Younger Palæozoic (Carboniferous and Permo-Carboniferous)	Coal-bearing series.
Older Palæozoic	Mainly limestone.
Younger Proterozoic (Sinian)	Mainly quartzite, slate, and siliceous limestone.
Older Proterozoic (Wutai)	Cristalline schists & marble.
Archæan	Gneiss and metam. complex.

Many disconformities are to be observed through the above tabled sequence; but for the purpose of the present paper it suffices to mention those unconformities which have structural importance. The following table will summarise the principal movements and the corresponding structural features.

Period of diastrophic movements	*Unconformity*
Quaternary	Latest warping.
Middle Tertiary	Between Yuanchü Series & the Hipparion clay.
Later Mesozoic	Post Jurassic, probably during the Middle Cretaceous.
Middle Palæozoic	Between Ordovician & Carboniferous: general disconformity.
Post Sinian	Between Sinian and Cambrian more often disconfermity.
Post Wutai	Between Wutai and Sinian.
Wutai	Probably several ones within Wutai.
Pre-Wutai	Between Algonkian and Archæan.

The structure of the Archæan and Wutai complexes are very intricated and the author had no time to make any detailed study. He will therefore content himself at present with outlining the structural features produced by the later diastrophic movements which are after all the most important for the comprehension of the regional geology.

http://www.geojournals.cn/dzxb/ch/index.aspx

As the post-Sinian and post-Ordovician movements resulted only in disconformities without any noticeable effect of folding, all the formations including Sinian, Cambro-Ordovician, Carboniferous, Permian, Triassic and Jurassic are parallel between them and constitute, structurally speaking, a whole mass which was almost uniformly affected by the tangential stress active in later Mesozoic time. The Carboniferous and Jurassic coal series, being as a rule more liable to the folding force than the rigid limestones or sandstones between which they are intercalated, show sometimes local folds which are not to be interpreted as effect of any earlier folding.

After these general considerations, I shall now enter into the special treatment of the main structural units of the province.

DESCRIPTION OF FOLDS

Chin-Shui (沁水) *syncline:* This is the largest of all the synclines in Shansi and is situated in the S. E. of the province with its axis trending from N. N. E. to S S. W. Both its west and east limbs are constituted by Cambro-Ordovician limestone and Permo-Carboniferous coal series dipping inwards at angles varying from 6° to 20°. It forms almost a closed basin except at the northwest and southeast ends where the syncline has been cut by faults. Near the axial zone the Triassic red shale and sandstone occur with very gentle inclination. This syncline is the most important for the coal and iron which both occur in the Carboniferous. The latter formation outcrops along a continuous zone extending from Ping Ting (平定), Ho Shun (和順) to Kao Ping (高平) and Chin Cheng (晉城) on the east and along other zone on the west, west of Chin Yuan (沁源), which is narrower and shorter because cut off by faults.

The upper Chin Shui river runs approximately along the axial zone of the syncline, thence the name given to the latter.

Tai-Hang (太行) *anticline:* Tai Hang Shan is the name generally given to the mountain mass which borders the Shansi plateau and separates it from the alluvial plain of Chihli and Honan. Geographically speaking, the name of Tai Hang Mountain or Tai Hung Shan is applicable to

§ See gological maps published in Tegengren's "The iron ores and the iron industry of China" Mem. Geol. Surv. China Ser. A N°. 2 Part II, Appendix Pl I, II.

http://www.geojournals.cn/dzxb/ch/index.aspx

the whole margin of the plateau extending northward to the Western Hills of Peking and the Nankou Range, north of the Capital. It is however here restricted to that portion which stretches from south of Shansi railway southward until it encounters the Yellow River. Thus defined, the Mountain is, generally speaking, formed by an anticline striking first N-S and further south bending to S.W. and finally to S.W.W. Along its axial zone occur the Wutai schists over a wide area west of Nei Chiu(內邱)and Lin Cheng(隆城) in Chihli Province. Only the western or north-western limb is observed in Shansi and is essentailly composed of Cambro-Ordovician limestone and Carboniferous coal series dipping gently toward W. or N. W. which we have already spoken of as the eastern limb of the Chin-Shui syncline. The importance of the anthracite and iron ore resources have long ago attracted the attention of mining specialists althotgh no modern industry is yet developed.

