STRUCTURE AND RELIEF-FEATURE OF THE
PROVINCE OF SHANTUNG

TSOU PAO-CHUN

I. FACTORS OF CONTROLLING THE TOPOGRAPHICAL FEATURES

The land of Shantung, though not very broad in dimension, presents rather a complex relief containing varied highlands and lowlands, to the fashioning of which three factors have contributed, first, the tilting of different strata, second, the intrusion of different magma, and third, the transport of the products of denudation inward or outward. The two former mainly contribute to the forming of the high- lands, while the last is responsible for the broad plain. As a rule, the different resistance of strata depends on the different character of their composition and their relative age; the older the age, the harder the strata. Thus in a cross section of the strata as affected by faulting, the upper part is seen to be softer and easily eroded, while the lower part, harder and stronger in appearance, forms residual hills and mountains. Thus many hills are formed by the lower Palaeozoic limestones or the Pre-Cambrian rocks, e.g., Ts'ienfushan (near Tsinan) and Mantoushan (near Changhsia). But the Pre-Cambrian rocks are much harder than those of the Post-Cambrian age, so that the highest mountain chain (Taishan, etc.) is made of it.

The igneous intrusion is also an important factor by which many mountains and hills have been formed. It forms considerable heights of its own and has also pushed up overlying strata into dome-shaped masses. The heights may be formed by the volcanic material of two kinds, intrusive and eruptive. The rocks in the former case are mostly the granites, gabbros, diorite, etc.; the rocks in the latter case are chiefly basalt and andesite. Of the whole series granitic intrusion often forms the highest mountains in Shantung, e.g., the Archaean granite, combining with gneiss, forms the great Taishan mass described above and the Mesozoic granites build the other hills, particularly the Laoshan block. Gabbro seems to form the group of
isolated conic hills, such as the Huashan near Tsinan. The basaltic flows, through dissection, often form the low flat-topped hills with their residual patches.

The migration or transport of rock-materials is the agency by which the broad plains have been formed. In the Central Highlands degradation by running waters is predominant but in the lowlands is replaced by aggradation. Generally speaking, there are two directions of migration, one inwards from the west, and the other outwards from the highlands of Shantung themselves. The agents of inwards migration are both the river, Huangho, and the winter monsoons. They carry the materials of huangtu and sands and other sediments from the northwest provinces to Shantung to pave the lowlands into flat plains. The outwards migration is carried out by small streams, originating in the interior of the highlands of Shantung. On the one hand, they reduce the height of the highlands and on the other, pave the lowlands with the materials derived from them. So that we can visualize that the higher parts of Central and Eastern Shantung are more or less barren or rocky but the surrounding lowlands are not merely very flat but also of great fertility. As a result of the interaction of these various factors, the complex relief of the present land-surface has been moulded.

Since the landscape assumed approximately its modern form four distinct stages of erosion can be traced in Shantung. The earliest one is known as the Tanghsien stage (Miocene) which opened just after the time of grand faulting, the result of faulting which presented a form of land-surface favourable for erosive rejuvenation. Then the consequent river-system of radial outward drainage widely developed. Even at the present day the rivers still retain more or less their initial direction. The rivers Sushi and Wenhao are good examples. Traces of the Tanghsien stage may also be seen in the Changluo and Linchu districts. Where the Cretaceous beds outcrop often form a series of low ranges, or rather an undulating plain; the same phenomenon occurs in the southern part of Chiaohsien as well as in other parts of Eastern Shantung. At the end of the Tanghsien stage, Shantung appeared as a mature landscape with wide intermont fault-valleys and separated mountains of residual blocks; probably much river capture had already occurred. The second period of erosion is now known as the stage of "Z erosion"(1) which may be regarded as one phase of the Fenhu cycle of erosion in Shanxi. The rivers rejuvenated their erosive agency reduced the original channels as well as the interstream-areas to a series of low convex swells and also carved the fresh covers of basaltic lava-flows to many separated low flat-topped hills. (See Fig. I a-g).

The third stage of erosion is the Tsingshui stage which began from the time of the lower Pleistocene just after the intensive deposition of the reddish loam. The
Fig. 1 The diagram of evolution of land-surface near the Changlo city

- a. The Tanghsien surface
- b. The spreading of basaltic lava flow
- c. The stage of Z erosion
- d. The deposition of reddish loam
- e. The stage of the Tsingshui erosion
- f. The huangt'u accumulation of the Malan type
- g. The present stage of erosion
scene of this erosion was still along the old river courses. The time of erosion was probably very short and consequently the residue of the reddish loam is still apparent here and there. Following this was the stage of huangt’u-accumulation of the Malan type.

The present stage of erosion operates still along the former lines of erosion. The phenomena of degradation occur along the small affluents in the highlands of Shantung but those of aggradation seem to be present along the channels of the main rivers, because most of them have braided channels and flood plains, such as the Tawenho, I-ho, and Siaotsingho, and particularly the well-known Huangho.

II. THE TOPOGRAPHICAL REGIONS

From the point of view of its superficial extent or outline, Shantung may be divided into two major regions: one is the region of its limb on the east of the Tsingtao-Hutouya-line and the other, the region of its trunk on the west of the same line. Generally speaking, the former is a kind of low and rolling uplands, called the hilly peninsula of Chiaotung, which is edged by many gulfs fringed with high cliffs; but the latter is the continental portion with rather flatter and straighter coast-lines on either shores, without gulfs or ports.

A. The Continental Portion

The shape of the continental portion is, as it were, like an overturned saucer, the highlands of its central part corresponding to the high bottom of the saucer, and the lowlands of its outer part, continuously encircling its central highlands, corresponding to the edge of the saucer. The streams flow outwards from the Central Highlands to the surrounding lowlands in various directions. Except for those on the eastern side, nearly all of the streams have been captured or intercepted by one or other of the following three great water-courses; namely the Grand Canal on the west, the Siaotsingho on the north, and the I-ho on the southeast, but the well-known Huangho has no tributaries below the confluence of the Grand Canal, and it flows northeastward between the parallel streams on either side, viz., the Siaotsingho and the T’uhaiho, although a small branch-stream of the latter connects with the Huangho near both estuaries.

