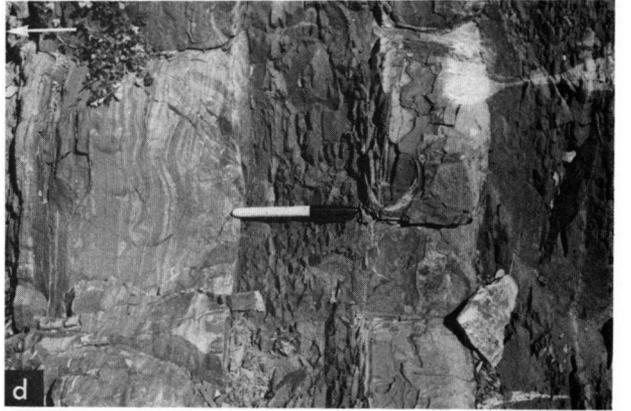
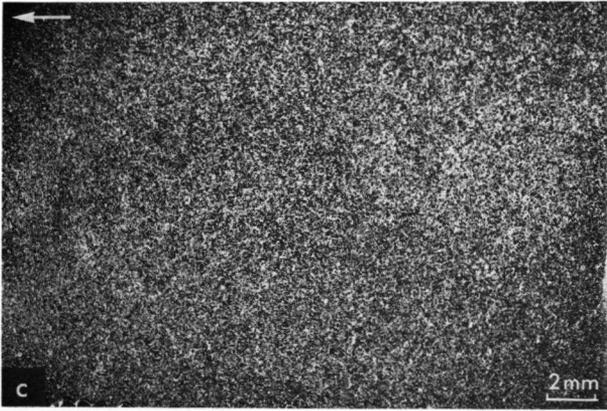
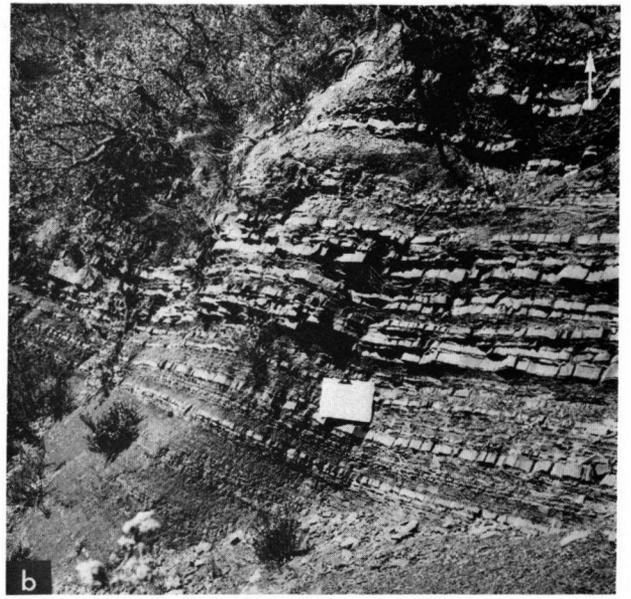
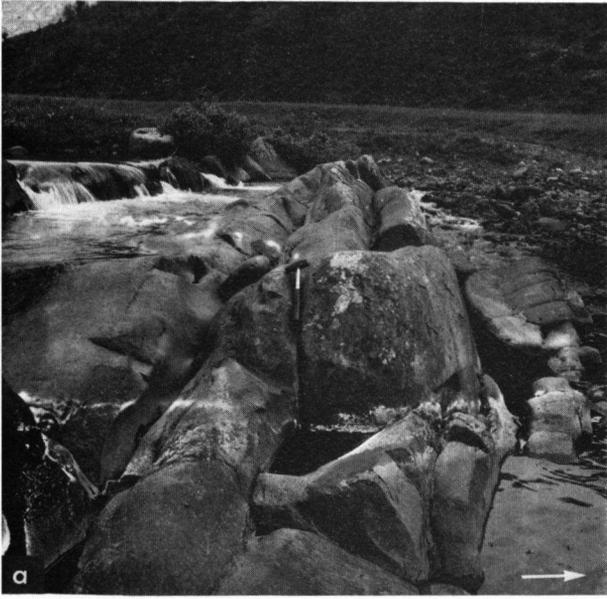


## PLATES

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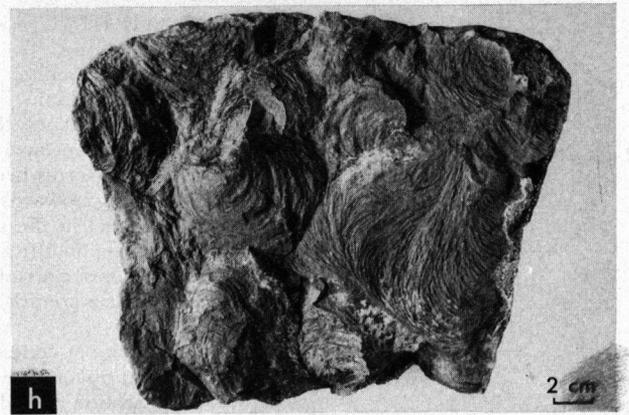
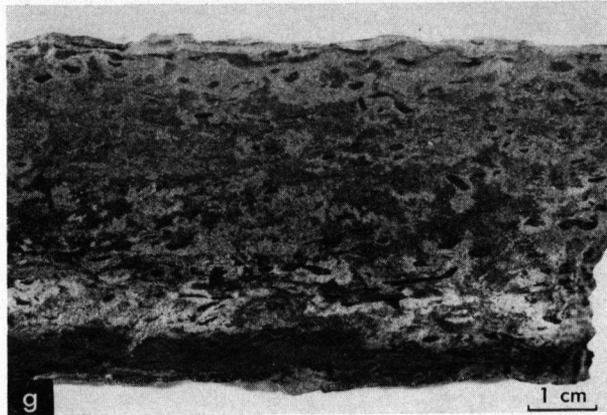
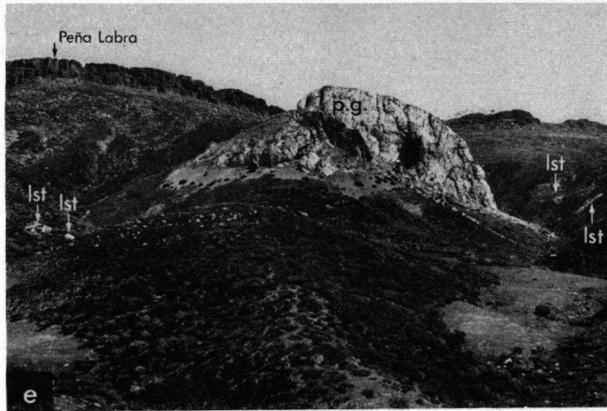
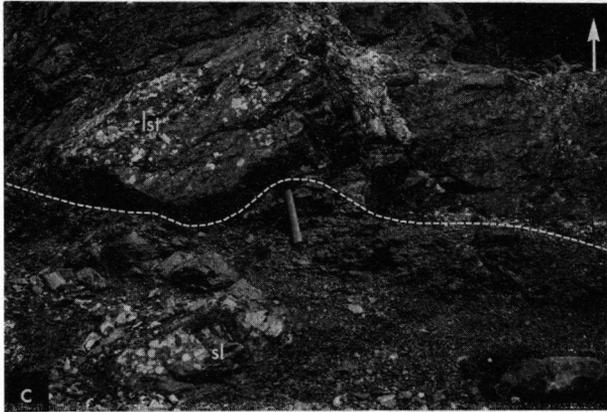
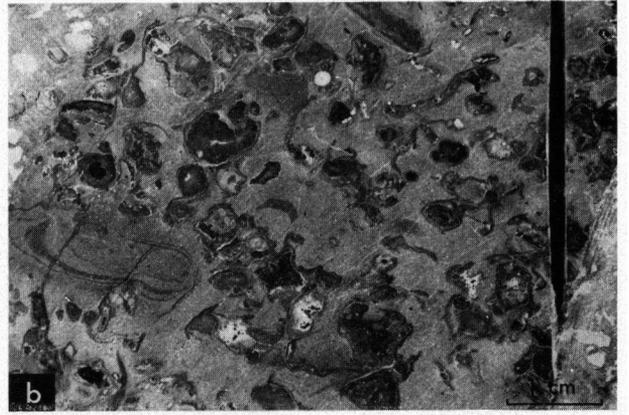
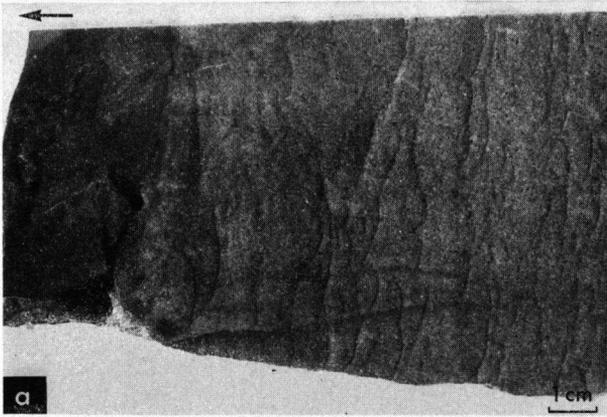
## PLATE I

- a. Immature turbidites of lithic arenitic composition. Facies type Ia. Section 10; approx. 60–70 m.
- b. Mature turbidites of quartz arenitic composition. Facies type Id. Section 4; approx. 1375–1385 m.
- c. Grading in the massive part (A interval) of a turbidite of lithic arenitic composition. Facies type Ib. Section 7; 106 m. Negative print of thin section.
- d. Convolutions in mature turbidites of quartz arenitic to quartz wacke composition. Facies type Id. Section 24.
- e. Graded limestone breccia. Facies type Ih. Section 21; 708 m.
- f. Pebbly mudstone. The well rounded pebbles and cobbles are of quartz arenitic composition. This outcrop is stratigraphically below the Agujas Limestone Member in the transitional zone from in situ lying to displaced limestone (in between Sections 21 and 22). Facies type IIf.



