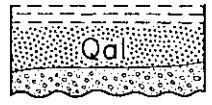

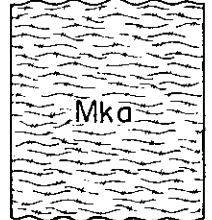
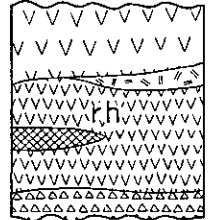
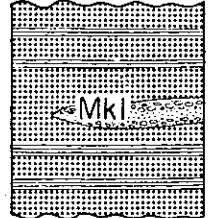
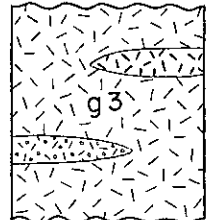
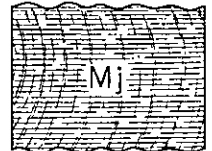
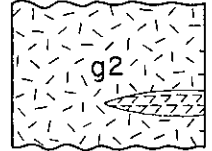
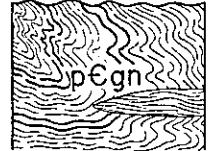


## GEOLOGIC COLUMN AND UNIT DESCRIPTION

AGE	ROCK UNIT	LITHOLOGY; THICKNESS WHERE KNOWN	UNIT DESCRIPTION	REFERENCES	
QUATERNARY	Alluvium	 Qa	Sand, clay and gravel; thickness less than 10 meters	Alluvium, consisting of sand clay and gravel, is distributed in the drainage basins of the uppermost reaches of the rivers that rise in the watersheds of the Ta-hsing-an-ling Shan-mo (大興安嶺) and the I-li-hu-li (伊勒呼里) range, namely, the Pei-erh-t'zu Ho (貝爾次河) and the Ken Ho (根河), which flow into the Argun River; the Kan Ho (甘河) and the A-li Ho (阿里河), which flow into the Sungari River; and the Hu-ma Ho (呼瑪河) which flows into the Amur River. The Alluvium is covered by vast marshes or grassland. Diluvium is distributed in small areas along the banks of the Pei-erh-t'zu Ho and the Kan Ho, however, it is not shown on the geologic map because the distribution is too narrow and complicated to be plotted, and few data are available. It consists of sand and gravel, forming river terraces which were dissected by the recent rivers.	<p>HARAGUCHI, Kuman, and others, 1937, Geology and geography of northwestern Manchuria: Geol. Inst., S. Manchuria Ry. Co.</p> <p>OHKI, Ken'ichi, 1938, Report on the mineral resources along the projected railway between Nen-ch'eng (嫩江) and Ch'i-kan (奇乾): Unpub. rept., S. Manchuria Ry. Co.</p> <p>SAITO, Rinji, compiler, 1940, Geological map of Manchuria and adjacent areas, scale 1:3,000,000: Manchoukuo Geol. Inst.</p> <p>USHIMARU, Shutarō, and others, 1937, Geology and geography of northern Manchuria: Geol. Inst., S. Manchuria Ry. Co.</p> <p>YAMASHIMA, Sadao, 1935, Geology of the northern part of the Great Hsing-an Range: Shina Kōgyō Jihō (Manchuria Geol. and Mining Rev.), no. 83, Geol. Inst., S. Manchuria Ry. Co.</p>
	UNCONFORMITY				
TERTIARY	Neogene basalt	 Mka	Augite basalt	Neogene basalt rests on the Cretaceous andesite flow (Mka) near the Ta-hsing-an-ling Shan-mo, and consists chiefly of black or dark gray compact cryptocrystalline trap-type basalt. Under a microscope, it shows a granular structure consisting of microcrystals of augite and feldspar, and a groundmass rarely containing microphenocrysts of olivine and augite.	
	EFFUSIVE CONTACT				
MESOZOIC	Cretaceous andesite	 Mka	Biotite andesite and hornblende-biotite andesite	<p>Cretaceous andesite occurs as flows resting on Cretaceous rhyolite (rh), Cretaceous granite (g<sub>3</sub>), and the Jurassic formation (M<sub>1</sub>). The rock near the Ta-hsing-an-ling Shan-mo is grayish purple biotite andesite showing a fluidal structure. The rock along the A-li Ho is dark brown biotite andesite with obvious phenocrysts of feldspar. The rock along the Ken Ho is dark or light green, massive, compact, porous biotite andesite associated with hornblende-biotite andesite showing a fluidal structure.