Ho-Shan (霍山) *Anticline:* This occurs west of Chin-Shui syncline. Baron F. von Richthofen considered Ho Shan as a horst bounded both west and east by normal faults. But from the author's recent observation it has been shown that the general structure of Ho Shan is still essentially an anticline which is only partly faulted especially on the west. The strata of the eastern limb of the Ho-Shan anticline consist of Cambro-Ordovician limestone and Permo-Carboniferous coal series regularly dipping toward the E. i. e., toward the center of the Chin-shui syncline at the average angle of about 10°, while those of the west limb composed of the same formations which are only occasionally found in isolated patches dip westward at an angle of about 30°. The axial zone exhibits wide exposures of Archaean gneiss which is sometimes still covered by horizontal beds of probably Cambrian limestone. We have therefore here a broadly arched anticline which was reenforced by faults to be treated later.

Chao-Cheng (趙城) *Syncline:* The Ho-Shan anticline is immediately succeeded on the west by the Chao Cheng syncline. This approximately corresponds to the Ping-Yang graben limited by the Ho-Shan and O-Shan faults already well known through the work of Richthofen and Willis. The faults seem, however, to have only more accentuated a preexisting structure which tends to preserve the Carboniferous coal series now found in the Fen Ho valley.

http://www.geojournals.cn/dzxb/ch/index.aspx

Lu-Liang (呂梁) *anticline:* Northwest of Ho Shan is situated the Lu-Liang anticline, the longest of all the anticlines in Shansi. Its axis runs from N. N. E. to S. S. W. over a distance of more than 330 kilometers. Its limbs occasionally cut by faults are represented by both Cambro-Ordovician limestone and Permo-Carboniferous coal series which all steeply dip outward at angles varying from 30° to 50° except in the N.W. part where the strata are gently inclined at 2°-3° or nearly horizontal. The anticlinal axis gradually pitches to the North and to the South so that the anticline appears rapidly narrowed to both directions. While the strata on the east and west limb generally dip at rather steep angles, those chiefly of Sinian and Cambro-Ordovician formations at the central zone are generally characterized by their gentle inclination or almost horizontal position.

Lu Liang Shan is an old name given by Chinese geographers to the N. S. trended mountainous mass serving water-shed between the Yellow River and the Fen Ho. This geographical line coincides in a remarkable way to the structural units as above defined.

Chung-Yang (中陽) *syncline and Li-Shih* (離石) *anticline:* Succeeding the Lu-Liang anticline are the Chung-Yang syncline and Li-Shih anticline parallel to each other, both having their axes in N-S direction. The sediments in the synclinal axial zone are Triassic red beds and in the anticlinal one the Archæan gneiss. The limbs of the folds are all built of Cambro-Ordovician limestone and Permo-Carboniferous coal series with dipping angles varying from 10° to 50°.

The Chung-Yang syncline and Li-Shih anticline are, however, structures of subordinate importance when compared with the Lu-Liang anticline. They both have a short extension and quickly give place to the general westward dipping toward the great North Shensi basin

Shih-Ch'ien-Feng (石前峯) *syncline:* This is on the east side of the middle portion of the Lu-Liang anticline. The formations constituting its west and east limbs and even its north end ranges from Cambrian to Permian in age. The strata in the east limb and north pitch are all gently inclined at angles from 5°-15°, while those in the west limb are much steepter. The southern part is cut off by a fault. The axis of the syncline runs in a

http://www.geojournals.cn/dzxb/ch/index.aspx

direction of north by east and south by west and is constituted by a zone of Triassic sediments in horizontal position. Below this, occurs the Carboniferous coal series which is much worked west of Tai Yuan Fu,[9] capital of the province.