## PLATE II

- a. Dish structures in inferred grain flow deposits. Note the shale clasts in the upper part of the sample. Facies type If. Section 22; 753 m. Polished slab.
- b. "Pebbly" mudstone. The limestone clasts are not rounded. Sample collected from the lower part of a graded calcareous breccia. Facies type Ig or Ih. Section 24; 290.10 m. Polished slab.
- c. Slump ball immediately below the base of the Sierra Corisa Limestone Member. 1st – limestone; sl – slump ball. Facies type IIb below IIc. Section 4; 1545 m.
- d. Synsedimentary unconformities on top of the lower tongue of the Sierra Corisa Limestone Member. Facies type IIb on top of IIc. Section 4; approx. 1590–1620 m.
- e. Slumped limestone block forming the Pico Guillermo. Unconformable Permo-Triassic deposits in the back ground. p.g. – Pico Guillermo; 1st – smaller limestone blocks.
- f. Calcareous mudflow deposits at the Pozo Diablo. Facies type II d.
- g. Bioturbated quartz wacke. Facies type IIIc. Section 22; 1222 m. Polished slab.
- h. *Zoophycos* Spreitenbauten in calcareous quartz wacke. Facies type III d. Section 3; 198 m.



### PLATE III

- a. Quartz arenitic channel fill with low angle cross-stratification. Facies type VIa. Section 3; 135 m.
- b. Spheroidal weathering in lithic arenitic sandstones in the lower part of a major coarsening upwards sequence. Facies type VIIa. Section 7; 970 m.
- c. Trough cross-bedding in lithic arenitic sandstones in the upper part of a major coarsening upwards sequence. Facies type VIIa. Section 1; approx. 940 m.
- d. Channel in the middle part of a major coarsening upwards sequence. Facies type VIIb. Section 10; approx. 570 m.
- e. Erosion surface of the Leonian disconformity on the Sierra Corisa Limestone Member. sst – quartz arenitic sandstone; lst – limestone. Facies type IXa on top of Xb. Section 4; 1845 m.
- f. Limestone conglomerate with quartz arenitic matrix, which occurs locally on the Leonian disconformity. q. – quartz arenitic pebble; lst – limestone pebble. Facies type IXa. Section 3; 388 m.



#### PLATE IV

a. Mega cross-bedding with superimposed macro cross-bedding in the upper part of a major coarsening upwards sequence. mds – main depositional surface. Facies type VIIa. Section 7; 1050–1060 m.

b. Detail of IVa.

c. Mega cross-bedding in the upper part of a major coarsening upwards sequence. mds – main depositional surface. Facies type VIIa. Section 13; 368 m.

d. Beach/beach barrier/chenier deposits with autochthonous plant growth, overlain by a transgressive sequence. lst – limestone; symbols as used on Enclosures 1 and 2. Section 10; 620–700 m.

e. Erosion surface of the Leonian disconformity on the Sierra Corisa Limestone Member. sst – quartz arenitic sandstone; lst – limestone. Facies type IXa on Xb, c. Section 3; 380–388 m.

f. Limestone with erosional (?) vugs filled with quartz arenitic sandstone. sst – quartz arenitic sandstone; lst – limestone. Facies type IXa in Xb, c. Section 3; 380 m.

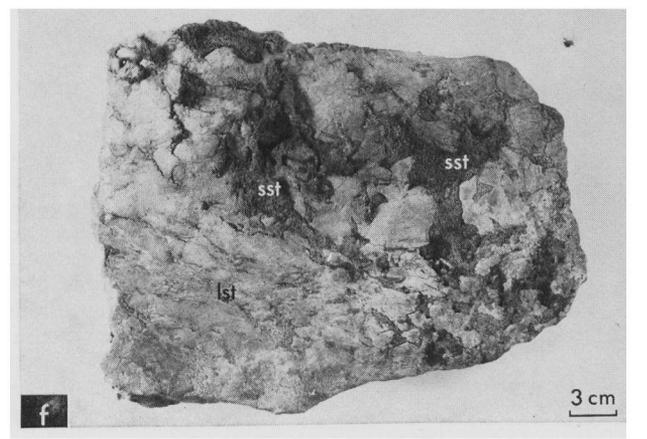
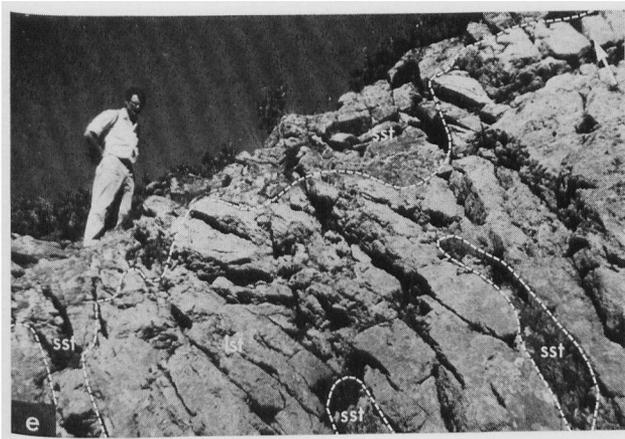
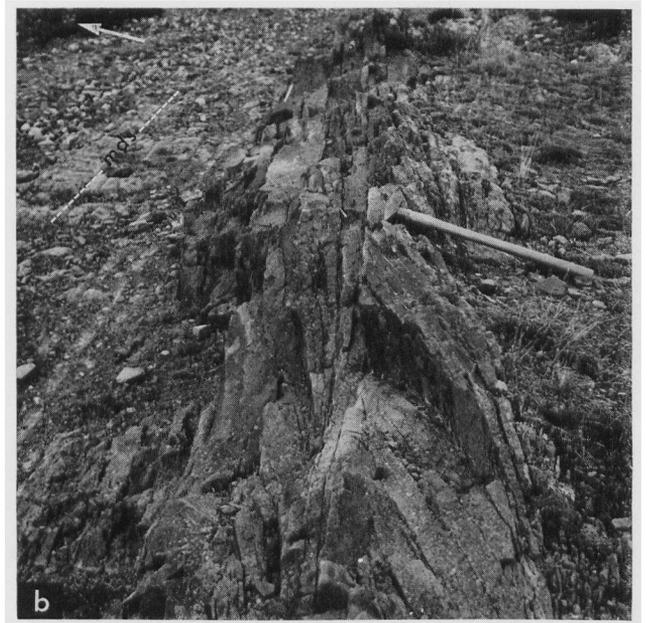
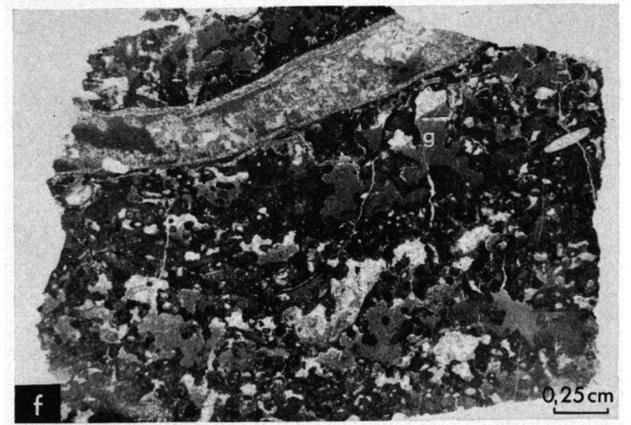
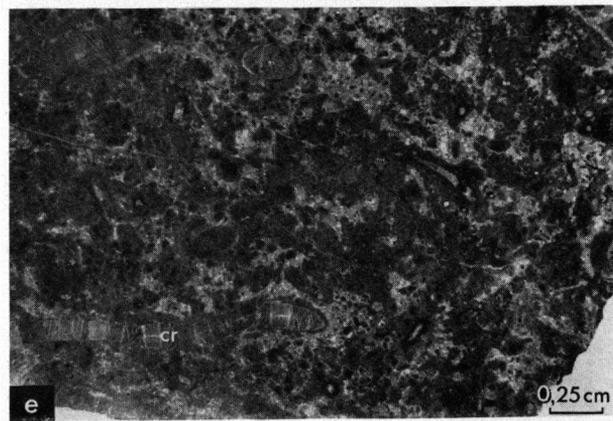
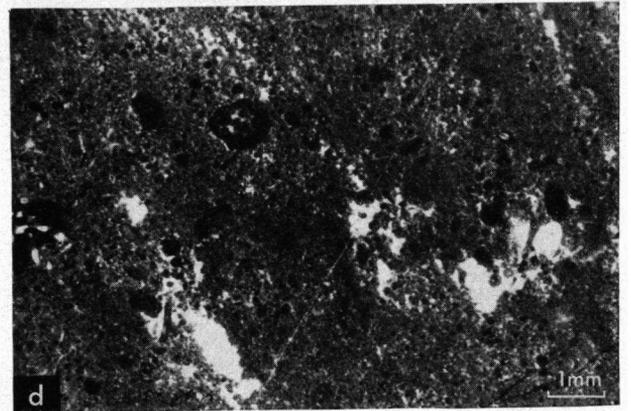
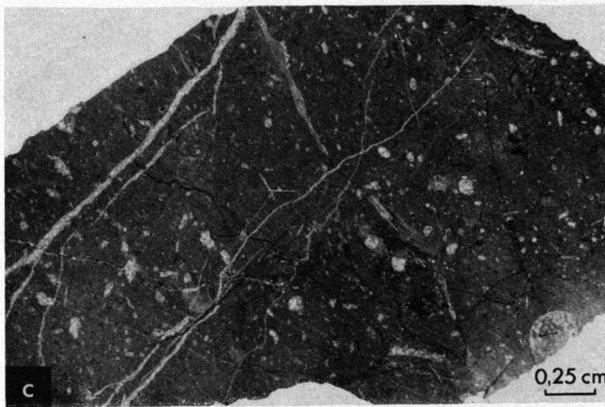
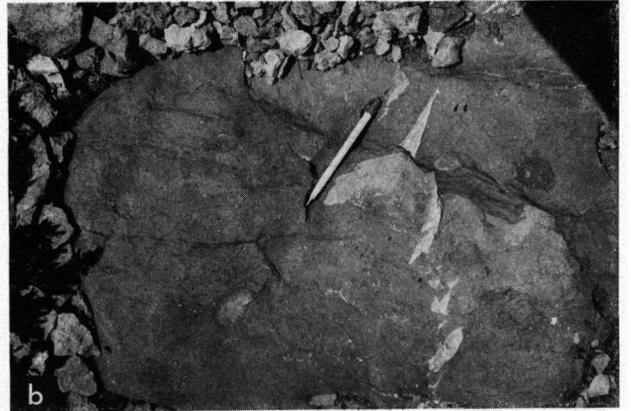
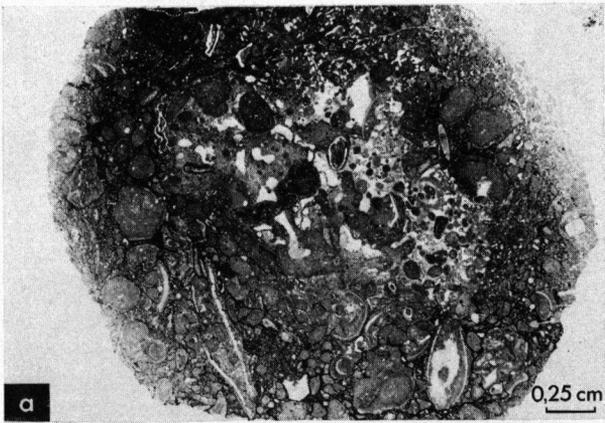