The continental portion may be divided into many subregions, tabulated as follows:
Fig. 2. The relief map of Shantung

Fig. 3. The topographical regions of Shantung

1. N. Shantung plain
2. W. Shantung plain
3. Shiaotsingho plain
4. Chiaowei plain
5. Taishan Chain
6. Low hilly region and broad valley region
7. Chiaosi hilly region
8. Chiaotung peninsula

The continental portion may be divided into many subregions, tabulated as follows:

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1. The Central Highlands

a. The Mountainous Region of Central Shantung

This region is located in the central part of the continental portion of Shantung. Roughly speaking, it occupies two degrees of longitude (117°E.—119°E.) and one degree of Latitude (35°40'N.—36°40'N.). From north to south it is about 70 km. wide and from east to west, about 200 km. long. Its general elevation is between 400—1,000 metres above sealevel. There still survive many high pinnacles over 1,000 metres, such as the peaks of Taishan, Lushan, Chulaishan, Menshan, etc. All of them belong to the Taishan complex which is tectonically the land-core of Shantung.
(1) The Taishan mass—The Taishan mass is no ordinary folded mountain chain. It is a block so dissected as to form a series of steep sided peaks of which the Taishan is the highest. The mass as a whole, as distinct from the peaks, has an even general level. Looking northward from the summit of Taishan one sees an irregular rugged landscape recalling a stormy sea. Its situation is between two basins: the Wenho basin on the south and the Changchiu-tzu-po coal-fields on the north. The highest pinnacle is not, as is generally the case, situated in the middle of the whole mass but in the extreme southwest corner and rises close to the north gate of Taian city which is situated just on the very edge of the Wenho alluvial plain. This gives an exaggerated impression of the height as seen from the low plain with which it is in the strongest contrast.

There are five sacred mountains in China, of which this is the first. Its relative altitude is more than 1,200 metres above Taian city. From the city to the summit of Taishan, the road has been paved with flagstones into many steps and there are many stone-inscriptions of different ages and old temples en route. The whole Taishan mass is, as it were, a great mosaic situated between three cities, Taian on the southwest, Tsinan on the northwest, and Poshan on the east. As for its general structure, the southern is made of the so-called Taishan complex of the Archaean group but the northern part is chiefly composed of the lower Palaeozoic rocks. The northern part, in consequence of the softer rocks, has been dissected more intensively than the southern, and here the rugged spurs spread widely like flying buttresses, whereas the southern part has been only gashed into many deep canyons, through which flow many consequent streams forming affluents of the Wenho. “The whole mountain mass has been reduced to a wall, which is crowned by pinnacles that stand like towers of a ruined castle”.(2)

(2) The Lushan mass and the I-shan mass—These two mountain masses are the prolongations of the Taishan mass toward the east. The pass of Tsingshih-kuan, midway on the Poshan-Laiwu-line, may be the boundary of the Taishan and Lushan masses, and, in turn, the pass of Tungling-kuan, at the head of the Miho valley, may be the boundary between the latter and the I-shan masses. From the areal point of view the Lushan mass is much the broadest in the whole province of Shantung. It is quite different from the Taishan, and the highest peak, Lushan, stands boldly in the central part of its own mass. Numerous streams, originating in its higher interior flow outwards radially along the initial slope. The central portion is made entirely of the Archaean group but the northern and southern are chiefly composed of the Ordovician rocks disturbed by many faults. However, the Lushan is lower than the Taishan and is about 1,080 metres above sea-level.
The I-shan mass is much smaller in area and much lower in altitude than the two former. It is also composed of the same rocks but it differs from them in its surrounding regional structures because it makes contact with the upper Mesozoic group on the eastern semicircular parts and with Cambrian rocks on the western semicircular parts. Its highest peak is about 990 metres above sea-level. Going eastwards from the I-shan mass the relief becomes progressively lower and finally the hills sink into an alluvial plain, the so-called Chiaowei plain. All these three masses, from Taishan to I-shan, are connected with one another, presenting, in a broad point of view, an east-west irregular mountain chain, by which the intercommunication between Southern and Northern Shantung has been long handicapped.

b. The Low Hilly Region and Broad Valley Plain

On the south of the mountain-chain described above is an area of flood-plains separated by low hills of old strata. Situated immediately to the south of the Taishan mass is the Tawenho plain, next, the Ssushui plain, following which by the Shu-I valley, and finally the Chiaosi hilly region.

(1) The Tawenho plain—It is bounded by the Mengshan range on the south, Lushan mass on the east, but on the west opens widely to the Great Huangho Delta Plain. All of the surrounding heights are made of rocks of the Archaean group. The Tawenho plain has been paved by the river Tawenho, which is formed by the confluence of two head streams flowing westwards from the Lushan mass; the more northerly being the Wenho and the more southerly the Siaowenho which unite to the east of Tawenkou. Between these two streams are the isolated mountains, Tsulaishan and Sinfushan, the high peaks of which are residual masses of Archaean rocks; the peak of the former is about 1,100 metres above sea-level and that of the latter, about 1,025 metres. They are separated by a great fault-valley, so that the communication between the Wenho-and Siaowenho-valley is not difficult. And those valleys all present broad plains paved with recent alluvium and surrounded, particularly the former, by abrupt mountain-blocks. In the upper parts of both valleys we can hardly lose sight of the low foot-hills and the scattered residual protuberance, but then these valleys are progressively wide to the west until they unite into one broad plain, viz., the Tawenho-plain Proper, extending directly to the "lake belt". The main valley is joined by a tributary, the Kangho which extends the lowland northwesterns. These four plains—Wenho, Kangho, Siaowenho, and Tawenho Proper—constitute altogether the Tawenho plain and form, with the Ssushui plain just to the south of it, a distinct region which played an important role in ancient Chinese history as the Terrain of the Lu State.
The upper Wenho valley in which the city of Laiwu stands is composed of more complex rocks than that of its north-bank tributary, Huiho or Tsaiewenho, which flows southwestward until it unites with the former to the east of Taian city. The bed of the Huiho is covered with Recent deposits but that of the Wenho has little such material. In the central part of the latter valley stands a conspicuous hill, called the Kungshan formed by dioritic intrusion and further to the east are many low flat-topped hills, consisting chiefly of Permo-Triassic and Carboniferous rocks. Between the Huiho and the upper Wenho the watershed region is composed of Eocene beds.