Ning-Wu (寧武) *syncline:* On the east edge of the north portion of the Lu-Liang anticline is the Ning-Wu syncline which axis first strikes N E. and S. W. gradually bending in the vicinity of Ning Hua Ch'eng(寧化城) and Ching Lo (靜樂) city, to N. N. E. and S. S. W. The strata in the axial zone range from Triassic to Jurassic in age, and all dip very gently while those in the limbs are from Neo-Proterozoic to Triassic in age, all steeply dipping at an average angle of 40°. The south-west and north-west parts of the syncline are also dislocated by faults.

GENERAL CHARACTERS OF THE FOLDS DESCRIBED

If one takes one's way from the Tai-Hang anticline westward, he will have to cross the Chin-Shui syncline, Ho-Shan anticline Chao-Cheng syncline, Lu-Liang anticline and the north Shensi syncline. On the other hand if one goes back eastward from the northern part of the north Shensi syncline, he again meets the Lu-Liang anticline and further the Ning-Wu syncline. Consequently the whole province of Shansi is, in reality, a folded area, though in northeast Shansi where the pre- Cambrian rocks are widely exposed, regular folds are more difficultly distinguished. The axes of the main folds are all in the same direction of N. N. E. and S. S. W. and therefore approximately parallel one to another.

Generally speaking, the folds in Shansi are remarkably simple, as, for example, both the Lu-Liang anticline and Chin-Shui syncline cover several tens of districts. The axial zone of the anticlines is commonly represented by the pre-Cambrian rocks and that of the syncline by the Mesozoic sediments, while the limbs of both the anticlines and synclines are usually built of the Palæozoic beds.

In the north-east Shansi where the regular succession of folds are not so readily recognized, one may still imagine, for instance, a Tai-Shan-Ho (台山河) syncline, a Wu-Tai-Shan (五台山) anticline, and then the Ning-Wu syncline and Lu-Liang anticline.

[9] See geological map Loc. Cit. App. Pl. IV.

http://www.geojournals.cn/dzxb/ch/index.aspx

DESCRIPTION OF FAULTS

Chin-Ch'éng (晉城) *fault:* This occurs west and north-west of Chin Cheng district.† This is a normal fault and has a N. N. E. & S. S. W. course. Its upthrow is on the northwest side. The existence of the fault is indicated by the Permo-Triassic sediments brought in contact with the Ordovician limestone north west of the Chin Ch'eng city. The length of the fault is something more than 160 li while its probable vertical throw, as determined west of Tung Yao T'ou (煮窑頭) N. of the Chin Ch'eng city, amounts to 500 m.

Chang-Chih (長治) *fault.* This is the northern continuation of the above mentioned fault and extends east of Chang Chih district. This fault runs from N. N. E. to S. S. W. with its upthrow on the S. E. side and with an approximate length of about 130 li. The probable vertical throw is more than 500 m. The existence of the fault is easily recognized by the topographic features as the upthrow side form a straight and steep cliff of the limestone bordering the Lu-An (潞安) loess basin†† on its east side.

Correlation of the Chin-Ch'éng and Chang-Chih faults: The courses of the above described two faults are all arranged in one straight line and the continuation between them is obscure only in the vicinity of Tai-I (太義) and Shih Chuang (師莊), south of Chang Chih district. It is consequently most probable that these two faults are in fact the two different portions of a same great pivotal fault which, in the vicinity of Tai I and Chih Chuang being near the axis of its rotation, only presents a minimum throw hardly detectable. North of this point the upthrow is on the east of the fault line while south of it the upthrow is on the west. If this assumption is accepted, the united great fault may be called Kao-Ping pivotal fault.

