Japanese Geologists in China from the Late Nineteenth Century to the Early Twentieth Century :
Geological Explorations in the Context of Japan's Imperialism

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AGH University of Science and Technology, Cracow, Poland
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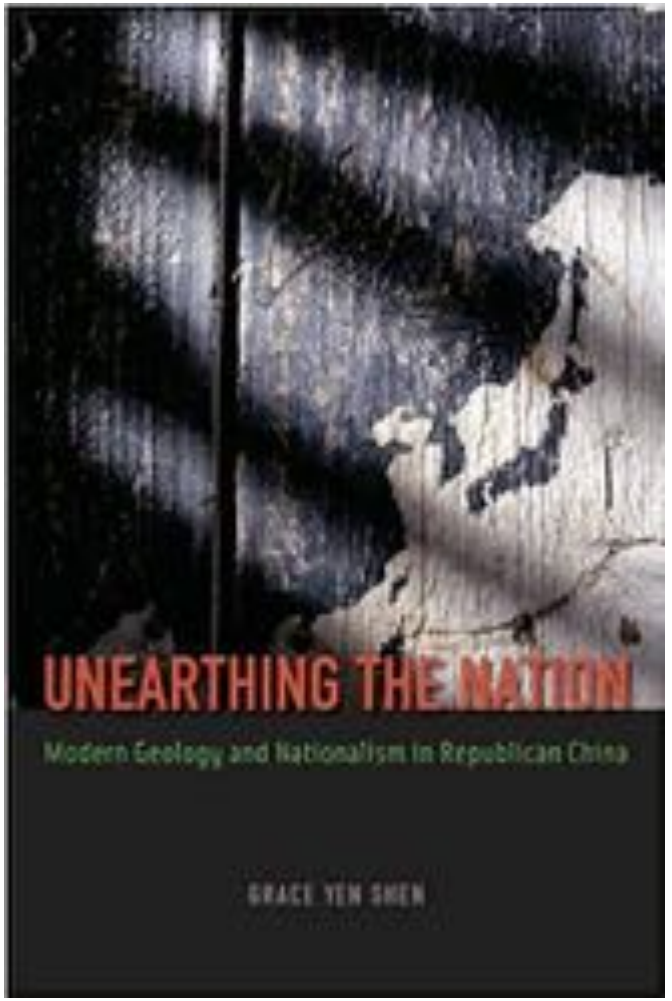
Version with some images omitted.

Grace Yen Shen, *Unearthing the Nation: Modern Geology and Nationalism in Republican China* (2014)

- A historian of science, Grace Yen Shen discusses the development of modern geology in early twentieth century China, especially examining the role of fieldwork in the Chinese geological enterprise.



Questions

- Grace Shen wrote, "*On January 18, 1915, Japan issued its Twenty-One Demands, including possession of resource-rich Manchuria and Shandong Province, control over China's main coal deposits*"
- Why was Japan interested in underground resources in Manchuria and Shandong Province?
- How did Japan investigate underground resources in China?
- How was Japan's policy affected by the results of investigations?

Contents of this presentation

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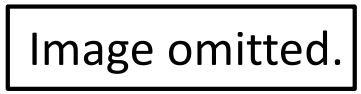
4. Comprehensive Survey of Industries in Manchuria in 1905

1. The First Sino-Japanese War and Geological Survey of Mineral Resources

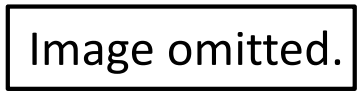
The first Sino-Japanese war

- The first Sino-Japanese war broke out in July 1894.
- The *Treaty of Shimonoseki* was signed in April 1895. In this treaty, the Qing dynasty recognised the total independence of Korea and ceded the Liaodong Peninsula, Taiwan and the Pénghú Islands to Japan.



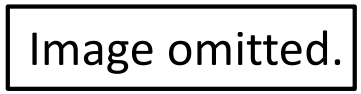
KOCHIBE Tadatsugu(1854-1927)

- Before *the Treaty of Shimonoseki* was signed, a Japanese geologist, KOCHIBE Tadatsugu made a geological expedition to the Liaodong Peninsula in China from March to April 1895.
- Kocibe had learned geology from German professor Edmund Naumann at the University of Tokyo and had contributed greatly to geological surveys in various places in Japan. He became the director of the Geological Survey Bureau in the Ministry of Agriculture and Commerce in 1893.



KOCHIBE Tadatsugu(1854-1927)

- Why did Kochibe go on a geological expedition so early before the end of the war?
- How did he make a geological investigation in the Liaodong Peninsula?
- What was the result of his geological investigation?



Richthofen, *China*, vol. 1 (1877) and vol. 2 (1882)

- Of course, Kochibe was not the first geologist who went on a geological expedition to the Liaodong Peninsula. German geographer and geologist, Ferdinand von Richthofen travelled in China from 1868 to 1872, and he investigated in the Liaodong Peninsula.
- Richthofen published his famous book *China* in 1877. He described geography, geology, climate, transportation networks, regional trade, and industries in his book.

CHINA.

ERGEBNISSE EIGENER REISEN

UND

DARAUF GEGRÜNDETER STUDIEN

VON

FERDINAND FREIHERRN VON RICHTHOFEN.

ERSTER BAND.

EINLEITENDER THEIL.

MIT XXIX HOLZSCHNITTEN UND XI KARTEN.

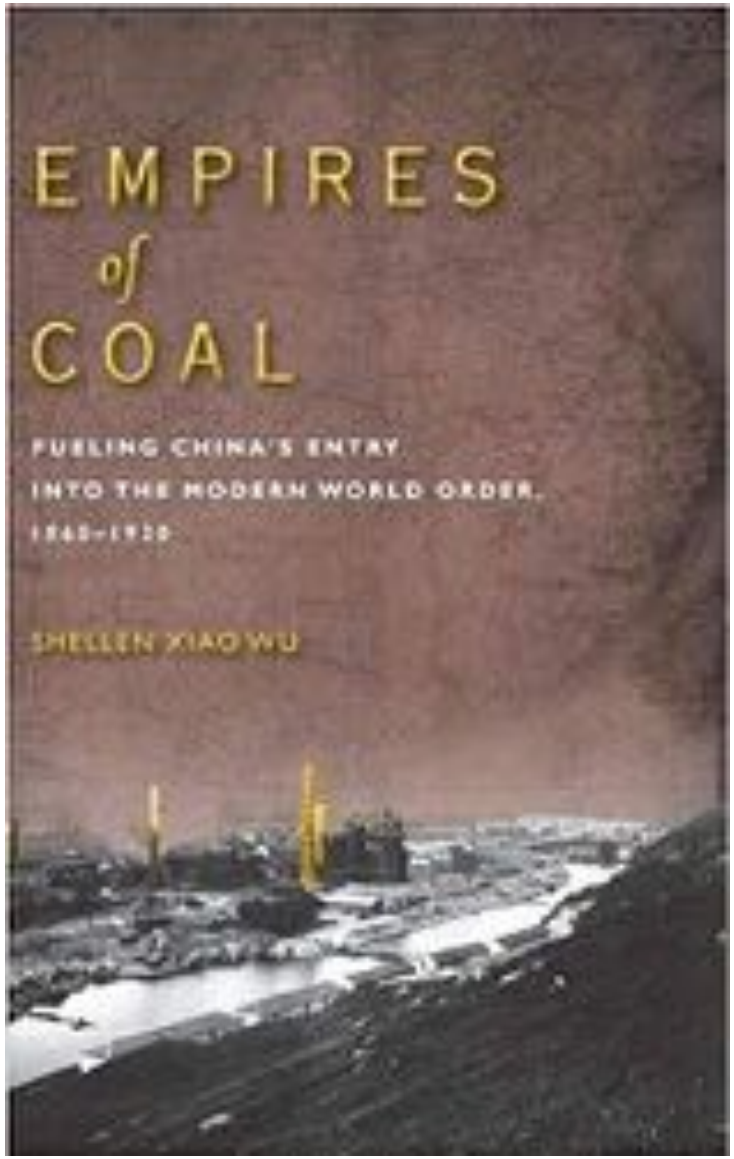
BERLIN.