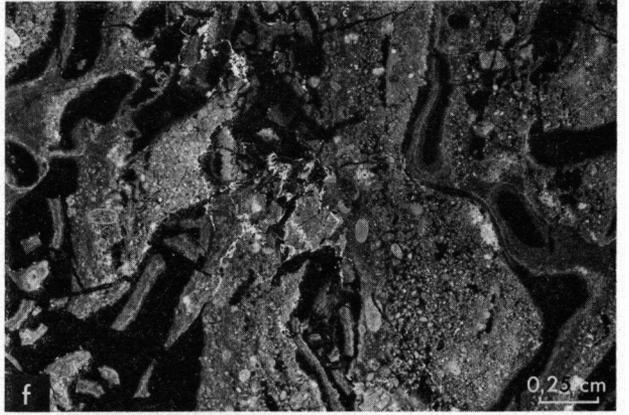
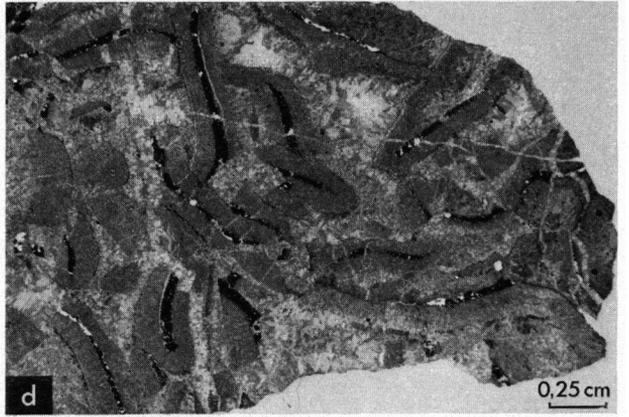
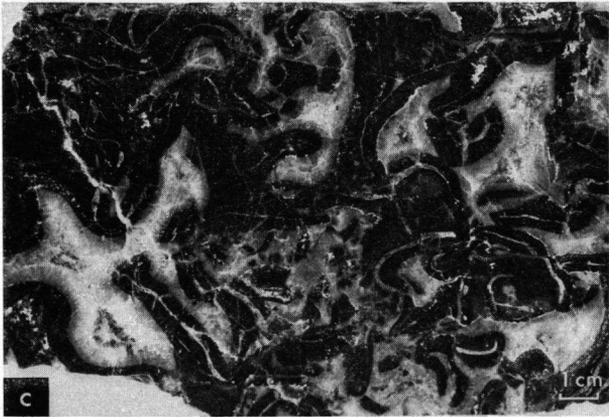
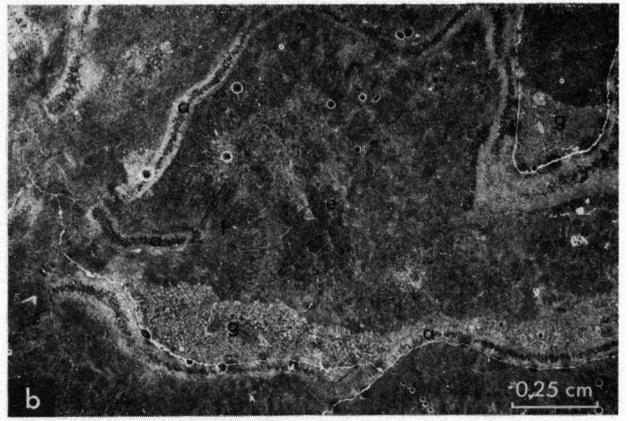
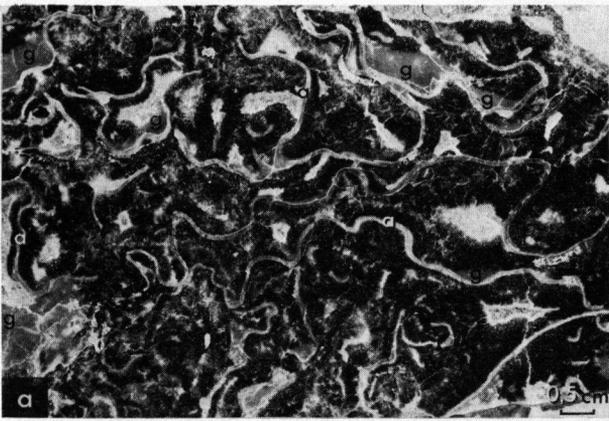
PLATE V

- a. Limestone breccia. Facies type Xa. Section 23; 14,5 m. Positive print of thin section.
- b. Wackestones to packstones with dolomitized pressure solution seams. Facies type Xb. Perpendicular to bedding plane.
- c. Wackestone. Facies type Xc. Positive print of thin section.
- d. Pelletiferous packstone. Facies type Xc. Positive print of thin section.
- e. Wackestone to boundstone. cr – crinoid stem. Facies type Xc. Section 18; 51 m. Positive print of thin section.
- f. Birdseye structures with geopetal fills in wackestone. g – geopetal fill. Facies type Xc to Xe. Section 18; 110 m. Positive print of thin section.
- g. Boundstone. Facies type Xd. Section 27; approx. 15 m.
- h. Boundstone. Facies type Xd. Laterally of Section 17; approx. 70 m.



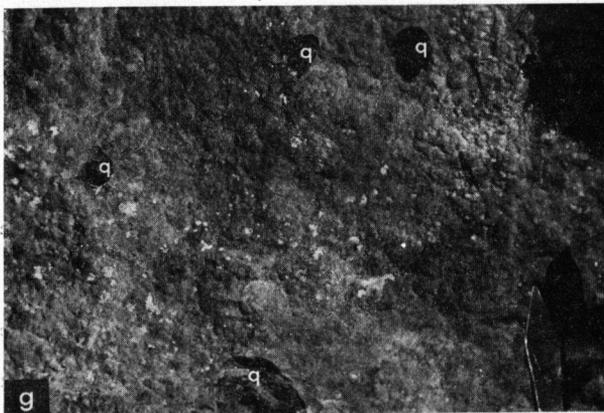
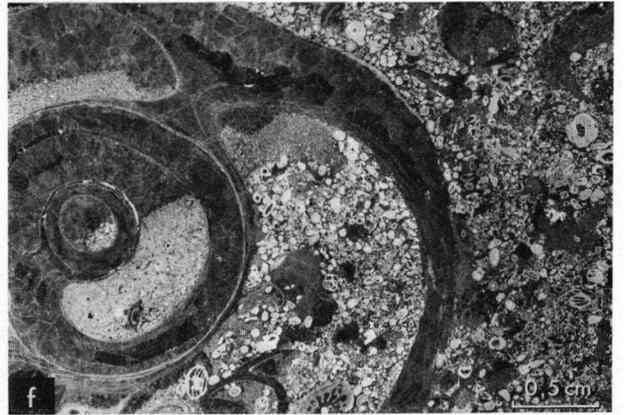
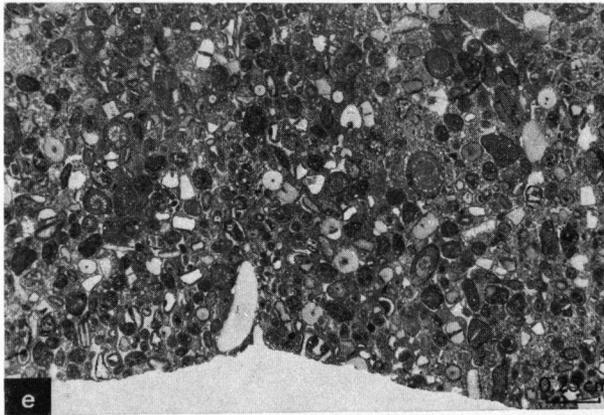
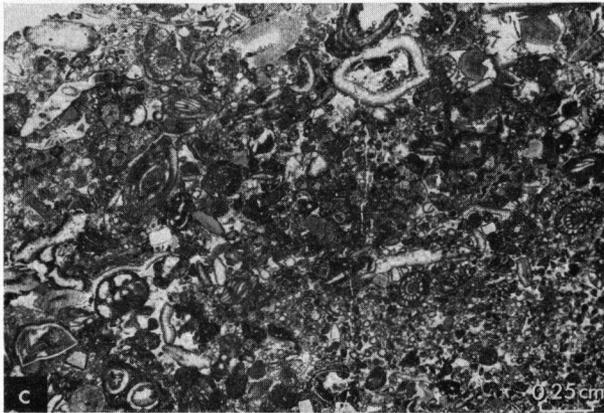
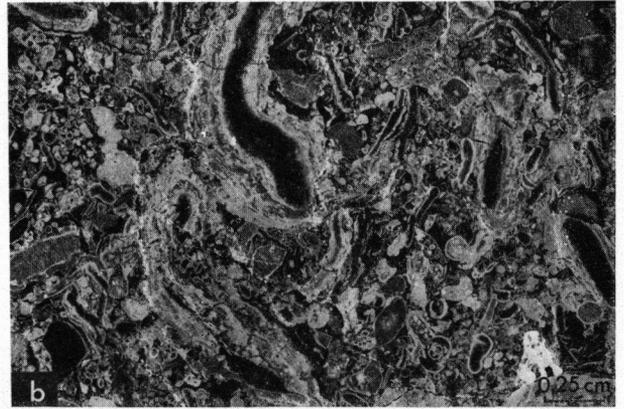
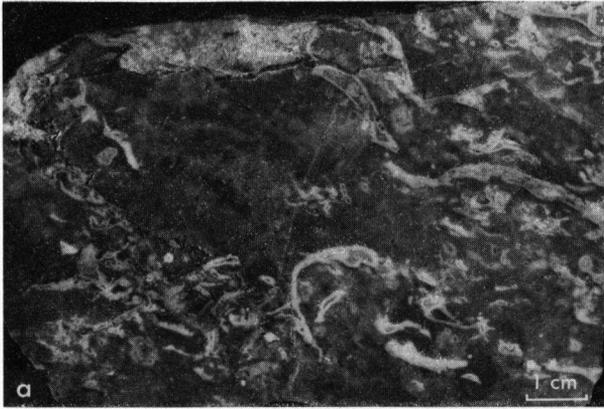
## PLATE VI