Fu-Shan (浮山) *and Ho-Shan* (霍山) *faults.* East of the Fu-Shan city, an Ordovician limestone ridge is raised in contact with the Triassic red sediments both on the east and west. Tectonically speaking this limestone ridge is a horst bounded by two parallel faults. The eastern fault is here called Fu-Shan fault, while the western one is probably the southern continuation of the Ho-Shan fault which limits the Archæan mass of the Ho-

† Loc. Cit. App. Pl. I. †† See the same map.

http://www.cnjournals.cn/dzxb/ch/index.aspx

Shan anticline already described. Though the southern terminations of these two faults are not yet well determined, they are separated from the north-east course of Willis' Fêng-Huang-Shan fault only by the I-Ch'êng (翼城) loess plain. It seems quite probable that either the Fu-shan or the Ho-shan fault is originally connected with the Fêng-Huang-Shan fault.

Willis considered that the Ho-Shan fault had a length of about 150 li with a vertical displacement from 2500 to 3000 m.

From our recent observations the northern course of the Ho-Shan fault seems to be intercepted at a point between Ho Hsien (霍縣) and Ling Shih (靈石) districts by another fault line which forms the eastern or south-eastern boundary of the Tai-Yuan graben. This latter fault may be called Tai-Ku (太谷) fault from the name of a nearby district. Thus the Ho-Shan fault of Willis may partly belong to the Tai-Ku fault of this paper. The vertical displacement of this fault seems to have been rather exagerated by previous estimates; according to the author's observation, it is from 1000 to 1500 meters.

As both the Ho-Shan Archæan mass and the Fu-Shan limestone ridge are limited on the west by the Ho-Shan fault, they seem to form one and the same horst although the evidence of fault on the east of the Ho Shan mass is not so clear as east of Fu Shan.

From the general direction, it seems probable that the Ho-Shan fault is more or less continuous with the Feng-Huang-Shan fault through the fault west of the Fu-Shan ridge and across the I-Ch'eng plain.

Lo-Yün-Shan (羅雲山) *fault:* From von Richthofen's "China" and his atlas, the Lo-Yün-Shan fault seems to be situated west of Ling Shih and Ho Hsien, while that west of Chao Ch'êng (趙城) and Hun Tung (洪洞) was called O-Shan (鵝山) fault with a vertical displacement of about 600 m.

In the author's recent survey no clear evidence of fault has been noticed west of Ling Shih and Ho Hsien and the location of Lo Yüng Shan ought to be west of Chao Ch'êng and Hun Tung. Consequently the Lo-Yüng-Shan fault of this paper just corresponds with the O-Shan fault of von Richthofen and still represents a fracture line of great magnitude to form the north-west boundary of the Ping-Yang (平陽) loess basin. Its length in Shansi amounts to 300 li, though it may be still continued into Shensi across

http://www.geojournals.cn/dzxb/ch/index.aspx

the Yellow River. Its course firstly takes a N.N.E.—S.S.W. direction, but on the N.W. of Hsin-Chiang (新絳) it quickly turns to the west to take an east by north and west by south direction. Its upthrow is on the north-west side with a vertical displacement from 400 to 1,000 m.

Tai-Ku fault: S. E. of Tai-Yuan loess basin is the Tai-Ku fault which strikes N. E. to S. W. and has a total length of about 230 li with the upthrow on its S. E. side. Its vertical displacement is estimated at more than 1500 m. The existence of the fault is well marked by a fault scarp that forms a straight aud steep cliff abruptly rising from the S. E. margin of the Tai-Yuan basin.

Correlation of Tai-Ku aud Lo-Yün-Shan faults: The south-west part of the Tai-Ku fault runs in exactly the same direction as the north-east course of the Lo-Yün-Shan fault. The continuation between them is only interrupted when they both run into the Cambro-Ordovician lime-stone in the vicinity of Tung Tsun (東村) in Ling Chih district. It is most probable that the Tai-Ku and Lo-Yün-Shan faults represent again the two portions of a great pivotal fault with its axis of rotation at the neighbourhood of Tung Tsun. If this supposition is correct, we may call this great continuous dislocation the Ho-Chou (霍州) pivotal fault.