VERLAG VON DIETRICH REIMER.

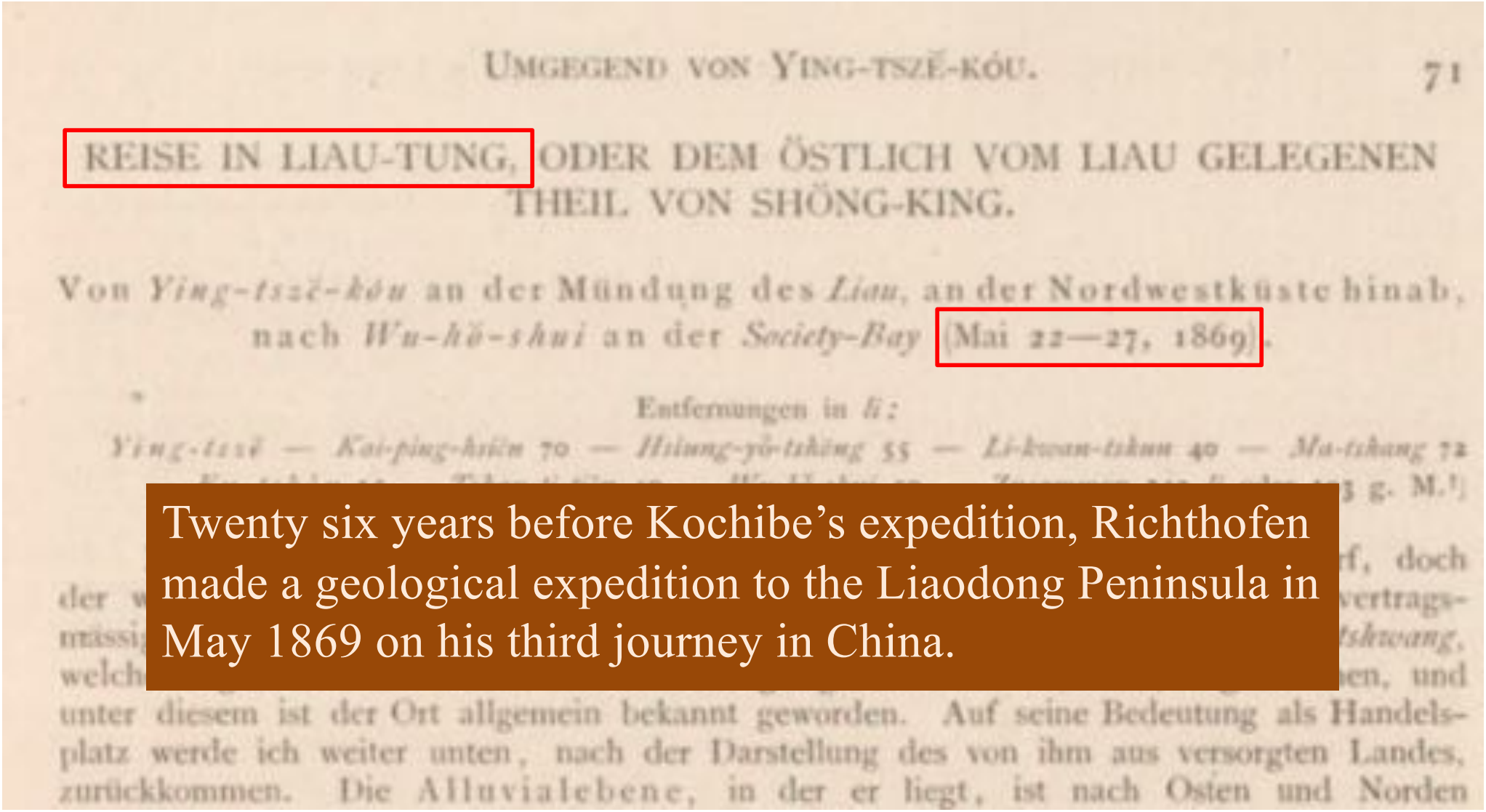
1877.

Richthofen, *China*, vol. 1 (1877) and vol. 2 (1882)

- Richthofen sent letters to Otto von Bismarck, the Chancellor of the German Empire and suggested establishing a German naval base in China.
- Richthofen's imperialistic ambition was discussed in Shellen Wu's book, *Empires of Coal: Fueling China's Entry into the Modern World Order, 1860-1920* (2015).



Richthofen's journey in Liaodong in May 1869 (*China*, vol.2)



UMGEGEND VON YING-TSZĔ-KÓU. 71

REISE IN LIAU-TUNG, ODER DEM ÖSTLICH VOM LIAU GELEGENEN THEIL VON SHÖNG-KING.

Von *Ying-tszĕ-kŏu* an der Mündung des *Liau*, an der Nordwestküste hinab, nach *Wu-hŏ-shui* an der *Society-Bay* (Mai 22—27, 1869).

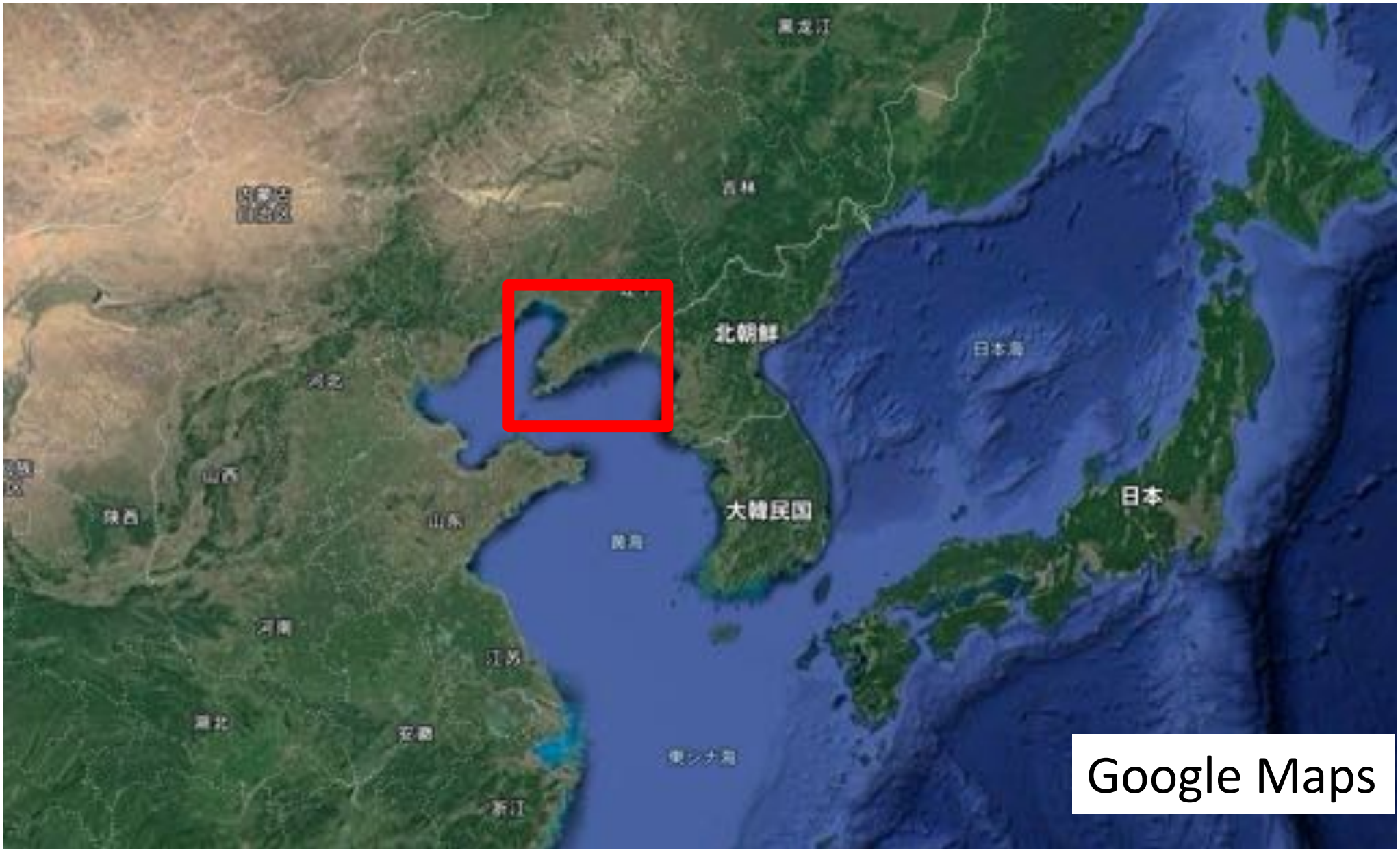
Entfernungen in *li*:

