117/3	P	18.5	21.5	6.5	9.0	11.5
117/3	P	11.6	14.0	-	-	-
117/6	P	16.0	22.0	4.5	6.0	12.0
117/6	P	7.0	10.0	2.5	3.5	7.0
117/7	P	22.5	21.0	6.5	9.5	-
117/7	P	20.0	22.0	6.0	8.0	-
117/7	P	7.5	12.0	2.3	4.6	9.0
117/8	P	19.5	24.0	5.5	9.0	-
117/9	P	16.0	17.5	5.0	7.5	-

Svobodaina armoricana Babin & Melou, 1972; mm

Locality and specimen number	Valve; pedicle (P) or brachial (B)	Length of valve	Width of valve	Maximum length of muscle field	Width of interarea
25/1	B	13.0	13.0	6.5	9.0
25/1	B	18.0	20.5	7.5	10.0
25/3	B	14.0	15.5	7.0	10.0
25/5	B	16.0	19.0	10.0	9.0
25/6	B	15.2	18.0	6.0	8.2
25/7	B	7.5	11.0	5.0	6.0
52/1	B	18.5	19.4	10.0	7.5
52/2	B	18.0	18.0	9.5	9.0
52/3	B	18.2	14.6	8.5	6.0
52/5	B	7.0	12.0	4.5	8.0
52/7	B	13.0	20.0	7.0	12.0
52/8	B	19.4	16.5	12.0	9.0
52/9	B	14.0	17.5	7.0	12.0
52/10	B	19.0	20.0	10.0	-
52/12	B	11.0	17.5	6.0	10.0
52/13	B	14.0	17.5	9.0	11.0
52/14	B	16.5	12.0	8.5	7.0
52/15	B	9.5	15.0	5.5	8.0
52/16	B	11.0	12.0	5.5	8.0
52/17	B	13.0	16.0	7.0	10.0

Svobodaina armoricana Babin & Melou, 1972; mm

Locality and specimen number	Valve; pedicle (P) or brachial (B)	Length of valve	Width of valve	Maximum length of muscle field	Width of interarea
52/17	B	15.0	17.0	7.0	-
52/21	B	14.0	14.0	7.5	8.5
117/1	B	18.0	30.0	8.0	-
117/2	B	17.0	18.0	-	-
117/4	B	18.0	22.0	7.0	12.5
117/5	B	15.0	25.0	-	-
117/6	B	10.0	14.0	4.0	6.0
117/7	B	13.0	20.5	4.5	-

v **Tissintia** sp. indet. mm

Locality and specimen number	Valve; pedicle (P) or brachial (B)	Width of valve	Length of valve.	Length of brachiophore bases or dental plates	Maximum width across brachiophores or dental plates
8/1	B	8.5	10.0	1.5	1.6
8/1	B	8.0	9.0	1.5	1.4
8/3	B	10.5	7.0	1.0	1.4
8/3	B	6.0	4.5	1.0	1.2
8/1	P	7.0	4.0	0.6	1.8
8/1	P	9.0	7.0	2.2	2.0
8/3	P	6.5	4.0	0.7	1.3
8/4	P	13.0	7.0	1.2	3.0

vi *Cacemia ribeiroi* (Sharpe, 1853); mm

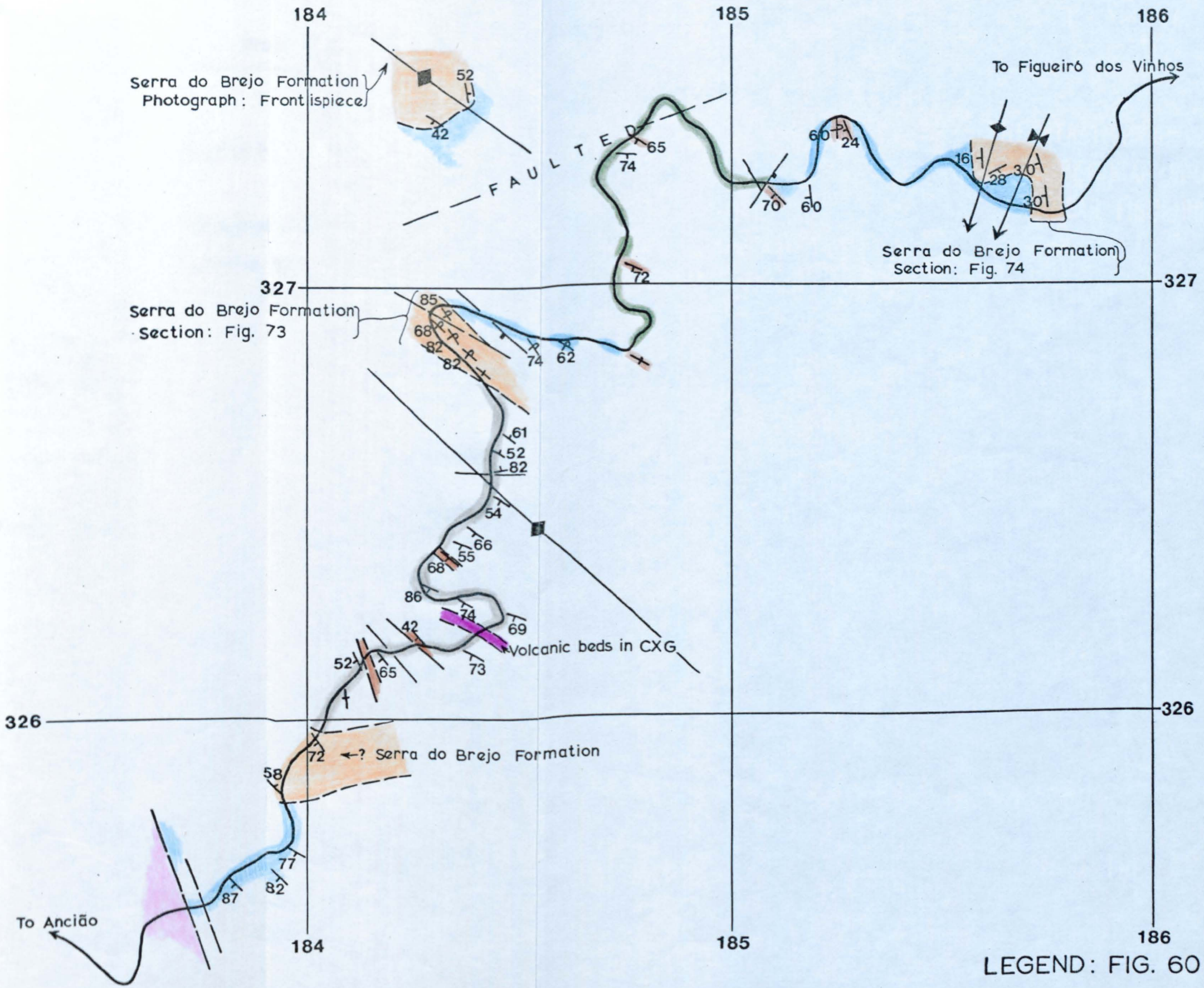
Locality and specimen number	Valve; pedicle (P) or brachial (B)	Length of valve	Width of valve	Length of muscle area	Length of brachiophores or dental plates	Thickness of valve (pl = planar)
66/1	P	9.0	17.0	3.5	1.5	2.5
66/2	P	8.0	14.0	4.5	1.5	1.8
66/2	P	8.0	10.0	3.5	1.6	1.5
66/3	P	6.2	12.5	-	-	1.8
66/4	P	8.0	16.0	-	1.3	2.0
66/4	P	10.5	18.0	5.5	1.7	2.3
66/4	P	8.0	11.0	3.5	1.4	2.0
66/4	P	5.0	8.0	2.0	0.8	1.5
66/4	P	5.0	7.5	-	-	0.1
66/8	P	9.5	15.5	-	-	2.8
67/1	P	9.5	22.0	-	-	-
66/1	B	7.0	9.0	-	0.9	pl
66/4	B	8.0	14.0	3.0	1.2	pl
66/5	B	6.0	10.0	-	1.0	pl
66/6	B	6.5	9.0	-	-	pl
66/7	B	6.2	7.5	-	0.9	pl

Appendix 4: Details of road sections studied to the north of the main Dornes area

During the first field season in Portugal the main road sections across the proposed mapping area were studied. During the next two field seasons the task of mapping about 250 sq km between these sections, however, proved to be impossible in the time available and only the area around Dornes to the south was mapped. Two road sections are presented in this appendix. Figure 72 is the road section west from Figueiró dos Vinhos and figures 73 and 74 are sections through the Serra do Brejo Formation exposed adjacent to this road. Figure 75 is the road section south from Figueiró dos Vinhos along the Arega road.

GEOLOGICAL MAP OF THE ROAD SECTION ALONG THE FIGUEIRÓ DOS VINHOS TO ANCIÃO ROAD, SCALE 1: 10,000

FIG. 72

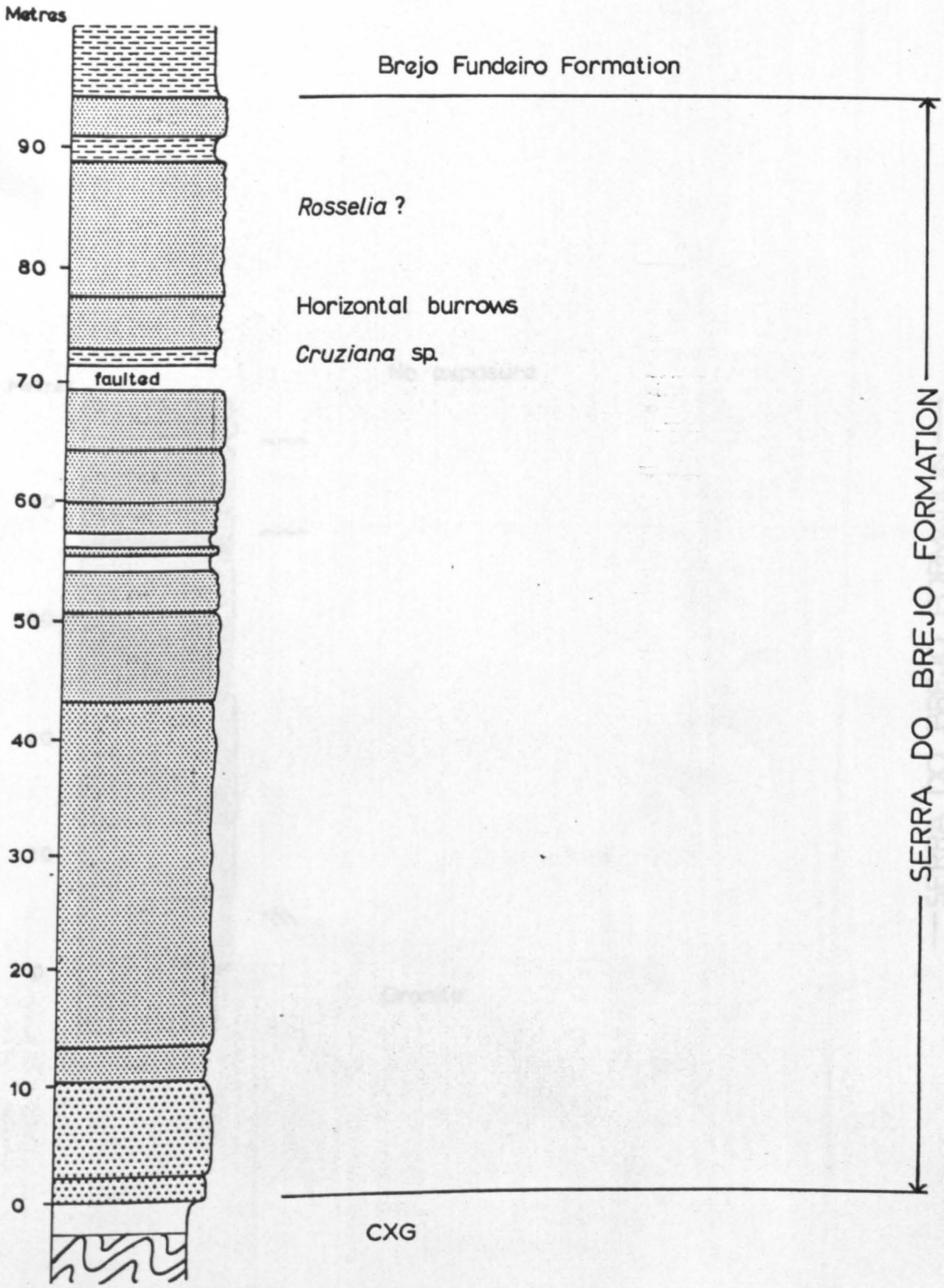


LEGEND: FIG. 60

SERRA DO BREJO FORMATION

FIG. 73

Road section; Serra de S. Neutel (18434 32698 to 18448 32675)

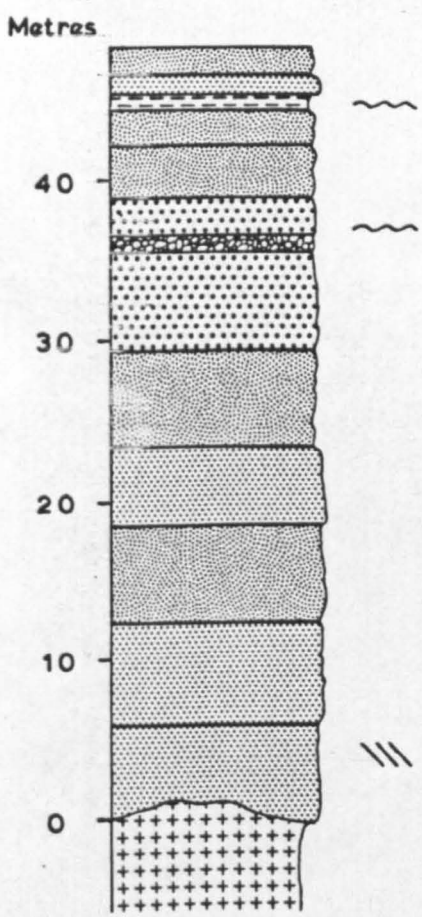


LEGEND FIG. 59

SERRA DO BREJO FORMATION

FIG. 74

Road section 1.5km north of Serra de S. Neutel
(18573 32717 to 18568 32719)



No exposure

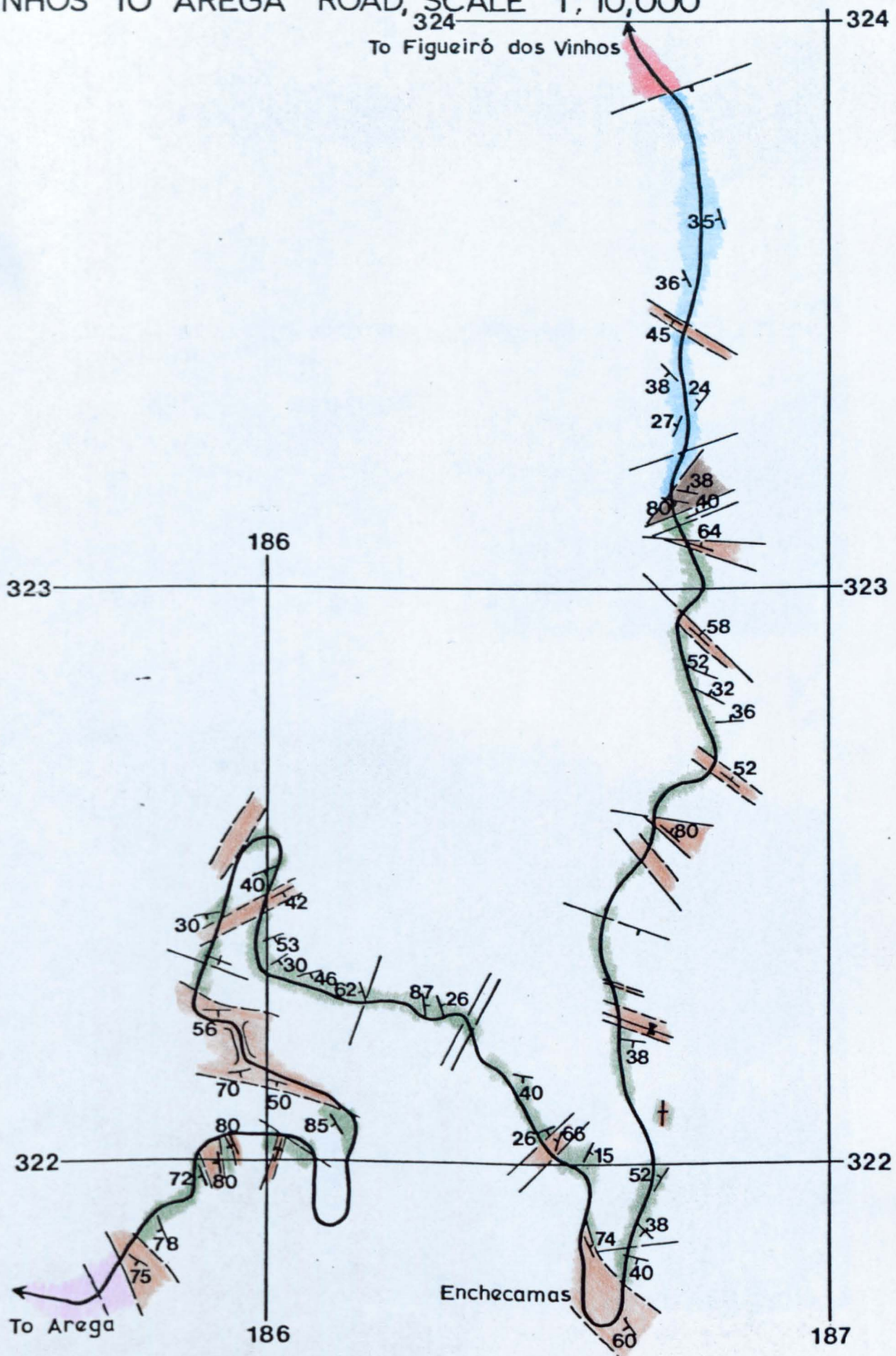
Granite

—SERRA DO BREJO FORMATION—

LEGEND FIG. 59

GEOLOGICAL MAP OF THE ROAD SECTION ALONG THE FIGUEIRÓ DOS VINHOS TO AREGA ROAD, SCALE 1:10,000

FIG. 75



LEGEND : FIG. 60

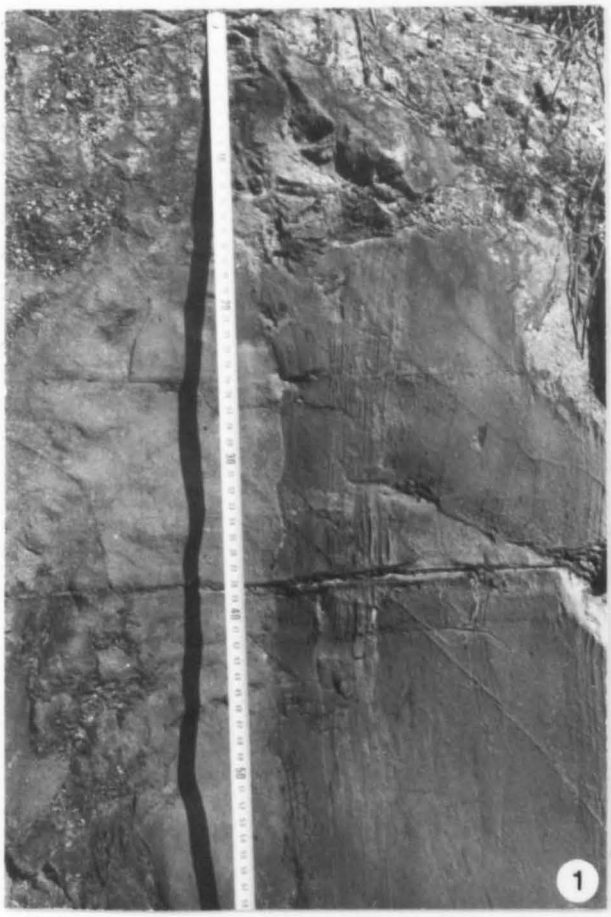
Plate 1

Figs. 1 & 2. Complexo xisto-grauvaquico (CXG) adjacent to the Sernache do Bonjardin road (19230, 31411). The vertically dipping graded beds of greywacke and mudstone, with flame structures and load casts, young to the left of the photographs.