- a. Boundstone. g – geopetal fill; a – phylloid alga. Facies type Xd. Section 4; approx. 1790 m. Polished slab.
- b. Boundstone. Same sample as VIa. g – geopetal fill; a – phylloid alga; f – fibrous cement; e – equant shaped cement. Facies type Xd. Section 4; approx. 1790 m. Negative print of peel.
- c. Boundstone. Facies type Xd. Section 8; 320 m. Polished slab.
- d. Boundstone. Facies type Xd. Section 8; 320 m. Positive print of thin section, partly crossed nicols.
- e. Boundstone. Facies type Xd. Section 27; 14 m. Polished slab.
- f. Partly brecciated boundstone. Facies type Xd. Section 27; 14 m. Negative print of thin section.
- g. Brecciated boundstone. Facies type Xd. Section 27; 12 m. Polished slab.
- h. Boundstone. Facies type Xd. Section 7; 1177 m. Polished slab.



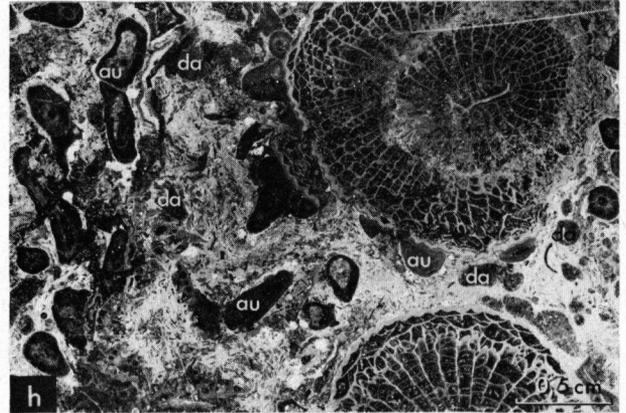
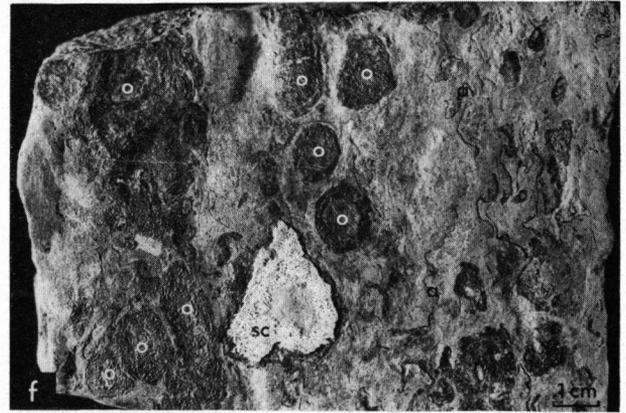
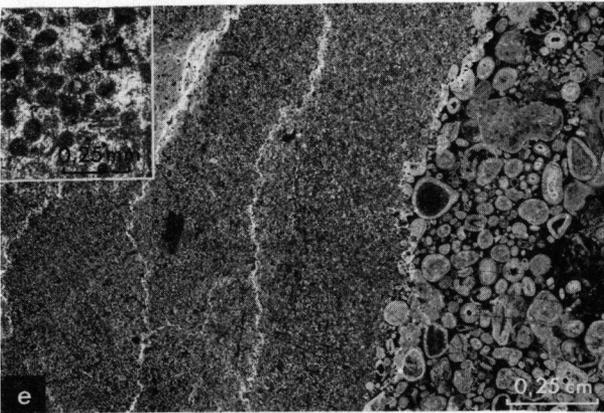
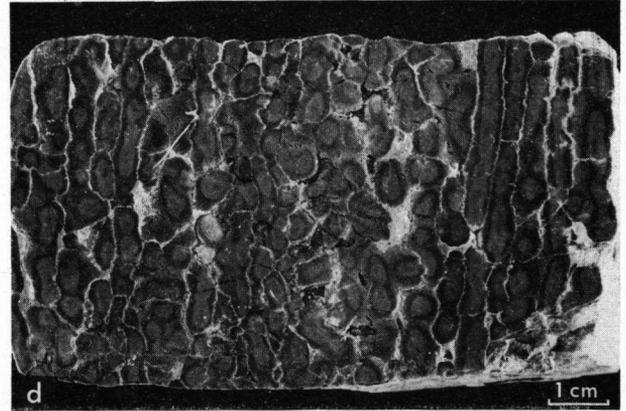
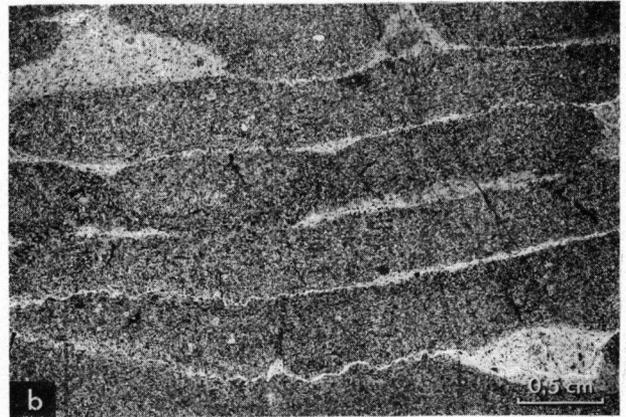
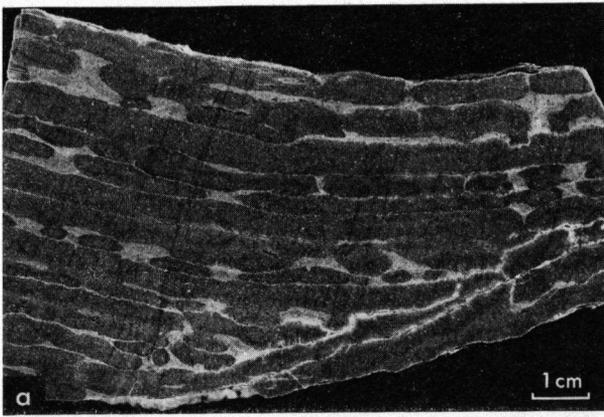
## PLATE VII

- a. Boundstone. Facies type Xd. Polished slab.
- b. Oncolitic packstone to grainstone. Lower part of facies type Xh. Section 18; 71 m. Negative print of thin section.
- c. Pelletiferous and fossiliferous packstone. Lower part of facies type Xh. Section 18; 63 m. Positive print of thin section.
- d. Oolitic and fossiliferous packstone to grainstone. Phylloid algae mostly abraded. a – phylloid alga. Upper part of facies type Xh. Section 18; 89 m. Negative print of thin section.
- e. Oolitic and fossiliferous packstone. Upper part of facies type Xh. Section 18; 84 m. Positive print of thin section.
- f. Oolitic, fossiliferous and pelletiferous packstone to grainstone. Upper part of facies type Xh. Section 23; approx. 79 m. Negative print of thin section.
- g. Quartz arenitic pebbles and cobbles (q) on a bedding plane. Facies type Xg. Section 22; 109.70 m.
- h. “Mottled” pelsparitic grainstones. Upper part of facies type Xh.



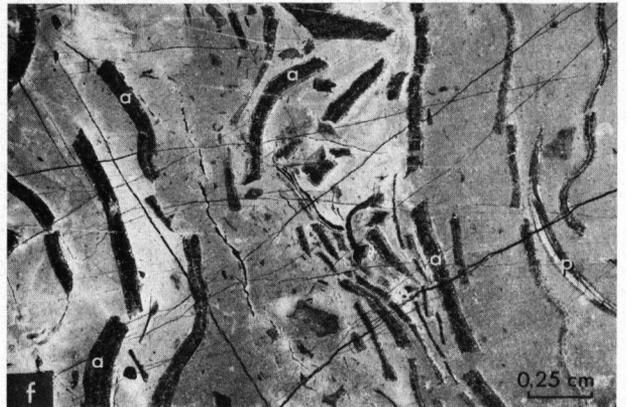
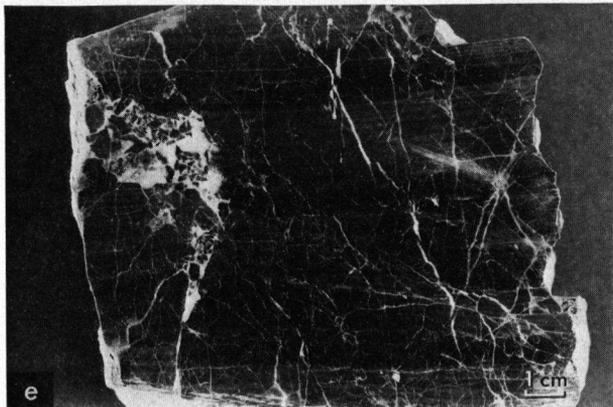
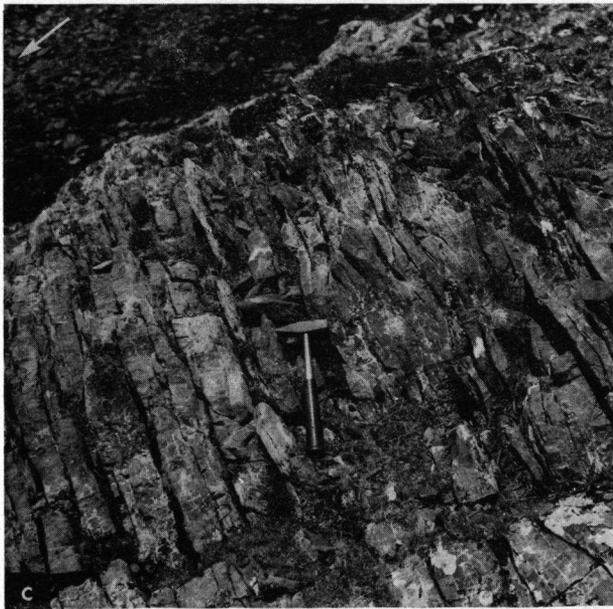
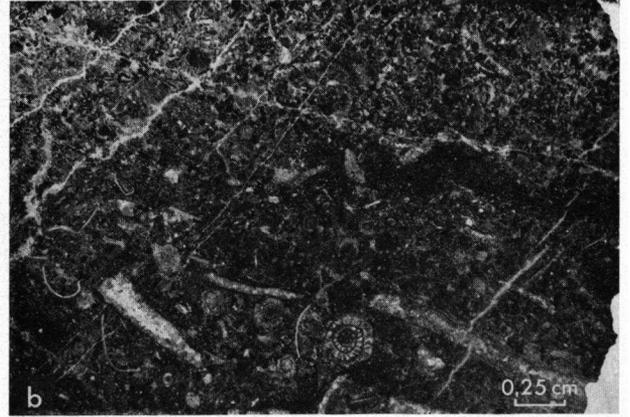
## PLATE VIII