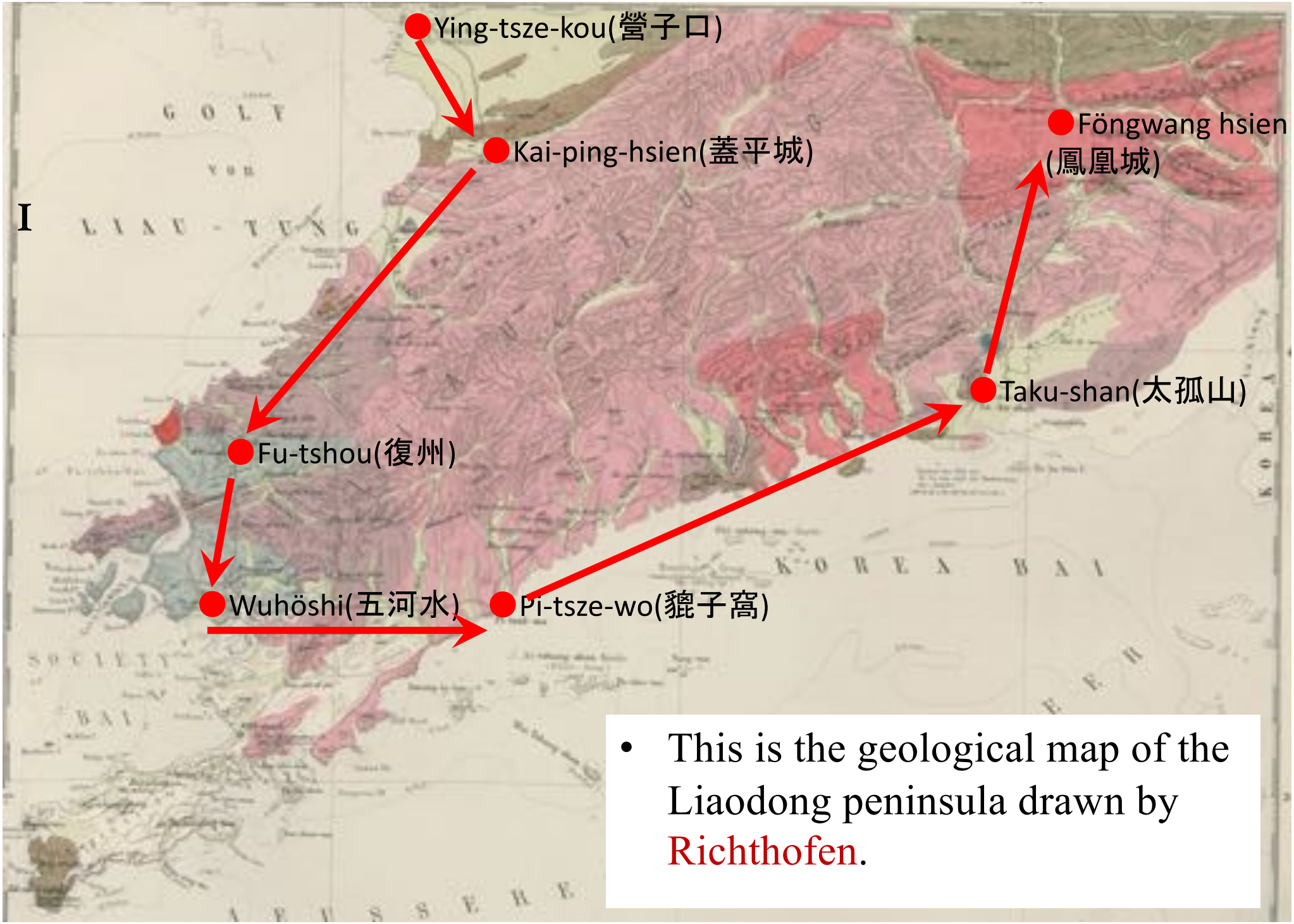
Ying-tszĕ — *Kai-ping-hsien* 70 — *Hiung-yŏ-tshêng* 55 — *Li-kwan-tshun* 40 — *Ma-tshang* 72

Twenty six years before Kochibe's expedition, Richthofen made a geological expedition to the Liaodong Peninsula in May 1869 on his third journey in China.

unter diesem ist der Ort allgemein bekannt geworden. Auf seine Bedeutung als Handelsplatz werde ich weiter unten, nach der Darstellung des von ihm aus versorgten Landes, zurückkommen. Die Alluvialebene, in der er liegt, ist nach Osten und Norden

Liaodong Peninsula





- This is the geological map of the Liaodong peninsula drawn by Richthofen.

The area drawn in pink is the largest in the Liaodong Peninsula.

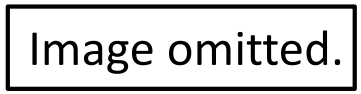
According to Richthofen, this rock layer of pink area includes gneiss and this rock layer is the Archeozoic and is one of the oldest rock layers in China.