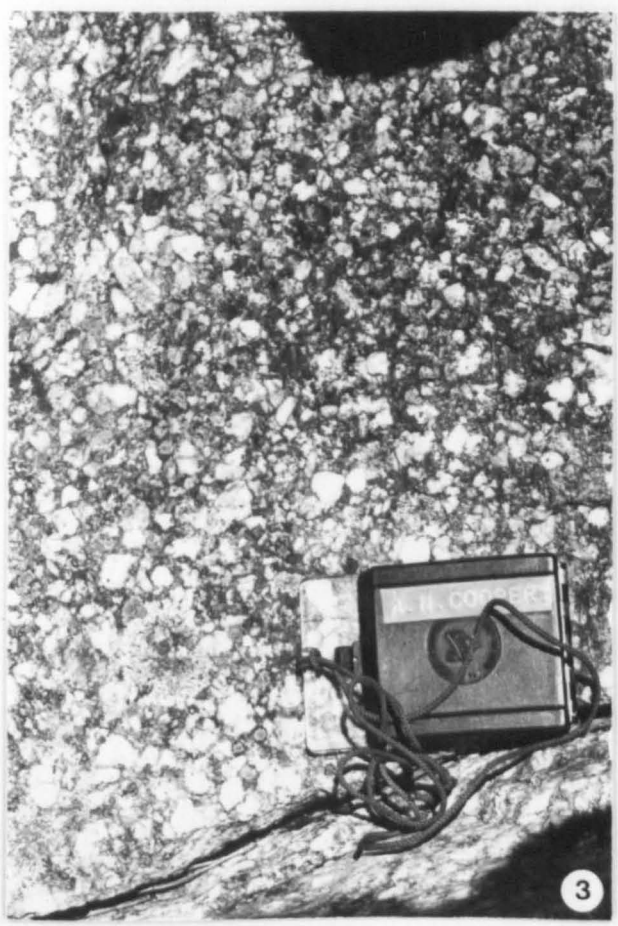
Fig. 3. Conglomerates about 4m above the base of the Serra do Brejo Formation at Serra do Brejo (19213 31690).

Fig. 4. Massive quartzite crags of the Serra do Brejo Formation crossing the Rio Zêzere about 1km east of Almegue (18951, 31926). In the distance the river is incised into granite and in the middle distance it cuts through the Brejo Fundeiro Formation.

PLATE 1


1


2


3


4

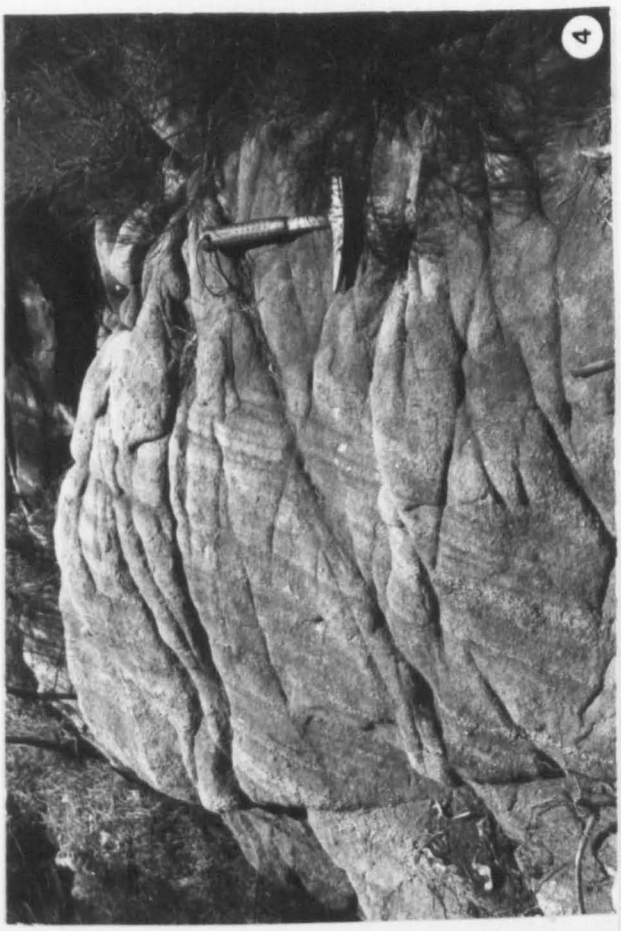
Plate 2

Fig. 1. *Skolithos linearis* Haldeman, 1840 in coarse-grained sandstone of the Serra do Brejo Formation at Serra do Brejo (19193, 31677).

Figs. 2 & 4. Planar cross-bedding in a very thick bed of very coarse to granule-grained arkose, within the lower part of the Serra do Brejo Formation, at Serra da Quinta (19344, 31283).

Fig. 3. Linguoid ripple marks on the surface of a fine-grained sandstone bed in the Serra do Brejo Formation at Serra do Brejo (19083, 31744).

PLATE 2



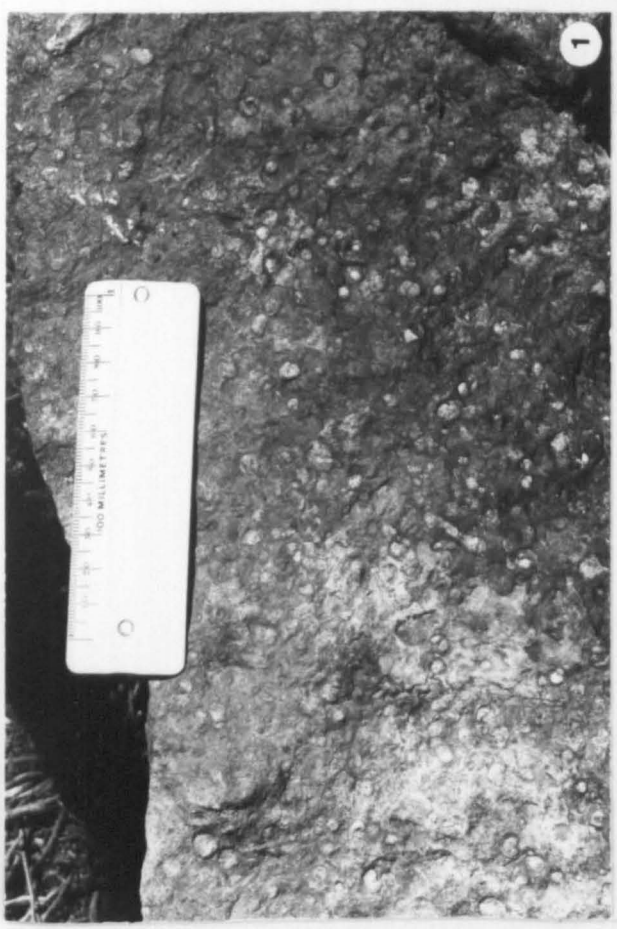


Plate 3

The upper part of the Serra do Brejo Formation and contact with the overlying Brejo Formation at Olival Grande (19160, 31625).

PLATE 3

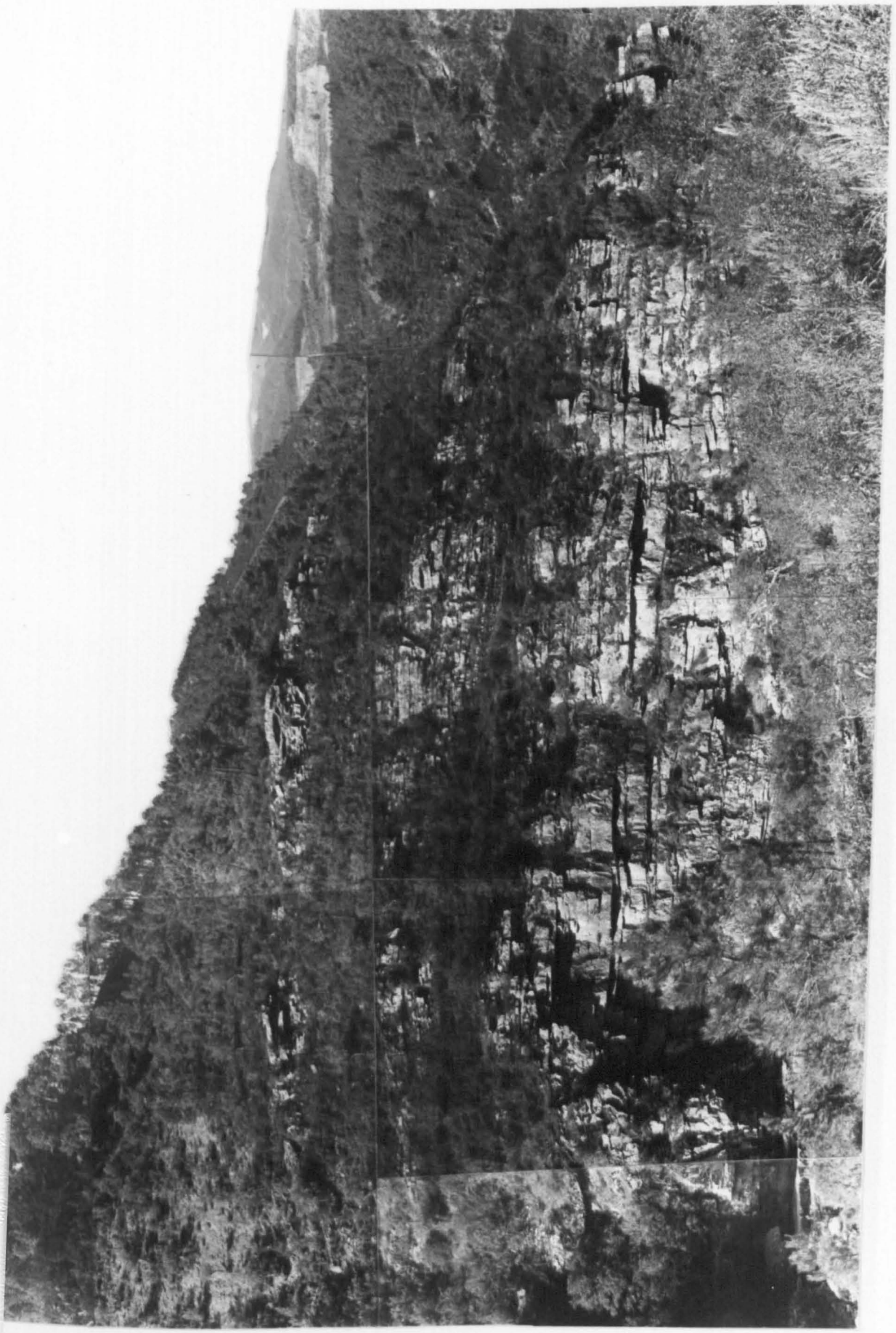


Plate 4

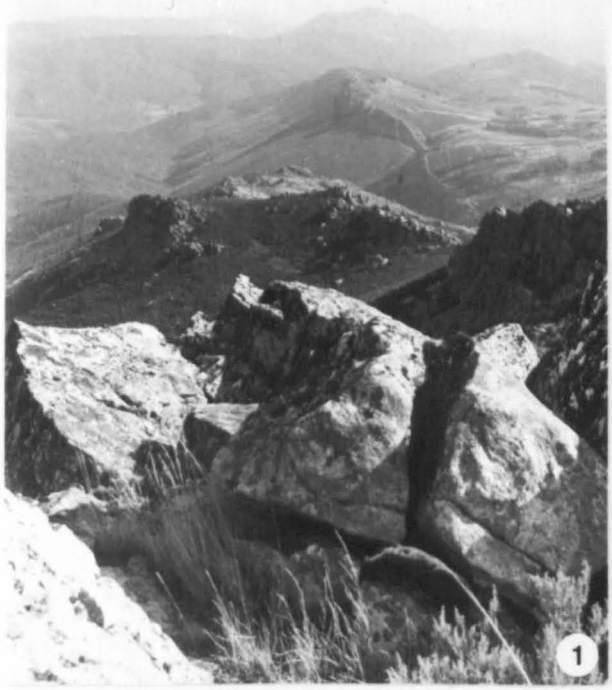
Fig. 1. View looking southwards from Serra de S. João (18414 33466) along the escarpment of the Serra do Brejo Formation in the north of the area.

Fig. 2. View looking north towards the village of Brejo da Correia (19100, 31700) showing the low-lying fertile plane formed by the Brejo Fundeiro Formation to the left of the village. The escarpment in the far distance is Serra de S. João (fig. 1).

Fig. 3. Spheroidally weathered greywacke in the Monte do Carvalhal Formation at Serra do Carvalhal (19033, 31267).

Fig. 4. Thin and medium-bedded quartzites and micaceous sandstones in the Monte da Sombadeira Formation at Monte da Sombadeira (19184, 31297).

PLATE 4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4

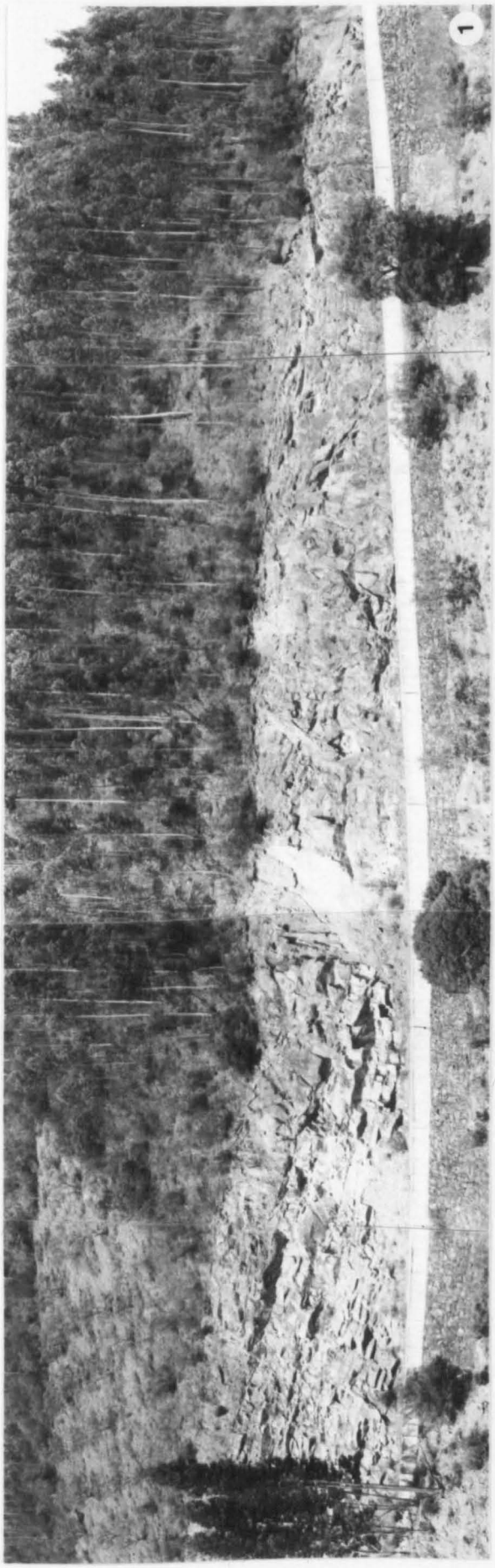
Plate 5

Fig. 1. The Monte do Carvalhal Formation at Serra do Amial (19045, 31292) showing the quartzites of the Serra do Amial Member overlain by greywackes and siltstones.

Fig. 2. Wash out structure within very thin graded beds of mudstone and siltstone in the upper few metres of the Brejo Fundeiro Formation at Monte da Sombadeira (19093, 31349).

Fig. 3. Thin-bedded sandstones and micaceous sandstones of the Monte da Sombadeira Formation at Cabeço dos Picos (18897, 32027).

PLATE 5



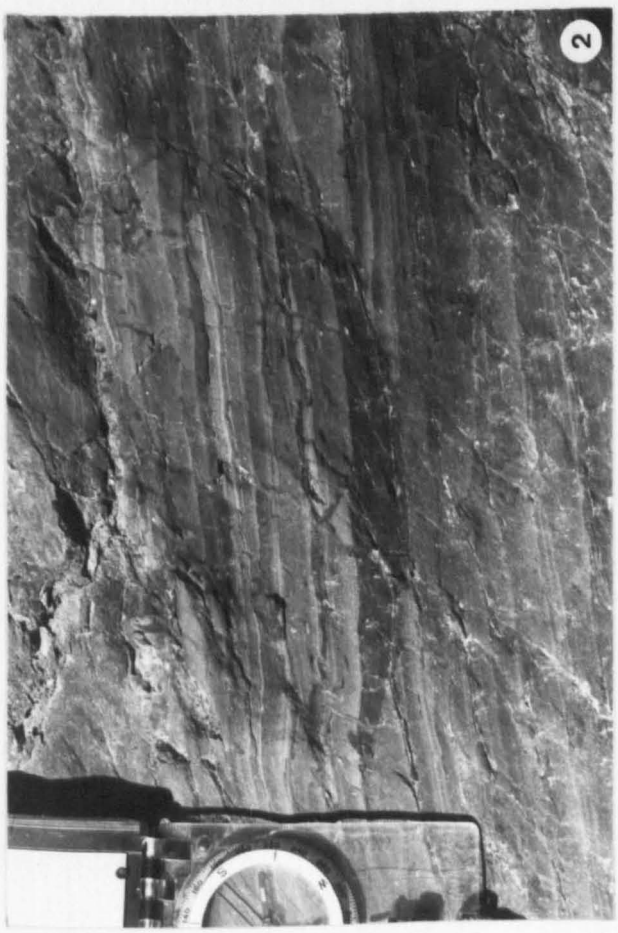


Plate 6

View of Vale da Lage (18670, 31580). The lower crag on the left of the photograph is the Serra do Amial Member of the Monte do Carvalhal Formation. The upper crag and the crag forming the anticline on the right of the photograph are the Vale da Ursa Formation. The crags are separated by a fault running up the valley to the coll in the middle of the photograph. See also plate 8, fig. 1.