</p> <p>Cretaceous rhyolite occurs as flows resting on Cretaceous granite (g<sub>3</sub>) and pre-Jurassic granite (g<sub>2</sub>). It consists chiefly of rhyolite and lithoidite, locally associated with obsidian. The rhyolite is dark gray or dark brown, porphyritic or fluidal, and consists of phenocrysts of quartz, feldspar, biotite, rarely hornblende, and a dark gray or dark brown cryptocrystalline groundmass containing microcrystals of biotite. The lithoidite consists essentially of cryptocrystalline felsitic rock without phenocrysts.</p> <p>The Lower Cretaceous(?) formation is exposed on the southern bank of the Seward-ka, 6 to 23 km west of I-chi-ch'i Shan (伊吉奇山). It consists of an alternation of light green sandstone and clay slate, locally interbedded with thin layers of green rhyolitic tuff. It strikes N 60° E and dips 30° NW on the east, and strikes E-W dipping 70° S on the west. The formation rests on the Cretaceous granite, and is overlain by Cretaceous andesite and rhyolite flows.</p> <p>Cretaceous granite is overlain by Neogene basalt, Cretaceous andesite and rhyolite, and the Lower Cretaceous formation, and occurs as batholiths or laccoliths. (1) The rock near I-chi-ch'i Shan consists chiefly of light-reddish coarse-grained porphyritic biotite granite, locally associated with whitish medium-grained biotite granite. (2) The rock in the eastern part of the map area consists chiefly of porphyritic biotite granite, locally associated with two-mica granite, hornblende-biotite granite and aplite. (3) The rock near I-li-ti-ch'i Shan (伊里德爾山) intrudes the pre-Jurassic granite (g<sub>2</sub>) and the Jurassic(?) formation (M<sub>1</sub>).</p> <p>The Jurassic(?) formation exposed in a small area on the top of I-li-ti-ch'i Shan consists essentially of clay slate. The rock had been contact-metamorphosed by the intrusion of the Cretaceous granite (g<sub>3</sub>), resulting in barite ore deposits of little economic value. The formation strikes N 45° E and dips 45° NW.</p> <p>The pre-Jurassic granite in the northwestern part of the map area is generally light-reddish coarse-grained biotite granite associated with whitish medium-grained biotite granite and graphic granite.</p> <p>The Precambrian gneiss in the northwestern corner of the map area consists chiefly of white to dark gray coarse-grained biotite granite gneiss, locally associated with hornblende granite gneiss or muscovite granite gneiss and lenticular mica schist.</p>	
	EFFUSIVE CONTACT				
	Cretaceous rhyolite	 rh	Rhyolite, lithoidite and obsidian		
	EFFUSIVE CONTACT				
	Lower Cretaceous(?) formation	 Mk1	Sandstone, clay slate and rhyolitic tuff; thickness unknown		
	UNCONFORMITY				
	Cretaceous granite	 g <sub>3</sub>	Biotite granite, two-mica granite, hornblende-biotite granite and aplite		
	INTRUSIVE CONTACT				
	Jurassic(?) formation	 M <sub>1</sub>	Clay slate; thickness unknown		
	UNCONFORMITY				
Pre-Jurassic granite	 g <sub>2</sub>	Biotite granite and graphic granite			
INTRUSIVE CONTACT					
PRECAMBRIAN	Precambrian gneiss	 pCgn	Biotite granite gneiss, hornblende granite gneiss, muscovite granite gneiss and mica schist		
	(Column not drawn to scale)				