THE ORDOVICIAN GRAPTOLITE BEDS OF PING LIANG, E. KANSU

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The physiographic features in the Ping Liang (平涼) area are composed of two parts, the mountain on the south and the loess plateau spreading northward to a great extent.

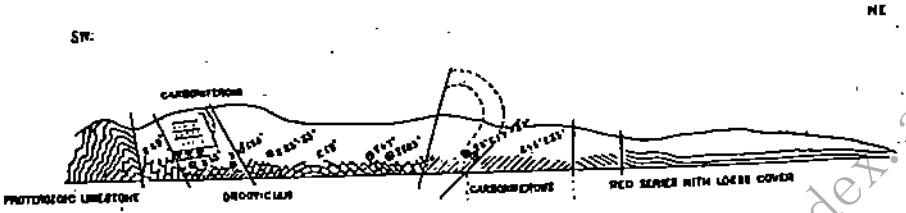
The river, Ching Shui (涇水), comes out from a gorge in the mountain mass about 25 li west of Ping Liang and while running eastward cuts down the loess plateau forming a valley of rich alluvium about 5 to 10 li wide, on which Ping Liang city is situated.

The southern mountain mass is a complex one and is composed of rocks ranging from Proterozoic (?) to late Tertiary time. It is in this mountain mass that the graptolite beds were discovered on June 4th, 1923, in the ravine of Kuan Chuang (官莊), about 20 li south-west of Ping Liang city. They cover a very small area. Its north and south extent is only 1100 meters or a little less than 2 li. Its eastern and western extent though not systematically explored can not be very large. For from my observation, about 3 li to the east there are Cretaceous shales and sandstones, and 10 li to the west there are post-Carboniferous sandstone and conglomerate.

The strata which are proved from their graptolites to be Ordovician were named by me the Pingliang shales and my observation of them was confined in the Kuan Chuang ravine alone. The lower part is composed of dark bluish, dense limestone, merging upward into alternating beds of dark gray, dense sandstone and greenish and yellowish, thin-bedded sandy-shale, while the uppermost part becomes all shale of the same character. It is in these upper beds that graptolites are found. The total thickness can not be ascertained. The base is not exposed and its top is disconformably overlain by Carboniferous shales and sandstones.

The main structure of the series is an anticline with its axis pitching eastward about 38°. Its northern and southern flanks are marked off by faults and thus its upper shaly beds become visible. Its northern flank, composed of thin shales, is overturned as shown in a west branching ravine and

lies on the Carboniferous dark gray shale bearing some fragmentary plant remains. Its southernmost limit is marked off by a fault from dark Proterozoic limestone. The relation of the different strata and the dipping directions are shown in the cross-section herewith given.



Distance 3200 m.
Section of Ordovician Graptolite Beds at Knan Chuang, 20 li S.W. of Ping Liang Hsien, E. Kansu
甘肅平涼縣西南二十里官莊之奧陶紀筆石層剖面圖

The graptolite-specimens are so well-preserved that their carbonaceous matter stands in distinct relief and some of them can even be easily detached from the rock. According to the preliminary study of these specimens by Dr. Grabau, there are represented 7 genera and 12 species and indicate middle Ordovician age, corresponding to the Normanskill of eastern North America. They are:

Climacograptus bicornis Hall
Climacograptus parvus Hall
Didymograptus sagitticaulis Gurley
Didymograptus serratulus Hall
Dicellograptus divaricatus (Hall)
Nemograptus exilis (Lapw.)
Nemograptus gracilis (Hall)
Dicranograptus cf *furcatus* (Hall)
Dicranograptus clingani Carruthers
Diplograptus (*Glyptograptus*) *augustifolius* (Hall)
Diplograptus (*Glyptograptus*) *teretiusculus* (His.) var. *kansuensis* Grabau (var. nov.)
Orthograptus whitfieldi (Hall)

The occurrence of graptolites which are plankton-animals indicates that the Ping Liang area was near the sea shore at the early part of the middle Ordovician time. They were entombed in the sandy shales in E. Kansu when the Actinoceras limestones were formed in the eastern part of N. China.