PLATE 6

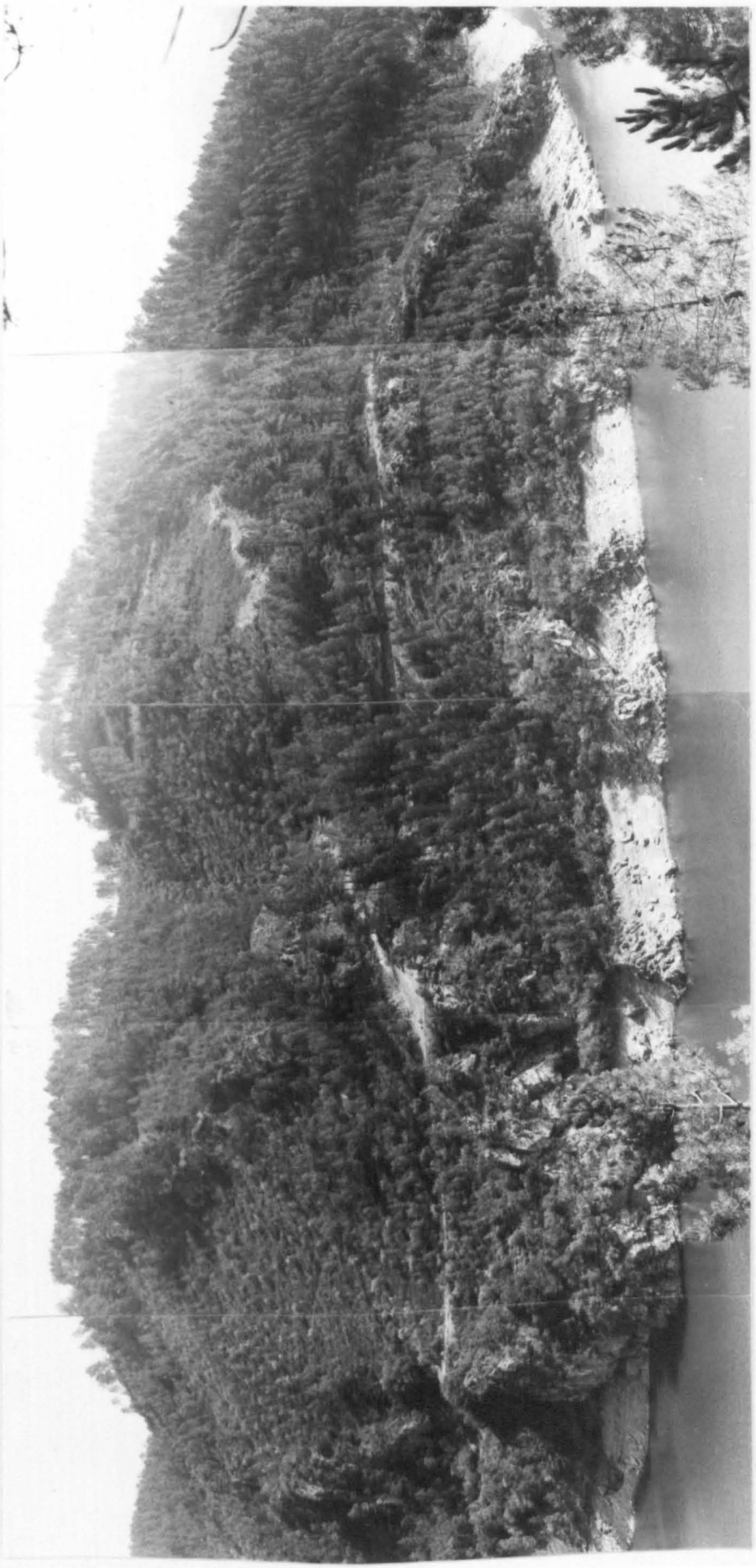


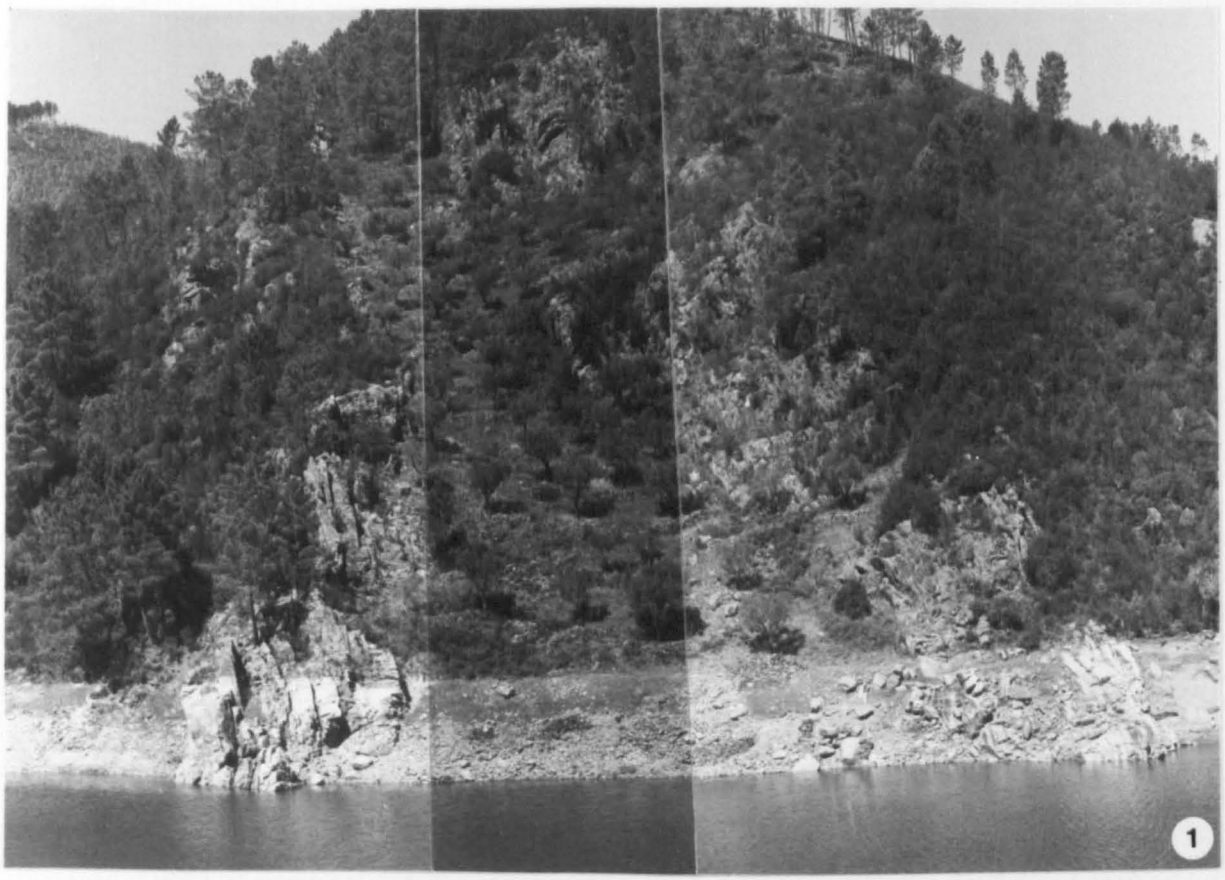
Plate 7

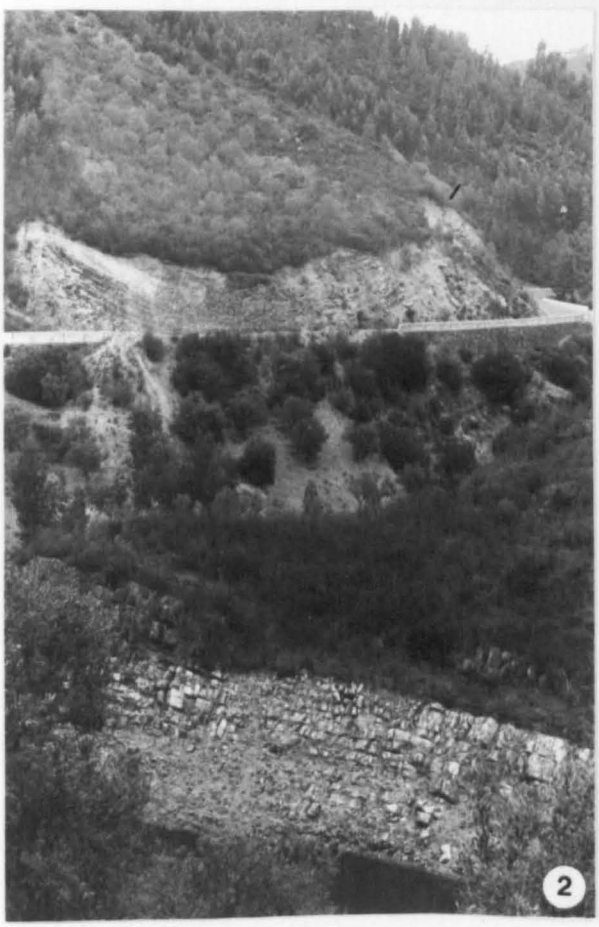
Fig. 1. Vertically dipping beds of the Monte do Carvalhal Formation at Serra de S. Paulo (18703, 31695). The crag on the right of the photograph is the Serra da Cadaveira Member and the crag on the left the Serra do Amial Member.

Fig. 2. The Serra do Amial Syncline at Serra do Amial (19061, 31290). The Serra do Amial Member of the Monte do Carvalhal Formation is exposed in the foreground and the Vale da Ursa Formation forms the core of the syncline.

Fig. 3. Quarry at Ponte Vale da Ursa (19018, 31207) in the upper part of the Vale da Ursa Formation showing the black sandstone of the Serra dos Aguilhões Member towards the top of the photograph.

PLATE 7





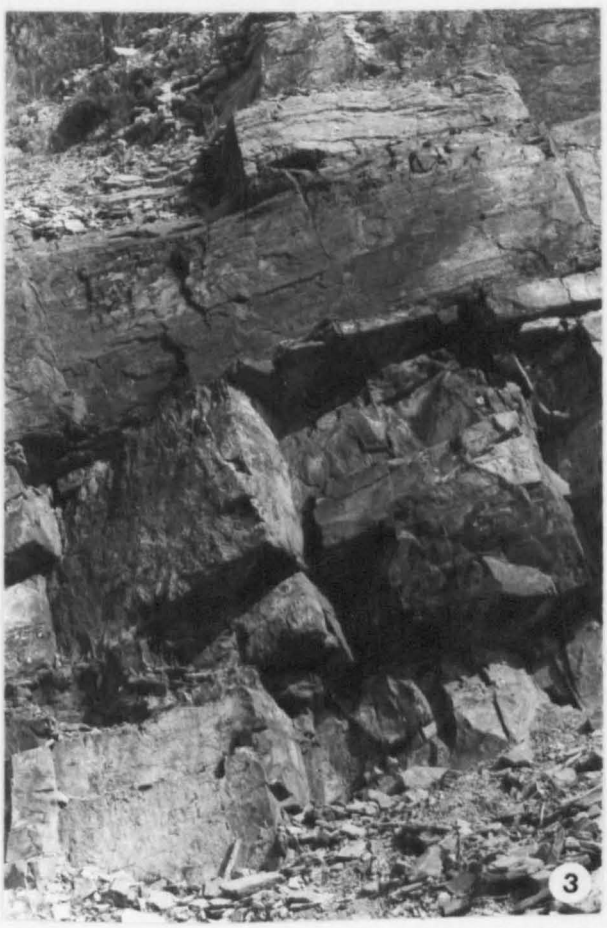


Plate 8

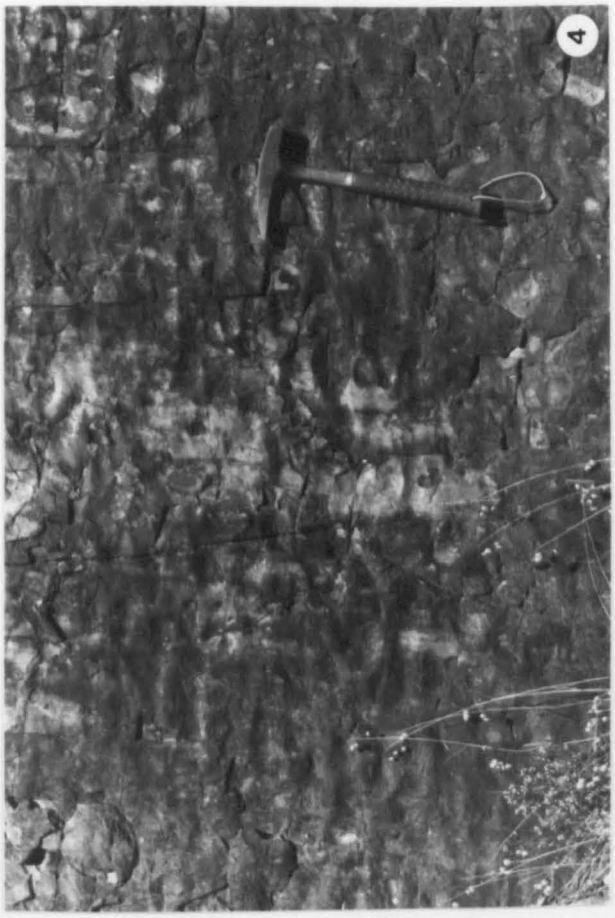
Fig. 1. The lower beds of the Serra do Amial Member of the Monte do Carvalhal Formation at Vale da Lage (18672, 31585). See also plate 6.

Fig. 2. Quarry at Ponte Vale da Ursa (19018, 31207) showing the upper half of the Vale da Ursa Formation.

Fig. 3. Poorly preserved graptolites in laminated black sandstone of the Serra dos Aguilhões Member; Vale da Ursa Formation at Ponte Vale da Ursa (19018, 31207).

Fig. 4. Ripple marked bedding plane in the Vale da Ursa Formation near Foz da Serta (19172, 31148).

PLATE 8



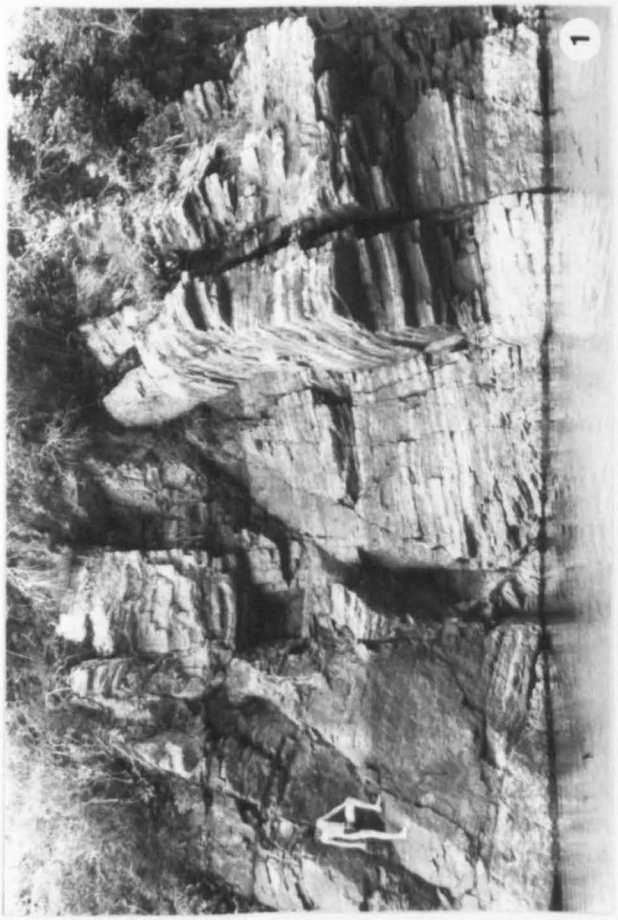


Plate 9

Figs. 1 & 2. Large pyrite nodules in fine-grained sandstone with siltstone partings; Vale da Ursa Formation units 6 and 7 at Ponte Vale da Ursa (19018, 31207).

Fig. 3. Close up photograph x 2 of the external surface of a small pyrite nodule showing the cubic form of the pyrite from Ponte Vale da Ursa (19018, 31207); the specimen was coated with ammonium chloride before it was photographed.

Fig. 4. Bedding plane in the Vale da Ursa formation near Foz da Serta (19172, 31148) showing cavities left by the decomposition of pyrite nodules (compare with plate 9, fig. 2).

PLATE 9

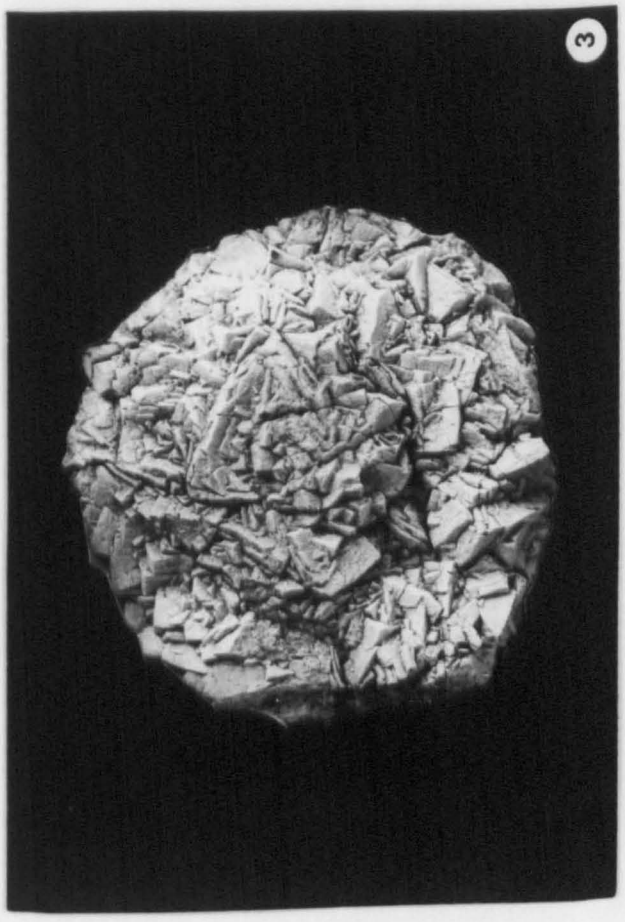


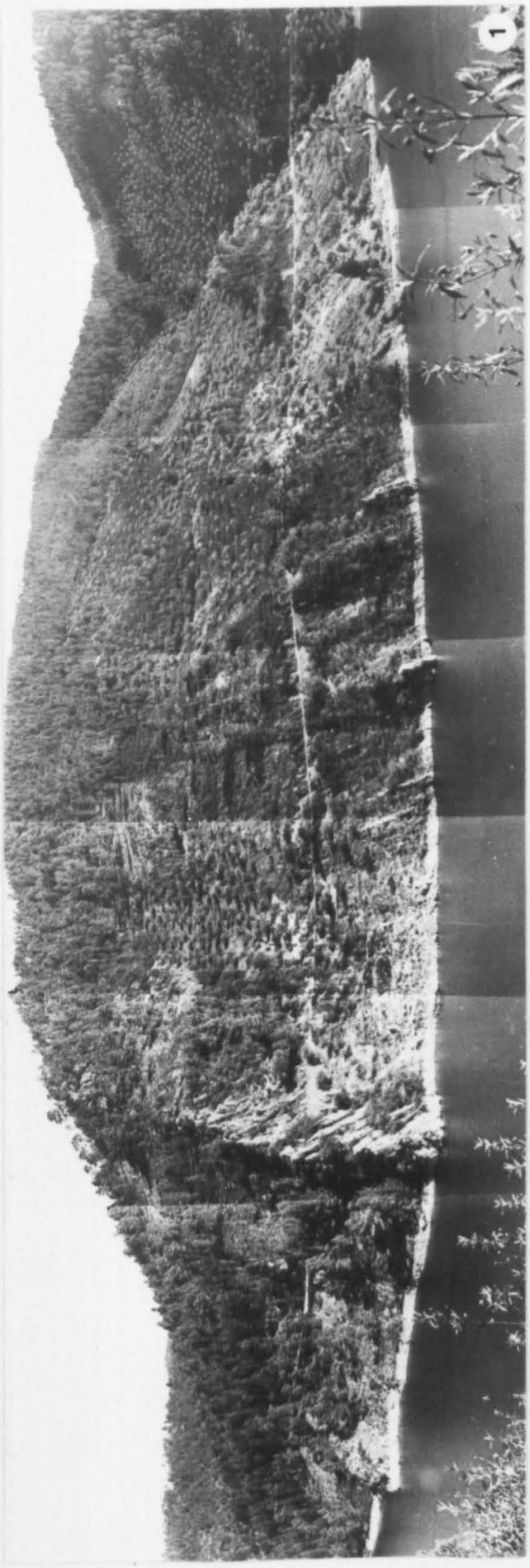
Plate 10

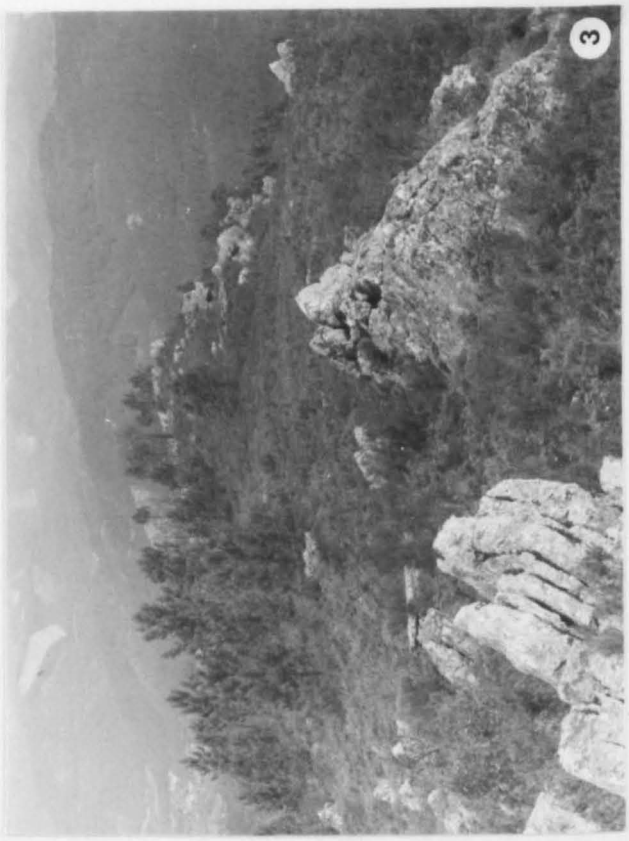
Fig. 1. View across the Rio Zêzere to Serra da Luação (18920, 31090). The Vale do Serrão Formation crops out in the left-hand one-quarter of the view. The Serra da Mendeira (type section) forms the massive crag and the Serra da Luação Formation (type section) is exposed along the road up to the valley on the right of the photograph where the Dornes formation crops out.

Fig. 2. Laminated quartzites and mudstones of the Vale do Serrão Formation at Vale do Serrão (18961, 31132).

Fig. 3. View along the ridge of the Serra da Mendeira (18870, 31340) showing the thick and medium-bedded quartzites of the Serra da Mendeira Formation.

PLATE 10





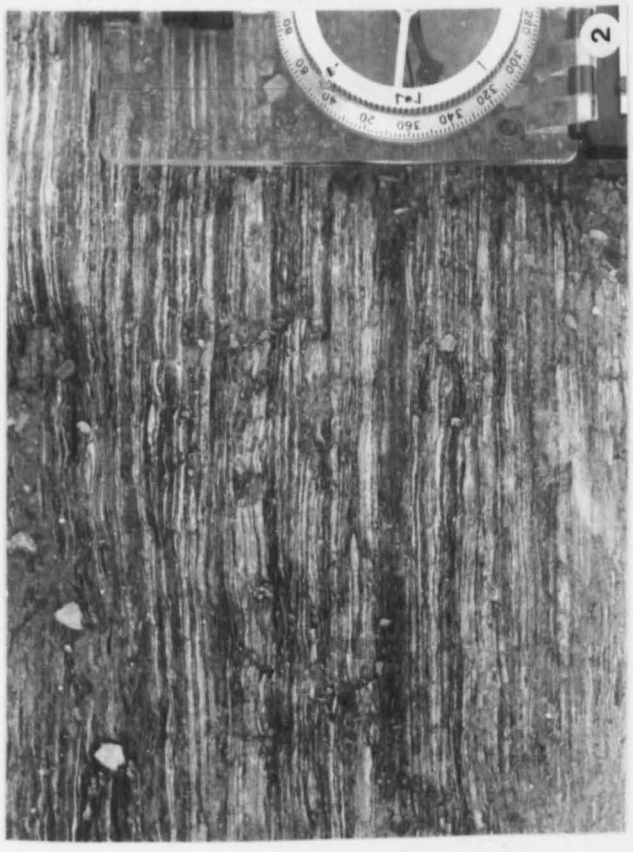


Plate 11

Fig. 1. View of Serra da Mendeira (right of picture; 18870, 31340) with the Serra da Mendeira Formation capping the hill. Massive laminated beds of the Vale do Serrão Formation form the crag which is faulted just to the left of the Mendeira peak. The Vale do Serrão Formation can be traced to the Rio Zêzere where it is folded into a syncline.

Fig. 2. Massive dolimitic limestone of the Dornes formation near Dornes Church (18838, 31150).

Fig. 3. Road cutting in sandstones of probable Triassic age (18168, 31715). The sandstones are red, pebbly and have irregular lenses of red mudstone. A channel infilled with coarse pebbly material is present towards the left-centre of the photograph.