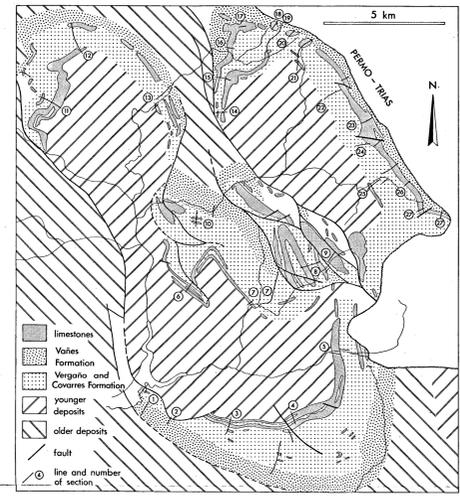
- a. "Mottled" pelsparitic grainstone. Upper part of facies type Xh. Section 23; approx. 79 m. Polished slab.
- b. "Mottled" pelsparitic grainstone. Same sample as VIIIA. Upper part of facies type Xh. Section 23; approx. 79 m. Positive print of thin section.
- c. "Mottled" pelsparitic grainstone. Upper part of facies type Xh. Section 23; approx. 79 m.
- d. "Mottled" pelsparitic grainstone. Same sample as VIIIC. Upper part of facies type Xh. Section 23; approx. 79 m. Polished slab.
- e. Oolitic grainstone with "mottled" pelsparitic grainstone. Upper part of facies type Xh. Section 23; approx. 79 m. Negative print of thin section.
- f. Oncolites (o), phylloid algae (a) and silicified coral (sc) in wackestone. Facies type Xi. Section 25; 35 m. Etched with HCl.
- g. Dasycladacean algae in situ in mudstone to wackestone. Facies type Xi. Negative print of thin section.
- h. Auloporid (au), solitary rugose corals, and dasycladacean algae (da) in situ in mudstone to wackestone. Facies type Xi. Negative print of thin section.