Mineral resources in the Liaodong Peninsula are scarce

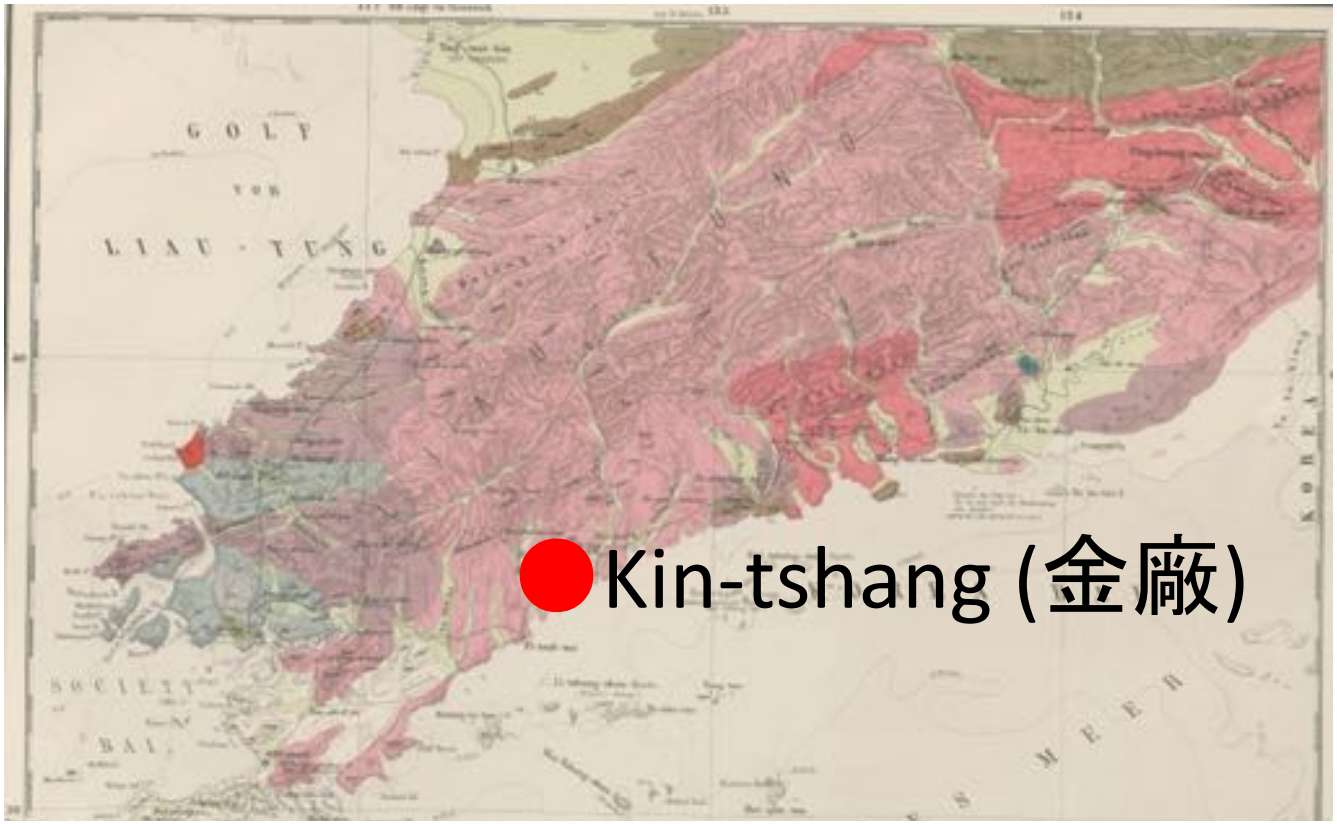
- Richthofen also mentioned valuable minerals in the Liaodong Peninsula such as gold, silver, copper, iron, coal, limestone, and marble.
- He concluded that mineral resources were scarce, except for iron. However even iron was not so rich.
- Now, back to the question of why Japanese geologists went on a geological expedition so early before the end of the first Sino-Japanese war.

SHIRAI Shintaro(1862-1932)

- A trading merchant SHIRAI Shintaro visited China in 1884.
- While he was engaged in trading with China, he became involved in the establishment of the *Oriental Association* in 1891.
- The *Oriental Association* was a study group about Asia. And Shirai made the acquaintances with influential politicians.

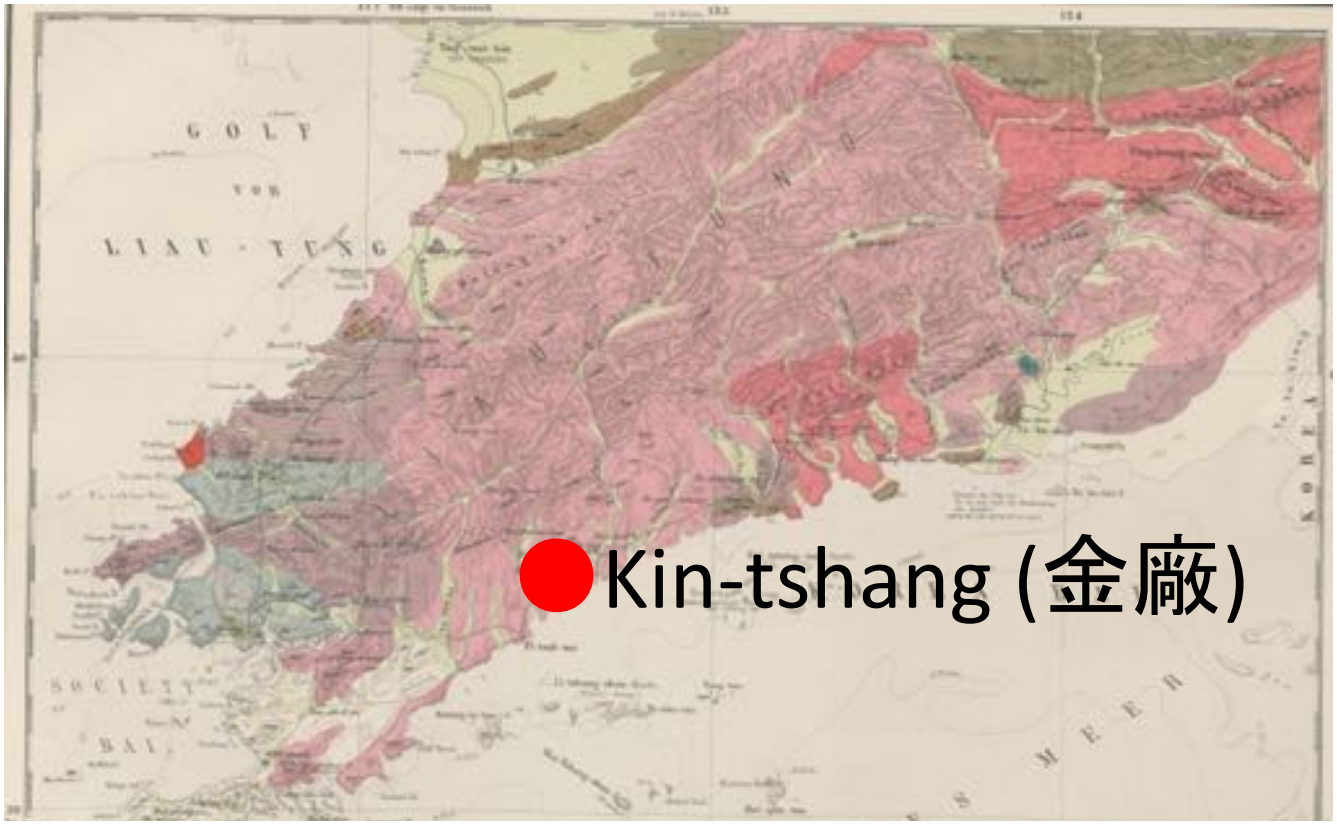


Shirai's Prospecting for gold at Kin-tshang (金廠)



- Shirai visited Jīnchǎng(金廠) in the Liaodong Peninsula and he prospected for gold in January 1895 during the war.
- After Shirai realised the possibility of the production of gold, he reported it to the Imperial General Headquarters.

Shirai's Prospecting for gold at Kin-tshang (金廠)



- The Imperial General Headquarters had the supreme command of both of the Japanese army and the navy. The head of the Imperial General Headquarters was the emperor of Japan.