On the southwest of the Taishan mass is the K'angho plain, through which flows the river K'ang, a north-bank tributary of the Tawenho. This plain is probably due to depression. On its north side lies a belt of low hilly region forming the watershed between K'angho and Huangho. The low hills, such as the Mashan (to the south of Changtsing city), T'ao-shan (to the west of Feicheng city), and Tatsaishan (to the south of Tungoh city) are outcrops of the Cambrian system. On its southern side there is also a belt of low hilly country composed of the same rocks with occasional outcrops of Archaean rocks, such as the Fenghuangshan and Yangshan (both to the south of Feicheng city). These form a watershed between the K'angho and the Tawenho and below the confluence of these streams is the Tawenho delta, through which the Tawenho sends out three distributaries, two of them running westwards into the Tungping lake and one southwards into the Lushan lake. The plains are about 50–200 metres high above sea-level but the Tawenho delta is much lower than this.

Only two cities stand respectively on the plains of K'angho and Siaowenho, viz., Feicheng and Sint'ai; four cities on the plains of Wenho and Tawenho Proper, viz., Laiwu and Taian on the former, Tungping and Wenshang on the latter.

(2) The Ssushui plain—To the south of the northern extension of the Menshan is the Ssushui valley through which the river flows westwards parallel roughly to the Tawenho and finally emptying into the Nanyang lake. There is a small affluent, called the I-shui which joins the Ssushui to the east of Tzuyang city, that is famous in Chinese history, because on both banks were the summer resorts of Confucius and his scholars. The Siaowenho, Wenho, and Ssushui are all parallel more or less to the axes of the downthrow blocks or grabens. There are many lateral tributaries on the other hand flowing down from the upthrows and cross the fault-lines joining their main streams nearly at right angles.

Seven cities stand on the Ssushui plain and other small associated river-plains along the "lake belt", viz., Ningyang, Tsining, Tzuyang, Chufu, Ssushui, Tsou, and T'enghsien.
(3) *The Shu-I valley plain*—To the south east of the Lushan mass is the Shu-I valley which is much broader and more conspicuous than former, and through which the rivers Shu and I flow parallel to each other southward into the Province of Kiangsu, the former joining the Grand Canal and the latter, emptying alone into the Yellow Sea. There are tributaries on the right side of I-ho, running down from the "central highlands" and also many affluents on the left side of the Shu flowing down from the Chiaosi hilly region. Between the two rivers there is a belt of low swells with Archaean outcrops which forms their natural watershed but there are no big affluents. Apart from some areas covered with Recent deposits, the valleys of the I-ho and Shuho consist of Late Mesozoic materials in which the tuff conglomerate beds are responsible for such undulation of relief as occurs. The watershed between the Shuho and the upper course of the Weiho is a continuous low range called Chiwushan which is composed of late Mesozoic rocks. From there the relief becomes progressively lower and lower towards the southwest until it presents a broad plain.

Among the tributaries of the I-ho, there are two big streams flowing southeastward to join their master river nearly at right angles and the upper I-ho flows also in the same direction between the I-shan mass on the northeast and the Motienling range on the southwest. The tributary Tungwenho flows between the Motienling range and the Mengshan range, and in turn, the Fangho, between the Mengshan range and the Paotuku-Nishan hilly region. They are all flowing parallel to one another. Their valleys are all grabens. The divide of the Siaowenho and the Tungwenho is a low ridge, from which both rivers flow in opposite directions. When erosion has had sufficient time to work the phenomenon of river-piracy will of course occur and as the watershed will disappear. Along the northern foot-slope of the Menshan range there stand also many hills which are composed mainly of red sandstone. The so-called Mengyin series is well developed to the southeast of Mengyin city and forms per se an especially poor land. But most of the western part of the valley is covered with the recent alluvium. Generally speaking, the Tungwenho and the Siaowenho valleys may be reckoned as one valley through which pass the leading roads.

The Fangho valley is also a well developed graben and comparatively much longer and broader than the Tungwenho valley. The hilly regions which delimit this valley are nearly all composed of Archaean rocks but the outcrops projecting through the alluvium of the valley bottom are Cambro-Ordovician. Both ends of the valley are opened so widely that the whole area of the valley is like a rectangle in shape. The Ssushui runs westwards out of the northwest end but the Fangho
flows southeastwards and empties directly into its main river, I-shui, near the city of Lin-i. Between both headwaters the watershed is a region of some small hills. Many low flattopped hills exist along the valley showing that peneplanation has been going on for a long time; so that the configuration of this valley is much older in its stage of erosion than that of the Tungwenho valley.

Two cities, Mengyin and Feihsien, stand in their respective grabens and four cities in the broad Shū-I valley, viz., I-shui, Lin-i, Chū and T'ancheng.

(4) The Paotuku-Nishan hilly region—The Paotuku is a high flat-topped hill with steep slopes situated on the southern edge of this region and situated on the opposite edge is Nishan which was a hill for worship in ancient Chinese time. The whole area is studded with residual hills of Archaean rocks as well as Cambrian. It is an undulating area and rather poor, though it is in general about 300 metres above sea-level. The streams originating in the western part of this region flow westwards and empty into the “Lake Belt”; and those originating in its eastern part, run eastward and join the Fangho.

The whole region is so poor that there is no city nor even an important town.

(5) The Chiao-Si hilly region—This region is limited by two great gulfs, one is the Chiaochouwan (Gulf of Chiaochou) on the northeast and the other, Lianyünkong (Port of Lianyün), on the southwest; and the latter is also the eastern end of the Lunghai railway. The whole region may be subdivided into two parts: the outer, bordering with the Yellow sea, is a narrow belt of coastal plain which, however, should be reckoned as a part of our region of “outer lowlands”. The inner part, the true hilly region, presents a peneplain form. The rocks are chiefly of the Archaean group, so it is rather like the Paotuku-Nishan hilly region, but this part has undergone far more intensive peneplanation. And the elevation of the residual hills is more or less uniform. The highest is only 788 metres and the rest are all about 500–600 metres. Thus they probably represent two stages of peneplanation.

The coastal part is about 20 kilometres wide but the inner part about 30 km wide forming the irregular watershed between the coastal region and the Shūho valley. There is only one city, Jihchao, standing not on the inner part but on the coastal plain.

To sum up the salient characters of the Central Highlands. It is a region of considerable diversity e.g. to the north of the main mountain chain the graben type of faulting hardly occurs while to the south is conspicuously developed, especially
as seen in the open-ended valleys. Evidence of peneplanation is abundant in the regions of Chiaosi and Paotuku-Nishan and the meandering lower courses of the streams show maturity but they still preserve for the most part their original directions. Finally, the contrast between the barren mountains and hills on the one hand and the very fertile valleys and plains on the other is important for here were conditions favourable to the development of many small states in early historical times.