PLATE 11

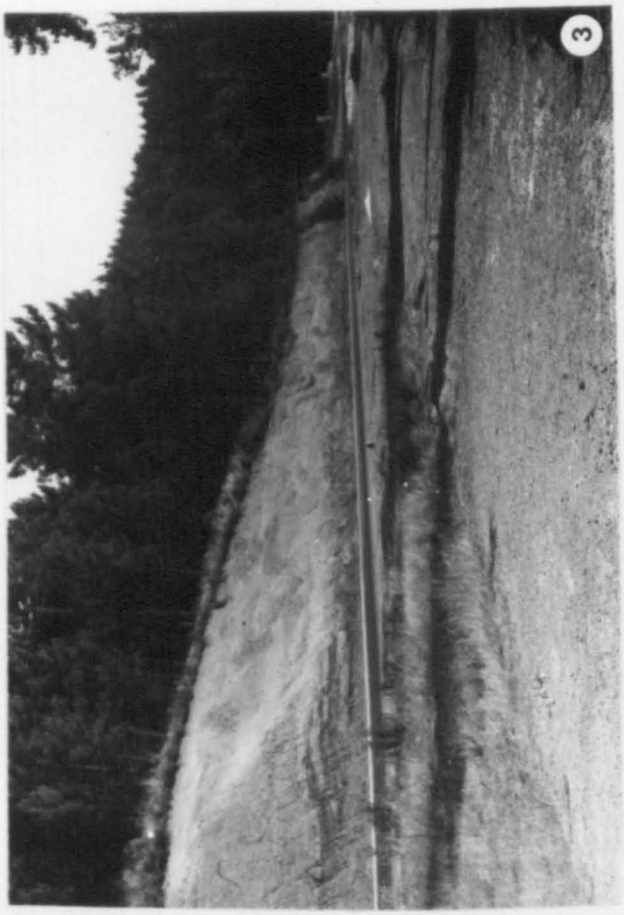


Plate 12

Fig. 1. Folded sandstones in the Monte do Carvalhal Formation at Serra do Luzim (18700, 31700). At the right-hand end of the crag the beds are folded into an asymmetrical anticline with a vertically standing limb (see also fig. 43 in text for cross-section).

Figs. 2 & 3. Boudinaged quartzite beds in the Vale da Ursa Formation near Foz da Serta (19167, 31173).

Fig. 4. Inverted bedding with cleavage dipping less steeply than the bedding; Monte do Carvalhal Formation near Sambado (18790, 31670).

PLATE 12

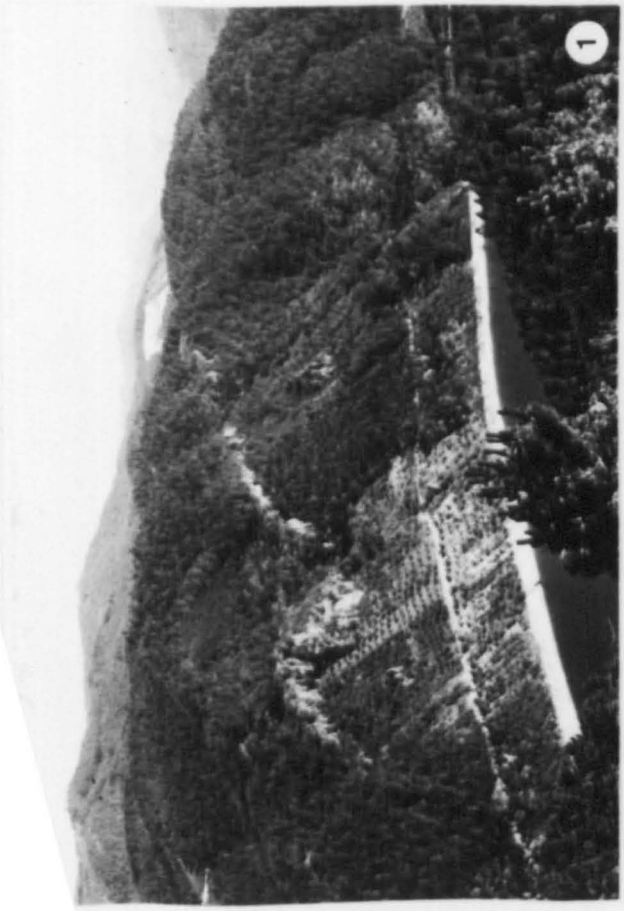


Plate 13

Fig. 1. Kink plane folds in very thick and laminated quartzites and mudstones of the Vale do Serrão Formation near Vale do Serrão (19030, 31110).

Fig. 2. Parallel ripple marks and joints in thin-beddedd quartzites of the Vale da Ursa Formation near Foz da Serta (19168, 31162).

Fig. 3. Asymmetrical anticline in very thin and medium-bedded quartzites of the Vale do Serrão Formation near Foz da Serta (19078, 31051).

Fig. 4. Inverted beds of sandstone and quartzite with load casts; Vale da Ursa Formation near Sambado (18791, 31687).

PLATE 13

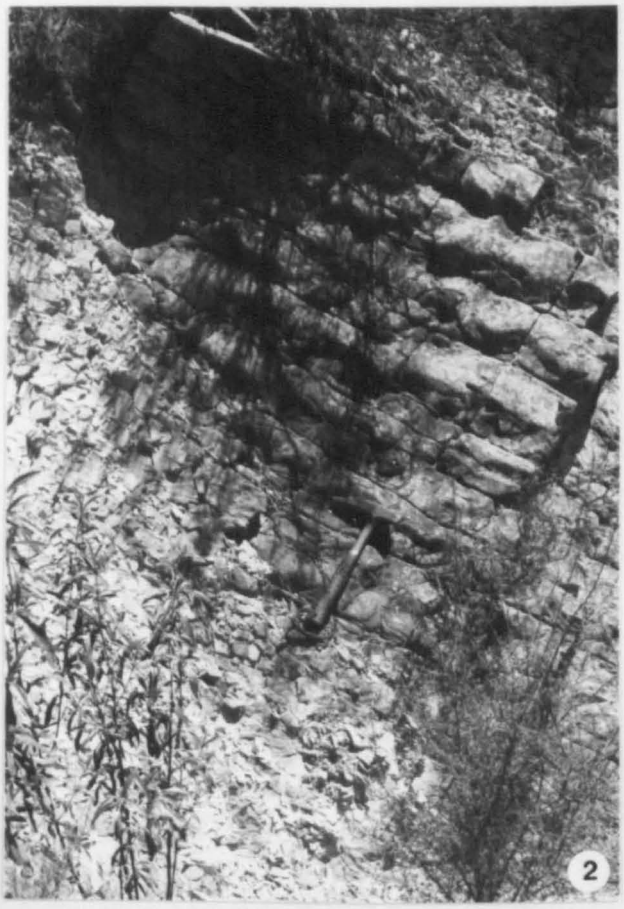


Plate 14

Fig. 1. Monocline in thin-bedded sandstones, quartzites and siltstones of the Vale da Ursa Formation near Foz da Serta (19171, 31159).

Fig. 2. Intersecting bands of tension gashes in a thick quartzite bed within the Foz da Serta Formation near Foz da Serta (19130, 31112).

Fig. 3. Microfolds (x2) in laminated quartzite and mudstone from the Vale do Serrão Formation near Vale do Serrão (18964, 31151).

PLATE 14

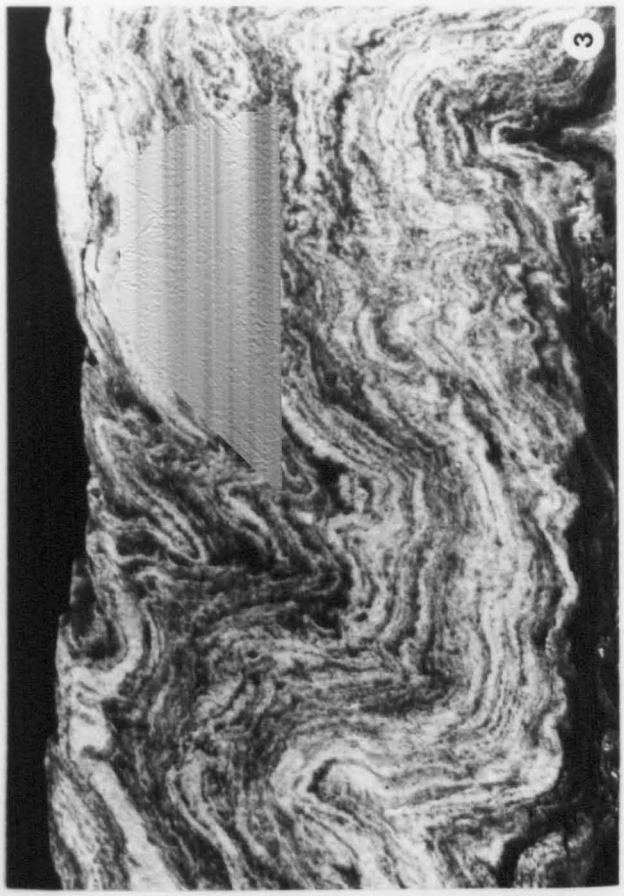


Plate 15

Figs. 1a & 1b. Overturned asymmetrical syncline in a thick quartzite bed within the Foz da Serta Formation near Sambado (18839, 31733).

Fig. 2. Minor disharmonic folds in sandstones and mudstones of the Foz da Serta Formation near Sambado (18787, 31825).

Fig. 3. Close up view of the bottom-right corner of fig. 2; see also plate 16, fig. 2.

PLATE 15

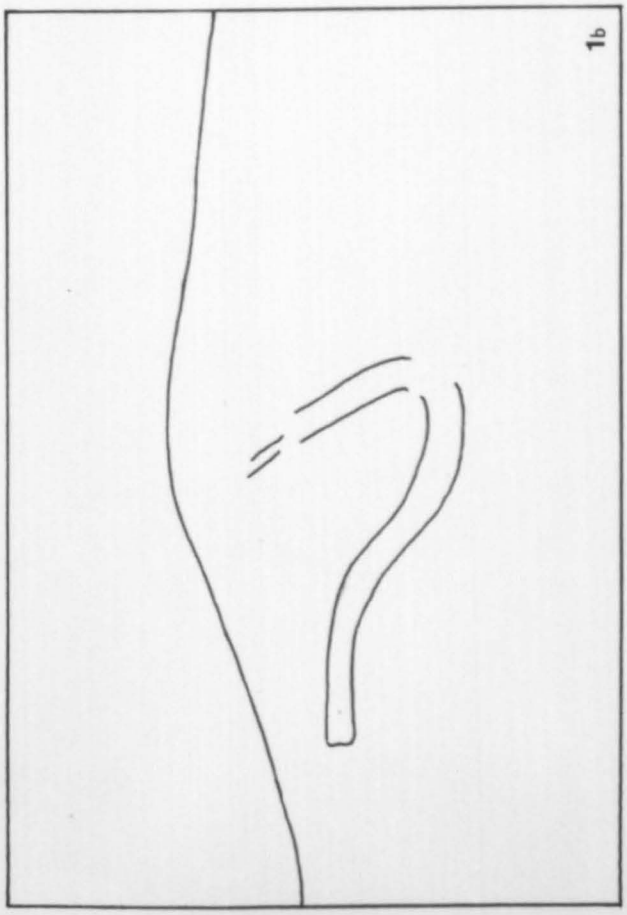


Plate 16

Fig. 1. Upright similar folds in thin-bedded sandstones and mudstones of the Foz da Serta Formation near Serra de S. Paulo (18744, 31316).

Fig. 2. Slightly overturned angular fold in thin-bedded mudstones and sandstones of the Foz da Serta Formation near Sambado (18786, 31825); see also plate 15, figs. 2 & 3.

Fig. 3. Close up view of similar folding in the core of the Dornes anticline (northern end; 18828, 31172).

Fig. 4. Concentrically folded beds at the southern end of the Dornes anticline (18832, 31166).

PLATE 16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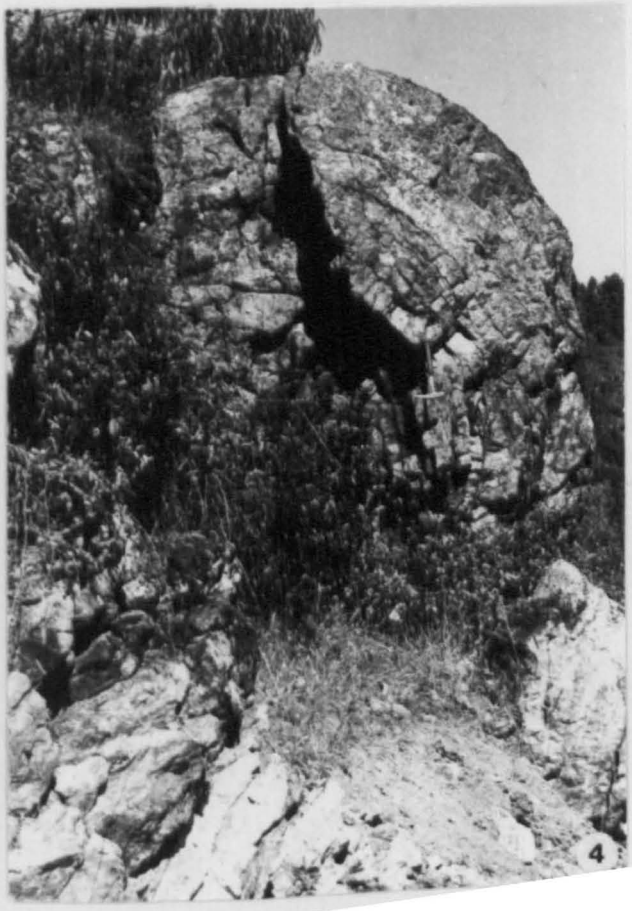
4

Plate 17

Fig. 1. Fracture cleavage in mudstones of unknown age near Serra de S. Paulo (18715, 31277).

Fig. 2. Refraction of cleavage by contrasting lithologies in the Monte do Carvalhal Formation north of Vale da Lage (18716, 31615).

Fig. 3. Intense folding of the Vale do Serrão Formation next to the reverse fault at Dornes (18826, 31151).

Fig. 4. The northern end of the Dornes anticline (18828, 31172).

PLATE 17

Plate 18

Fig. 1. Syncline with axial planar cleavage in the Foz da Serta Formation near Serra de S. Paulo (18734, 31357).

Fig. 2. Steeply dipping cleavage in greywackes and siltstones of the Monte do Carvalhal Formation north of Vale da Lage (18715, 31607).

Fig. 3. Fracture cleavage in laminated mudstones and quartzites of the Vale do Serrão Formation at Serra da Mendeira (18946, 31237).

Fig. 4. Quartz-veined breccia associated with wrench faulting in siltstones and greywackes of the CXG at Serra dos Mindeiros (19136, 31798).

PLATE 18


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2


3

Plate 19

Fig. 1. Chevron folding in incompetent mudstones and sandstones of the Foz da Serta Formation near Ponte Vale da Ursa (19002, 31200).

Fig. 2. Normal faults in sandstones of the Monte da Sombadeira Formation near Serra do Amial (19090, 31350).

Figs. 3 & 4. Microfolds parallel to faulting in the CXG near Ribeira do Braz (18288, 31577). The bedding and cross-lamination are microfaulted and sheared.

PLATE 19

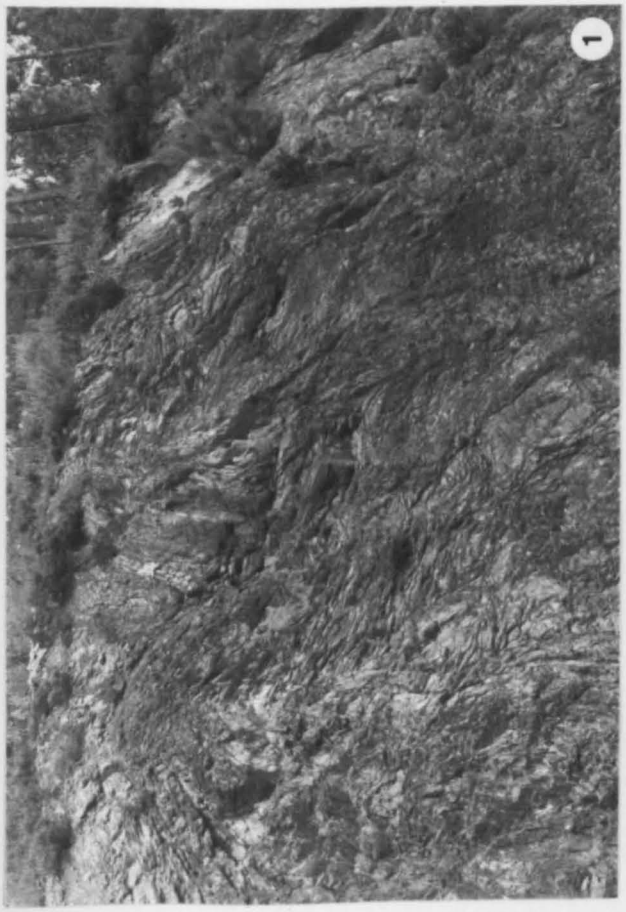


Plate 20

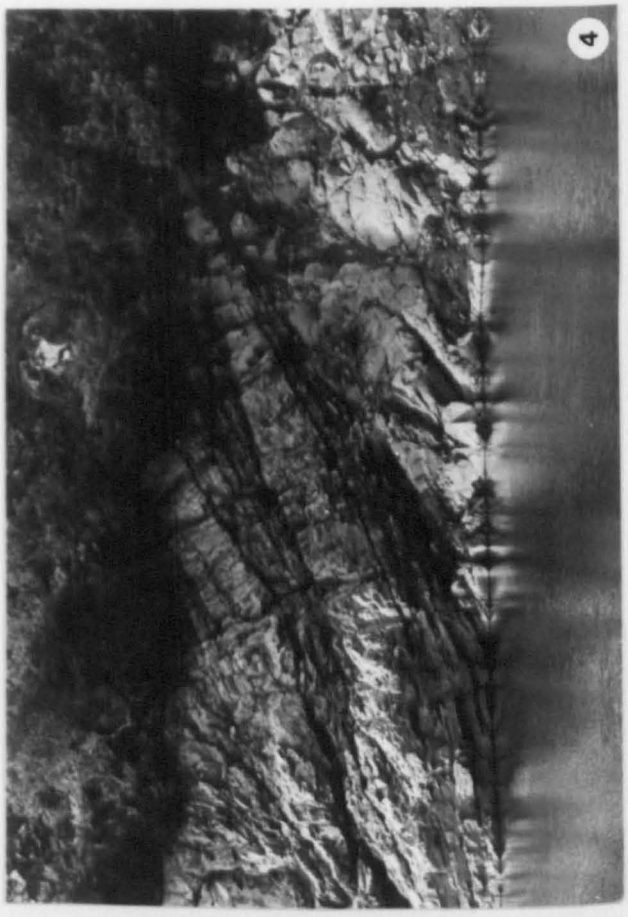
Fig. 1. Normal fault with a slight wrench movement between red sandstones of Triassic age (left of fault) and sub-vertically dipping pre-Ordovician CXG near Ribeira do Braz (18281, 31593).

Fig. 2. Recent fault scarp breccia at the foot of a normal fault next to the Rio Zêzere east of Almegue (18951, 31926). This breccia is exposed to the right-hand side of plate 20, fig. 3.

Fig. 3. View across the Rio Zêzere showing normally faulted quartzites of the Serra do Brejo Formation (fault line in shadow) east of Almegue (18952, 31934). The granite-quartzite contact (plate 20, fig. 4) is exposed behind the crag on the left of the river.

Fig. 4. Contact between granite and recrystallised quartzites of the Serra do Brejo Formation adjacent to the Rio Zêzere east of Almegue (18956, 31939).