Imperial General Headquarter's order

- Shirai's report had some influence on decision making by the Imperial General Headquarters. In February 1895, The Imperial General Headquarters ordered Kochibe and OKI Tatsuo to make a geological and mineral survey in the Liaodong Peninsula.
- Oki graduated from the Department of Mining Engineering at the Imperial College of Engineering and had worked as a mining engineer at the Bureau of Mines in the Ministry of Agriculture and Commerce.

Image omitted.

←Imperial College of Engineering

Geological map by Kochibe

Taipingling(太平嶺)

Jinchang
(金廠)

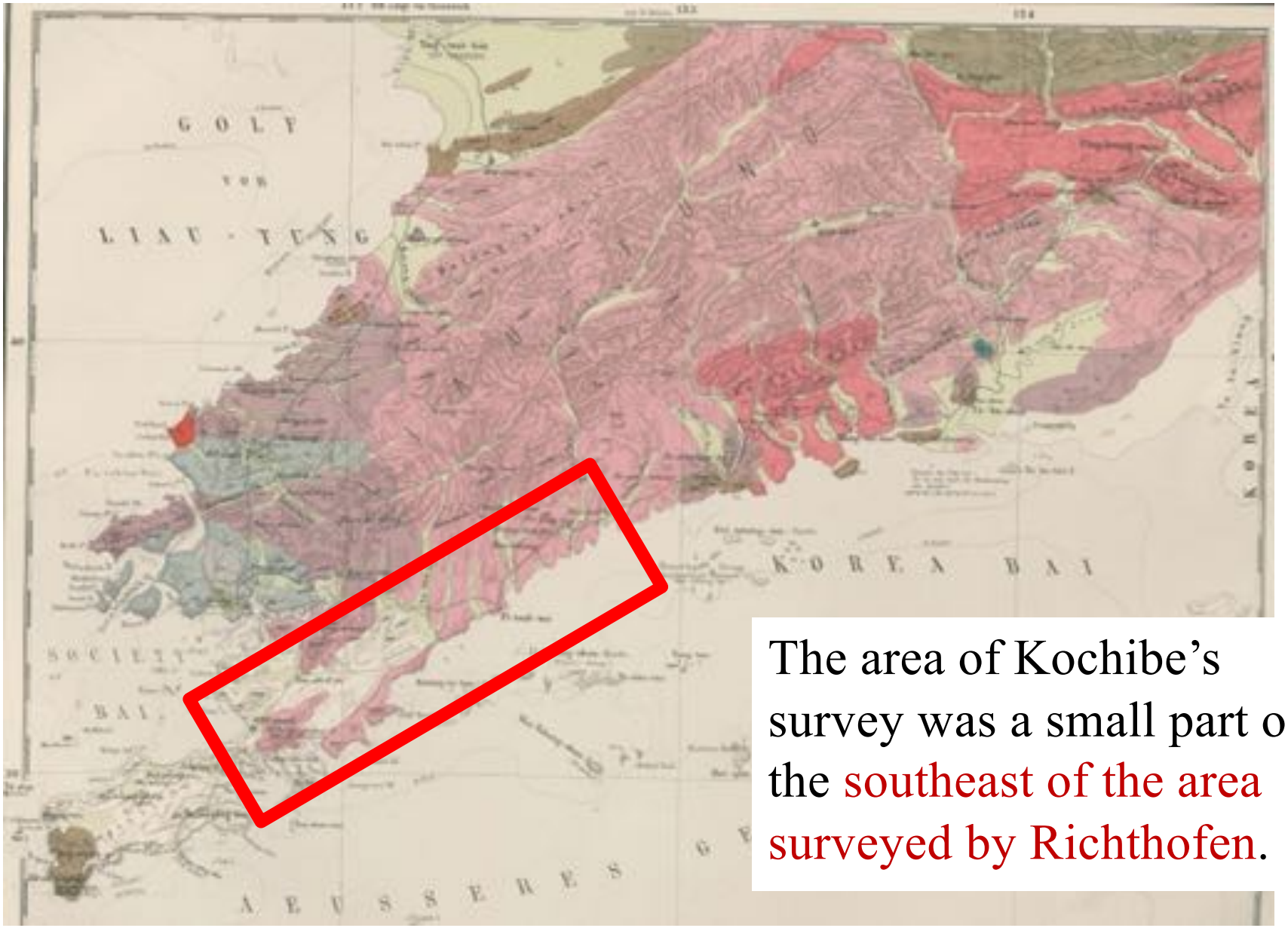
Image omitted.

Kochibe geologically investigated from Jīnzhōu(金州) to Tàipínglǐng(太平嶺).

Jinzhou(金州)

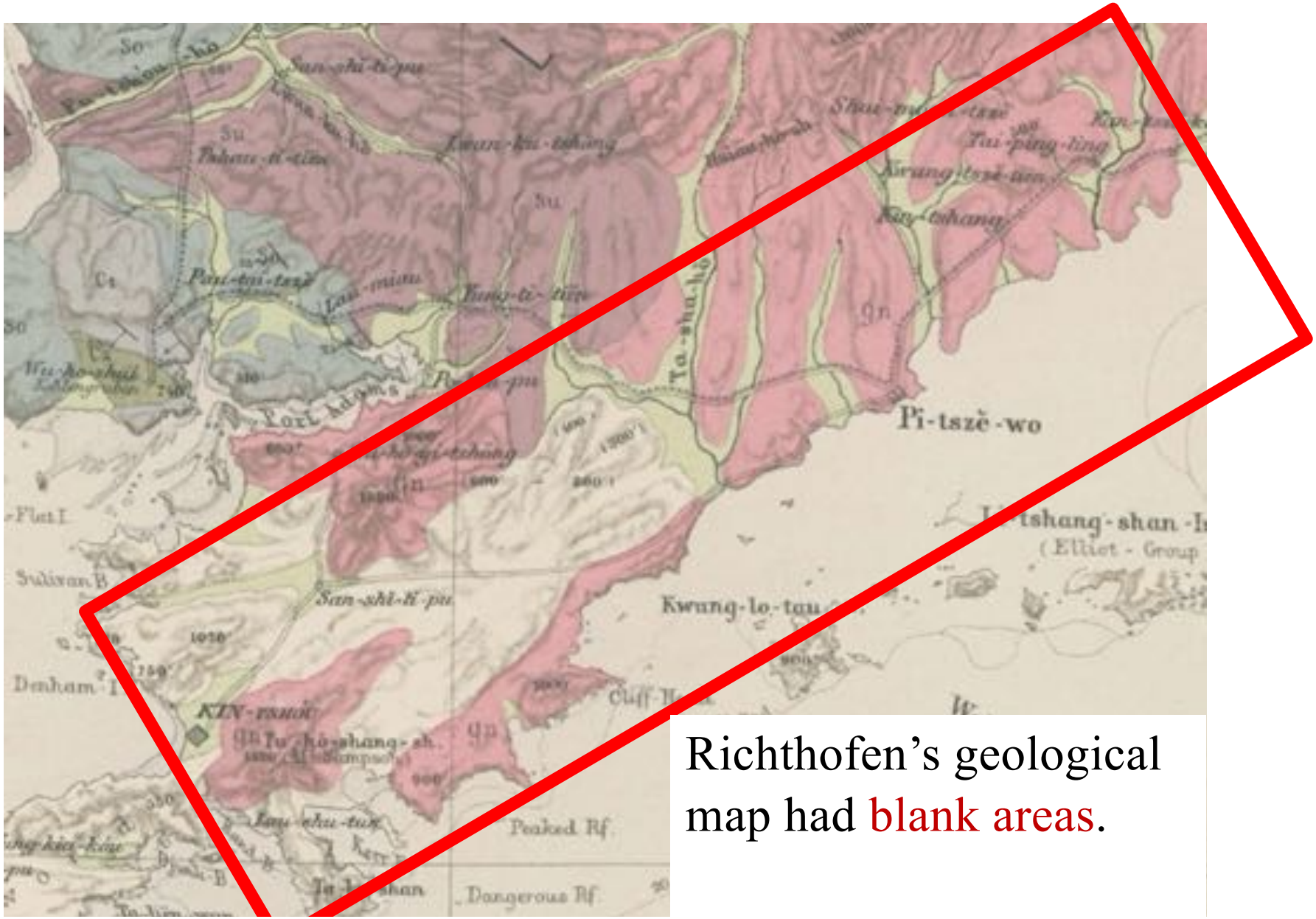
Dalian wan(大連灣)

Area of Kochibe's survey on Richthofen's map



The area of Kochibe's survey was a small part of the southeast of the area surveyed by Richthofen.