2. The Surrounding Lowlands

a. The Chiaowei Plain

This plain is a land linking two hilly regions, the Chiaotung peninsula on the east and the Central Highlands on the west. It is about 150 kilometres long from north to south, and 80 kilometres wide from east to west. Its two coasts are indented by gulfs, the Chiaochouwan and the Laichouwan, which form the “Waist” of the Shantung peninsula. The whole area is so flat, about 0-50 metres above sea-level that the river courses are scarcely distinct systems; some rivers flowing to the north connect with those running to the south, namely the Nanchiaohoh and the Pechiaoho intercommunicate with each other. Generally speaking, the eastern part is the drainage of the Nanchiaohoh, and the western, the drainage of the Pechiaoho and Weihho. The former originates in the Laiyang basin, and the two latter, in the Chüchcheng basin. This region is no doubt an eroded plain covered with Recent alluvium. To the south of Chang-i city there are many outcrops of the Archaean group. Except for these, the whole region is extremely flat and extends east and west to the peneplains which bound it on every side.

This is an important plain and a great route-way and there are eight cities standing there, viz., Tsimo, Pingtu, Chiaohsien, Chücheng, Kaomi, Anchiu, Weihsien, and Chang-i.

b. The Siaotsingho Plain

To the north of the Central Mountain Chain is the Siaotsingho plain which connects the Huangho deltaplain on the northwest and with the Chiaowei plain on the east, and merges into both without any topographical break.

The river, Siaotsingho, originates in a famous lake, Taminghu, within the city of Tsinan, and flows northeastwards parallel to the Huangho and turns to the east,
after passing north of Tsinan city; then it empties directly into the Laichouwan (Gulf of Laichou). Although its course is close to that of the Huangho, this river is quite different in character from it and from other streams in Shantung. First of all, the pure and transparent water of the Siaotsingho, especially, by contrast, to its dirty neighbour, is so fascinating that its proper name was thence derived.\(^{(5)}\)

It owes this character to the fact that its numerous head-streams flow out of Ordovician limestones. Secondly, the fluctuation of its regime is less than the others, owing to its amply water source, differentiating it from those which depend upon the summer rain. And finally it is the only navigable river today in Shantung. The junks can be moved directly from its estuary to its head-water.

There are many affluents on the right side running down from the Central Mountain Chain but none on the left side. These affluents decrease the purity of the water in its lower course. Among such affluents, the bigger streams are the Laiho, Tzuho, and Hsiaofoho but the latter directly empties into the swamp, Matahu, and then connects with the river. The Niho, though it still retains its independent character, may connect with the Siaotsingho in future, if the Laichouwan ceaselessly carries on its regression through river deposition.

Furthermore, this plain may be subdivided into two sections, an undulating southern region with broad valley-plains, and a northern flat flood plain. Both are of very great importance. In the former, there occur the chief coal fields of Shantung and in the latter lie the productive farm-fields.

The southern section may be also subdivided into four subregions, viz., the Changchiu coal fields on the west, Tzupo and Linchi basins in the middle, and the Fangtszu coal fields on the east. Nearly all of the energy-resources of Shantung are concentrated in the southern section, through which passes the Tsingtao-Tsinan railway to meet the Tientsin-Pukou railway at Tsinan. By these railways the coal can be easily exported to other places. To the east of Changchiu city there is an isolated intrusive mass of andesite forming a high mountain, the Changshan, between which and the Taishan mass is a broad and flat valley.

Under these conditions this region is a really important area and seventeen cities have been developed there, namely, Changlo, Linchü, I-tu, Tzuchuan, Poshan, Changchiu, Tsinan, Tsouping, Ts'itung, Kaowan, Pohing, Huant'ai, Shoukuang, Lintzu, Kuangjao, Changshan, and Tsingcheng.


c. The Northern and d. Western Shantung Plain

The plain of Northern Shantung is the area to the north of the Huangho and the plain of Western Shantung is the area between the same river and the Lake Belt. The total area is more than one fourth of the whole province. An outstanding feature is that although these two plains are entirely derived from the deposition of the Huangho, the area actually drained by the river at the present time is limited to a very narrow belt between two artificial dikes. It has no tributaries or affluents except the Grand Canal (See Table I).

Table I Areas of Huangho Drainage

<table>
<thead>
<tr>
<th>Huangho</th>
<th>Square Kilometres</th>
<th>Square Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. from Paotou to its head streams</td>
<td>394,780</td>
<td>152,500</td>
</tr>
<tr>
<td>2. between Paotou and Lungmen and its small affluents</td>
<td>120,528</td>
<td>46,500</td>
</tr>
<tr>
<td>3. between Lungmen and Tungkuan and its small affluents</td>
<td>6,960</td>
<td>2,780</td>
</tr>
<tr>
<td>4. between Tungkuan and Tsingchou and its small affluents</td>
<td>14,788</td>
<td>5,710</td>
</tr>
<tr>
<td>5. between Tsingchou and the sea</td>
<td>6,000</td>
<td>2,400</td>
</tr>
<tr>
<td>great tributaries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fenho</td>
<td>40,240</td>
<td>15,530</td>
</tr>
<tr>
<td>Suho</td>
<td>5,320</td>
<td>2,050</td>
</tr>
<tr>
<td>Weiho (Shensi)</td>
<td>144,760</td>
<td>55,870</td>
</tr>
<tr>
<td>South Loho</td>
<td>13,028</td>
<td>5,030</td>
</tr>
<tr>
<td>I-ho</td>
<td>4,960</td>
<td>1,910</td>
</tr>
<tr>
<td>Tsinho</td>
<td>10,500</td>
<td>4,050</td>
</tr>
<tr>
<td>Fanho</td>
<td>820</td>
<td>320</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>762,684</strong></td>
<td><strong>292,700</strong></td>
</tr>
</tbody>
</table>

To the north of the Huangho and parallel to it there are two streams, the nearer the T’uhaiho, and the farther the Machiaho; the river regime of both fluctuates very widely. In summer, they make floods like a great river but in winter their beds are nearly exposed. Their intermittent character is due to the summer rains. The Grand Canal intercepts all the east-ward-flowing streams. Notable among these is the Weiho, flowing from Anyang in the corner of Honan and which now forms the head-waters of the northern section of the Grand Canal.