PLATE 20



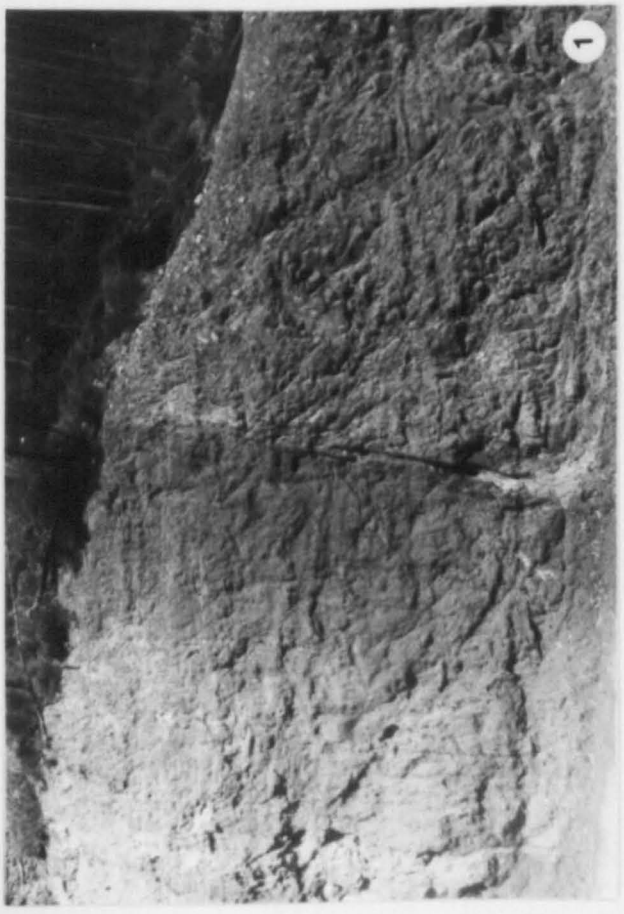
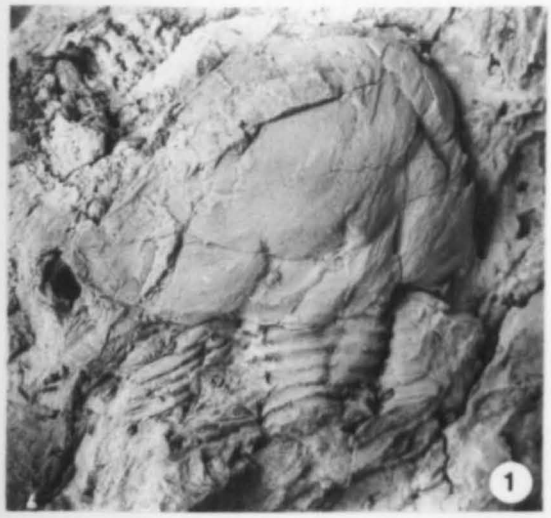


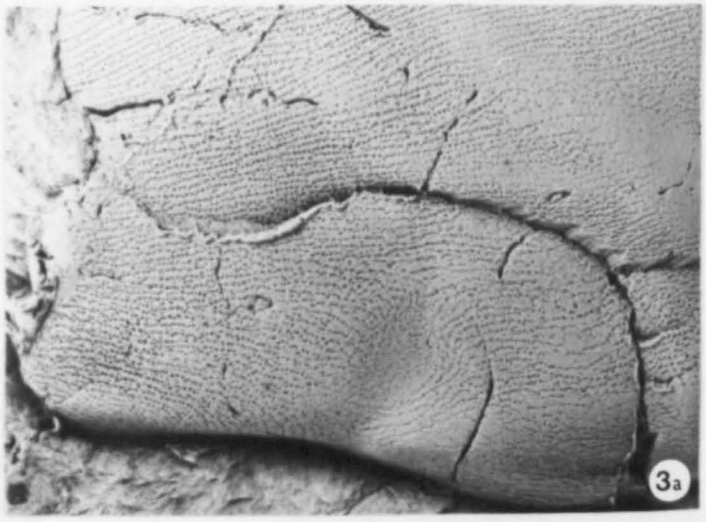
Plate 21

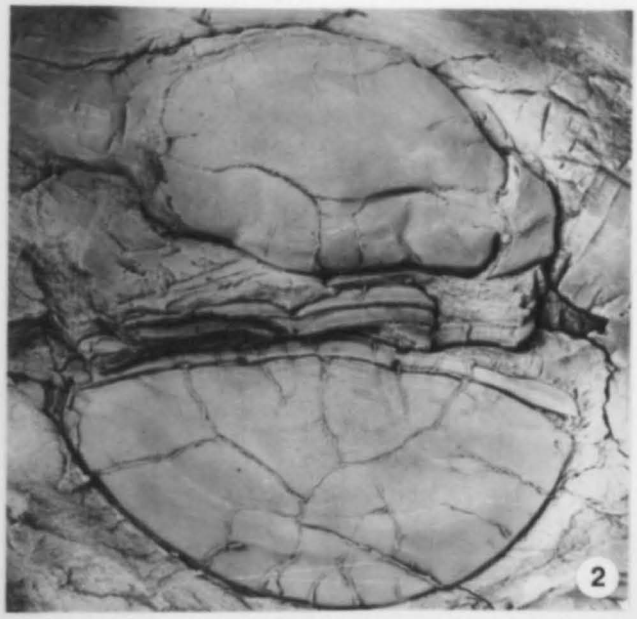
Fig. 1. *Dysplanus* sp. indet, internal mould X2; lower Caradoc, locality 151, bryozoa beds of the Monte do Carvalhal Formation.

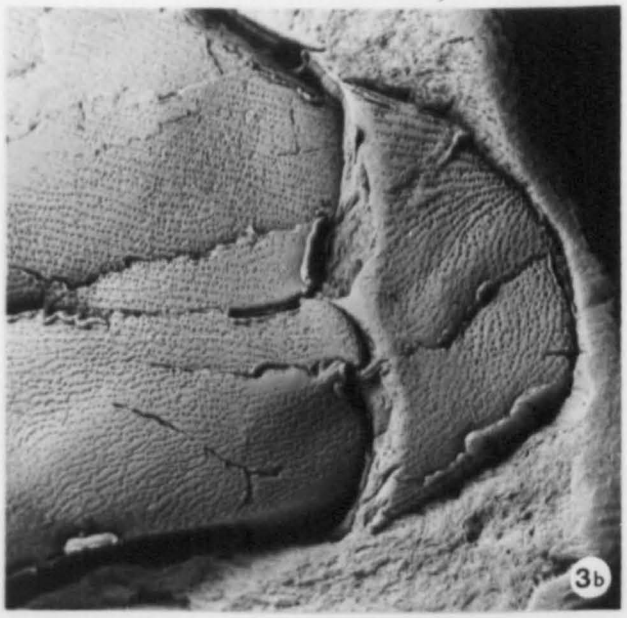
Figs. 2–4. *Ectillaenus* cf. *bergamimus* Whittard; Llanvirn, Didymograptus murchisoni Zone, locality 85, Brejo Fundeiro Formation; fig.2, internal mould of almost complete specimen with crushed thorax X2; fig. 3a, plasticine cast of external mould to specimen in fig. 2, showing postero-lateral ornament of the cranidium X3.5; fig. 3b, as fig. 3a showing ornament of free cheek X3.75; fig. 3c, as fig. 3a showing anterior cephalic ornament X3.5; fig. 4, internal mould of cranidium and incomplete thorax X1.15.

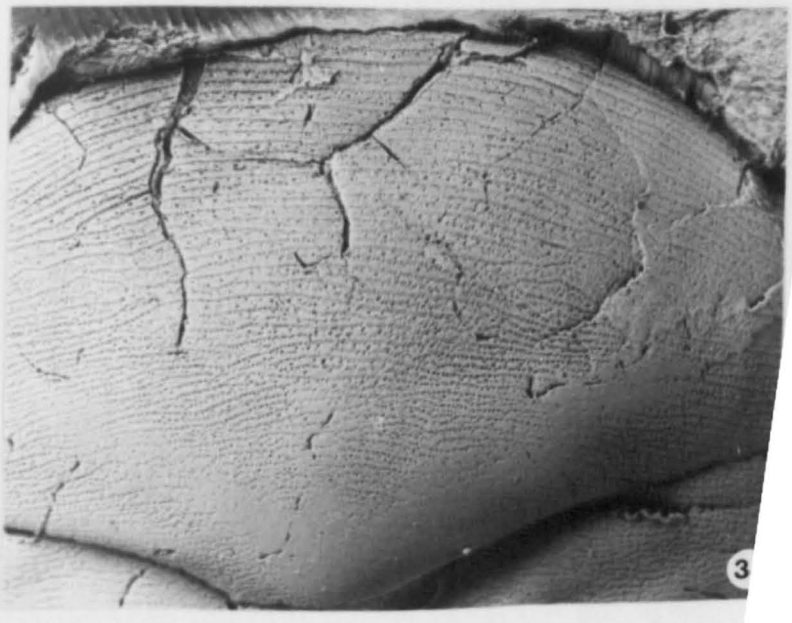
PLATE 21











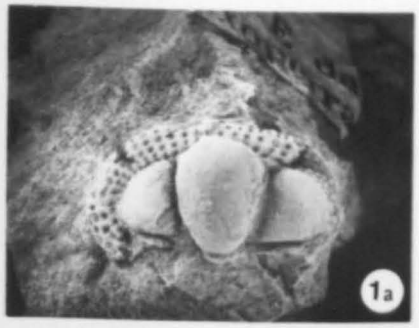
Figs. 1-7. Onnia grenieri (Bergeron, 1893), lower Caradoc, specimens from the J.F.N. Delgado collection drawer 15B2 of the Serviços Geológicos Museum, Lisbon. Specimens collected from "1700m a N57°E de pyr de Queixopera Maçao" and associated with material similar to the bryozoa beds of the Monte do Carvalhal Formation. Figs. 1-4, all stereoscopic pairs of an internal mould; figs. 1a-1b, dorsal view X2.3; figs. 2a-2b, anterior view X2.3; figs. 3a-3b, lateral view showing broken fringe and lower lamella X2.3; figs. 4a-4b, lateral view X2.3; fig. 5, internal mould of obliquely distorted cephalon X2; fig. 6, internal mould of fragmentary fringe X2; fig. 7, internal mould of incomplete cephalon X2.

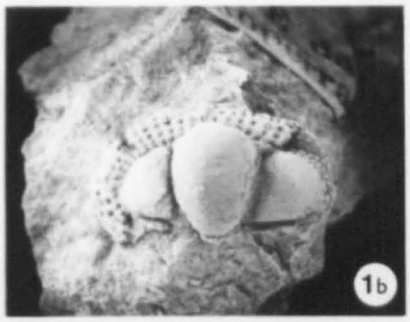
Fig. 8. Onnia cf. grenieri (Bergeron, 1893), internal mould of left-hand genal lobe and fringe X2.1; lower to middle Caradoc, locality 52, Serra da Cadaveira Member of the Monte do Carvalhal Formation.

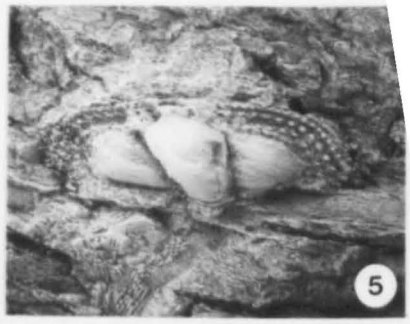
Fig. 9. Eccoptochile (Eccoptochile) cf. clavigera (Beyrich, 1845), obliquely distorted internal mould of incomplete glabella X1.4; lower Caradoc, locality 72, bryozoa beds of the Monte do Carvalhal Formation.

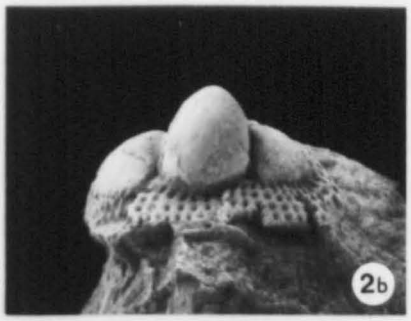
Fig. 10. Calymenella (Calymenella) boisseli Bergeron, 1890, internal mould of cranidium X3; lower to middle Caradoc, locality 52, Serra da Cadaveira Member of the Monte do Carvalhal Formation.

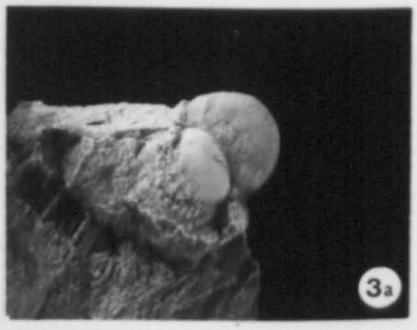
PLATE 22

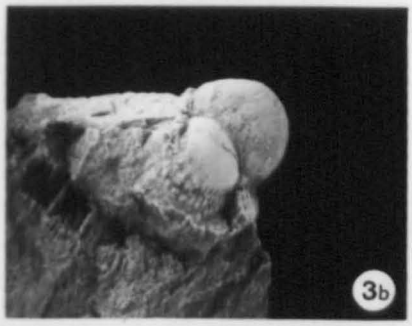


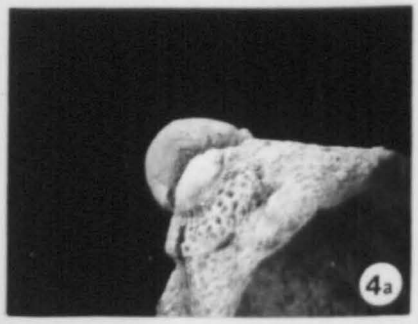


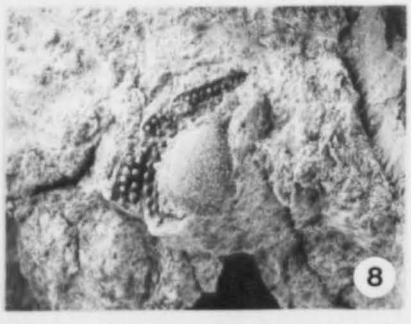












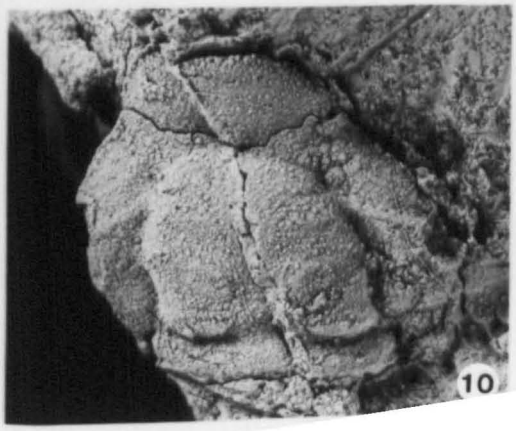


Plate 23

Fig. 1. Calymenella (Calymenella) boisseli Bergeron, 1890, internal mould of pygidium X2; lower to middle Caradoc, locality 12, Serra da Cadaveira Member of the Monte do Carvalhal Formation.

Fig. 2. Calymenella (Calymenella) boisseli Bergeron, 1890, lateral view X3 of internal mould figured in plate 22, fig. 10.

Fig. 3. Neseuretus (Neseuretus) tristani (Brongniart, 1822), internal mould of cephalon; Llanvirn, locality 105, Brejo Fundeiro Formation; fig. 3a, dorsal view X1.4; fig. 3b, lateral view X1.4; fig. 3c, anterior view X1.4; fig. 3d, antero-ventral view of rostral plate and rostral suture X3.5.

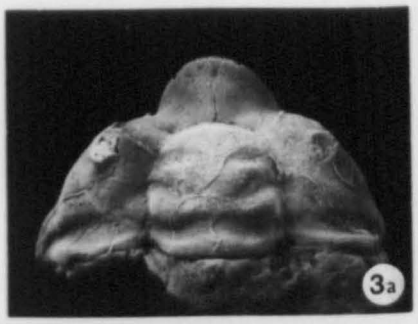
Figs. 4, 7 & 8. Neseuretus (Neseuretus) tristani (Brongniart, 1822); Llanvirn, Didymograptus murchisoni Zone, locality 85, Brejo Fundeiro Formation; figs. 4 & 7, internal moulds of cranidia X2; fig. 8 internal mould of cranidium and small cranidium of Colpocoryphe rouaulti Henry 1970 X2.

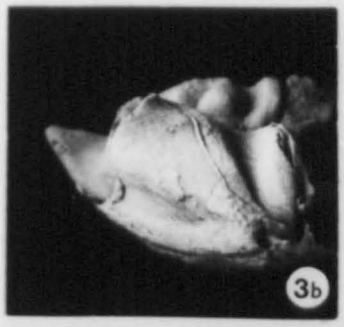
Fig. 5. Neseuretus (Neseuretus) tristani (Brongniart, 1822), internal mould of cranidium X2; Llanvirn, locality 68, Brejo Fundeiro Formation.

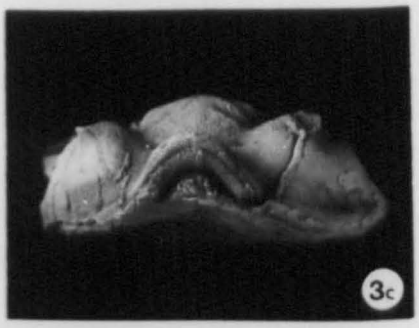
Fig. 6. Neseuretus (Neseuretus) tristani (Brongniart, 1822), internal mould of complete enrolled specimen; Llandeilo, locality 14, Lameiros Member of the Monte do Carvalhal Formation; fig. 6a, dorsal view X3; fig. 6b, anterior view X3; fig. 6c, lateral view X3.

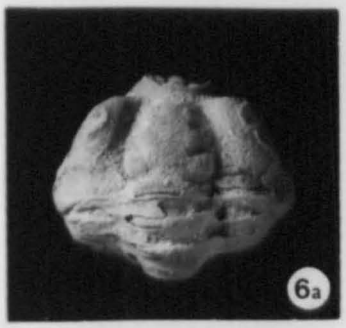
Fig. 9. Neseuretus (Neseuretus) tristani (Brongniart, 1822), internal moulds of free cheeks with small pedicle valves of Tissintia sp. indet X1.5; Llandeilo, locality 135, Brejo Fundeiro Formation.

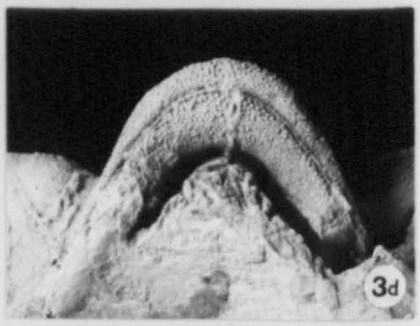
PLATE 23

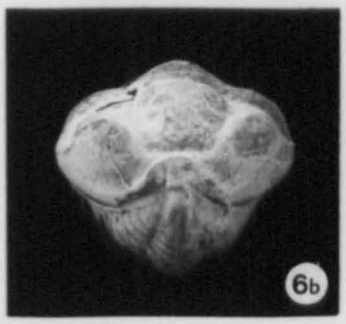












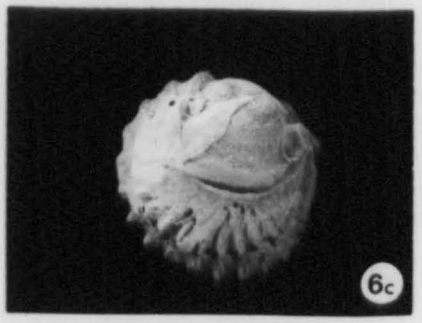


Plate 24

Fig. 1. Neseuretus (Neseuretus) tristani (Brongniart, 1822), internal mould; Llanvirn, specimen from the J.F.N. Delgado collection drawer 15B2 of the Serviços Geológicos Museum, Lisbon. Specimen collected from "250m S de Brejo Fundeiro Sernache"; fig. 1a, lateral view X1; fig. 1b, dorsal view X1; Brejo Fundeiro Formation.

Figs. 2, 3 & 6. Neseuretus (Neseuretus) tristani (Brongniart, 1822); Llanvirn, Didymograptus murchisoni Zone, locality 85, Brejo Fundeiro Formation; fig. 2, internal mould of pygidium, posterior view X2; fig. 3, internal mould of pygidium, dorsal view and free cheek X1.5; fig. 6, internal mould of free cheek X1.6

Fig. 4. Neseuretus (Neseuretus) tristani (Brongniart, 1822), internal mould of pygidium, posterior view X2; Llandeilo, locality 76, Lameiros Member of the Monte do Carvalhal Formation.

Fig. 5. Neseuretus (Neseuretus) tristani (Brongniart, 1822), internal mould of pygidium, Llanvirn, locality 1, Brejo Fundeiro Formation; fig. 5a, dorsal view X2; fig. 5b, ventral view X2.

Fig. 7. Colpocoryphe lennieri (Bergeron, 1893), internal mould of cranidium with bryozoa and Drabovia cf. redux (Barrande, 1848) lower Caradoc, specimen from the J.F.N. Delgado Collection, drawer 15B2 of the Serviços Geológicos Museum, Lisbon. Specimen collected from "1700m a N57 E de pyr de Queixopera Mação and associated with material similar to the bryozoa beds of the Monte do Carvalhal Formation; fig. 7a, dorsal view X1.4; fig. 7b, anterior view X1.4.

Fig. 8. Colpocoryphe rouaulti Henry, 1970, internal mould of cephalon with fragmentary thoracic segments attached X3.1, Llanvirn, locality 5, Brejo Fundeiro Formation.

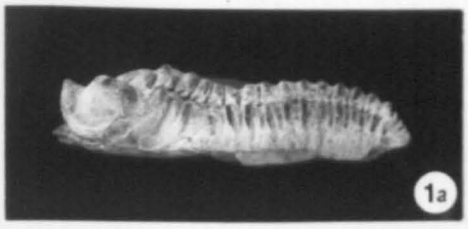
Fig. 9. Colpocoryphe rouaulti Henry, 1970, internal mould of cranidium; Llanvirn, specimen from the J.F.N. Delgado collection, drawer 15B2 of the Serviços Geológicos Museum, Lisbon. Specimen collected from the Brejo Fundeiro Formation, "250m a S de Brejo Fundeiro Sernache"; fig. 9a, anterior view X2; fig. 9b, dorsal view X2.

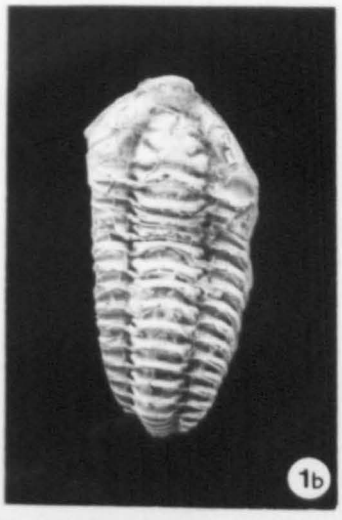
Fig. 10. Plaesiacomia oehlerti (Kerforne, 1900) internal mould of incomplete cephalon X4.5; Llandeilo, locality 147, Brejo Fundeiro Formation.