Area of Kochibe's survey on Richthofen's map



Richthofen's geological map had blank areas.

‘Lower-Gneiss Formation’

Kochibe named this light green area as the oldest stratum ‘Lower-Gneiss Formation’. The ‘Lower-Gneiss Formation’ was the largest in the area where Kochibe conducted a geological survey in the Liaodong Peninsula.

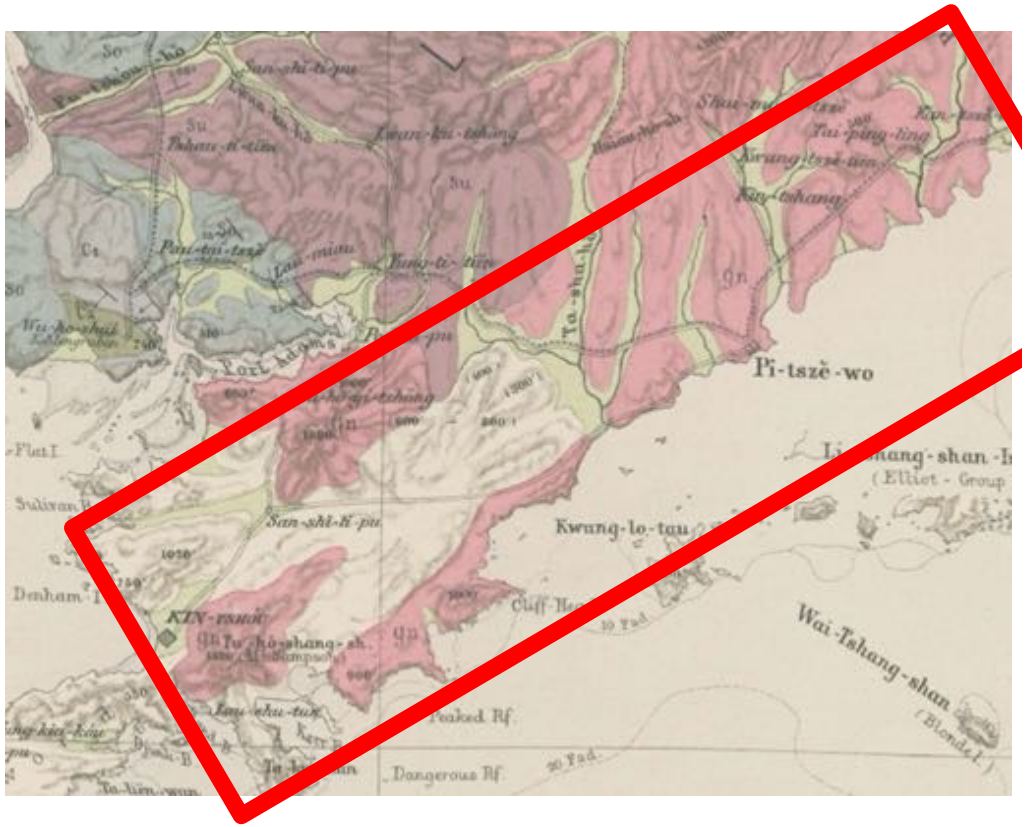
Image omitted.

● Jinzhou(金州)

● Dalian wan(大連灣)

Comparison of the oldest stratum including gneiss

Image omitted.



‘Lower-Gneiss Formation’ can be compared with the rock layer drawn in pink on Richthofen’s geological map. According to Richthofen, this stratum of pink area also included gneiss as the main component.

Comparison of two maps

Lower-Gneiss Formation

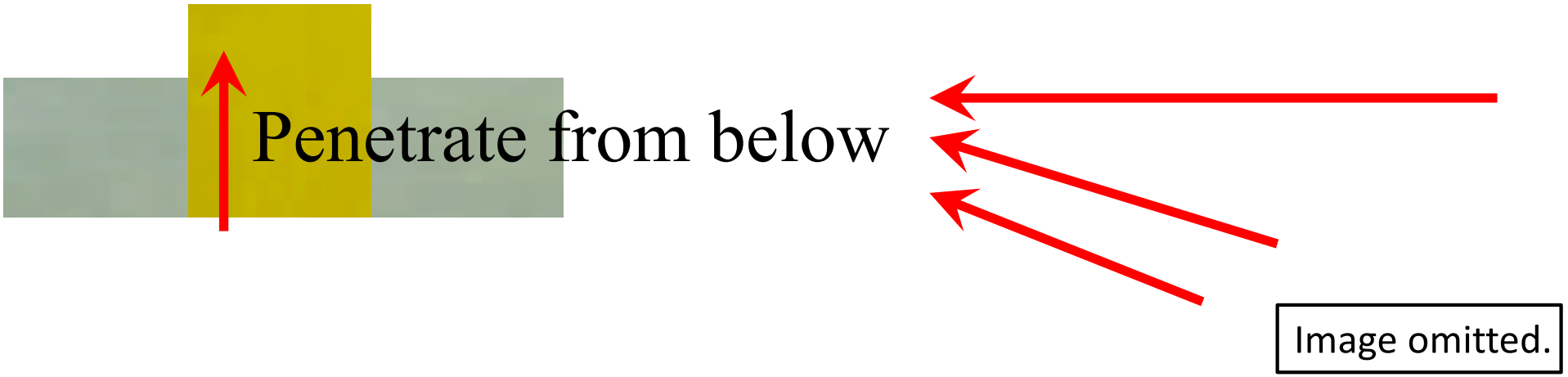
Igneous Rock

Upper-Gneiss Formation

Kochibe discovered igneous rock, but Richthofen did not find igneous rock in this area. According to Kochibe, the quartz porphyry was distributed in the yellow areas in Kochibe's geological map.

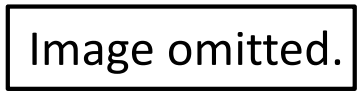
Quartz porphyry

Kochibe realized that the quartz porphyry penetrated the Lower-Gneiss Formation from below and exposed on the ground in several places.



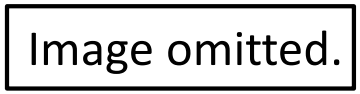
Locations of gold production

In this map, the red points indicate the locations of gold production. Yellow areas indicate the stratum of the quartz porphyry. Kochibe conjectured that the gold veins were derived from igneous rock, especially the quartz porphyry.



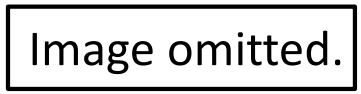
How to find gold

Kochibe triumphantly suggested that if someone wanted to find the place of production of gold in an occupied territory by Japan then person should look for the layer of igneous rock.