In the Western Shantung plain the streams are numerous but very short; they originate from the region near the former Huangho-course which is the present divide of the Huangho system and the Lake Belt, owing to the extra elevation through the former Huangho-deposition. The Lake Belt is an independent drainage system,
though the water of those lakes empties indirectly into the other rivers via the Grand Canal. The development of the Lake Belt is nourished by small streams and the Huangho floods and possibly it is being downwarped. Strictly speaking, the Western Shantung plain is a triangle, like a delta, delimited on three sides by the Lake Belt and the river courses of the present and former Huangho. Nearly every one knows that the Huangho is “China’s Sorrow” but the heart of the sorrow is this triangular region in the centre of the migration area of the Huangho, uniting the Haiho plain to the north and the Huaiho plain to the south. Together these constitute the North China plain which is chiefly the result of the Huangho deposition; so that to understand the structure of the North China plain we should, first of all, study the river Huang.

The Huangho flows directly to the Yellow sea from the T'ungkuan Bend with a tremendous quantity of waters though it varies from month to month. At first it freely passes through the flat delta-plain but at last is blocked by the Central Highland of the Shantung province. As a result, it has repeatedly shifted its courses to the north or south of this highland-area. According to reliable records there have been eight great migrations of the river-course since the time of Yü. Those are as follows:

(1) 2278 B.C.—According to tradition, Yü began to control the Huangho and other rivers which had flooded for a number of years. At the time the Huangho flowed northward from Hingtzu to Tsunhsien (both in Honan) and was joined by the Weiho and Changho (both in Honan). It then followed approximately the course of the modern Fuyangho above Yungnian of the present day and emptied into the Pohai near Tientsin.

(2) 602 B.C.—The Huangho changed its channel at Süsükou (to the southwest of Tsunhsien) and flowed eastward to join the Luiho, and then ran to the east between Puhosien and Puyang. At last it turned to the north along the Grand Canal of the present day and emptied into the sea near Tientsin.

(3) 11 B.C.—It shifted its channel again near Huahsien (to the south of Tsunhsien) to flow eastward along the course of Tuhaiho of the present day, emptying into the sea at Litsin. After that an engineer of the Eastern Han Dynasty built an artificial dyke several hundreds of miles in length from Hingyang to the sea, which retained the Huangho in a regular course for a long time.

(4) 1048 A.D.—It turned its course to the northeast of Puyang city to the north along the Grand Canal and emptied into the sea near Tientsin.

(5) 1194—It flowed again from Hingtzu, through Kaifeng and Siuchang into Liang-shanlo, where it divided into two distributaries: one north along the present
course and the other south along the Grand Canal to the Szushui and Huaiho whence it emptied into the Yellow sea. The water of the northern distributary decreased after the completion of the Canal, Huitungho, in the early part of the Yuan Dynasty. And at the end of the same dynasty an engineer, called Mr. Chia Lu, blocked the north Channel and deepened the south; then the Huangho and the Huaiho were entirely united.

(6) 1855—It changed its course at Tungwashiang (in Honan), running northeastward to Litsin where it emptied into the Pohai.

(7) 1938—As a result of the invasion of Japanese armies the dykes collapsed in several sections and a portion of the water emptied again into the Huaiho, but its estuary remains at Litsin. This was the only one of numerous floods, resulted from artificial method.

(8) 1947—The south channel was blocked, the Huangho retook its former channel and empties into the Pohai at Litsin.

Generally speaking, about every 600 years the Huangho shifts its course without counting its annual floods. During such shifting, the Huangho has destroyed two great rivers, the Huaiho and the Tsiho. In ancient times there were four great rivers called the "four Tu"(8) in North China, viz., Kiang (Yangtze River), Huai (Huaiho), Ho (Huangho), and Tsi (Tsishui). They had no certain courses in their lower basins, particularly the third, which first destroyed the Tsishui and finally occupied the Huaiho. Nearly all the present river courses in the North China plain have been occasionally occupied by the Huangho. So intricately have the river-courses been interwoven that the broad plain has been paved very flatly and harmoniously. The extreme limits of the Huangho-shifting may be the Peking Grid on the northwest and the eastern Tsinling (as the Tapashan and Huaiyangshan) on the southwest. The Huaiho system and Hailo system have only played complementary roles in the plain-building. To understand the factors affecting the shifting of the Huangho, we must survey the causes of the floods.

The total length of Huangho is 4,670 kilometres, next only to the Yangtze river in China. It is more liable to flood as a result of the following three factors. First, as a whole, it is characterized from its head-water to its lower course by very steep gradients (Nearly one metre of gradient to one kilometre of river distance). There are two sections of steep slope: one is the upper basin between the head-water, Shingsühai, and the city of Kueiteh, where the average gradient is about 1.6 metres to one kilometre and the other occurs in the lower part of the middle basin between Paotou and Tungkuan about one metre to one kilometre. Between these two sections of steep slopes is a section of gentle gradients and river meandering where the
Ninghia plain was formed. Below the T'ungkuan Bend is another section of meanders. As judged from this character the Huangho is by no means a graded river. Below Shenhsien to its estuary the range of gradient is about 0.3 to 0.1 metre to one kilometre. This conspicuous change of character is one of the main causes of the marked contrast between erosion in the upper basin and deposition in the lower. The relative range of gradient, however, is the chief factor affecting erosion and transportation. The second factor is that, except in some localities, the area of Huangho drainage is entirely covered with huangt'u deposit which are very easily degraded and carried away by the running water, especially from the area of bare huangt'u plateaux. According to records, the total quantity of silt carried by the river in a particular year was 1,451,852,000 cubic metres at Shenhsien and only 1,110,282,000 at Lokou near Ts'inan. That is to say that 341,570,000 cubic metres of silt were laid down en route between Shenhsien and Lokou in that year. Assuming that to be an average annual deposit, it implies an elevation of one metre per year by deposition for a unit area of about 340 square kilometres. At that rate the North China plain would be raised about one metre every thousand years if the silt were evenly distributed. Therefore the coincidence of Huangt'u-area and the Huangho-basin is also an important factor to keep the deposition going on along the lower Huangho basin. The third factor and the most directly responsible for causing floods is the sudden concentration of high-level swift currents, running down from various tributaries. The last factor is itself the outcome of two circumstances, one (the minor) the sudden melting of packed ice in the late Spring and the other (the major), the sudden heavy rains in Summer and Autumn. So broad is the drainage-basin and so heavy is the short-period rain that the lower course of the Huangho can not carry it off (See the Table I of drainage areas of the Huangho and its tributaries). The fluctuation of the water level of the Huangho is greater than that of any great river in the world (See Table II), especially in the lower basin. If we glance at the map, we shall see an important zone of concentration of the chief tributaries, such as, the Fenho from Shansi, the Peloho and Weiho from