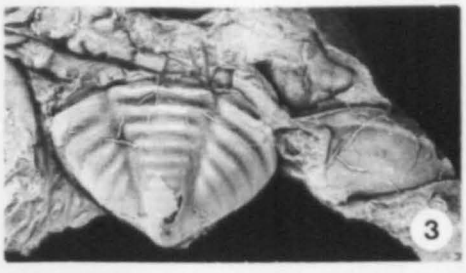
Fig. 11. Plaesiacomia oehlerti (Kerforne, 1900) internal mould of incomplete cephalon; Llandeilo, locality 13, Lameiros Member of the Monte do Carvalhal Formation.

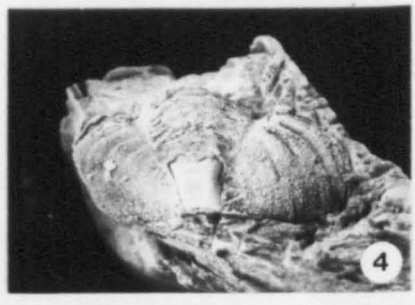
Fig. 12. Plaesiacomia oehlerti (Kerforne, 1900) internal moulds of incomplete cranidia X3; Llandeilo, locality 20, Lameiros Member of the Monte do Carvalhal Formation.

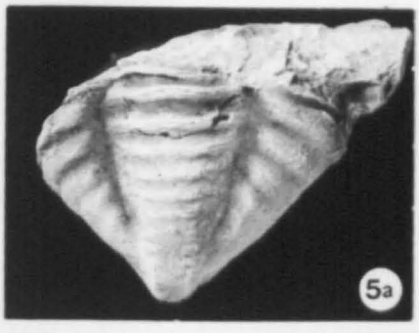
PLATE 24

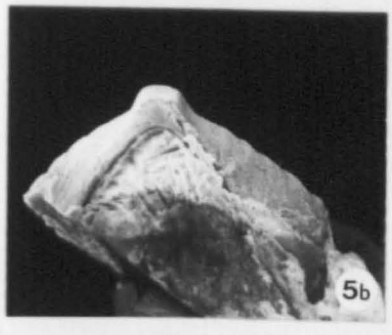


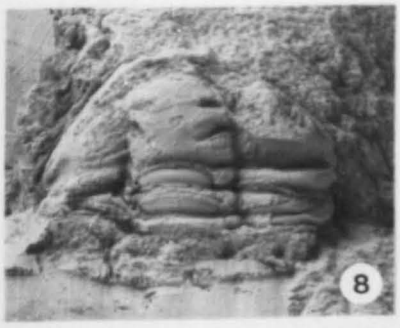


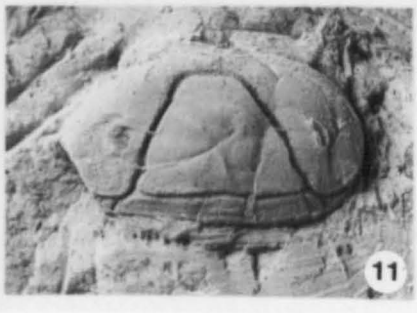












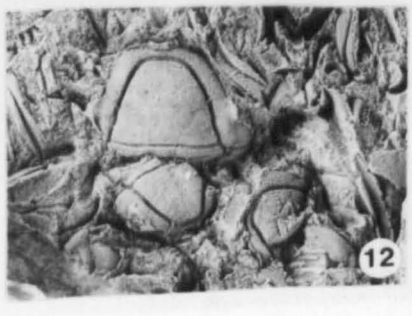


Plate 25

Fig. 1. *Plaesiacomia* sp. indet. internal mould of cranidium X3; Llanvirn, *Didymograptus murchisoni* Zone, locality 85, Brejo Fundeiro Formation.

Fig. 2. *Plaesiacomia oehlerti* (Kerforne, 1900), internal mould of cephalon; Llandeilo, locality 15, Lameiros Member of the Monte do Carvalhal Formation; fig. 2a, dorsal view X4; fig. 2b, anterior view X4.

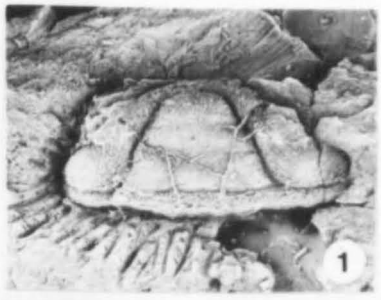
Fig. 3. *Plaesiacomia oehlerti* (Kerforne, 1900), internal mould of incomplete thorax and pygidium; Llandeilo, locality 147, Brejo Fundeiro Formation; fig. 3a, lateral view X3; fig. 3b, dorsal view X3.5.

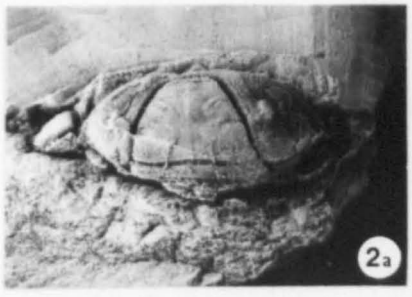
Figs. 4–8. *Plaesiacomia oehlerti* (Kerforne, 1900); Llandeilo locality 20, Lameiros Member of the Monte do Carvalhal Formation; fig. 4, internal mould of pygidium X5; fig. 5, internal moulds of cranidium and pygidium X5; fig. 6, internal moulds of cranidium and pygidium X3; figs. 7 & 8, internal moulds of cranidia X3.

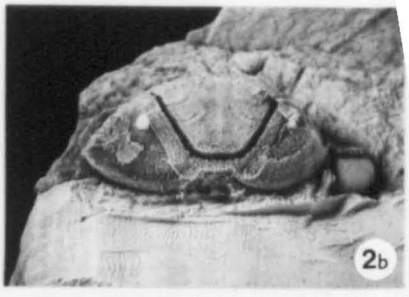
Fig. 9. *Crozonaspis armata* Hammann, 1972; Llandeilo, locality 20, Lameiros Member of the Monte do Carvalhal Formation; fig. 9a, latex cast from external mould of visual surface and free cheek X5; fig. 9b, external mould of visual surface and free cheek X5,

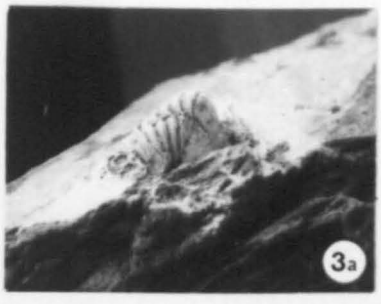
Fig. 10. *Crozonaspis armata* Hammann, 1972; plasticine cast from external mould of enrolled specimen X1.1; Llandeilo, locality 105, Brejo Fundeiro Formation; see also plate 26, fig. 2.

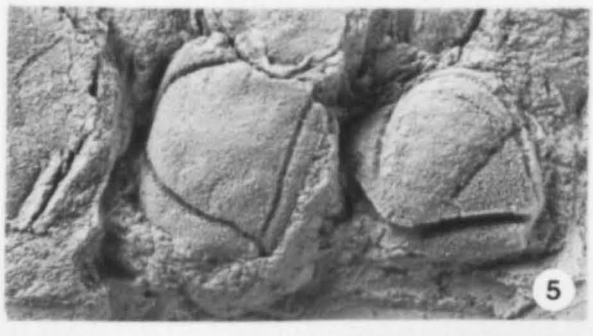
PLATE 25

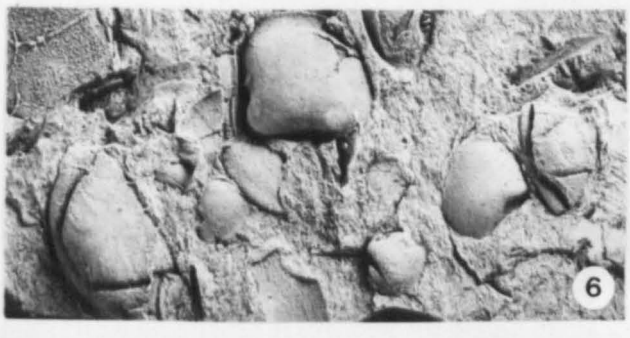


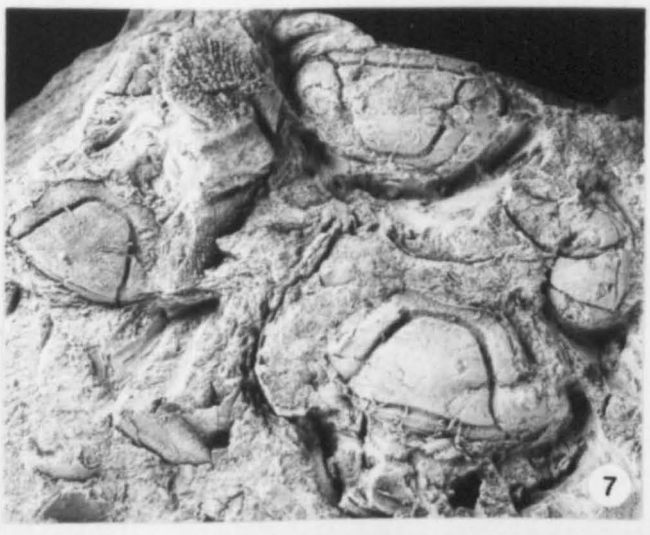


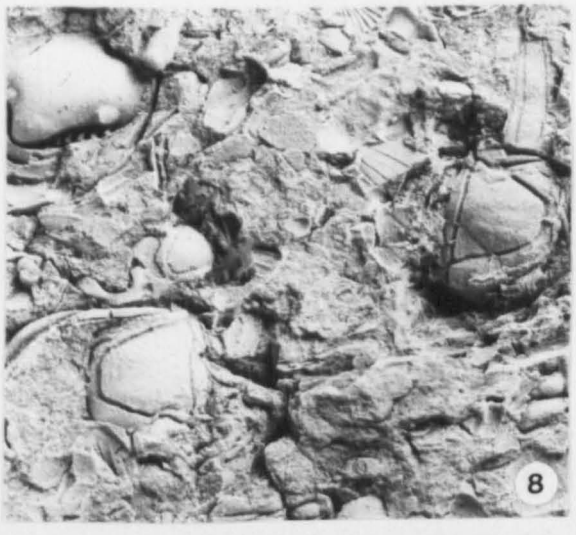


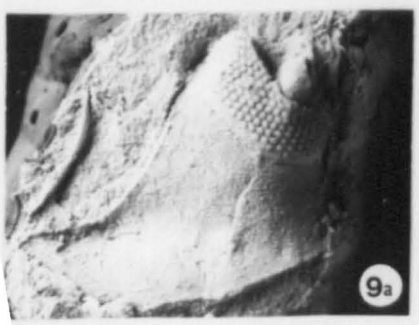


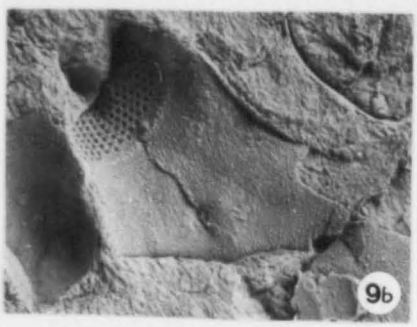












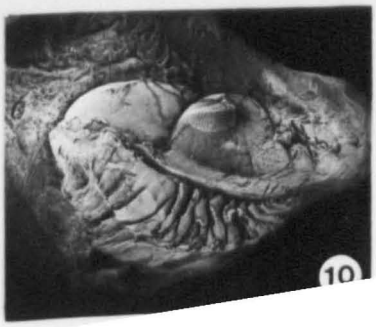


Plate 26

Fig. 1. *Crozonaspis armata* Hammann, 1972, cephalon; Llandeilo, locality 20, Lameiros Member of the Monte do Carvalhal Formation; fig. 1a, external mould X3; fig. 1b, internal mould X3; fig. 1c, dorsal view of latex cast from external mould X3; fig. 1d, anterior view of latex cast from external mould X3; fig. 1e, lateral view of latex cast from external mould X3.

Fig. 2. *Crozonaspis armata* Hammann, 1972, internal mould of complete enrolled specimen X2.5; Llandeilo, locality 105, Brejo Fundeiro Formation; see also plate 25, fig. 10.

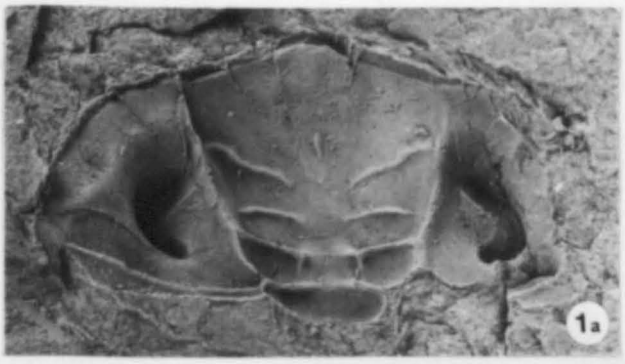
Fig. 3. *Crozonaspis armata* Hammann, 1972, latex cast of pygidium taken from external mould X2.2; Llandeilo, locality 20, Lameiros Member of the Monte do Carvalhal Formation.

Fig. 4. *Crozonaspis armata* Hammann, 1972, internal mould of incomplete cephalon X2; Llandeilo, locality 20, Lameiros Member of the Monte do Carvalhal Formation.

Fig. 5. *Crozonaspis morenensis* cf. *morenensis* Hammann, 1972, incomplete cranidium; Llandeilo, locality 155, Monte da Sombadeira Formation; fig. 5a, internal mould X5.6; fig. 5b, external mould X5.6.

Figs. 6 & 7. *Crozonaspis morenensis mayensis* Clarkson & Henry, 1973; Llanvirn, *Didymograptus murchisoni* Zone, locality 85, Brejo Fundeiro Formation; fig. 6a, plasticine cast of cephalon taken from external mould X3; fig. 6b, external mould of cephalon X3; fig. 7, external mould of fragmentary cephalon X2.5.

PLATE 26


1a


1b


1c

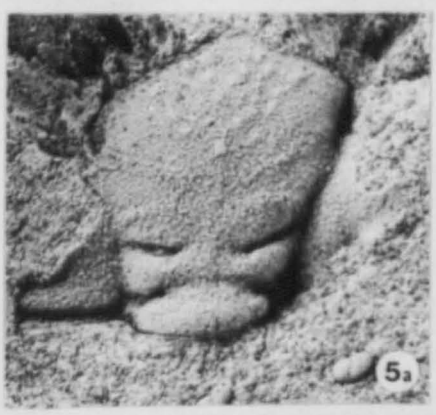

1d


2


3


1e


4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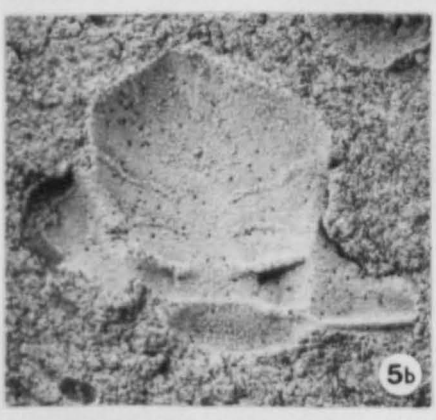

5b


6a


6b


7

Plate 27

Fig. 1. Crozonaspis armata Hammann, 1972, internal moulds of pygidia and fragmentary cranidia, Placsiacomia oehlerti (Kerforne, 1900), internal mould of cranidium and several internal moulds of pygidia, Horderleyella cf. plicata Bancroft, 1928, external mould of brachial valve and numerous fragments, X2; Llandeilo, locality 20, Lameiros Member of the Monte do Carvalhal Formation.

Fig. 2. Neseuretus (Neseuretus) tristani (Brongniart, 1822), internal and external moulds of cranidia and pygidia, Crozonaspis armata Hammann, 1972, internal and external moulds of pygidia, X1.7; Llandeilo, locality 175, Lameiros Member of the Monte do Carvalhal Formation.

PLATE 27

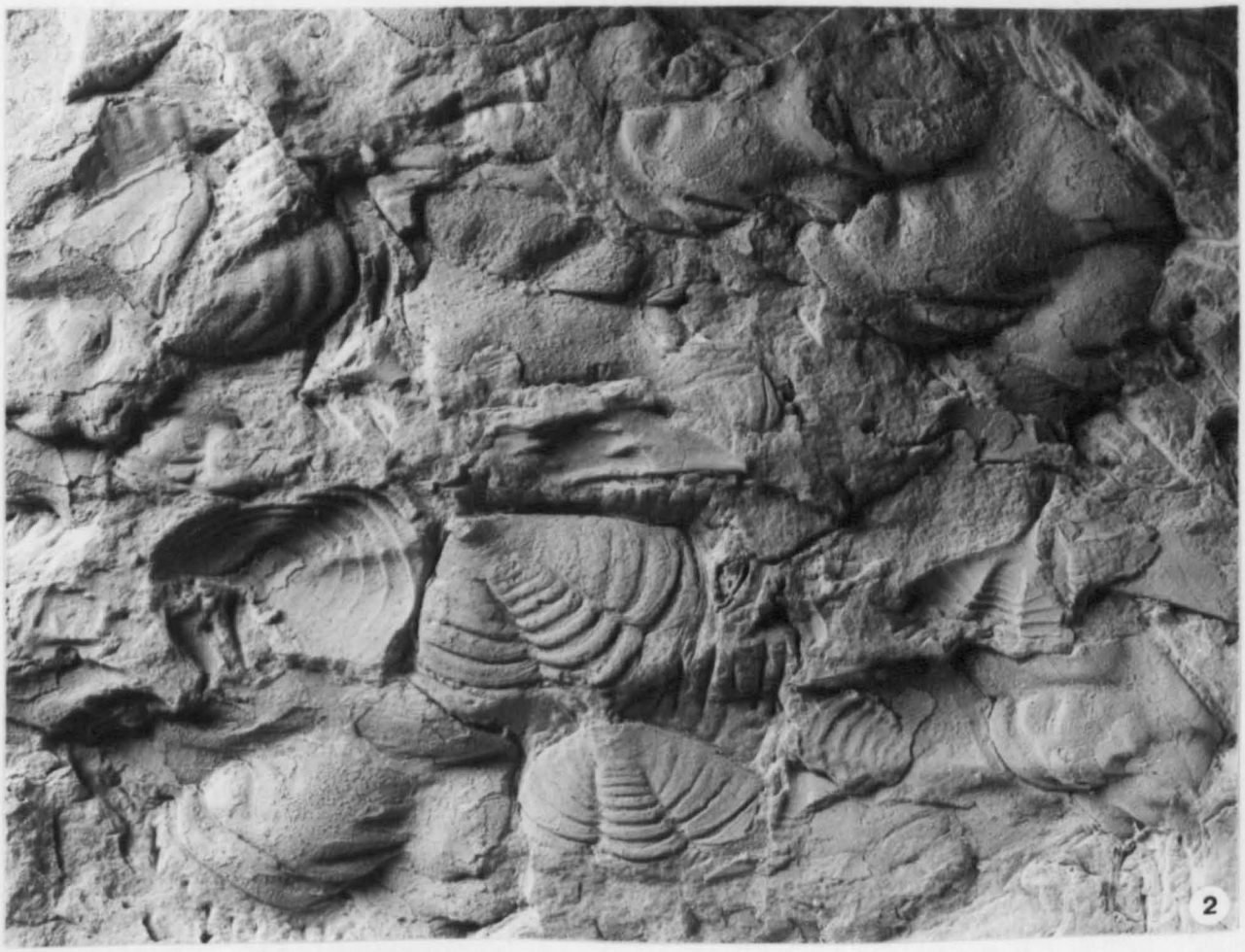


Plate 28

Fig. 1. Crozonaspis morenensis mayensis Clarkson & Henry, 1973, internal mould of pygidium and incomplete thorax X2; Llanvirn, Didymograptus murchisoni Zone, locality 85, Brejo Fundeiro Formation.

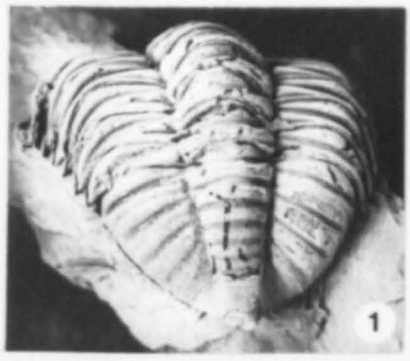
Figs. 2 & 3. Micronaspis cf. macrophtalma (Brongniart, 1822); Llanvirn, Didymograptus murchisoni Zone, locality 190, Brejo Fundeiro Formation; fig. 2, internal mould of incomplete cranidium X5.5; fig. 3, internal mould of incomplete cranidium X3.5.

Fig. 4. Crozonaspis armata Hammann, 1972, internal mould of incomplete cephalon X3; Llandeilo, locality 20, Lameiros member of the Monte do Carvalhal Formation.

Figs. 5–8. Micronaspis chillonensis Hammann, 1972; Llanvirn Didymograptus murchisoni Zone, locality 85, Brejo Fundeiro Formation; fig. 5, internal mould of cephalon X3; fig. 6, internal mould of fragmentary cephalon X3; fig. 7, internal mould of fragmentary cephalon X3; fig. 8a, internal mould of cephalon X5; fig. 8b, external mould of 8a X5.