Between the Lo-Yün-Shan fault or the southern portion of the Ho-Chou pivotal fault and the Feng-Huang-Shan fault with its northern continuation to the Ho Shan fault, extends the large Ping-Yang graben.

Chiao-Ch'êng (交城) fault: This has firstly a N. N. E. –S. S. W. course west of the Yang Chü (陽曲)§ city, which gradually turns to the west to take a N. E. to S. W. direction on reaching south-west of Tai Yüan§§ (太原) district. Its length is about 200 li with its upthrow side on the N.W. Its vertical displacement is estimated at not less than 1200 m. The existance of the fault is clearly indicated by the topographic evidence as the Chiao-Chêng fault scarp forms a mountain mass abruptly rising from the N. W. margin of the Tai-Yuan loess basin.

---

§ Yang Chü is the modern name for Tai Yuan Fu. See Loc. Cit. App. Pl. IV.

§§ Tai Yuan district[or Tai Yuan Hsien is about 20 Km. S.S.W. of Tai-Yuan-Fu

http://www.geojournals.cn/dzxb/ch/index.aspx

Ki-Chou-Shan (祁州山) *fault:* This fault lies on the north and north-east of Tai Yuan and was observed by Willis. The important points given by him are as follows: Ki-Chou-Shan fault is a normal one having a N. E. and S. W. course. South of Tung Yü it interrupts the continuity of the Cambro-Ordovician limestone On topographic feature it makes the range of Ki Chou Shan with a straight front. The displacement is apparently greatest immediately southeast of Chung Hua, where it amounts to the height of the range above the Hsin-Chou plain, 1200 m. and unknown below the plain.

Correlation of Ki-Chou-Shan and Chiao-Ch'êng fault: If we join on the map by dotted lines the south-west termination of the Ki-Chou-shan fault with the north-east part of the Chiao-Ch'êng fault, we may get a possible great fault whose continuation is only untraceable in the loess basin of Huang Tu Chai. If this continuation occurs in fact, it is another great pivotal fault with its axis of rotation in the vicinity of Huang Tu Chai and may be called the Yany-Chü pivotal fault.

Shih-Mên-Shan (石門山) *normal fault*§: N. E. of Pu Hsien (蒲縣) is the Shih-Mên-Shan fault which strikes in a N. and S. direction. Its existence is recognised by the Ordovician limestone brought in contact with the Triassic red sediments N. E. of Pu Hsien. Its length probably reaches 140 li while its greatest vertical displacement at Chih Mên Shan amounts to 700 meters with the upturow side on the east.

Ling-Hsien (隰縣) *normal fault:* This fault represents a line of dislocation east of Ling-Hsien§§ and runs from N. to S. with a probable length of about 140 li. Its greatest throw is more than 500 meters east of Ling Hsien, where the Triassic sediments are in contact with the Ordovician limestone.

The Shi-Men-Shan fault and the Ling-Hsien fault are on a same fracture-line west of the Lu-Liang anticline. Both are typically strike faults having the effect of suppressing the outcrop of Carboniferous coal measure and bringing in direct contact the Permo-Triassic sandstone with the Cambro-Ordovician.

§ See Loc. Cit. App. Pl. III. §§ Loc. Cit. App. Pl. V.

http://www.geojournals.cn/dzxb/ch/index.aspx

Chü-Chu-Shan (句注山) *step faults:* If we go northwards from Hsien Kang Chên (軒崗鎮), Kuo Hsien (崞縣), we shall meet the repeated outcrops of Ordovician limestone, Permo-Carbonferous coal series, and Triassic red beds several times; this repetition of outcrops is caused by a series of strike faults all running from N. E. to S. W., parellel to one another and all having the upthrow side on the N. W. Such a series of faults is here called the Chü-Chu-Shan step faults.