<table>
<thead>
<tr>
<th>Station</th>
<th>River-level (metres)</th>
<th>Quantity (sec. cub. m.)</th>
<th>Silt-burden (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shenhsien</td>
<td>295.3</td>
<td>289.2</td>
<td>290.2</td>
</tr>
<tr>
<td>Kaifung</td>
<td>78.5</td>
<td>77.0</td>
<td>77.4</td>
</tr>
<tr>
<td>Lokou</td>
<td>28.5</td>
<td>23.7</td>
<td>25.7</td>
</tr>
</tbody>
</table>
Shensi, all of which empty into the Huangho at the T'ungkuan Bend where the main river quickly runs in a narrow trough. This concentration means that the river quickly reached its highest level. Thus the current with an unparalleled force flows down to the lower course where it is limited by artificial dikes somewhere and floods widely. This high-level swift current is often beyond human control. For this reason the proper term "river node" is given to the T'ungkuan Bend by the Writer.

In general, the mean minimum volume of drainage at Shenhshien is about 450 cubic metres in a year and about 200 cubic metres at Lokou. The maximum volume is about 8,000–10,000 cubic metres at Lungmen, a little above the "river node", and about 10,000 cubic metres at the bridge of the Peiping-Hankou railway and about 14,000 cubic metres at Shenhsien, a little below the "river node", and much less in Shantung, only about 8,000 cubic metres. So that the area between Hopei and Honan and Shantung can hardly escape the floods spreading when the drainage-volume is over 15,000 cubic metres there. The year 1933 saw the greatest floods since 1855. In that year (1933) the records at Lungmen showed about 12,000 cubic metres per second and at the same time the drainage-volume at Shenhshien was 23,000 cubic metres, so that about 11,000 cubic metres originated from the tributaries which concentrate at the T'ungkuan Bend forming the "river node". That is to say it is not the water-level rising in the upper basin which causes the floods in the North China plain. The real cause is the sudden concentration in the "river node". A current of 30,000 cubic metres is quite possible. The misery that would occur under such conditions can be imagined.

Such are the conditions which have formed the Huangho delta-plain. One feature however, remains to be emphasized, the great depth of the delta-plain. At the bottom of the deepest well about 861 metres at Tientsin quite near the seashore the deposits are still of the land facies. The same phenomenon occurs in the deepest well at Peiping, about 708 metres, and in another about 500 metres in Western Shantung.

According to late Professor Grabau's explanation this plain began to be built as early as the Sanmen Stage. The sedimentation has been accompanied by the sinking of the underground base or in other words downwarping. Consequently the Central Highlands of Shantung have been half buried by the alluvium, especially the gabbroic cones, near Tsinan.

In the Western Shantung plain there are 11 cities, viz., Yencheng, Yüncheng, Chüyeh, Hotso, Tingt'ao, Chiahsiang, Chinhiang, Wucheng, Ts'ao, Shan, and Yüt'ai.
In the Northern Shantung plain stand 37 cities; to the west of the Grand Canal are Ch’iu, Kuant’ao, Kuan, T’ang-i, Shin, Yangku, Tsiaocheng, P’u, Fan, Kuancheng, Shouchang, and Liaocheng. Between the Grand Canal and the Tientsin-P’ukou railway stand ten cities, namely, Wucheng, Lintsing, Hiatsin, Enhsien, Kaot’ang, Tsingping, Poping, Szuping, Pingyüan, and Ts’iho. To the east of the railway there are 15 cities viz., Teh-hsien, Linhsien, Lin-i, Yücheng, Tsiyang, Shangho, Tehping, Loling, Wuti, Yangsin, Hueimin, Tsienhua, Pinhsien, Litsin, and P’ut’ai.

To sum up, the Northern and the Western Shantung plain is the gift of the Huangho but the Chiaowei plain is the gift of other streams. By comparison, the latter and the Siaoatsingho plain are more fertile and less subject to the miserable floods which often invade the triangular plain of Western Shantung. Looked at broadly, the combined result of river-erosion and deposition is an arrangement of valleys and plains so linked together as to favour the unification of the Shantung area.

B. The Chiaotung Hilly Peninsula

The region now to be studied is to the east of the Tsingtao-Hutouya line which is at once a physiographical boundary and a boundary of different human activities. This region in general character is an old residual upland, which was disturbed by countless igneous intrusions. As a result of peneplanation at different stages, the land presents an irregular surface with very small relative elevation. Low round-topped hills, broad valleys, small basins, tiny patches of plain and isolated high bare-topped hills form the present relief of the Chiaotung Peninsula. Generally speaking, this region may be reckoned as in a late mature stage of the erosion cycle but it has not yet reached the stage of peneplanation attained by the Chiaosi region. For the purpose of description, it may divided in five subregions.

1. The Laoshan Dome

A granitic intrusion is the core of the Laoshan promontory. On the west side of the Laoshan dome is the porphyric zone dipping to the north-west, and on the eastern side, the metamorphic zone, dipping to the southeast. Thus the Laoshan dome is, strictly speaking, an anticlinal folding but its southern part was truncated by faulting. Its summit is about 1,130 metres above sea-level.

2. The Northern Coastal Plain

From Hutouya on the west through Chefoo and Weihaiwei to Chingshantou on the east, there is a narrow belt of coastal plain whose breadth varies locally. This
plain faces partly to the Pohai (Gulf of Pechili) and partly to the Yellow sea. It is bounded by the Kūnyü range. Its form is irregular and it may be subdivided into many crescent plains separated by residual hills, projecting towards the sea as promontories. Two promontories half enfold a gulf and sometimes the promontory is connected to an island by a sand bar; of the latter the Chefoo island is an especially good example. From west to east, there are six separated crescent plains, as follows:

**Chengshantou Promontory**
- Weihaiwei crescent plain. Gulf of Weihaiwei

**Weihaiwei Promontory**
- Muping-Chefoo crescent plain. Gulf of K'ungt'ung

**Chefoo island** (connected with the land)
- Fushan crescent plain. Gulf of Pachia

**Peitsinshan Promontory**
- Pingch'angho crescent plain. Gulf of Pingch'angho

**P'unglai Promontory**
- Huanghsien crescent plain. Gulf of Lungkou

**Muchitao Promontory**
- Yeh-hsien crescent plain (no promontory). Gulf of Fuyungtao

The whole region is not so flat as the Huangho deltaplain but is a region of very low hills separated by broad basins and entirely under cultivation with terrace systems. Rivers are very narrow and short. None of them can be used for navigation.