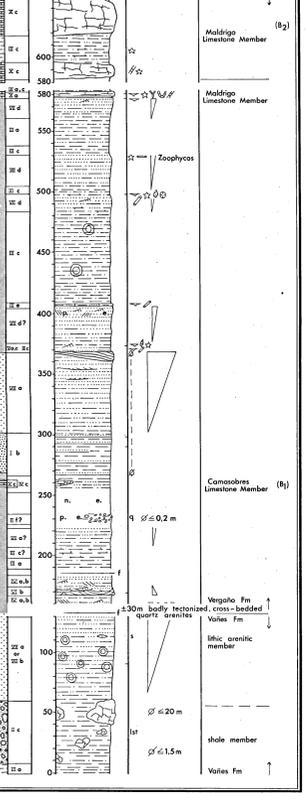
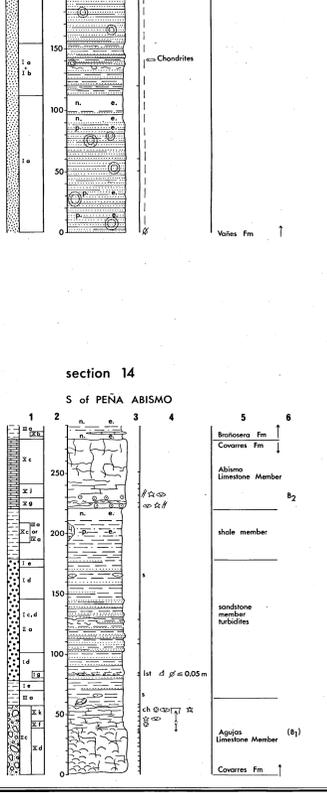
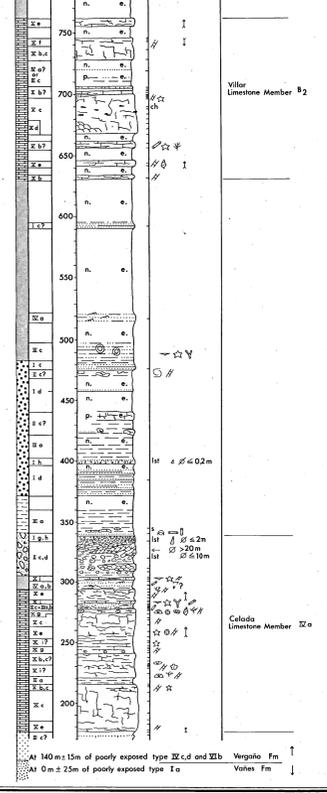
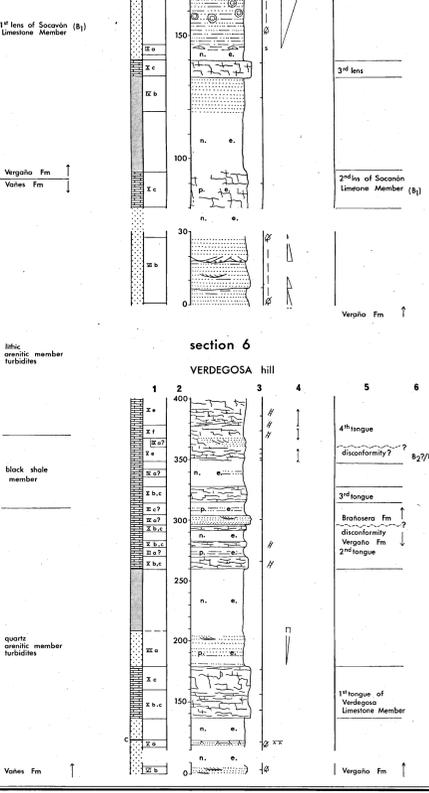
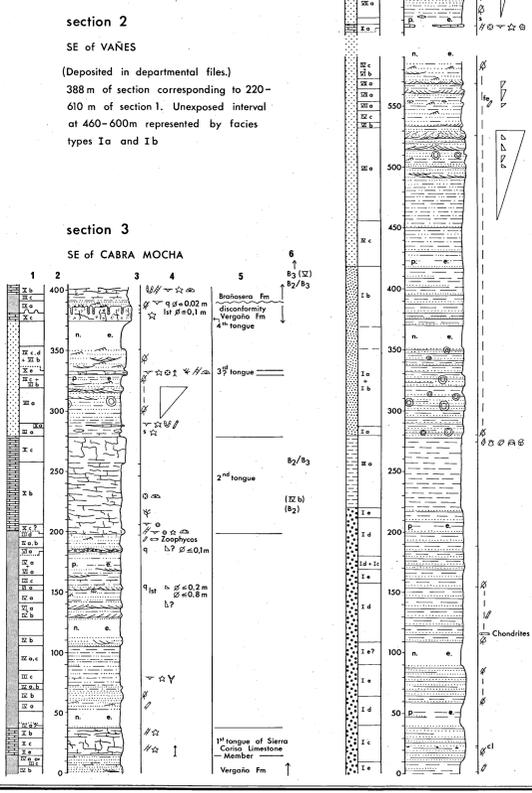
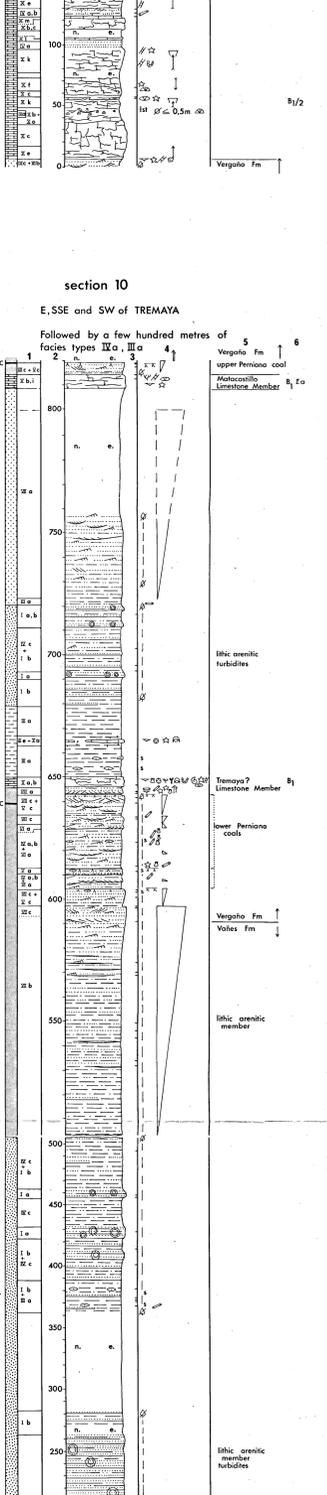
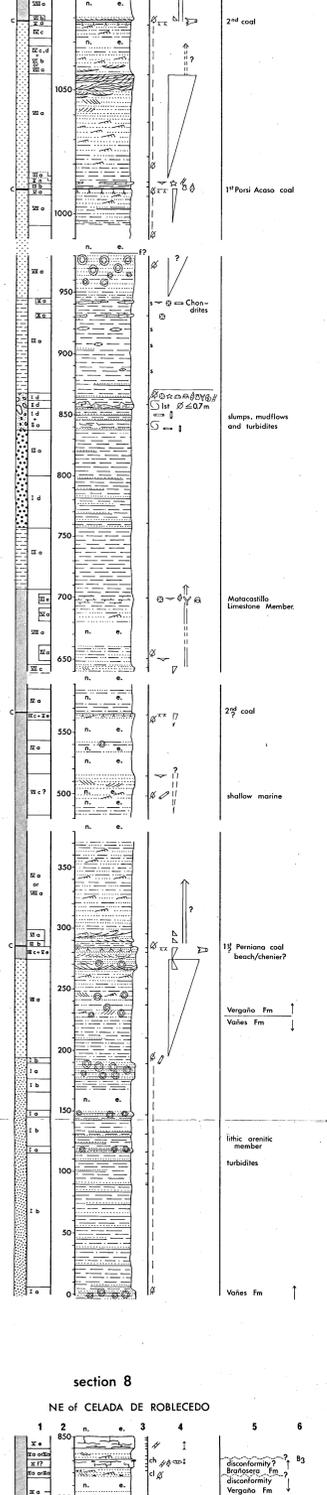
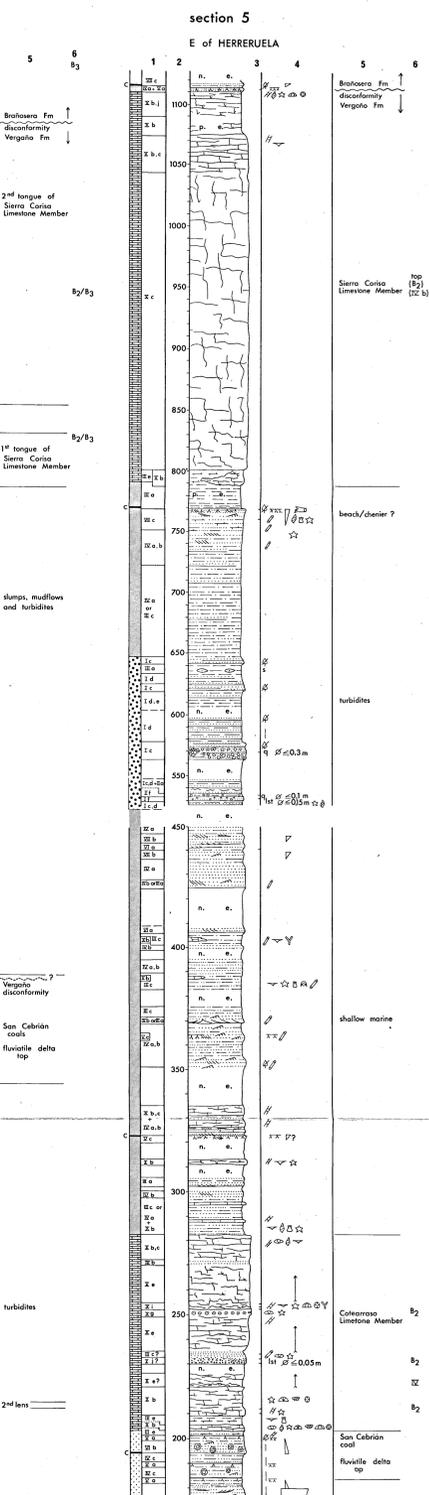
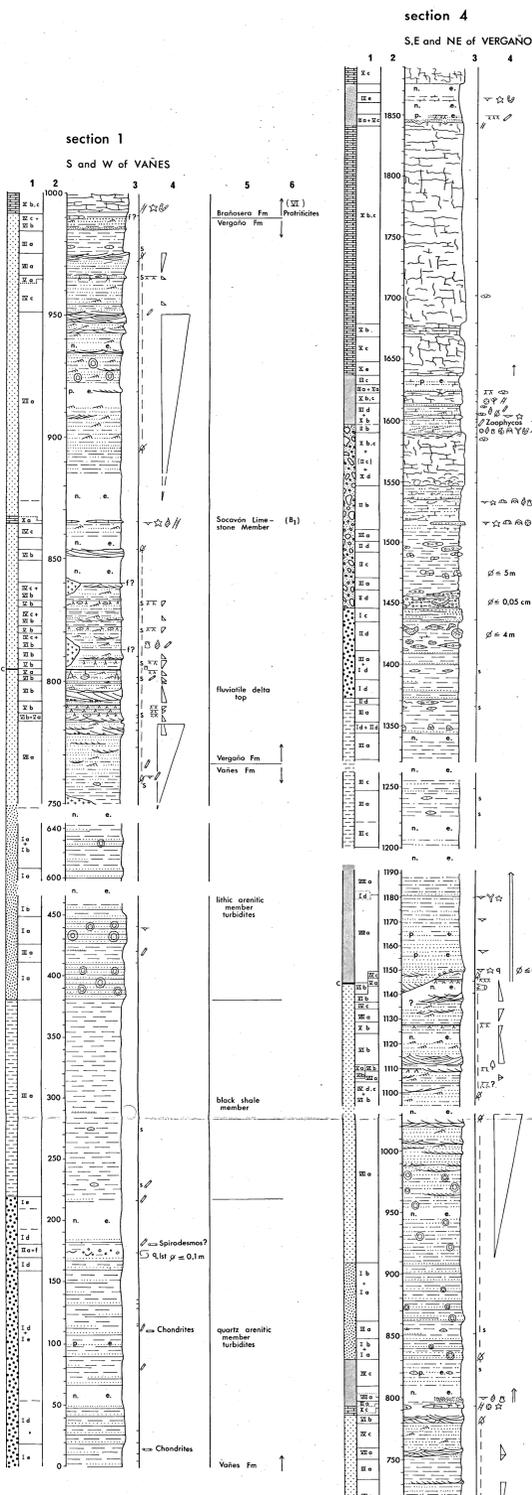
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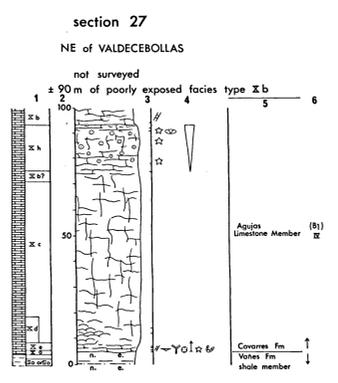
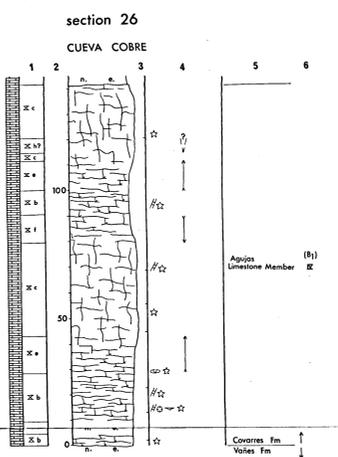
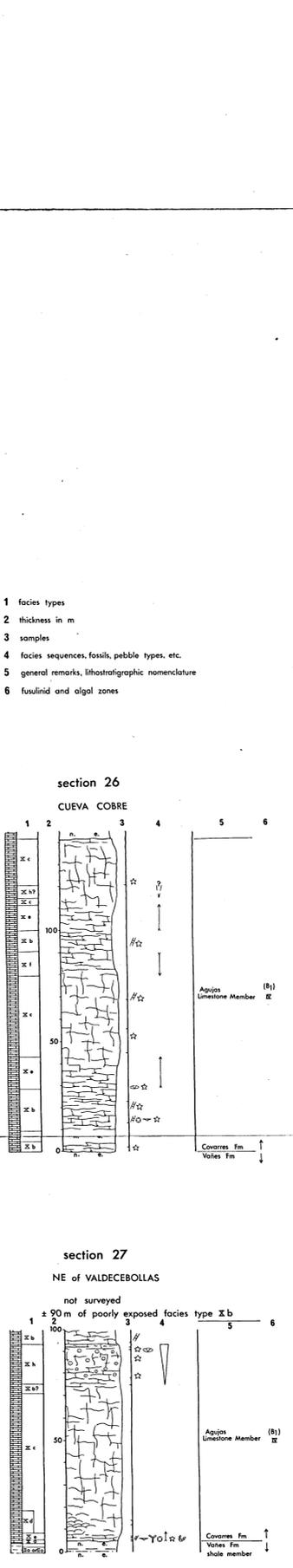
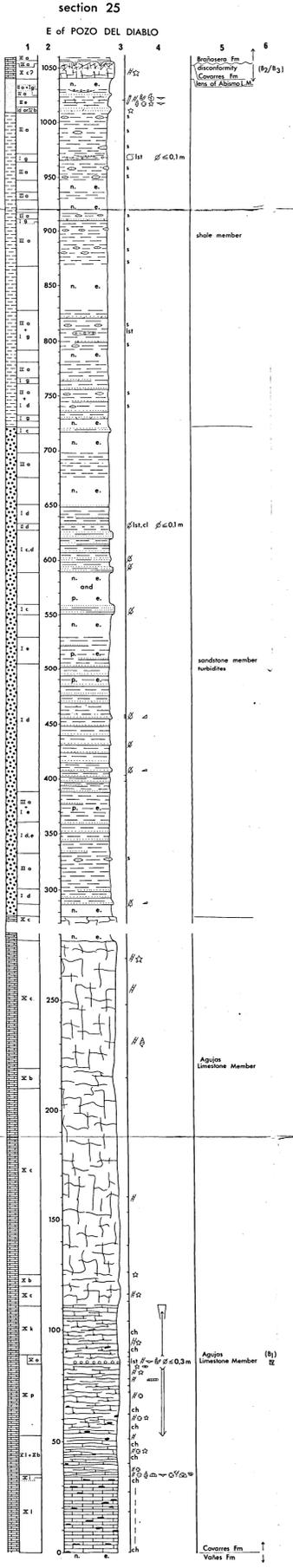
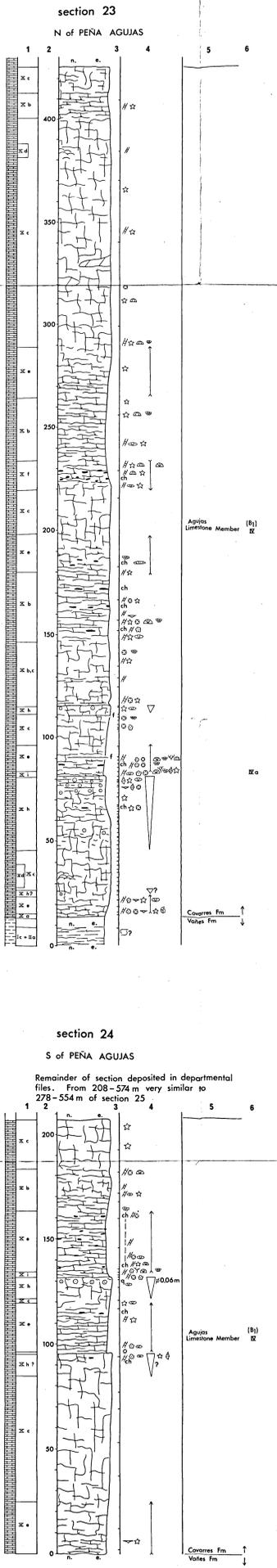
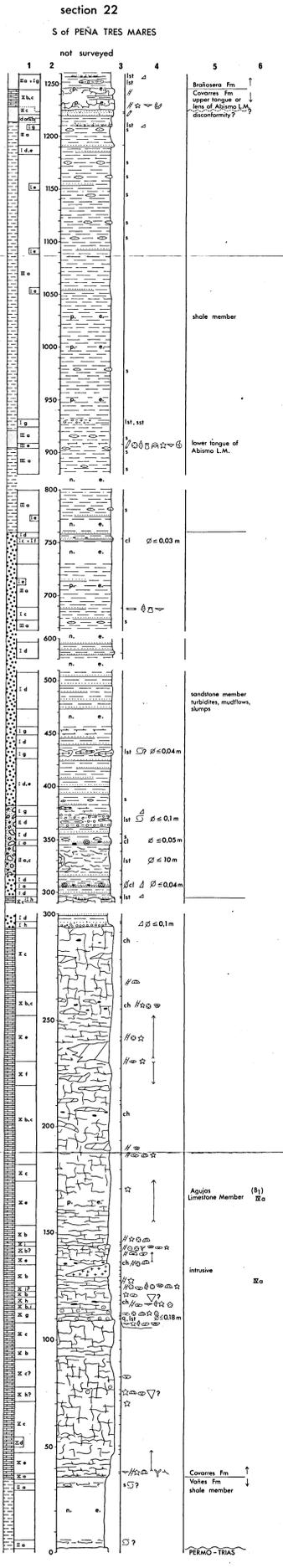
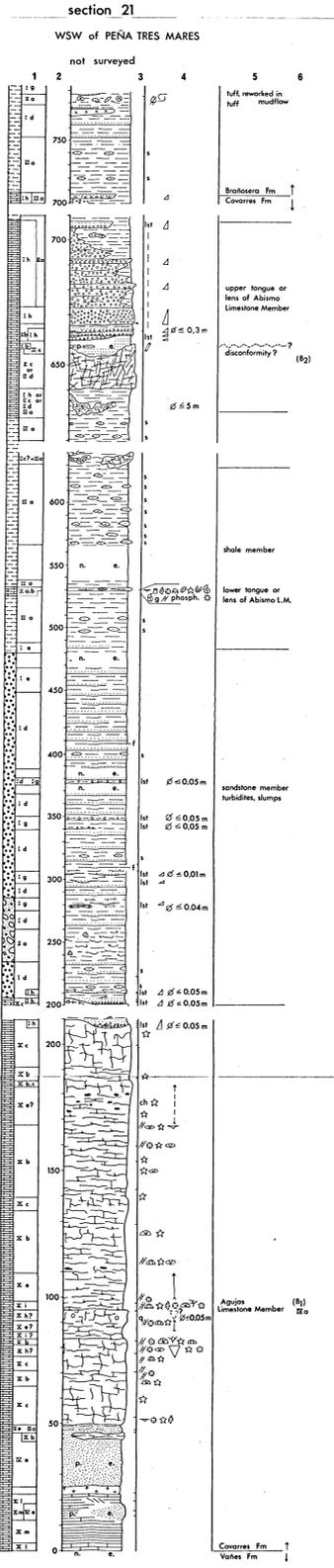
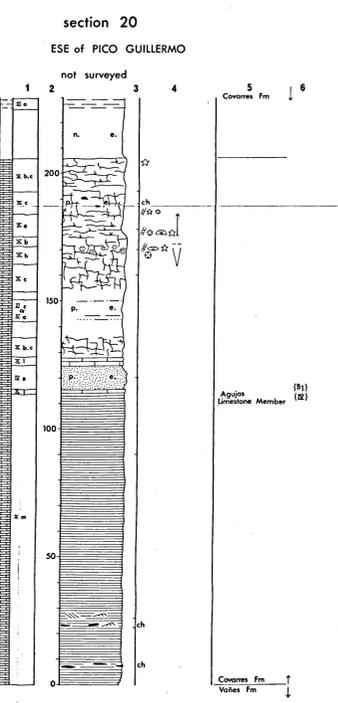