Ch'un-Ch'ing-Wa (春景凹) *fault:* This fault is indicated by the repetition of the Permo-Carboniferous coal series and Ordovician limestone both constantly dipping southeastward, west of Ning Wu. Its length is about 40 li and its minimum throw is not less than 300 meters.

Hêng-Shan (恆山) *fault:* This has a N.E. and S.W. course with a probable length of about 250 li. Its vertical displacement is doubtless very great for the height of the Hêng Shan range constituted by the Archæan gneiss and Cambro-Ordovician limestone, the upthrow of the fault, amounts to 500 meters above the Ta-Tung (大同) loess basin. The topographic evidence of the fault is shown by the straight front and abrupt face of the Hêng Shan range with the downthrow buried beneath the loess of the Ta-Tung plain.

Sang-Kan-Ho (桑乾河) *fault:* This is followed by Sang-Kan-Ho valley on its downthrow-side. Its upthrow on the southeast constitutes a steep range of more than 400 m. in height above the valley. Its length in Shansi is about 100 li and is continued into Chihli still for a considerable distance.

K'ou-Chuan (口泉) *fault:* The fault between T'o Ping Tsun (拖平村) and K'ou Chuan Chên, west of Ta Tung[4], has been described in my paper on the coal field of Ta Tung. We now find out that this fault extends further southwestward though O Mao K'ou (鵝毛口), Huai Jên (懷仁) district, to Ta Yü K'ou (大峪口). Consequently N.W. of Huai Jên the range abruptly rises from the N. W margin of the Ta Tung basin at a height of about 400 meters. The total length of this fault is believed to be more than 100 li

4 Bull. Geol. Surv. China No. 3, 1921, pp. 71–74 Pl. XI.

http://www.geojournals.cn/dzxb/ch/index.aspx

SUMMARY AND CONCLUSION ON THE FAULTS

All the main faults given in the preceeding paragraphs, such as the Kao-Ping fault, Ho-Chou fault, Yang-Chü fault, Hêng-Shan fault, and K'ou Chuan fault, are nearly parallel to one another and have a common N. E. and S. W. direction.

The more interesting dislocations in Shansi are the three pivotal faults of Kao-Ping, Ho-Chou and Yang-Chü, of which not only the general courses are parallel one to another but also the direction of the pivotal movement remains remarkably constant. Thus in all the three great pivotal faults, their northern section has always the upthrow-side on the east and down throw side on the west while the contrary is true with the southern portion.

Although it is always not easy to know the exact position of the fault planes whether vertical or inclined, it is however most probable that all the faults above described belong to the "Normal" type with vertical or very high-angle fault-plane. This seems to be well attested by the abrupt fault scarp often still wonderfully preserved.

One of the topographical effect of such faults is the production of rift valleys or graben. Thus we have the Tai-Yüan graben bounded on the S. E. by the uplifted block of Tai-Ku fault and on the N.W. by the elevated block of Chiao-Ch'eng fault; the Ping-Yang graben is between Lo-Yün-Shan fault on the N. W. and Fu-Shan faults on the S. E.; and the Ta-Tung graben has Hêng-Shan and Sang-Kang-Ho faults on the S. E. and K'ou-Chuan fault on the N. W. The situation of these three grabens are also arranged in a N. N. E. and S. S. W. direction.

On the other hand the Lu-Liang horst is elevated between the depressed areas of Shih-Mên-Shan and Ling-Hsien faults on the west and the sunken districts of Lo-Yün-Shan and Chiao-Chêng faults on the east.

The Fen Ho valley constituting always the high way from Shansi to Si An in Shensi has been often taken as a whole and simple graben. From the above considerations, it is clear that there is a succession of two grabens Tai-Yüan and Ping-Yang oblique to the valley itself.