3. *The Southern Coastal Plain*

From Chengshantou on the east to Tsingtao on the west the coastal plain presents the same features as the northern, and it also possesses five crescent plains, separated by promontories and facing one or more independent gulfs respectively, as follows:

**Chengshantou Promontory**
- Yungcheng crescent plain. Gulf of Yungcheng

**Litao Promontory**
- Sangkouwan crescent plain. Gulf of Sangkou

**Shihtao Peninsula**
- Muchuho crescent plain (no prominent promontory). Gulf of Wuleitao
Yushanho crescent plain (no promontory) ............... Gulf of Yushanho
Wulungho crescent plain .................................. Gulf of Laoshan

Gulf of Tingtzu Kong

Laoshan Promontory

Of these crescent plains, the Yungcheng plain is the easternmost in Shantung, and on it stands the city of Yungcheng. To the east of this plain is a narrow belt of granitic promontory, called the Chengshantou, projecting far into the Yellow sea. It is about 20 kilometres long and the sea near it is rather dangerous for navigation. To the west of Yungcheng city is a belt of low hills forming the eastern part of the Künyü hilly region.

The other four crescent plains are very small in area and they are bounded by the low hills of late Mesozoic rocks, the age probably corresponding to that of the Laoshan dome.

4. The Künyü Hilly Region

Between these two belts coastal plains, is the Künyü hilly region which, strictly speaking, is not a range, but an irregularly undulating area with an unsystematic arrangement of scattered low hills, among which are present small basins and valleys. The hills may be divided according to the height of their summits into two groups: the one is between 500—600 metres high above sea-level; and the other, between 700—900 metres. It is very possible that they represent distinct phases of peneplanation.

5. The Laiyang Basin

By comparison, it is a distinct region and rather wide in area. On the north and east it is bounded by the Künyü hilly region, on the western the Tsayehshan, and on the southern the Laoshan. All the streams, originating there, converge to form the head streams of the Nanchiaoho, except the small streams, Wulungho, which singularly empties into the gulf, Tingtzu Kong. This is the fertile region in the Chiaotung peninsula.

There are seven cities (Yeh-hsien, Tsiaoyüan, Huanghsien, Punglai, Fushan, Muping, and Wenteng) and three seaports (Lungkou, Chefoo, and Weihaiwei) along the northern coastal region. On the eastern and southern coastal region there are only two cities, viz., Yungcheng and Haiyang. Two cities stand in the Laiyang basin, namely, Tshia and Laiyang. One important commercial port stands by the Laoshan dome.
To sum up, the northern part of the Chiaotung peninsula is chiefly composed of Archaean rocks and the southern part is characterised by igneous intrusion of late Mesozoic and early Tertiary date.

The whole region is rather poor compared with the Plains of the mainland portion. But the people of this region, thanks to the favourable environment of good harbours are generally willing to emigrate or work on ships.

III. SUMMARY OF STRUCTURAL FEATURE

The land of Shantung possesses many conspicuous characters:

(1) The lowlands penetrate far into and even separate the mountainous regions.
(2) Mountains occur chiefly in groups or in isolation without outstanding ranges.
(3) Rivers meander through the broad plains even near their sources.
(4) Owing to the peneplanation the distribution of heights is extremely irregular and unsystematic.
(5) The lowlands of younger strata are often separated by the mountain ranges or highlands of older rocks.
(6) The whole land of Shantung has a tendency to subside, the coast of the Chiaotung peninsula presenting the character of submergence, and the northeastern coast of the mainland, in spite of the fact that the land is progressively extending towards the sea through Huangho-deposition, is also a subsiding coast.
(7) The ratio of the land favourable to human activities to the total area of the province is very high. On the supposition that land under four hundred metres in height is suitable for cultivation. The ratio is over 97 per cent. The writer’s estimate (made by a planimeter) is as follows:

<table>
<thead>
<tr>
<th>Height (metres)</th>
<th>Area (sq. Km.)</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peaks over 700</td>
<td>80</td>
<td>0.05</td>
</tr>
<tr>
<td>Slopes 400-700</td>
<td>4,240</td>
<td>2.75</td>
</tr>
<tr>
<td>Hilly regions 50-400</td>
<td>62,520</td>
<td>40.67</td>
</tr>
<tr>
<td>Plains below 50</td>
<td>86,871</td>
<td>56.50</td>
</tr>
<tr>
<td>Total</td>
<td>153,711</td>
<td>100.00</td>
</tr>
</tbody>
</table>


(3) According to Chinese history, Confucius was born after his parents worshiped near this hill, so probably the region of this hill was a place for public worship at that time.

(4) Wanpaoshan—580 metres
    Wulianshan—583 metres
    Chishan—520 metres
    Chiu fas han—788 metres
    and many others are below 500 metres.

(5) The Shantung peninsula (as distinct from Shantung province) lies to the east of a line joining the points along the coast where Shantung meets Hopei and Kiangsu respectively.

(6) Siao = little                 Tsing = pure or transparent
    Ho = river                   Siao tsing ho = a small river with pure water

(7) Huanghochi pp 4-5

(8) Tu means a great river.


