## GEOLOGIC COLUMN AND UNIT DESCRIPTION

	AGE.	ROCK UNIT	LITHOLOGY; THICKNESS WHERE KNOWN	UNIT DESCRIPTION
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CTOZOMED		Alluvium	Qui Mud, clay and sand; thickness not known	The Alluvium, consisting of mud and clay with thin aeolian sand, is a fluviatile deposit widely distributed in the drainage basins of such rivers as the Sung-hua Chiang (松 花 江), I-t'ung Ho (伊 通 河), Yin-ma Ho (飲 馬 河) and Hsin-k'ai Ho (新 開 河), or a lacustrine deposit distributed in several wind-erosion basins, playas and swampy grounds.
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	GENOZOIC	Diluvium	Qdl, silty sand and loessic clay; thickness 20 to 30 m	Alternating silty sand and loessic clay of the Pleistocene rest conformably upon the sand-gravel bed, and are considered to be lacustrine deposits of aeolian sand and loess, because the former is cross-bedded in places and the latter contains plant fragments. The thickness is 20 to 30 m.
		DITION ICM	Qdg, clay, gravel and sandstone; thickness about 20 m	The Pleistocene sand and gravel bed at Huo-shih-ling (火 石 楠) in the southeastern corner of the map area is composed of reddish-brown sandstone, tuffaceous clay, gravel, and conglomeratic sandstone, in descending order. At the Sung-hua Chiang railway bridge, it consists, in descending order, of loessic clay, 10 to 20 m thick, and residual clay with fragments of bedrock, about 10 m thick.
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	Cretaceous	Cretaceous formation (Sunghuachiang series)	Shale and marl; thickness 50 m	The Cretaceous formation, exposed in the river cliff near the Sung-hua Chiang railway bridge, is composed of an alternation of shale and marl; shale predominates in the upper 30 m, and marl predominates in the lower 20 m. The shale comprises three kinds, dark gray shale, gray shale, partly bentonitic, and grayish-blue shale. The marl also includes three kinds, yellowish-brown marl, brown oolitic marl, and grayish-yellow siliceous marl. The formation was named the Sunghuachiang series by UCHINO (1937). The geologic age of the series is unknown, but from the rock character and degree of crustal movement it seems to be younger than the Tungning series (Upper Jurassic) or the Talatzu series (Lower Jurassic) in eastern Manchuria. Thus, it may roughly correlate with the Cretaceous to Tertiary.
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	Cretaceous	Rhyolite v	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Rhyolite is poorly exposed at the Huo-shih-ling coal mine, and is grayish white to white in color, occasionally showing flow structure.
	Jurassic-	Andesite #	Olivine andesite	The andesite rests upon, or apparently intrudes the Jurassic formation at the Huo-shih-ling coal mine. The rock is purple, dark brown or dark gray, and contains some phenocrysts of plagioclase and olivine, occasion-ally accompanied by inclusions of chalcedony.
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	MESOZOIC	Jurassic formation	Sandstone, shale and coal; thickness unknown	The Jurassic formation is poorly exposed in the Huo-shih-ling mine area, striking generally NNW and dipping 20 to 25° WSW. The formation is composed of an alternation of sandstone and shale, intercalated with two workable coal seams that extend at least 1,500 m. The upper coal seam is about 1 m thick, and the lower is about 3 m thick, with an interval about 30 m between the two. The coal is a brown coal, and slacks when dried. The result of a chemical analysis for the coal of the upper coal seam is as follows: moisture, 10.53; volatile matter, 35.20; fixed carbon, 39.27; ash, 15.00; sulphur, 0.80; coking property, non-coking; color of ash, brown; calorific value, 5,983 cal. The coal is now mined at Huo-shih-ling and Ma-chia-kou [馬家溝], and the reserves are estimated at about two million metric tons. The formation yields the following fossils: Sphenopteris ahnerti (Krasser), Coniopteris hymenophylloides (Brongn), Ginkgoites cfr. sibirica (Heer), Baiera kidoi Yabe and Oishi, B. orientalis Yabe and Oishi, Czekanowskia murrayana (L. and H.), Elatocladus manchurica (Yokoyama), Pityophyllum cfr. lindstroemi Nathorst, and Podozamites lanceolatus (L. and H.).
	Triassic(?)	Triassic(?) granite	Hornblende granite and biotite granite	Triassic(?) granite is found in the southeastern corner of the map area, and is an extension of the granite which predominates in the Ch'ang-ch'un map area (Ch'ang-ch'un sheet, NK 51-3) adjacent on the south. It consists chiefly of biotite granite, though hornblende and muscovite granite are also found in places. The age of intrusion of the granite in the Ch'ang-ch'un map area is considered to be younger than the Permo-Carboniferous and older than the Jurassic.
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	PALEOZOIC Permo-Carboniferous	Chilin formation	Sandstone hornfels and slate hornfels	The Chilin formation occurs chiefly in the map sheets to the south (Ch'ang-ch'un) and southeast (Chi-lin), where it consists of greenish, hard, and compact sandstone hornfels and slate hornfels in association with limestone.
	PALE( Permo-Carl	(Column not drawn ) to scale		

Nung-an

## REFERENCES

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