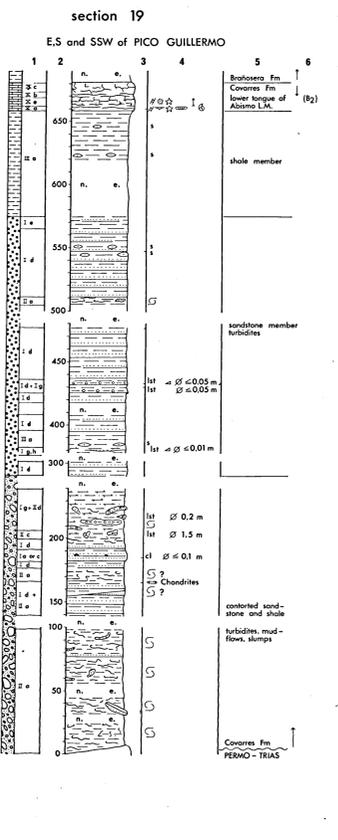
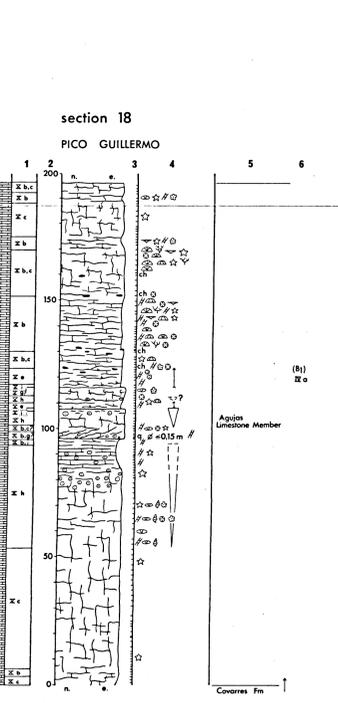
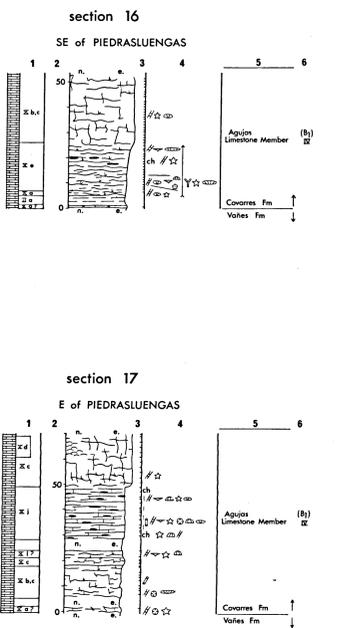
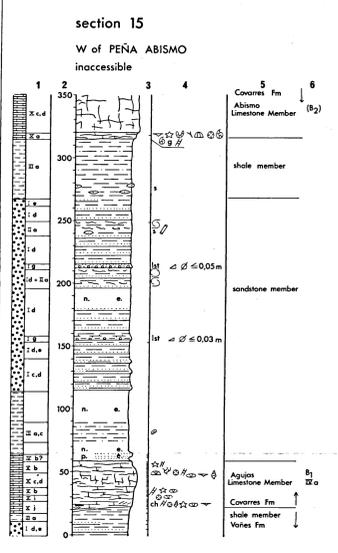
- a. Oncolites in packstone. Facies type Xi to Xe. Section 18; 121 m. Positive print of thin section.
- b. Fossiliferous packstone. Facies type Xj. Section 17; 38 m. Positive print of thin section.
- c. Bituminous mudstones. Facies type Xm. Section 20; approx. 30 m.
- d. Burrowed (b) and chertified (ch) packstones. Facies type Xj. Section 17; approx. 36 m.
- e. Laminated, bituminous mudstone. Facies type Xm. Polished slab.
- f. Fossiliferous wackestone. a – phylloid alga; p – pelecypod. Facies type Xn. Section 7; 1013 m. Negative print of thin section.