Fig. 9. Selenopeltis cf. macrophthalmus(Klouček, 1916); Llanvirn, Didymograptus murchisoni Zone, Brejo Fundeiro Formation; fig. 9a, external mould of fragmentary cephalon X2; fig. 9b, plasticine cast taken from esternal mould in fig. 9a X2.

PLATE 28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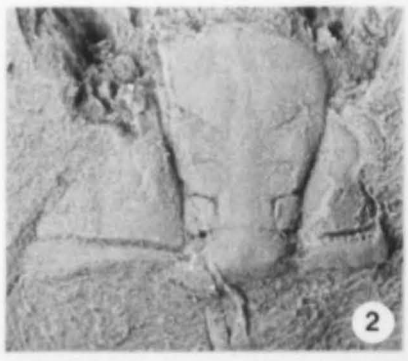
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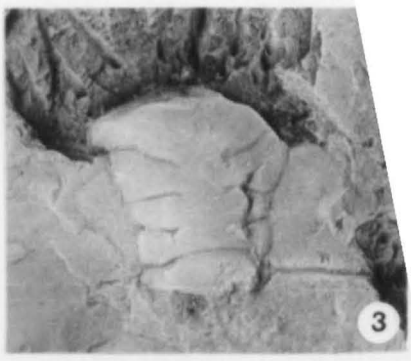
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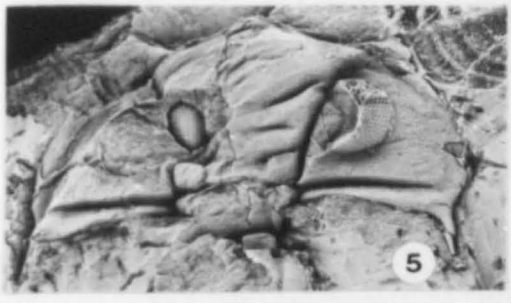
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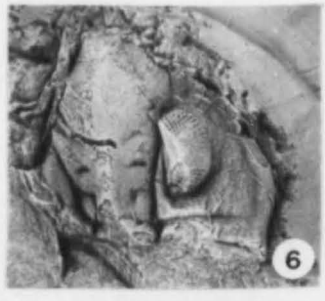
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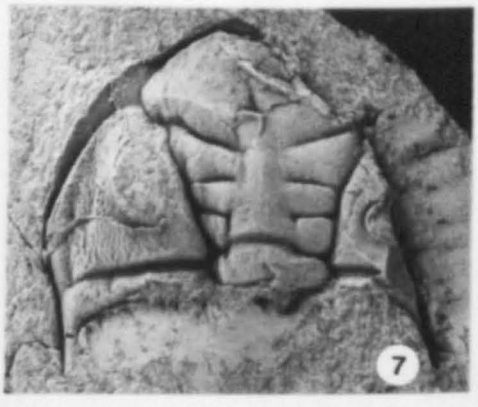

7


9a


8a


9b


8b

Plate 29

Figs. 1-2. Kloucekia (Kloucekia) cf. taouzensis Destombes, 1972; Caradoc, locality 52, Serra da Cadaveira Member of the Monte do Carvalhal Formation; fig. 1, internal mould of cephalon X4.2; fig. 2a, internal mould of pygidium, dorsal view X3; fig. 2b, internal mould of pygidium, posterior view X3.

Fig. 3. Selenopeltis cf. macrophthalmus(Klouček, 1916); Llanvirn Didymograptus murchisoni Zone, locality 85, Brejo Fundeiro Formation; fig. 3a, plasticine cast taken from external mould of fragmentary left pleura X2; fig. 3b, external mould of fragmentary left pleura X2.

Fig. 4. Drabovia cf. redux (Barrande, 1848), internal mould of brachial valve X3; Caradoc, locality 16 bryozoa beds of the Monte do Carvalhal Formation.

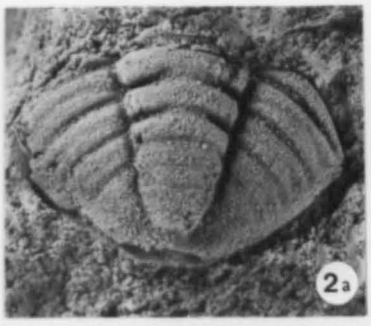
Fig. 5. Drabovia cf. redux (Barrande, 1848); Caradoc, locality 150, bryozoa beds of the Monte do Carvalhal Formation; fig. 5a, internal mould of pedicle valve; fig. 5b, plasticine cast from internal mould of pedicle valve X3; fig. 5c, plasticine cast from external mould of pedicle valve X3.

Fig. 6. Drabovia cf. redux (Barrande, 1848), Caradoc, locality 22, bryozoa beds of the Monte do Carvalhal Formation; fig. 6a, internal mould of brachial valve X3; fig. 6b, plasticine cast from internal mould of brachial valve X3.

Fig. 7. Drabovia cf. redux (Barrande, 1848), fragmentary internal mould of pedicle valve and external moulds of pedicle and brachial valves with bryozoa X3; Caradoc, locality 16, bryozoa beds of the Monte do Carvalhal Formation.

PLATE 29


1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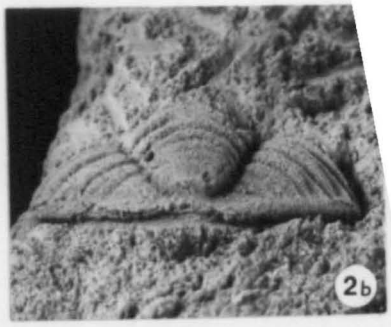
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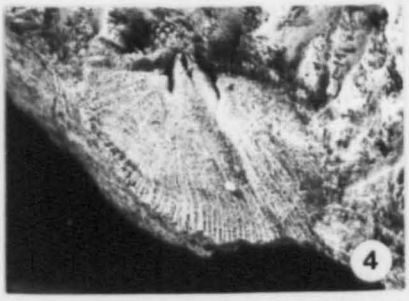
3a


3b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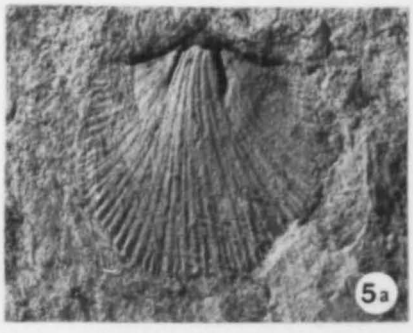
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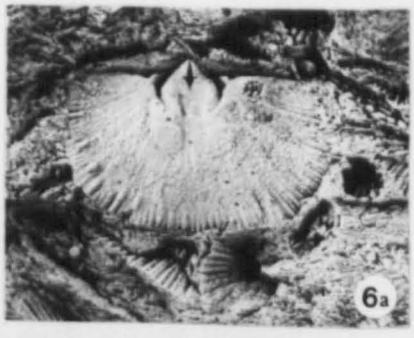
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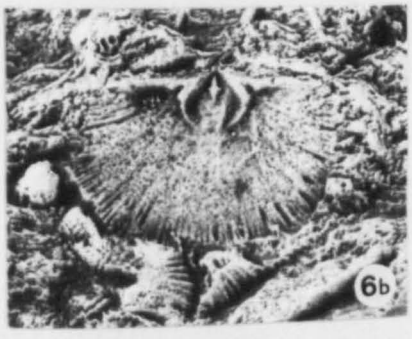
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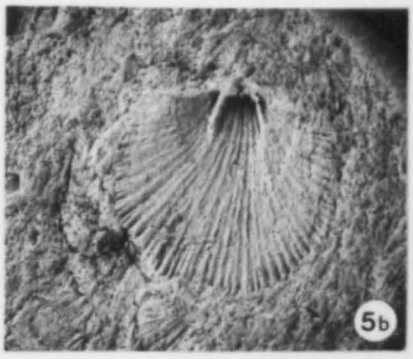

5b


7

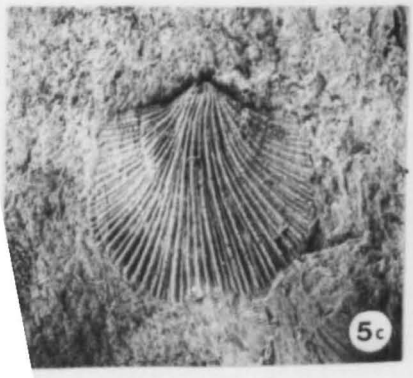

5c

Plate 30

Fig. 1. Drabovia cf. redux (Barrando, 1848), internal mould of pedicle valve X3; Caradoc, locality 33, bryozoa beds of the Monte do Carvalhal Formation.

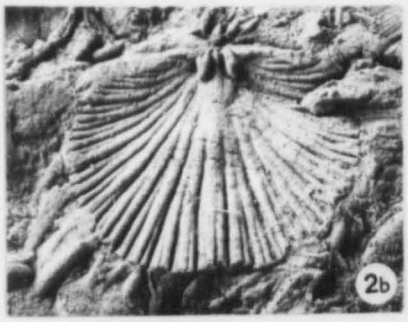
Figs. 2–7. Horderleyella cf. plicata Bancroft, 1928; Llandeilo locality 20, Lameiros Member of the Monte do Carvalhal Formation; fig. 2a, internal mould of brachial valve X3; fig. 2b, plasticine cast from internal mould of brachial valve X3.5; fig. 3, internal mould of pedicle valve with small external moulds of both valves plus cranidia and pygidia of Plaesiacomia oehlerti (Kerforne, 1900) X3; fig. 4, internal moulds of pedicle valves with fragments of Plaesiacomia oehlerti (Kerforne, 1900) X3; fig. 5, external mould of small pedicle valve and cranidium of Plaesiacomia oehlerti (Kerforne, 1900) X3; fig. 6, internal mould of small brachial valve X3; fig. 7, external mould of brachial valve with pygidium of Plaesiacomia oehlerti (Kerforne, 1900) X3.

Figs. 8–13. Svobodaina armoricana Babin & Melou, 1972; Caradoc, locality 52, Serra da Cadaveira Member of the Monte do Carvalhal Formation; fig. 8, internal mould of pedicle valve X2; fig. 9, internal mould of brachial valve X2; fig. 10a, internal mould of brachial valve X2; fig. 10b, plasticine cast from internal mould of brachial valve X2; fig. 11, internal mould of brachial valve X2; fig. 12, external mould of pedicle valve X2; fig. 13, external mould of brachial valve X2.

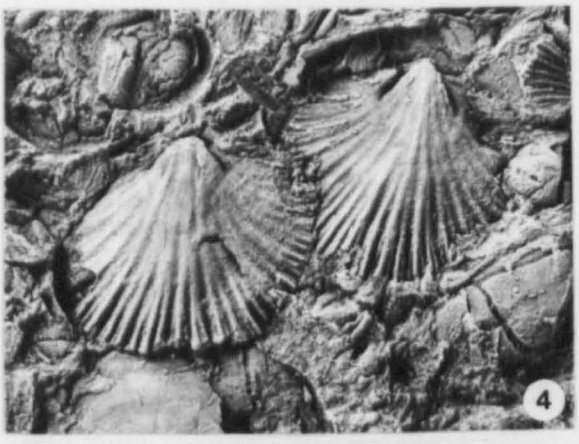
PLATE 30


1


2a


2b


3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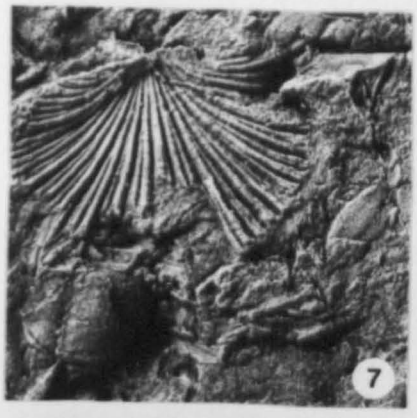
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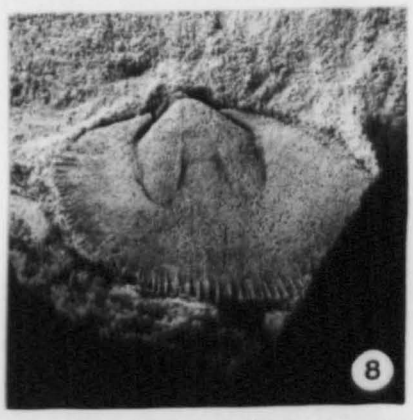
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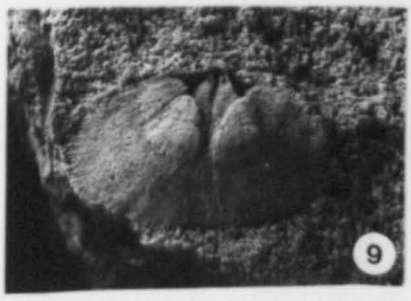
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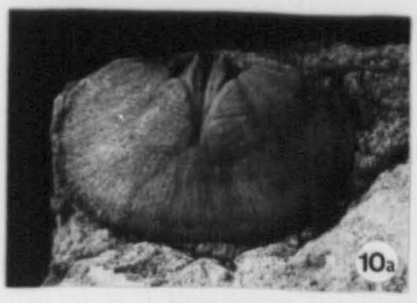

10a


10b


11


12

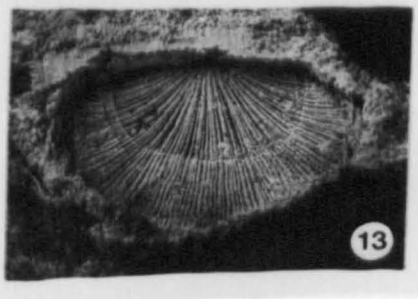

13

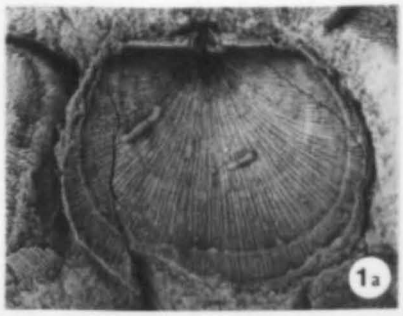
Plate 31

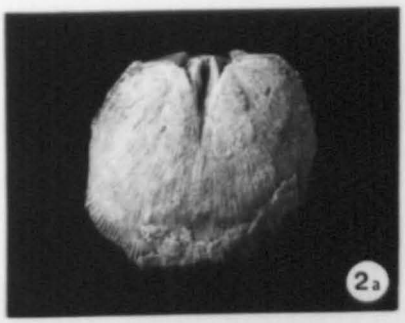
Figs. 1-4 & 6. Svobodaina armoricana Babin & Melou, 1972; Caradoc, locality 52, Serra da Cadaveira Member of the Monte do Carvalhal Formation; fig. 1a, external mould of pedicle valve X2; fig. 1b, plasticine cast from external mould pedicle valve X2; figs. 2a & 2b, internal moulds of brachial and pedicle valves X2; figs. 3a & 3b, internal moulds of brachial and pedicle valves X2; figs. 4a & 4b, internal moulds of brachial and pedicle valves X2; fig. 6, internal mould of pedicle valve.

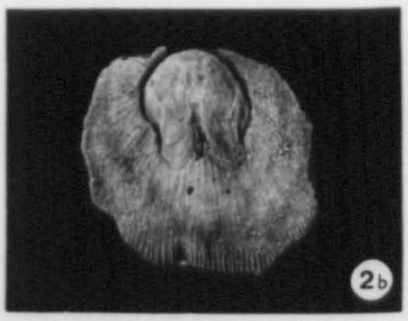
Fig. 5. Svobodaina armoricana Babin & Melou, 1972. internal mould of pedicle valve X2; Caradoc, locality 117, Serra da Cadaveira Member of the Monte do Carvalhal Formation.

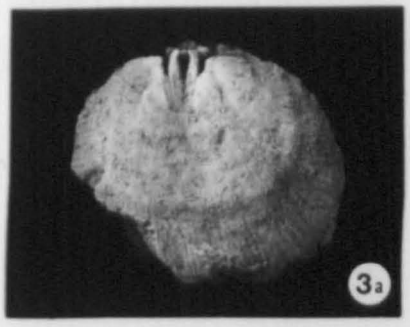
Figs. 7-9. Tissintia sp. indet.; Llandeilo, locality 8, Brejo Fundeiro Formation; fig. 7, external moulds of pedicle valves X3; fig. 8, internal mould of pedicle valve and external mould of brachial valve X3; fig. 9, internal mould of pedicle valve X3.

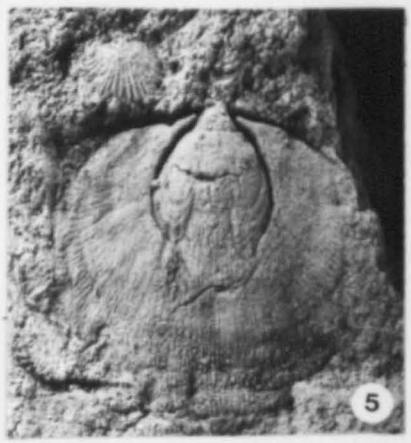
PLATE 31

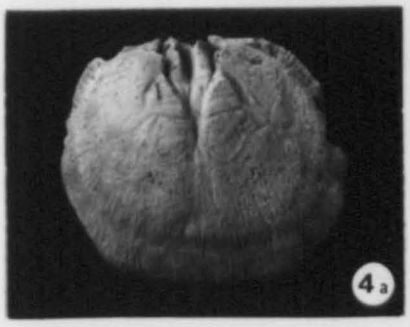


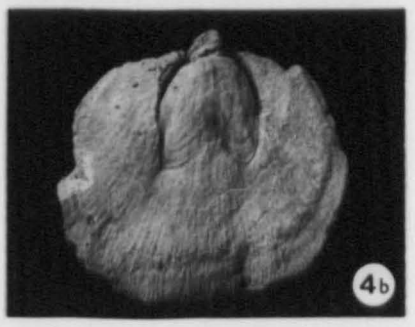


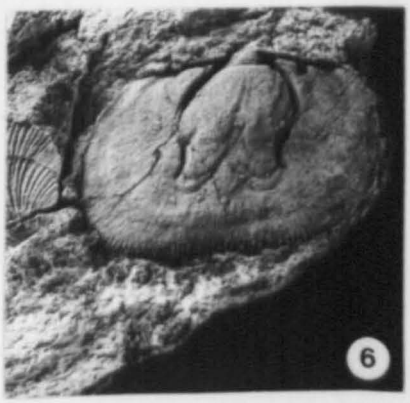












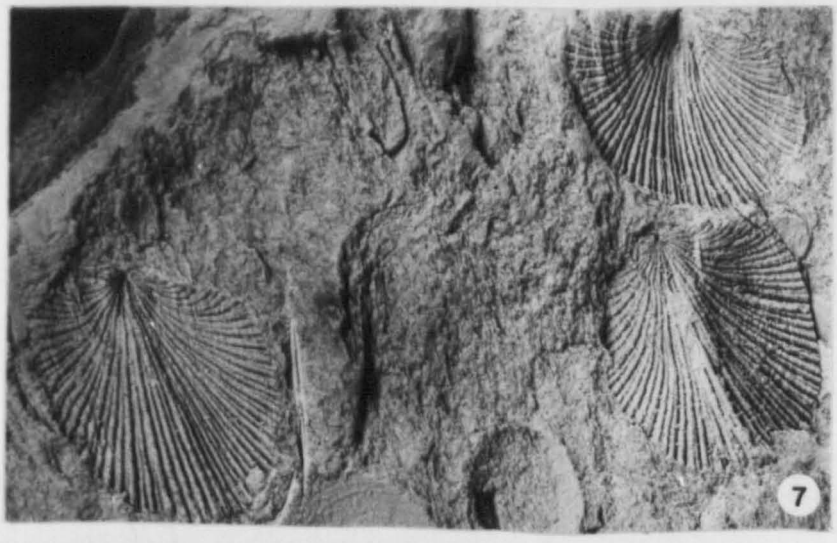


Plate 32

Fig. 1. Tissintia sp. indet., internal moulds of pedicle and brachial valves X3; Llandeilo, locality 8, Brejo Fundeiro Formation.

Fig. 2. Tissintia sp. indet., external mould of brachial valve, Llandeilo, locality 76, Lameiros Member of the Monte do Carvalhal Formation.

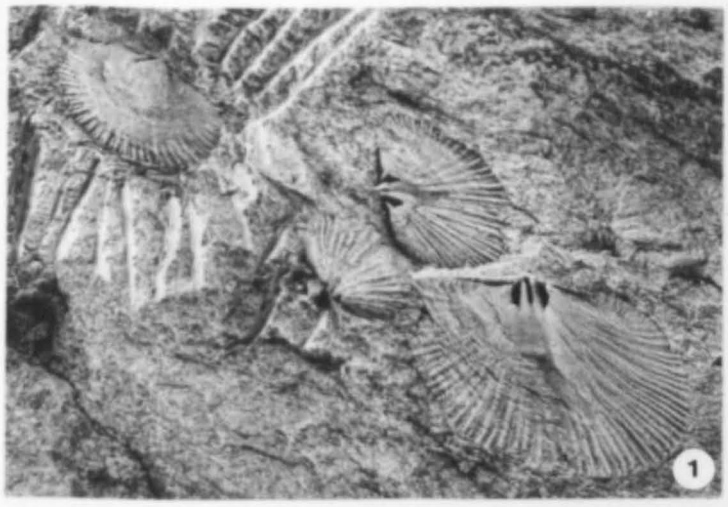
Figs. 3, 4, 6, 9 & 10. Cacemia ribeiroi (Sharpe, 1853); upper Llanvirn or possibly Llandeilo, locality 66, Brejo Fundeiro Formation; fig. 3, internal moulds and fragmentary external moulds of brachial valves X3; fig. 4, internal mould of brachial valve X3; fig. 6, internal moulds of three pedicle valves and one small brachial valve X3; fig. 9, internal mould of pedicle valve X2; fig. 10a, plasticine cast from external mould of pedicle valve X2; fig. 10b, external mould of pedicle valve X2.