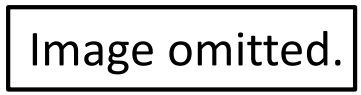
Oki's opinion on gold mine

- However, a mining engineer Oki was pessimistic. He estimated the value of gold produced around Jīnzhōu at sixty thousand Japanese yen a year.
- The value of gold produced in California in a year was over one thousand times more than the value of gold produced around Jīnzhōu.
- Oki said that a proper method of gold mining would increase the amount of gold production. However, large hydraulic constructions were required to concentrate gold. Oki insisted that it was impossible to earn back the cost of investment.



Oki's conclusion on the mining industry in the Liaodong Peninsula

- Judging from both his investigations and the general geological structure in the Liaodong Peninsula, Oki supposed that there were very few underground resources in the Liaodong Peninsula.
- He concluded that the mining industry could not develop in the Liaodong Peninsula.



Tokyo Geographical Society dispatched Professor Jimbou

- *Tokyo Geographical Society* dispatched JIMBOU Kotora, professor of geology at Tokyo Imperial University to Liaodong peninsula.
- Jimbou arrrived at on July 6 and return to Tokyo on October 3.

Image omitted.

Jimbou Kotora
(神保小虎, 1867-1924)

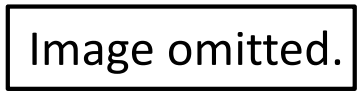
What did Prof. Jimbou report ?

- Jimbou reported that “all mines in Liaodong peninsula are extremely poor” (*Journal of Geography*, 10 November)
- How did geology students see these surveys by governmental and academic geologists ?

●遼東の鑛物の富　遼東に於ける鑛物の富特に
鑛山の富は最も少し貔子窩旅順普蘭店及復州等の金鑛者
蘭店の石炭復州の鐵鑛は皆少量にして言ふに足らず大連
附地方には印刷用に供すへき石版石の産出顯著なり燒て石
灰を製すへき石灰岩あり然れども安東縣九連城鳳凰城
邊には石炭を産すると聞きし所も往きて見れは石炭も何
もなく銅を産するといふも跡方なきの類多し唯遼東の特

Geology Majors' Thoughts

- A student excited to see their masters' geological surveys in Liaodong peninsula.
- He wrote that "masters such as Dr. Kochibe and Prof. Jimbou went to Liaodong peninsula and carried out geological surveys. We students regreted that we could not join their surveys."



OGAWA Takuji

- He was OGAWA Takuji who later became famous geologist and geographer and also known as father of YUKAWA Hideki who was the first Japanese Nobel laureate for physics.
- In later years, Ogawa proposed global tectonic theory that explained the structure of the earth's surface as the result of activity of deep interior of the earth.

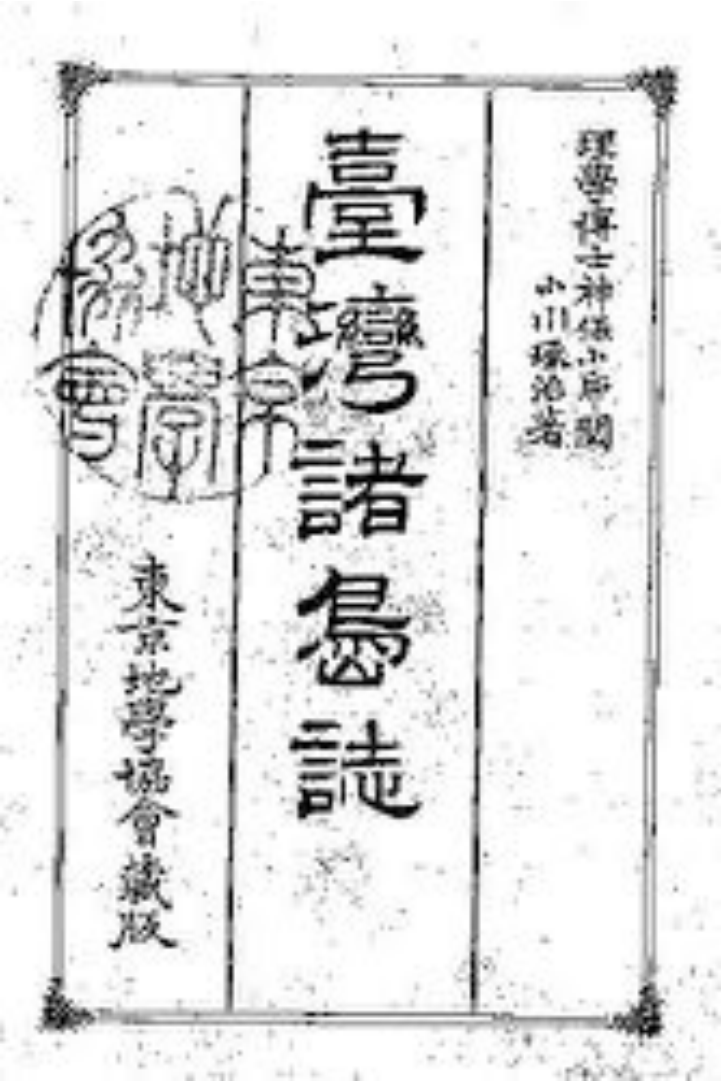
Image omitted.

Ogawa Takuji
(小川琢治 1870–1941)

2. Ogawa Takuji's Geological Survey in China

Geography of Taiwan Islands

- After Japan's appropriation of Taiwan, *Tokyo Geographical Society* asked Prof. Jimbou to write geography of Taiwan. He passed it to Ogawa.
- Ogawa refered to Chinese historical materials and published *The Geography of Taiwan* in 1896.
- Next year he graduated from Tokyo Imperial University and found his job at the Geological Survey Bureau.



Ogawa explored for mineral resources in China

- From 1902 to 1903 Ogawa visited China several times and explored for mineral resources. Those visits were not planed by the Imperial General Headquarters but by WADA Tsunashiro.
- Wada was a mineralogist, the first director of the Geological Survey Bureau, ex-director of the Bureau of Mines, and ex-director of the Yahata Ironworks.

Image omitted.

Wada Tsunashiro
(和田維四郎 1856-1920)

Wada's geological survey of China with his personal connection

- Wada was interested in importing iron ore from China and he had personal connection with geologists, politicians and business leaders in Japan.
- Wada appointed Ogawa and a mining engineer HOSOI Iwaya of the Bureau of Mines and YAMADA Kunihiko, professor of mining engineering at Kyoto Imperial University to investigate mineral resources in China.
- Wada asked his former classmate KOMURA Jutaro, the Minister of Foreign Affairs to support him.

Image omitted.

Komura Jutaro(小村寿太郎 1855-1911)

Wada's geological survey of China with his personal connection

- Wada had connection with Colonell TACHIBANA Koichiro who was a military advisor of Yuan Shikai, a powerful figure in the army and politics in China.
- Wada asked Yuan Shikai to support him through Tachibana.

Image omitted.

Yuan Shikai(袁世凱 1859-1916)

The Russo-Japanese War and Ogawa

- The Russo-Japanese War broke out in February 1904.
- Japan's army defeated Russia at the battle of Liaoyang and occupied Yantai coal mine in September 1904. Yantai coal mine had been run by Russia.

- The Imperial General Headquarters needed coal for army as fuel in winter, so intended to use Yantai coal mine. The Imperial General Headquarters ordered Ogawa Takuji and Hosoi Iwaya to investigate Yantai coal mine on August 30th before the end of the battle.

Image omitted.