For legend see enclosure 2





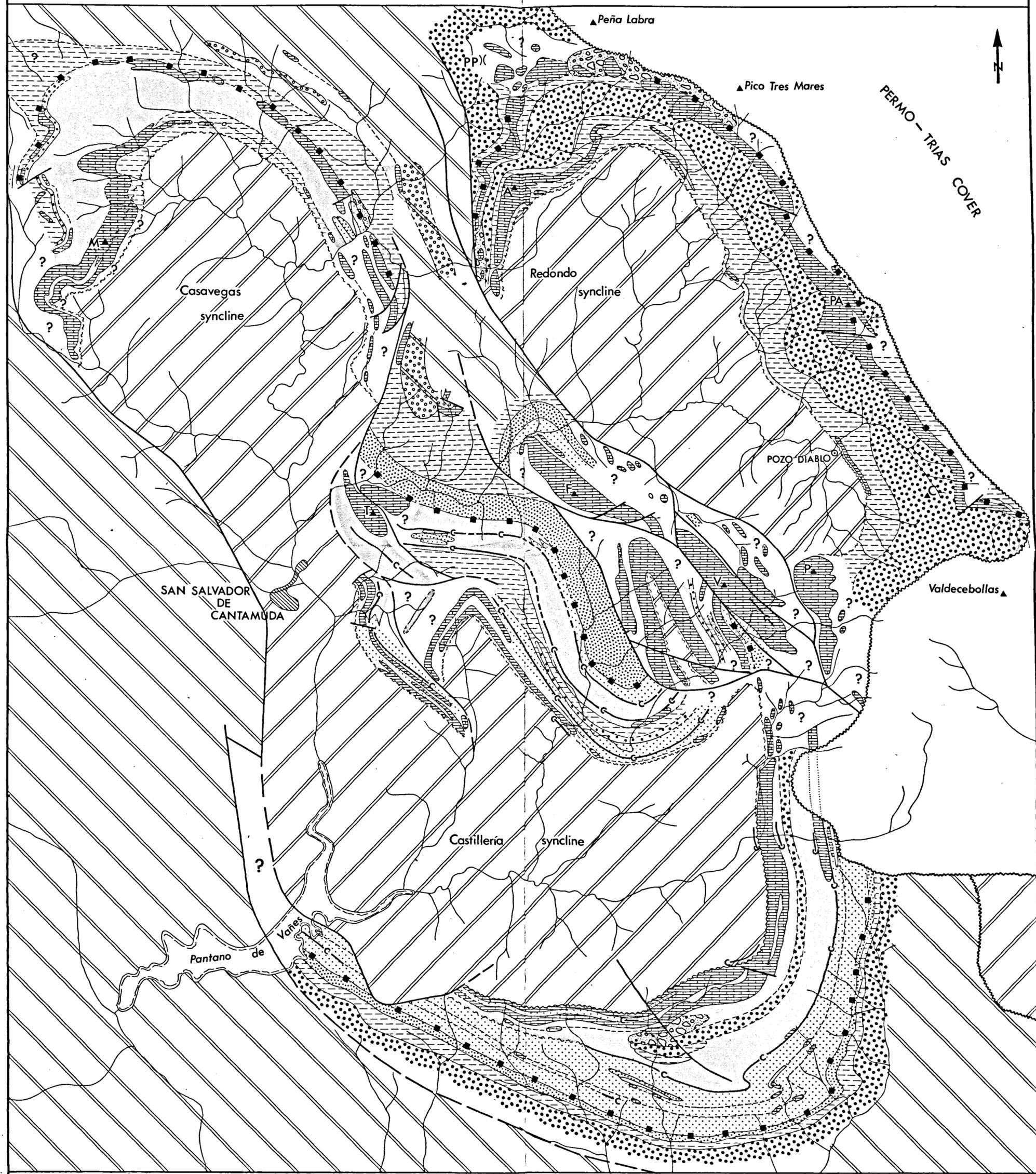
Legend of stratigraphic sections 1 to 27

- shale/mudstone
- siltstone
- silty sandstone
- sandstone
- shale/mudstone calcareous siltstone sandstone
- massive limestone
- irregularly, (indistinctly) bedded limestone
- regularly bedded limestone
- "stromatolitic" boundstone
- regularly, thinly bedded limestones
- laminated, fetid limestone
- brecciated limestone
- karst surface on limestone
- quartz sand filled cavities in limestone
- dolomite lens in limestone
- oolitic limestone
- "mottled" peloparitic grainstone
- limestone with dolomitic partings
- breccias or conglomerates with shale/mudstone matrix
- intrusive igneous rocks
- extrusive igneous rocks
- contorted beds in shale/mudstone matrix (slump structures)
- angular or rounded clasts of quartzitic limestone, cherty or lydite composition
- quartzitic pebbles, diameter not over 0.1 metre
- silicific concretions
- pyritic concretions
- phosphatic concretions
- chert
- seal-earth with or without coal
- ripple cross-lamination
- cross-bedding with or without sharp (erosive) base
- erosive channel
- shallow (non-erosive) channel
- mega cross-bedding with superimposed macro cross-bedding
- major coarsening upwards sequence (shooting or regressive sequence)
- coarsening upwards sequence
- fining upwards sequence
- discontinuous fining upwards sequence
- well developed grading in turbidite
- discontinuous grading in turbidite
- deepening or transgressive sequence
- coarsening upwards sequence in limestones of faciestype Xh
- coarsening upwards sequence in limestones of faciestype Xk
- faciestype Xe
- faciestype Xf
- faciestype Xp
- spheroidal weathering
- actual dating
- extrapolated dating
- brachiopods
- crinoids
- echinoids
- sphinctozoon sponges
- other sponges
- solitary rugose corals
- chaetetid corals
- platy chaetetids
- aluloparid corals
- "lithostrotionid" corals
- overturned chaetetid corals
- trilobites
- ostracods
- gastropods
- pelecypods
- bryozoans
- nautiloids
- goniatites
- fusulinids
- radiolarians
- algae
- oncolites
- determinable plants
- comminuted plant debris
- floats tree trunks
- burrows
- vertical and horizontal burrows
- not exposed
- poorly exposed
- fault
- quartz arenites and wackes deposited as turbidites + interbedded shale/mudstone
- lithic arenites and wackes deposited as turbidites + interbedded shale/mudstone
- shale/mudstone
- shales/mudstones, siltstones and lithic sandstones deposited in deltaic and fluvial environments
- shales/mudstones, siltstones and quartzose sandstones deposited in littoral environments
- limestones
- slump and mudflow deposits
- seatearth and/or coal horizon(s)

- 1 facies types
- 2 thickness in m
- 3 samples
- 4 facies sequences, fossil, pebble types, etc.
- 5 general remarks, lithostratigraphic nomenclature
- 6 fusulinid and algal zones

symbols as used on enclosures 3 and 5

# Approximate present day distribution of the major facies groups of the studied interval



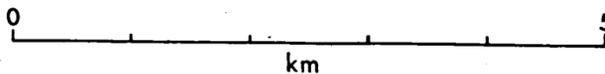
## LEGEND

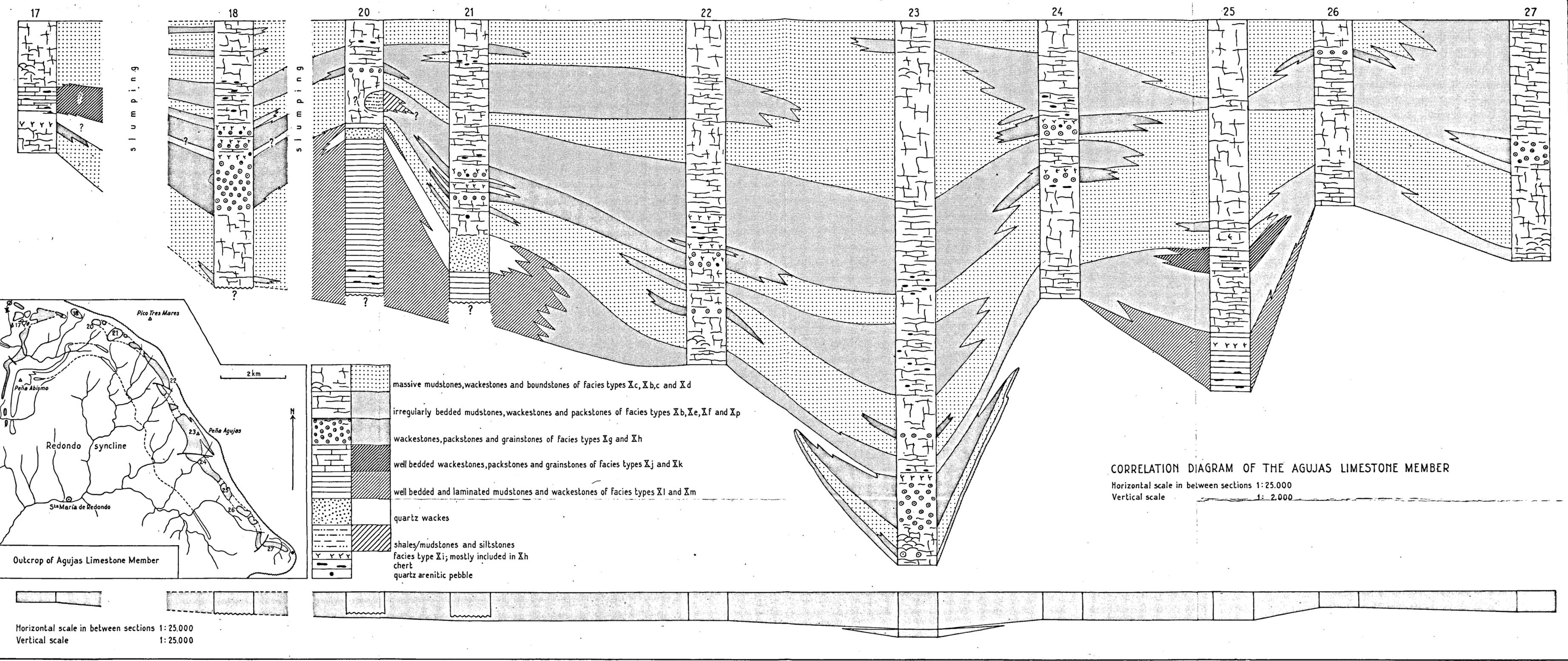
- Devonian and older Carboniferous
- Younger Carboniferous
- Quartz arenitic turbidites
- Shale/mudstone commonly associated with limestones and/or turbidites
- Lithic arenitic turbidites

- Shales, mudstones and sandstones of (fluvial) deltaic origin
- Limestones
- Shales, mudstones and sandstones of shallow marine or littoral origin
- Slump and mudflow deposits with or without limestone blocks
- Curavacas conglomerate beds

- A - Peña Abismo
- C - Covarres
- F - La Frechilla
- M - Peña Maldrigo
- P - Peña Tejado
- PA - Peña Agujas
- PP - Puerto de Piedrasluengas
- T - Peña Tremaya
- V - Verdiana

- Seat-earth and/or coal horizon(s)
- Not surveyed; no exposure; no unambiguous interpretation
- Unconformity
- Disconformity
- Disconformity, inferred
- Approximate boundary Vañes - Vergaño Formations
- Fault





FENCE DIAGRAM OF THE VAÑES, VERGAÑO AND COVARRES FORMATIONS WITH LITHOFACIES CORRELATIONS

Distances corrected for tectonic shortening  
 All sections, except 11, 12 and 21 are depicted in their original orientation  
 Vertical scale is 2x horizontal scale

-  quartz arenitic turbidites
-  shale/mudstone, commonly associated with limestones and/or turbidites
-  lithic arenitic turbidites
-  shales, mudstones and sandstones of (fluvial) deltaic origin
-  limestones
-  shales, mudstones and sandstones of shallow marine or littoral origin
-  slump and mudflow deposits with or without limestone blocks
-  —c— seat-earth and/or coal horizon(s)
-  - - - - - level of disconformity between San Cebrián coals and Coterarrasolimestone Members
-  ~ ~ ~ ~ ~ Leonian disconformity