(10) Percentage in weight.
山東省的構造及其地面狀態

鄉 豹 君

由青島向西北直至虎頭崖作一直線，此線以東是中國大陸的腹部，叫做膠東半島；此線以西是中國大陸的幹部，叫做大陸部山東。普通而論，膠東半島是頗有起伏的丘陵區域，海岸曲折，多良港；大陸部山東是山地、丘陵與平原複合而成的區域，內部為高大的山地，周圍為沖積平原，海岸很直，缺乏良港。

大陸部山東好像一個開邊的園盤覆於柱面之上，園盤的底部向上凸起，相當於中部高地；園盤的開邊相當於中部高地周圍的沖積平原。

中部高地區包括泰山山地、魯南丘陵區及膠西丘陵區。圍繞中部高地的沖積平原又可分為四區，即膠濱平原、小清河平原、魯北平原及魯西平原。此外尚有一狹窄之沿海平原帶位於膠西丘陵區之外部。

泰山山地在大陸部山東的中部，南北寬約七十公里，東西長約二百公里，高度由四百公尺至一千公尺。這個區域是山東省內地體核心。由西向東可分為泰山地壟、魯山地壟及沂山地壟，其中以泰山地壟為最高，高出海平面五十四二公尺。泰山高峯不在地壟的中央，而在地壟的西南角，相對高度由泰安城至泰山頂約有一二○○公尺。由泰安城北望，山勢崔巍，極為雄壯。泰山地壟介於三個城市之間：泰安在其西南，濟南在其西北，博山在其東。青石關在博山與萊蕪兩縣之間，可為泰山與魯山兩地壟的分界；銅犢關在瀕河谷上游，可為魯山與沂山兩地壟的分界。泰山、魯山與沂山三地壟之中部均為泰山溝谷，周圍為古生代地層。魯山高度為一○八○公尺，沂山高度為九九○公尺。這三個地壟連續排列而成泰山山地，隔絕山東省南北交通。先秦時代山地北側小清河平原與魯北平原產生強大
的齊國；山地西南側之泗水平原與大汶河平原產生文化甚高的魯國。

魯南丘陵區略似三角形，北接泰山山地，西南接「湖帶」，東南接沂沭河谷。本區內有許多地勢式的河谷平原，其中沉積沖積層；谷與谷之間又為老地層構成的丘陵區域所隔離。泰山地勢之西南方為大汶河平原；由此向南為泗水平原。魯山與沂山兩地劃之東南方為沂沭河平原。 淄河與沂河平行南流直至江蘇省，沂河注入大運河，流河東流入黃海。 沂沭河平原是膠東平原與淮河平原之間的過路。 沂河右岸有兩條支流，北為東汶河，南為枋河，都是地勢式的廣谷。 東汶河平原是大汶河平原與沂沭河平原之間的過路；枋河平原是泗水平原與沂沭河平原之間的通路。東汶河平原以南與枋河平原以北之地是蒙山山地，最高峯為龜雲頂，高度為一一五〇公尺。 枋河平原以南是一廣大的丘陵區，曲阜東南方的尼山及東莊以北的土地丘圓分列於本區西北部與南部。

膠西丘陵區介於沂沭河平原與黃海之間，東北止於膠州灣，西南止於山東省境。 本區分內外兩部分：外部分為沿海平原，是圍繞中西部高地的一部分，海岸極平，缺乏良港；內部分為丘陵區，地層屬太古代，地面經年累月平化，產生礦物質礦丘，最高者約達七百餘公尺，較低者介於五百與六百公尺之間。

膠東平原是一個廣大的地勢谷，其中沉積甚厚的沖積層。 本區東接膠東丘陵半島，西鄰泰山山地。 東西寬約八十公里，南北長約一百五十公里。 南北兩端臨海灣，北臨萊州灣，南臨膠州灣，兩灣之間是膠澳地峡。 本區異常平坦，高度不及五十公尺，排水系統不甚明顯。 光氣而論，本區北部屬北膠河流域，南部屬南膠河流域。 南貯河與北貯河之間，支流彼此相連接；河水有時北流，有時南流，甚為紊亂。這種情形表示南北貯河正在彼此掠奪，勝負尚未分曉。

小清河平原是泰山山地北側最肥沃的平原，春秋時代齊國即在本區之內興起。 小清河發源於大明湖，東北流，略與黃河平行，注入萊州灣。 黃河之水，小清河水清，一清一濁，且流不亂。 小清河水位變化不大，可以航行民船。 平原南側與泰山山地接觸，富有煤礦，其中以湄川、博山兩縣為最著。 其次為章邱煤田與臨朐煤田。 此外在金鄉鎮附近產鐵，品質甚佳。膠濟鐵路在這些礦區附近經過。
魯北與魯西平原是山東省內最廣大的平原區。這是黃淮平原的東邊緣。魯北平原是山東省黃河以北的平原，魯西平原是黃河與「湖帶」之間的平原，兩平原的面積約佔全省面積四分之一。雖然這兩平原處於黃河的沖積作用，但黃河現在的水道與本區的排水系統毫無關係。因爲黃河水道在黃河大堤之內向下流，注入渤海。兩岸以外的水受大堤阻隔，不能流入黃河，結果兩岸無支流發生。惟有大運河在東阿之西與黃河相遇。黃河以北有兩條平行的河流，較近之河叫做徒駁河，較遠之河叫做馬頭河。這兩條河是黃淮平原上順斜河，河谷甚淺，不甚明顯。降雨時雨水集聚谷內，下流入海，乾季時河牀顯露，不見河流。魯西平原內河流短小，東流注入湖帶，不能直接入海。

「湖帶」是介於東阿縣與江蘇省銅山縣之間的湖泊帶。由北而南有東平湖、壽山湖、南陽湖、西山湖及微山湖等。黃河沖積作用如此之盛，這些小湖到現在依然存在，真是奇蹟。湖帶產生的原因可能由於本區地盤有向下瓦褶的傾向。魯西平原是三角形，東接「湖帶」，西北濱黃河水道，西南濱黃河故道（由河南省鋼瓦廠東南流入淮河）。黃河下游氾濫是中國嚴重的災患，魯西平原恰在黃河南北遷移的頂部，正是黃河氾濫的焦點，水災最多。

膠東半島是一塊古老殘餘的低臺地，地層受多次火成岩的侵入，地面又受長期侵蝕。有些地方尚覆有玄武岩。膠東半島沿岸多港灣及海角，內部多丘陵。膠州灣附近有勞山穹窿。此山為一巨大侵入花崗岩，上部地層已全部被侵蝕而去，高度為一二三○公尺。半島北岸有芝罘灣與威海衛灣。芝罘島與半島之間產生巨大沙洲，彼此連接。最大的海角為成山頭，向東侵入黃海，長達二○公里。南岸有膠州灣、丁字港及五壇島灣等。半島中部有崑嵛山脈。勞山與崑嵛山脈之間為萊陽盆地。

山東省共有一五三、七十一方公里，平原約佔百分之五十六，丘陵約佔百分之四十，山地約佔百分之三。大體而論，是適於開發的省區。