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最后，笔者愿強調几个重要論点，并把它們作为本文的簡单結語。

（1）蔚县运动相当广泛地存在于我国各地，它在梁山是以輕微的不整合而出現的。

（2）根据化石証明，梁山有亚利尼統，而楊子貝（*Yangtzeella poloi*）的地层領域較广，不能代表下奥陶紀的一个化石带。

（3）我国的志留系应以 *Dalmanites nanchengensis* 带作为底层，頂部則有 *Sinostomatograptus mui*，梁山地区可能沒有中志留紀地层存在。

（4）关于梁山二迭紀地层的划分，作者基本同意卢衍豪的意見，将上二迭紀灰岩命名为吳家坪灰岩。至其以下的王坡頁岩，則因厚度过小，似可不必創立。

SOME PROBLEMS ON THE STRATIGRAPHY OF THE LIANGSHAN AREA, SOUTH SHENSI

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About 10 km SW from Hanchung, there rise rocky hills of the Liangshan Area which is covered with little gravel and dissected by streams. Thus we have access to many excellent natural sections. Being highly fossiliferous the relative ages of strata may be exactly determined. With different cycles of sedimentation the rocks varied in lithological characters while under stress of crustal movements hiatuses were formed. From all the facts accumulated the writer will disscuss some important stratigraphical problems concerning this region.

1. *The relation between the Pre-Sinian and the Sinian (Cheng-kiang movement)*

The Pre-Sinian forms the foundation of Tapashan platform which is composed of granite, diorite with numerous small quartz veins. In the Liangshan area some places are found where diorite dikes cut across the granite ones. Occasionally diorite may be seen as xenoliths of granite. So the former is older than the latter. The age of these intrusive rocks is collectively Archaean.

The Sinian consists of arkosic sandstone and siliceous limestone, which repeat three times in this area. Strange bodies attributed to *Collenia* occur at two horizons. The total thickness of this system is 450 m.

The unconformable contact between two systems has been observed in many localities. In point of time this hiatus reflects a far-reaching revolution corresponding to the Chengkiang movement. So the Sinian-Archaean unconformity is widespread and this relation may be expressed as follows: (1) A folded series of intensely metamorphosed Archaean complex is covered by the sedimentary rocks of the Sinian; (2) dikes can be found below the plane of unconformity but they are absent above it; (3) there has been an old destructional surface of erosion between the Archaean complex and the Sinian rocks; (4) The base of the Sinian is composed of, for the most part, the minerals present in Archaean granite, its parent rock.

2. *The exact stratigraphical position of the Cambrian and the relation between the Cambrian and the Sinian (Chihsien movement)*

The Cambrian consists of shale, sandy shale, marl and limestone. These rocks form a complete cycle of sedimentation. This formation, over 350 m thick, contains *Eoredlichia, Redlichia,*

Parabadiella, Liangshanella, Hanchungella, Nanchengella, Hanchiangella, Shensiella, Wuchiapingella, Obolus, Obolella and *Hyolithes*. It is therefore not impossible that the exact age of this formation is the early part of the Lower Cambrian. In some places of the Liangshan Area there is a bed of oolitic limestone (which overlies conglomeratic sandstone) with abundant Archaeocyathids, forming the topmost of the formation. This is a result of the deepening of the sea.

In the Liangshan Area the Sinian is overlain by the Cambrian and there is an angular unconformity between the two. This orogenic movement at the end of the Sinian seems to correspond to the Chihsien movement in North China.

3. *The division of the Ordovician System and the relation between the Ordovician and the Cambrian.*

The rocks above the Cambrian belong to the Ordovician, which represents a complete cycle of sedimentation. The descending succession is as follows:

(6) Grey dense thin-bedded limestone..... 10 m
(5) Purple thin-bedded argillaceous limestone..... 10 m
(4) Greyish white impure limestone ..... 10 m
(3) Yellow greenish marl ..... 37 m
(2) Yellow greyish and grey greenish shale..... 35 m
(1) Brown greyish basal conglomerate..... 2 m

By means of lithological characters and index fossils we may divide the Ordovician of the Liangshan Area into the following zones:

Rocks	Ages	Zones
Grey dense thin-bedded limestone	Upper Ordovician (Caradocian-Ashgillian)	*Phylacops* sp.
Purple thin-bedded argillaceous limestone		*Staurocephalus* sp. *Sinoceras chinense*
Greyish white impure limestone	Middle Ordovician (Llandeilian)	*Glyptograptus teretiusculus*
Yellow greyish marl	Lower Ordovician (Llanvirnian)	*Sinocystis loczyi* *Didymograptus bifidus*
Yellow greyish & grey greenish shale	Lower Ordovician (Arenigian)	*Didymograptus protobifidus* *Ningkianolithus welleri*
Brown greyish basal conglomerate	Lower Ordovician (Tremadocian)?	Fragments of brachiopods

While we have failed to find any angular contact between the Ordovician and the Cambrian, there is strong evidence to show that an earth-movement took place in post-Cambrian and pre-Ordovican time. Sometimes the contact is clearly marked by an irregular erosion surface with a layer of basal conglomerate resting upon it; and sometimes the Ordovician comes into contact with the oolitic limestone at one locality, but with older strata in another. Moreover, the work of rock destruction had been going on for long duration and widespread area of erosion had been accomplished on the land surface. These facts seem clear to indicate a movement corresponding to the Yungkwei and Yehli movement.

4. *The zonation of the Lower Silurian and the relation between the Silurian and the Ordovician*

Above the Ordovician limestone lies concordantly the Lower Silurian, composed of sandstone and shale which mark the beginning of a new cycle of sedimentation. The change from chemical

precipitates to clastic sediments means the decrease of sea-water depth. The total thickness of this series is estimated at 200 to 350 m.

In the Lower Silurian the writer has established nine zones by means of graptolites and trilobites. These are as follows in descending order:

(9) Zone of *Sinostomatograptus mui*
(8) Zone of *Monograptus turriculatus*
(7) Zone of *Rastrites maximus*
(6) Zone of *Monograptus segwicki*
(5) Zone of *Petalolithus palmeus*
(4) Zone of *Monograptus cyphus*
(3) Zone of *Orthograptus vesiculosus*
(2) Zone of *Pseudoplegmatograptus obesus*
(1) Zone of *Dalmanites nanchengensis*

There is no discordance between the Silurian and the Ordovician, although biostratigraphical facts leave little doubt as to the change of deposition. It is not impossible that sea-floor of the Liangshan Area was gently lifted in Post-Ordovician time.

5. *Absence of the Devonian and the age of the Liangshan Coal Series*

On the Silurian shale of which the thickness varied in different localities, rests the Liangshan Coal Series containing abundant marine fossils of Permo-Carboniferous age. There exists no trace of Devonion in this area. These facts clearly signify that an intense erosion of long duration took plâce in post-Silurian time. We do not know precisely whether this is the result of one period of erosion or two. The age of the Liangshan Coal Series is considered by Professor Y. H. Lu as the early part of the Lower Permian, but a further study of the fossils is required.

6. *Division of the Permian System*

In the Liangshan Area the Permian is represented by the pure, grey, and fine-textured limestone. It attains a thickness of 470 m. The completeness of the section is rare in the whole world. The Permian of this Area may be divided into three parts. The lower part is corresponding to the Yanghsin Limestone, and the upper part is named by Professor Lu as the Wuchiaping Limestone. The middle part between the two series is composed of shale, only two meters thick. This is corresponding to the Loping Coal Series, and we have no reason to use a new name for it.