STRUCTURAL RELATION BETWEEN THE FOLDING AND THE FAULTING

The folding in Shansi is largely predominated by the Lu-Liang anticline on the west and Chin-Shui syncline on the east. Both of these

http://www.geojournals.cn/dzxb/ch/index.aspx

major folds have their axes directed N—S or N. N. E.—S. S. W The same essential trend is observed in the minor folds such as Shih-Ch'ien-Feng syncline, Ho-Shan anticline etc. We may conclude thus the N—S or N. N. E.—S. S. W. direction is the typical trend of the Shansi folds.

Of the faults we may distinguish two different systems. One system of faults is clearly parallel to the folding; for instance, the Shih-Mên-Shan and Ling-Hsien faults west of Lu-Liang anticline. The other system of faults i. e , those producing graben structures such as the Yang-Chü and Ho-Chou pivotal faults are distinctly obligue to the folding axis with a dominantly N. E.—S. W. direction.

DATES OF FOLDING AND FAULTING

As the folds in Shansi are often cut by the faults, the date of folding is consequently earlier than that of faulting.

From Willis'† consideration the cessation of folding might be early or middle Mesozoic not later than the middle of Jurassic.

By our recent observations the strata from the neo-Proterozoic to the Jurassic and even to the Jura-Cretaceous as observed in north Shensi have all been subjected to the same movement of folding; i. e , they are all conformably folded. Consequently the folding has not ceased in the pre-middle Jurassic time as believed by Willis but was developed during the post-Jurassic or even during the post-Lower Cretaceous time.

In the vicinity of Tung Tsui (仝峪) N. of the Hun Yuan (渾源) city, the Upper Cretaceous sediments seem to be unconformably overlying both the Cambro-Ordovican limestone and Permo-Carboniferous coal series If this observation is correct, though the fact still has to be confirmed, the folding seems to have ceased in the pre-Upper-Cretaceous; it means that the folding movement attains its climax during the middle Cretaceous.

If we wish to know the date of faulting, we may study the youngest sediments which have been affected by the faults. According to Dr. Andersson's notes§ , in the Yuan-Chu (垣曲) district in southern Shansi the Eocene deposits have been faulted. The author also found that the Oligocene rocks north of the Fan Chih (繁峙) district in northern Shansi have been

† *Willis*: Research in China. Vol. I., pt. I, page 261.

§ J. G. Andersson: Essays on the Cenozoic of N. China Mem. Geol. Surv. China No. 3.

http://www.geojournals.cn/dzxb/ch/index.aspx

affected by faulting. If these observations are correct, the beginning of faulting must not be earlier than the Oligocene. To determine positively how much later than the Oligocene, the relation of the faults with the loess has to be discussed.

Willis suggested that the beginning of faulting in Shansi was not earlier than the Pleistocene and loess was aggregated during the Pliocene.

In fact the loess of Willis consists of both true loess and red clay. From Dr. Anderssion's§ study the red clay or Hipparion clay represents the transition epoch between the Miocene and Pliocene while the true eolian loess belongs to the middle Pleistocene Consequently if we are to accept Willis' suggestion that the aggregation of loess is earlier than faulting, the date of faulting may belong to the upper Pleistocene.

On the other hand according to Dr. Andersson's§§ opinion regarding the relative age of faulting and loess, the deposition of eolian loess was later than the faulting which took place chiefly during the lower Pleistocene. A detailed discussion on these apparently conflicting views will require more physiographic considerations which are not in the scope of the present paper.

http://www.geojournals.cn/dzxb/ch/index.aspx

§ *J. G. Andersson:* Ob. cit.

