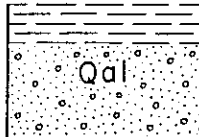
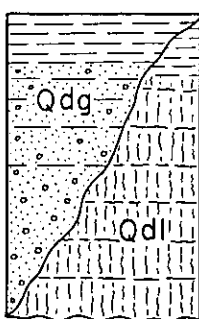



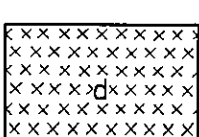

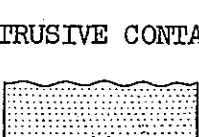
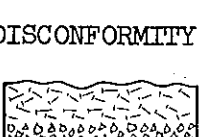
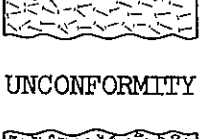
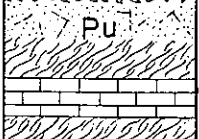


GEOLOGIC COLUMN AND UNIT DESCRIPTION

AGE	ROCK UNIT	LITHOLOGY; THICKNESS WHERE KNOWN	UNIT DESCRIPTION	REFERENCES
QUATERNARY	Alluvium	 Sand, gravel and clay; thickness less than 15 meters	Alluvium, consisting of sand, gravel and clay, is distributed on the low terraces and in the flood plains. It is generally covered by wind-blown dust. Numerous playas and playa lakes are found in the vast fluvial plains along the Nen Chiang [嫩江].	HATCHO, Torao, 1926, Geology and mineral resources along the route Tao-nan -- Cha-lai-no-erh -- Man-chou-li [海南-礼券諾爾-滿洲里]: Unpub. rept., Geol. Inst., S. Manchuria Ry. Co.
	Diluvium	 Qdg: Fluvial-lacustrine sand, gravel and clay Qdl: Aeolian-lacustrine loess, sandy loess and clay Thickness more than 100 m	Diluvium (Qdg), consisting of fluvial-lacustrine sand and gravel, locally crossbedded, covers higher terraces of Cretaceous rhyolite (rh) that fringe the vast fluvial plains of the Nen Chiang. It is considered to be uplifted delta deposits around the eastern mountain ranges of Ta-hsing-an-ling [大興安嶺]. East of the Nen Chiang the diluvium (Qdl) is chiefly interstratified sandy loess and clay of probable aeolian-lacustrine origin. Diluvium is also widely distributed beneath the cover of wind-blown dust and Alluvium throughout the Nen Chiang drainage basin. Records of test holes drilled at various stations on the Szepingkai--Tsitsihar railway, namely, Chiang-ch'iao [江橋], Wu-miao-tzu [五廟子], T'ai-lai [泰來], Tung-p'ing [東屏], etc., have revealed that Diluvium consists, in descending order, of aeolian and lacustrine sands 50 m thick, an alternation of sand and clay less than 20 m thick, and sand and gravel more than 15 m thick. The total thickness is supposed to be more than 100 m, although no drill-holes exceeded 90 m in depth.	OKADA, Shigemitsu, 1955, Iron zone along the eastern margin of the Ta-hsing-an-ling: Unpub. rept. in English. OZAKI, Hiroshi, 1938, Reconnaissance report on the route Tao-nan -- A-erh-shan [阿爾山] hot spring: Unpub. rept., Geol. Inst., S. Manchuria Ry. Co. SATTŌ, Rinji, compiler, 1940, Geological map of Manchuria and adjacent areas, scale 1:3,000,000: Manchoukuo Geol. Inst.
MESOZOIC	Andesite	 Flows and breccia of hornblende andesite; thickness unknown	Andesite occurring south of Mo-li-k'o [莫里喀] is probably younger than the rhyolite (rh). The rock is rather fresh, black, and is marked with columnar joints. It contains hornblende and plagioclase phenocrysts.	
	Rhyolite	 Rhyolite, trachyte, trachyte porphyry, trachyandesite, tuff and breccia; thickness 300 m or more	Rhyolite consists of flows of rhyolite and trachyte of felsitic or glassy structure, and dikes and sheets of trachyte porphyry; it is associated with tuff and breccia. Flows of trachyandesite locally occur interbedded within the rhyolite. The age of the rhyolite is probably Middle Cretaceous. The total thickness is inferred to be no less than 300 m.	
	Quartz porphyry	 Quartz porphyry, granite porphyry and diorite porphyry	Quartz porphyry, including granite porphyry and diorite porphyry, is believed to represent a marginal facies of the granite batholith known as the Great Hsingan granite of Lower Cretaceous age. The quartz porphyry is intruded by dikes of rhyolite porphyry.	
	Diorite	 Diorite, granodiorite, gabbro and anorthosite	Diorite comprises differential basic rocks having wide ranges of mineral composition, such as granodiorite, diorite, gabbro and anorthosite, even within a single intrusive mass. These rocks may have been derived from the granite (G ₃).	
	Cretaceous granite	 Granite, syenite and pegmatite	Granite consists of biotite granite and syenite, with allied pegmatites. It occurs as stocks and laccoliths that have solidified at rather shallow depths, and locally grades into quartz porphyry (qp). The granite may be a marginal facies of the Mongolian batholith.	
	Mesozoic formation	 Sandstone and conglomerate; thickness 100 to 130 m	The Mesozoic formation, exposed in the vicinity of K'ang-kang [康崗] and in places northeast of Cha-lai-t'e Wang-fu [扎賚特王廟], was reported to consist of dark gray tuffaceous sandstone alternating with conglomerate. It strikes N or N 40° E and dips NW. The thickness as measured near Cha-lai-te Wang-fu is between 100 m and 130 m.	
PALEOZOIC	Jurassic volcanic complex (Greenstone complex)	 Propylite, diabase porphyry, breccia, tuff and tuffaceous rocks; thickness unknown	The Jurassic volcanic complex consists of flows and sheets of propylite and diabase porphyry, breccia, tuff and tuffaceous rocks. It has generally a dark greenish tinge due to propylitization, so some geologists called it the "greenstone complex".	
	Upper Paleozoic formation	 Diabase tuff, slate, graywacke, quartzite, limestone and schist; thickness unknown	The Upper Paleozoic formation, consisting of diabase tuff, slate, graywacke, quartzite, limestone and schist, is a marine formation contact-metamorphosed in various degrees by granitic intrusion. The exposures northwest of Cha-lai-t'e Wang-fu are predominantly limestone; those southwest of Nontominobō and 18 km northeast of Cha-lai-t'e Wang-fu were reported to consist of dark-greenish graywacke, quartzite and limestone which yields Palaeofusulina sp., and some pelecypods and gastropods. The formation east of Nārincharaka consists of dark-grayish graywacke that lies almost horizontally, whereas the formation in the Wang-yeh-miao district consists of biotite hornfels and spotted slate. The Upper Paleozoic formation can be correlated with the Upper Paleozoic formation of northeastern Manchuria.	
PRECAMBRIAN (?)	Precambrian(?) gneiss	 Paragneiss (Column not drawn to scale)	Paragneiss of probable Precambrian age is distributed west of Wu-pao-t'un [五寶屯]. The rock appears to be of a very old age and is considered to be dynamo-metamorphosed Precambrian sandstone. It is generally banded gneiss showing a folded structure, predominantly composed of quartz, and is very hard. It is tentatively defined as a Precambrian metamorphic rock.	

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