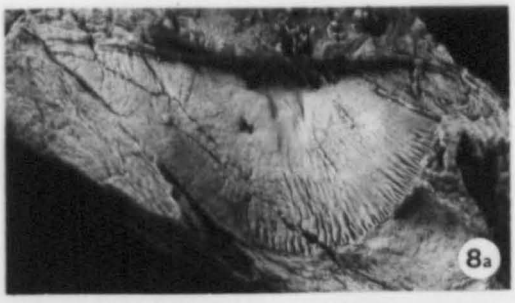
Fig. 5. Cacemia ribeiroi (Sharpe, 1853), external mould of brachial valve X2; upper Llanvirn or Llandeilo, locality 67, Brejo Fundeiro Formation.

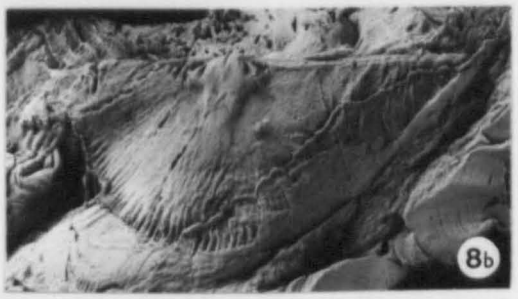
Fig. 7. Cacemia cf. ribeiroi (Sharpe, 1853), internal mould of pedicle valve and incomplete brachial valve X2; upper Llanvirn or Llandeilo, locality 9, Brejo Fundeiro Formation.

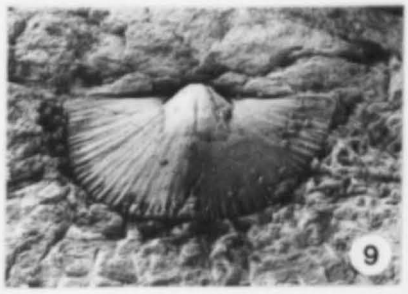
Fig. 8. Cacemia ribeiroi (Sharpe, 1853); upper Llanvirn or Llandeilo, locality 106, Brejo Fundeiro Formation; fig. 8a, internal view of pedicle valve X2; fig. 8b, plasticine cast of 8a X2.

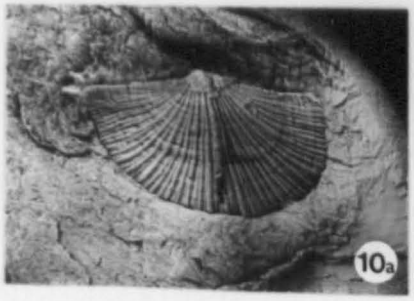
PLATE 32











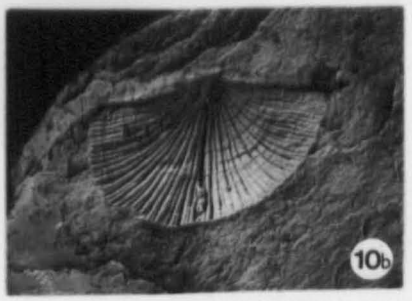


Plate 33

Fig. 1. Cruziana sp. indet., hypichnial ridges X0.46; Arenig, locality 98, Serra do Brejo Formation.

Fig. 2. Cruziana sp. indet., hypichnial ridge X2; Arenig, locality 131, Serra do Brejo Formation.

Fig. 3. Cruziana goldfussi (Rouault, 1850), hypichnial ridge X2; Arenig, locality 99, Serra do Brejo Formation.

Fig. 4. Merostomichnites sp. indet., epichnial grooves X0.11; Arenig, locality 114, Serra do Brejo Formation, see also plate 34.

Fig. 5. Rusophycus sp. indet., hypichnial ridges X2.4; Arenig, locality 124, Serra do Brejo Formation.

Fig. 6. Planolites cf. virgatus (Hall, 1847), hypichnial ridges X0.23; Arenig, detached slab from near locality 114, Serra do Brejo Formation.

PLATE 33

Plate 34

Figs. 1 & 2. Merostomichnites sp. indet., epichnial grooves; Arenig, locality 114, Serra do Brejo Formation; fig. 1, general view of specimen, surface of rock wetted with water X0.5; fig. 2, close up view of imprints X1.

PLATE 34

Plate 35

Fig. 1. Cruziana goldfussi (Rouault, 1850), hypichnial ridges X1.5; Arenig, locality 131, Serra do Brejo Formation.

Fig. 2. Cruziana goldfussi (Rouault, 1850), hypichnial ridges X1; Arenig, locality 114, Serra do Brejo Formation.

PLATE 35

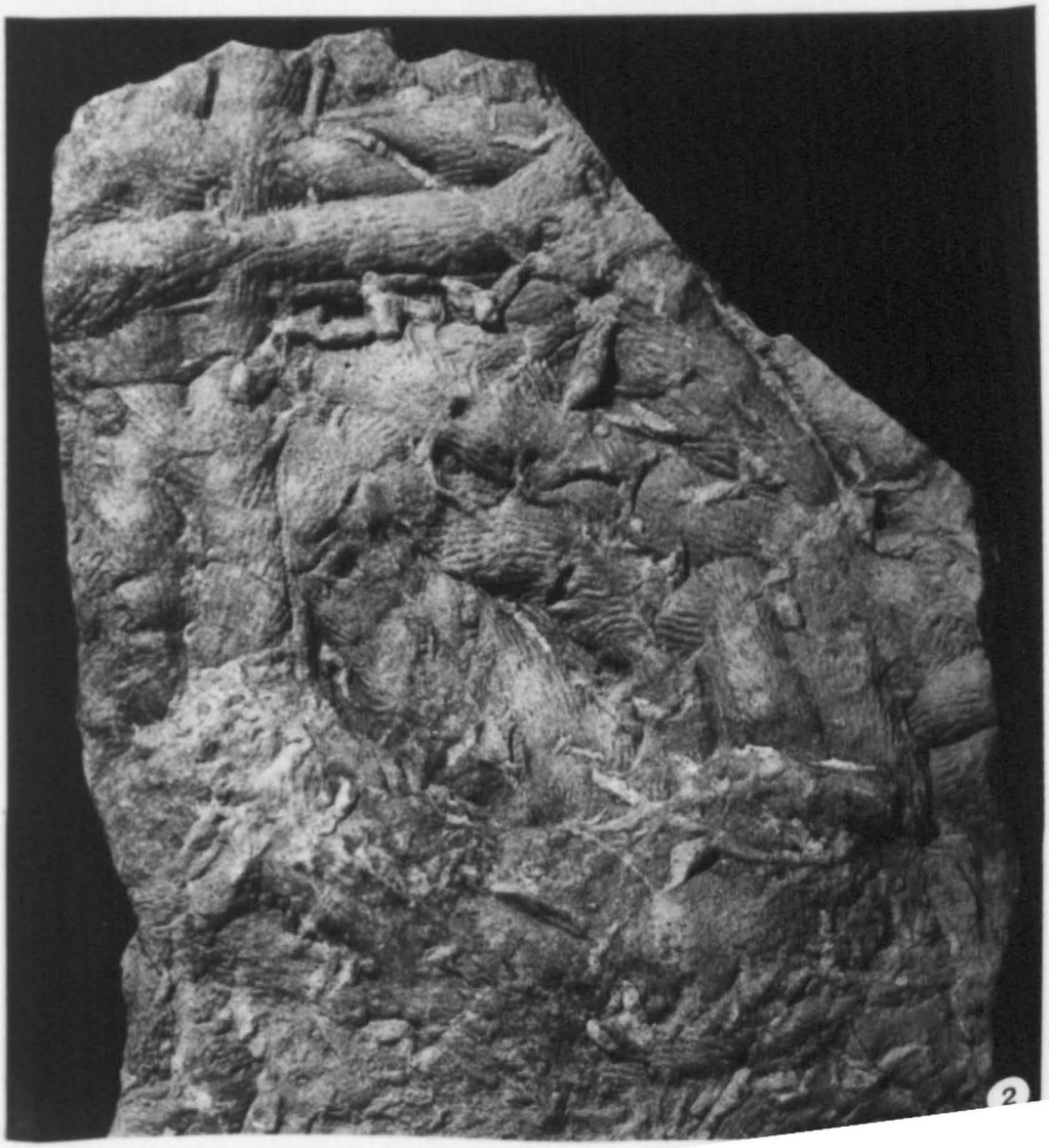


Plate 36

Fig. 1. Cruziana furcifera d'Orbigny, 1842, hypichnial ridge X1; Arenig, locality 170, Serra do Brejo Formation; this specimen has incomplete genal grooves suggesting that Cruziana furcifera d'Orbigny, 1842 and Cruziana goldfussi (Rouault, 1850) may be produced by different burrowing habits of the same type of trilobite.

Fig. 2. Cruziana furcifera d'Orbigny, 1842, hypichnial ridge X0.75; Arenig, locality 23, Serra do Brejo Formation.

Fig. 3. Arthrophycus sp. indet. and Cruziana furcifera d'Orbigny, 1842, hypichnial ridges X1; Arenig, locality 99, Serra do Brejo Formation.

PLATE 36

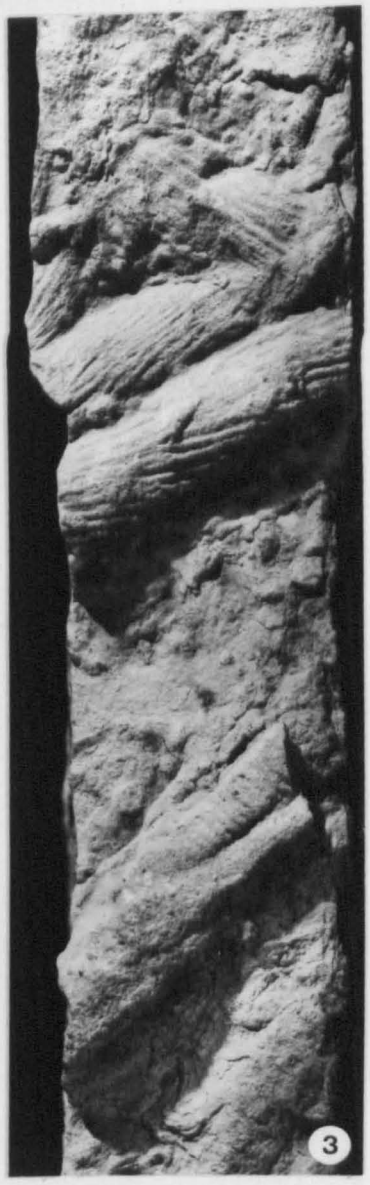


Plate 37

Fig. 1. Palaeophycus sp. indet., hypichnial ridge X1.16; Caradoc, locality 195, Monte do Carvalhal Formation.

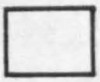
Fig. 2. Monocraterion sp. indet., endichnia, dorsal view showing sections of different sizes across conical burrows X1.4; Ludlow, locality 87, Serra da Mendeira Formation.

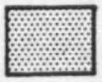
PLATE 37

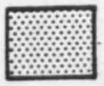
1

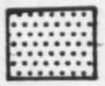
2

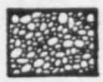
LEGEND FOR FIGURES 3-36 AND 47-51; FIG. 59
Details in parentheses refer only to figs. 3 and 47-51.

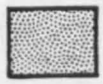

No exposure

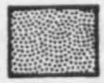

Fine-grained quartzite

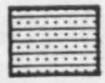

Medium-grained quartzite (quartzite)

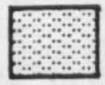

Coarse-grained quartzite

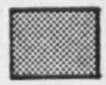

Conglomerate


Fine-grained sandstone (sandstone)

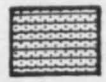

Medium-grained sandstone


Sandstone with micaceous laminae

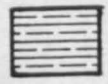

Micaceous sandstone

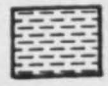

Carbonaceous & pyritic fine-grained sandstone


Laminated sandstone & mudstone


Laminated quartzite & mudstone


Mudstone

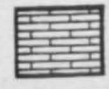

Mudstone & siltstone

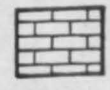

Siltstone

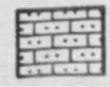

Siltstone & sandstone


Fine-grained greywacke


Coarse-grained greywacke (greywacke)

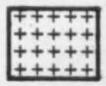

Thin-bedded limestone (limestone)


Massive limestone


Sandy limestone

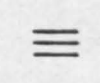

Folded greywacke & mudstone


Lava & tuff


Granite


Trough cross-bedding

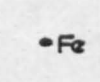

Planar cross-bedding

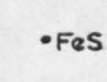

Parallel horizontal lamination

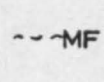
Ripple marks

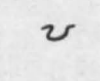

Cut and fill structures

Nodules


•Fe Ironstone nodules


•FeS Pyrite nodules


MF Mudstone flakes


Load casts


Flame structures

Abbreviations :-

Fm. Formation

M. Member

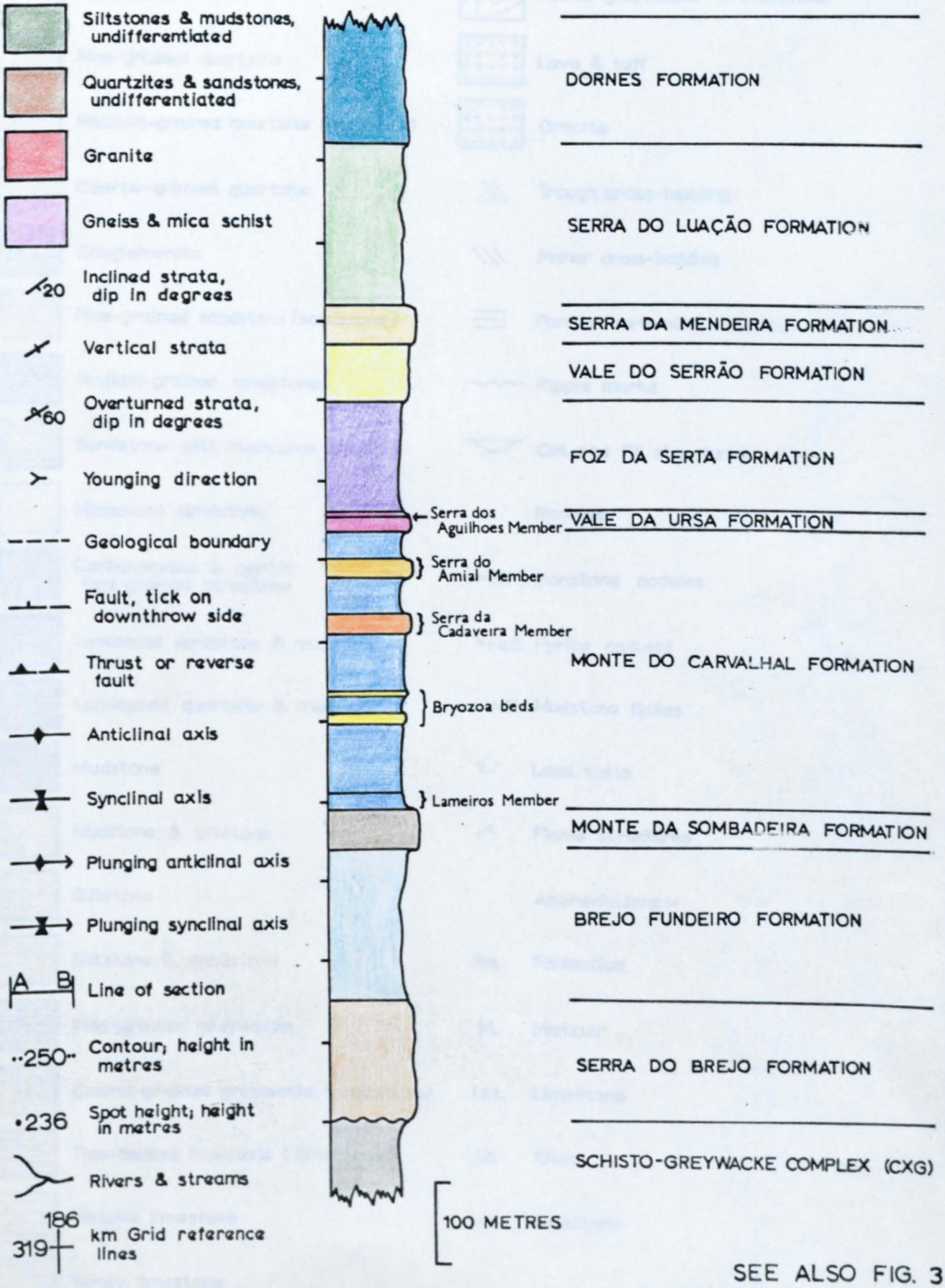
Lst. Limestone

Sh Shale

Q. Quartzite

LEGEND AND GENERALISED VERTICAL SECTION FOR FIGS. 37-45 OF THE DORNES AREA.

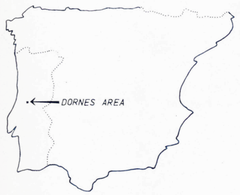
FIG. 60



SEE ALSO FIG. 3

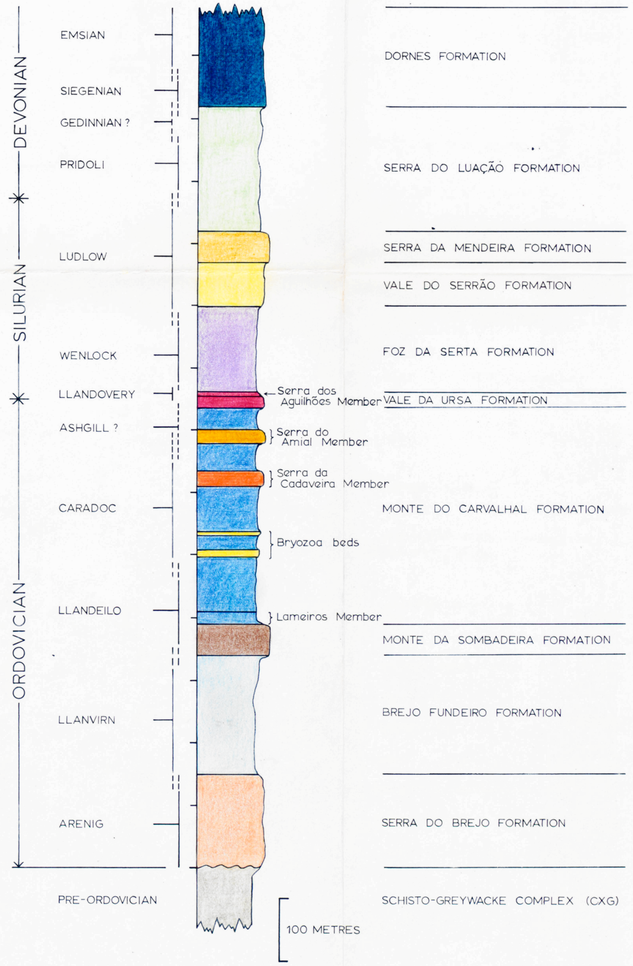
DORNES, CENTRAL PORTUGAL By A. H. COOPER; SCALE 1: 25,000

University of Sheffield
Ph.D. Thesis 1980
Map 1



- Triassic sandstones & conglomerates
- Siltstones & mudstones, undifferentiated
- Quartzites & sandstones, undifferentiated
- Metamorphosed CXG
- Granite
- Gneiss & mica schist
- Quartz veins & breccias
- Inclined strata, dip in degrees
- Vertical strata
- Younging direction of overturned strata
- Geological boundary
- Fault; tick on downthrow side
- Thrust or reverse fault
- Synclinal axis
- Anticlinal axis
- Contours; heights in metres
- Almeque Villages
- Outeiro Topographic features

GENERALISED VERTICAL SECTION, SCALE 1: 5000



Surveyed by A.H.Cooper
1972-1974

See figures 37-45 for detailed maps and cross-sections of selected areas at a scale of 1: 10,000

DORNES, CENTRAL PORTUGAL

By A. H. COOPER
University of Sheffield
Ph.D. Thesis 1980
Map 2, Faults and Folds
Scale 1: 25,000

- Fault; tick on downthrow side
- Thrust or reverse fault
- Wrench fault
- Synclinal axis
- Anticlinal axis
- Minor fold; crest horizontal
- 8 Minor fold; plunge in degrees

DORNES, CENTRAL PORTUGAL

By A. H. COOPER
University of Sheffield
Ph.D. Thesis 1980
Map 3, Cleavage
Scale 1: 25,000

74 Cleavage, dip in degrees

Cleavage, dip vertical

Rodding and strike of cleavage, dip uncertain