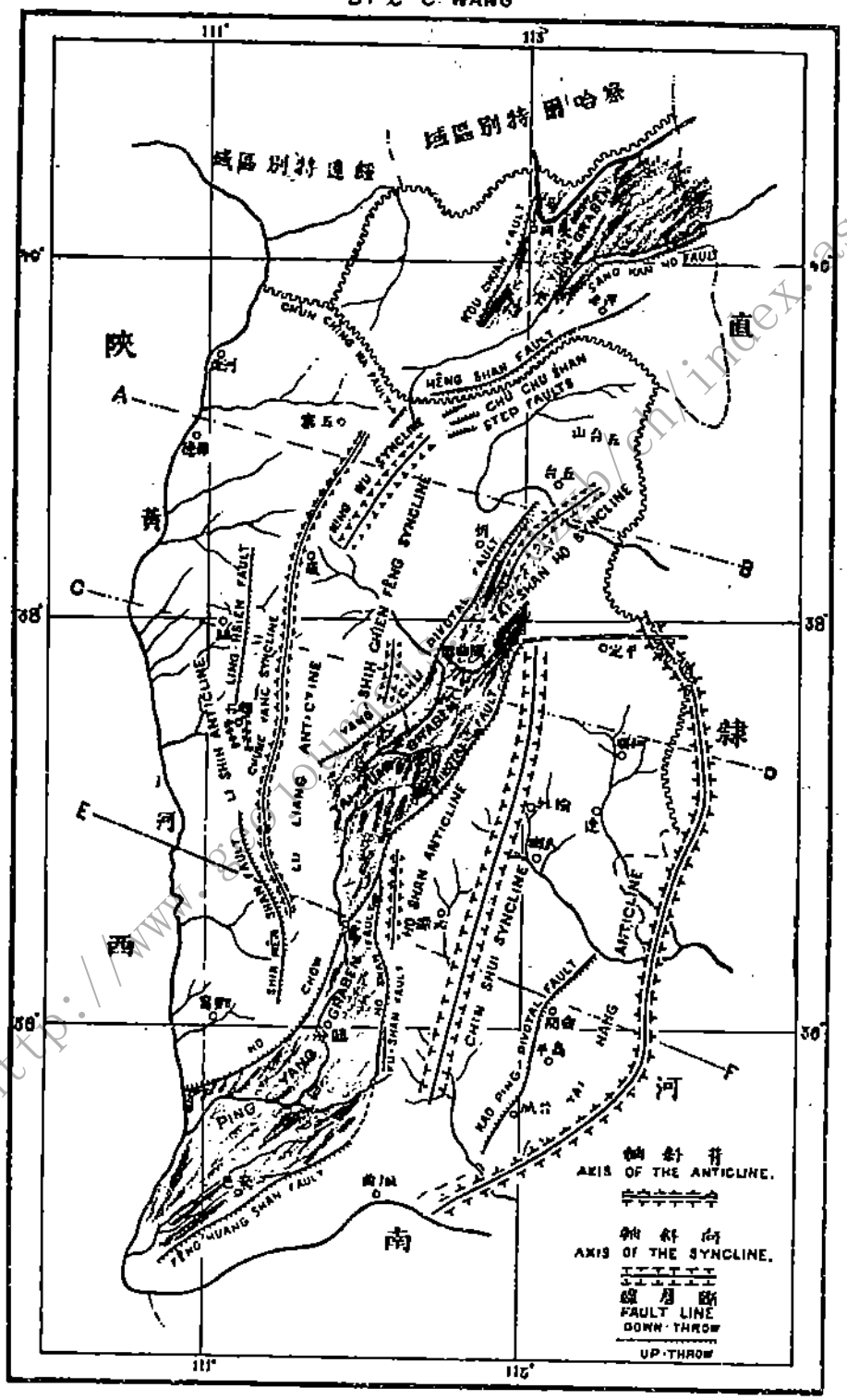
§§ *L. F. Yih:* The Geology of Hsi-shan or the Western Hills of Peking. Mem. Geol. Surv. China No. 1. pp. 70-73

山西構造地質圖

PLATE I

TECTONIC MAP OF SHANSI.

BY C. C. WANG



http://www.geology.ac.cn/cn/index.aspx

http://www.geojournals.cn/dzxb/ch/index.aspx