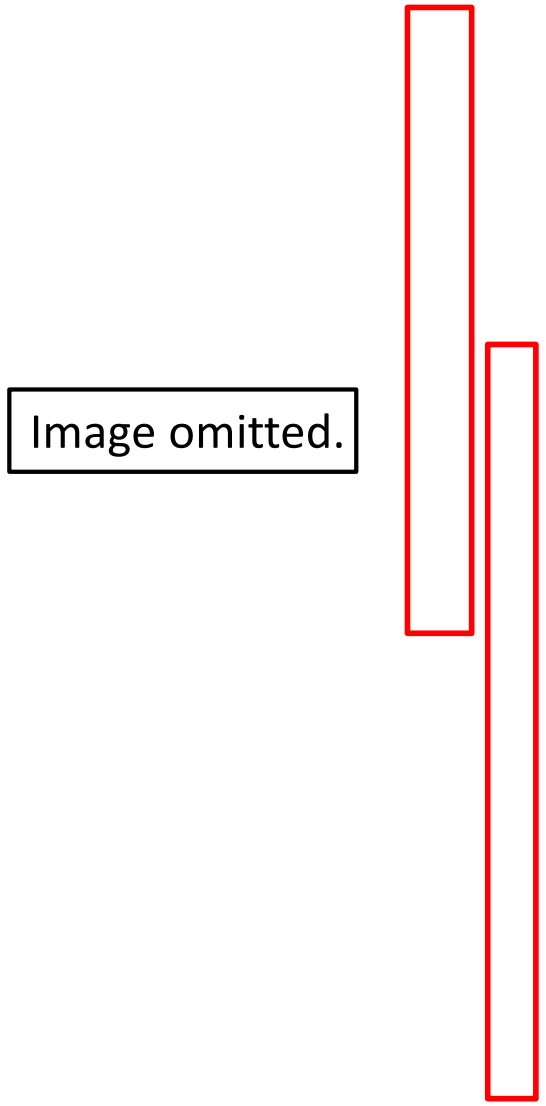
The Imperial General Headquarters mobilized Ogawa and Hosoi in September 1904

- Alhough Kochibe and Wada worried for Ogawa, he went to the war front in military uniform.
- Ogawa investigated coal field geologically and Hosoi examined a method of coal mining.
- Besides, Another geological survey of mineral resources in Manchuria was planed in same month as follows.

3. Geological Survey of Gold Ore during the Russo-Japanese war

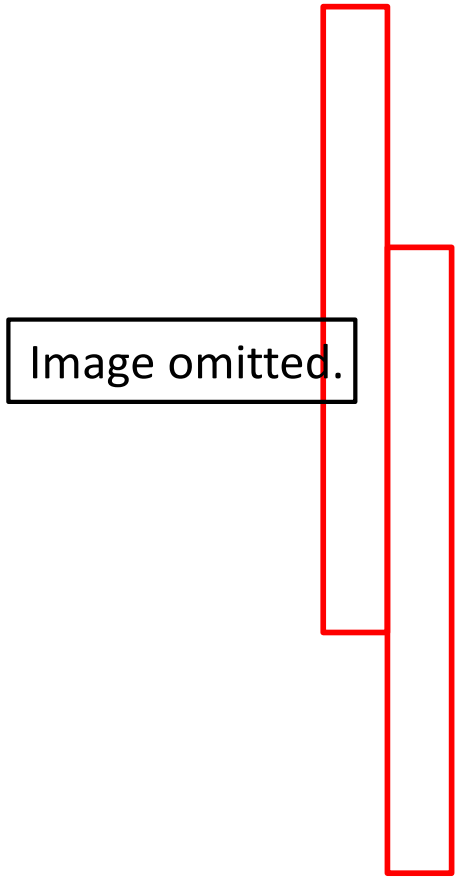
Geological Survey of Gold Ore in Manchuria, 1904

- KIYOURA Keigo the Minister of Agriculture and Commerce asked TERAUCHI Masatake, the Minister of Army to employ eight geologists for geological survey of gold ore in area under Japanese occupation in Manchuria on September 30th, 1904.



Geological Survey and Army, The Imperial General Headquarters

- The Imperial General Headquarters had taken the initiative of this geological survey.
- Geologists were divided to four groups which explored each of four areas.
- They explored for gold ore from October 1904 to January 1905.



Report on Gold Ore in Manchuria, 1905

- A report on gold ore in Manchuria was submitted to the Imperial General Headquarters on August 2nd, 1905.
- Geologists reported as follows.
  - Area 1: "Liaodong peninsula is lack of promising gold vein"
  - Area 3: "We could not discover promising gold vein"
  - Area 4: "There is no mine that deserve to run"

Image omitted.

Report on Gold Ore in Area 2

- Area 2: “We were so busy to investigate Benxihu coalfield and Yantai coal mine that we did not explore gold ore. ”
- Geologists could not find any promising gold vein in all areas.
- In the area 2, they were devoted to investigate coal mine the same as Ogawa.

Geological Survey in Korea

- After that survey in Machunia, a part of geologists joined the geological survey in the whole Korea, which was conducted by the Ministry of Aguriculture and Commerce (December 1904 – January 1906).
- The result of the survey was reported as *The Report on Mining in Korea* in 1906.
- On the other hand, comprehensive survey of various industries was done in Manchuria immediately after the Russo-Japanese war.

4. Comprehensive Survey of Industries in Manchuria in 1905

Comprehensive Survey of Industry in Manchuria

- The Russo-Japanese War ended in September 1905.
- Form October to December, comprehensive survey of industries in Manchuria was done.
- In this survey the following industries were explored.

➢ 1. Agriculture, 2. Forestry,

➢ 3. Sericuture and Livestock industry, 4. Brewing industry,

➢ 5. Commerce and Manufacturing industry,

➢ 6. Cotton industry, 7. Fisheries, 8. Mining industry

Driving Force of the Survey of Industry in Manchuria

Image omitted.

- ISHIZUKA Eizo, the Civil Administrator of Kwantung Leased Territory wrote that this survey was originated by him.
- Ishizuka was controled by General KODAMA Gentaro who was the Chief of General Staff of Japanese Army in Manchuria.

Survey of Mining Industry in Manchuria

- In this survey of mining industry, the whole area was divided to five areas. Each area was examined by geologists and mining engineers.
- They explored mines of gold, silver, copper, iron, lead and coal.
- The area 2 was investigated by Ogawa Takuji and OHASHI Takichi of the Geological Survey Bureau who had also participated in the geological survey of gold ore in Manchuria.
- They explored around Houten, especially Fushun coal mine in great detail.

Survey of Fushun Coal Mine

- Ogawa and Ohashi reported that quality of coal at Fushun was the closest to coal producted in Japan.
- They concluded that the Fushun coal mine could product 2 million tons per year for several decades at least.
- Actually Fushun coal mine producted 23,000 tons in 1907, over 2 million tons in 1914 and over 9 million tons in 1937.

Image omitted.

Concluding Remarks(1)

- Japanese Army took initiative in some geological surveys of mineral resources in China between 1895 and 1905.
- A trading merchant proposed geological exploration of gold to the Imperial General Headquarters.
- The Imperial General Headquaters were interested in military and industrial value of mineral resources. The Imperial General Headquarters did not concern only to the battle itself but also the administration of Manchuria.

Concluding Remarks(2)

- Japanese geologists and mining engineers explored underground resources in China and reported that there were very few underground resources except for coal by 1905.
- However, the Japanese military remained interested in underground resources in China.
- This is the research on only the earliest geological exploration by Japanese geologists. It is necessary to examine succeeding geological explorations to answer my research questions.

Thank you very much
for your attention