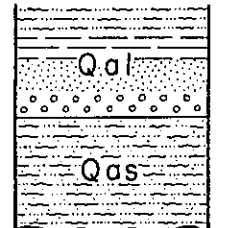
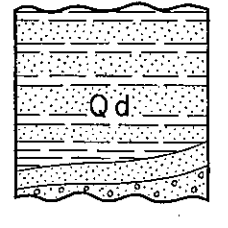
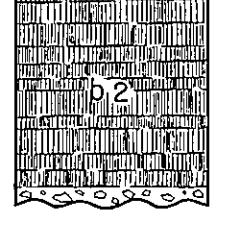
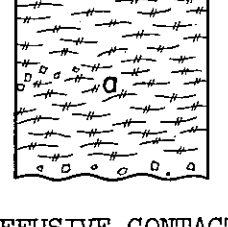
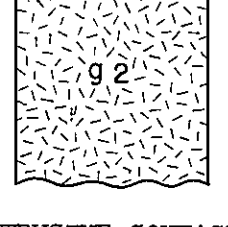
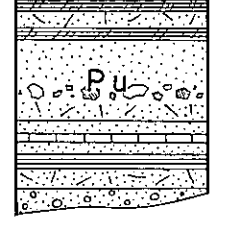


## GEOLOGIC COLUMN AND UNIT DESCRIPTION

AGE	ROCK UNIT	LITHOLOGY; THICKNESS WHERE KNOWN	UNIT DESCRIPTION	REFERENCES
QUATERNARY	Alluvium	 <p>Qal: sand, gravel, clay and silt; thickness 10 to 20 meters Qas: aeolian-lacustrine sand and silt; thickness unknown</p>	<p>Alluvium (Qal) has an extensive distribution over the low terrace remnants and in the flood plains of the drainage basins of the Amur, the Sungari (Sung-hua Chiang) and the Ussuri Rivers. Alluvium covering the low terraces consists of sand, gravel and clay, whereas that of the flood plains is predominantly sand, silt and clay. Marshes composed of grass and black muck are found locally. Dunes of aeolian-lacustrine sand and silt (Qas), probably older Alluvium, occur north of the Pieh-la-hung Ho (阿拉木图河) and south of the Nung Chiang (嫩江).</p>	<p>KAWADA, Kiyosuke, 1951, Some problems on the topography and geology of northeastern Manchuria, in <i>Geology and mineral resources of the Far East, Manchuria</i>, II-5-1: Comp. Comm. Geology and Mineral Res. Far East, Tokyo Geog. Soc.</p> <p>MONDEN, Shigeyuki, 1936, Survey report of the geology of the route between Ch'i-k'o-te (奇克特) and Fu-yuan (抚顺) along the Amur River: Unpub. rept. Geol. Inst., S. Manchuria Ry. Co.</p> <p>NALIVKIN, D. V., editor, 1955, Geological map of U.S.S.R., scale 1:5,000,000: U.S.S.R. Ministry of Geology.</p> <p>SAITO, Rinji, compiler, 1940, Geological map of Manchuria and adjacent areas, scale 1:3,000,000: Manchoukuo Geol. Inst.</p> <p>SAKAMOTO, Takao, and others, 1937, Geology and geography of northeastern Manchuria: Geol. Inst., S. Manchuria Ry. Co.</p> <p>SHIKAMA, Tokio, 1951, The Quaternary period of Manchuria, in <i>Geology and mineral resources of the Far East, Manchuria</i>, III-10: Comp. Comm. Geology and Mineral Res. Far East, Tokyo Geog. Soc.</p>
	Diluvium	 <p>Qd: Gravel, sand and clay; thickness more than 80 m</p>		
TERTIARY	Neogene basalt	 <p>b2: Flows of augite-olivine basalt; thickness unknown</p>	<p>Flows of augite-olivine basalt occur as a cap rock of the mesa in the vicinity of Lien-hua-p'ao (莲花河) along the Nao-li Ho (纳力河) and rest unconformably upon the pre-Jurassic granite (g2). The basalt contains phenocrysts of hypersthene and olivine. Under a microscope, the hypersthene shows an orthopyric texture 1 to 1.5 mm long. The groundmass consists of titaniferous hypersthene, olivine, plagioclase, magnetite, ilmenite and a small amount of glass.</p>	
MESOZOIC	Cretaceous andesite	 <p>a: Flows and breccias of hornblende andesite</p>	<p>The Cretaceous andesite constitutes mesas of Chieh-ching Shan (街津山), 552 m high, and Ch'ing-lung Shan (青龍山), 134 m high. The rock is dark green, showing a flow structure and tabular joints, is glassy in texture, and consists of large phenocrysts of plagioclase and a microcrystalline groundmass containing rectangular hornblende.</p>	
	Pre-Jurassic granite	 <p>g2: Biotite granite, biotite-hornblende granite and gneissose granite</p>	<p>The pre-Jurassic granite is exposed in the hills south of the Nao-li Ho and in the vicinity of Erh-lung-shan (二龍山). The rock is light gray, medium-grained biotite granite or biotite-hornblende granite, consisting of biotite, hornblende, plagioclase, orthoclase and quartz. It locally grades into gneissose granite. The rock intruded into the Upper Paleozoic formation and metamorphosed it along the contact, as is observed along the Ta-chia Ho (大佳河). The rock near Erh-lung-shan is quarried for use in civil engineering works.</p>	
PALEOZOIC	Upper Paleozoic formation	 <p>P4: Quartzite, graywacke, hornfels, chert, slate, conglomerate, limestone and sandstone; thickness unknown</p>	<p>The Upper Paleozoic formation is exposed in the vicinities of Pieh-la-hung, Ta-chia-ho and at Wu-erh-ku-li Shan (烏爾古力山). It consists of thick quartzite, graywacke, hornfels, chert, slate and conglomerate, and is intercalated with thin beds of limestone and sandstone. The quartzite is gray, compact and cleavable; the rock at Wu-erh-ku-li Shan is quarried for use in civil engineering works. The chert is purple, marked with networks of quartz veins, and contains radiolarian fossils. The hornfels was derived from graywacke. The formation may be correlated with the marine Permo-Carboniferous formation of the Khabarovsk district (Khabarovsk sheet, NM 53-11).</p>	

(Column not drawn to scale)