GEOLOGIC COLUMN AND UNIT DESCRIPTION

AGE	ROCK UNIT	LITHOLOGY; THICKNESS WHERE KNOWN	UNIT DESCRIPTION
QUATERNARY — Pleistocene - Recent	Quaternary deposits	Q, Quaternary deposits, undifferentiated, Qal, Recent sand, silt, clay and gravel, Qd, Pleistocene sand and silt; maximum thickness about 50 meters	The Quaternary beds cover the vast plain region which comprises the coastal plain of Lake Hanka and the fluvial plains of the Mu-leng Ho[穆 棱 河], the Chi-hu-lin Ho[七 虎 林 河], and the Sungacha and Ussuri Rivers. Swampy depressions filled with alluvial beds (Qal) of silt and sticky clay, 2 - 10 m thick, occupy the greater part of the plain region. Low terraces, less than 20 m above the nearby water level, surround the swamps. These terraces are generally covered by fluvio-lacustrine beds (Qd) of sand and silt, presumably the Upper Pleistocene in age. Low terraces with three benches, consisting of beach sand, were reported on the north coast of Hsiao-hsing-k'ai Hu[小 興 凱 湖]which is separated from Lake Hanka by an offshore bar. In the USSR area the Quaternary beds are roughly divided into Alluvium and Diluvium, but in the Manchurian area such division is quite difficult due to lack of information.
	UNCONFORMITY		
TERTIARY — Neogene	Neogene basalt	Olivine basalt, dolerite, titaniferous augite-olivine basalt, sandstone and shale.	The Neogene basalt is chiefly augite-olivine basalt, accompanied by titaniferous augite-olivine basalt; all occurring as flows and sheets of varied thicknesses. It is distributed as cap rock of the Wan-ta [完 達]Mountain Range, as low hills on either side of the Ussuri River, as monadnocks in the fluvial plain of the Hsiao-mu-leng Ho[小 穆 棱 河]and as lava terraces north of Lake Hanka.
	EFFUSIVE CONTACT		
	Neogene beds	Sandstone, conglomerate and shale; thickness 30 m.	The Neogene beds cover coastal hills between Iman and Il'inskiy east of the Ussuri River. According to the geological map of USSR (1955), the beds consist of sandstone, conglomerate and shale, and the thickness is probably more than 30 m.
	UNCONFORMITY		
MESOZOIC — Cretaceous	Cretaceous granite	Porphyritic granite	The Cretaceous granite is known to occur at three localities in the USSR area. The pink porphyritic granite constituting Shih-ching Shan[石 青 山]northwest of Hei-tsui-tzu[黑 嘴 子]in the Manchurian area probably is Cretaceous granite.
	INTRUSIVE CONTACT		
	Andesite	Augite andesite and porphyrite	Andesite constitutes low gentle hills northeast of Hei-tsui-tzu, monadnocks between Hui-ts'ui[輝 嘴] and Pao-tung-t'un[東 東 屯]south of the Linkow - Hulin Railway, and a hill northwest of Kuang-tao [広 道]. The rock is mainly augite andesite, characterized by phenocrysts of plagioclase, augite and biotite. An exposure near Kuang-tao was reported to have a rather acidic mineral composition. The andesite lava flows may be roughly contemporaneous with the Lower Cretaceous beds or the Huashan series of the Tung-an sheet (NL 52-9) adjacent on the west.
	EFFUSIVE CONTACT		
Jurassic	Upper Jurassic beds or Mishan series	Arkose, conglomerate, shale and coal; thickness not known	The Upper Jurassic beds of unknown thickness around the Wan-ta Mountain Range were discovered in 1942 by the Japanese garrison forces stationed at Kuang-tao. The beds consist of arkose, conglomerate and shale, and are intercalated with several coal seams. The coal-bearing formation of the coal field north of Kuang-tao generally strikes east-west and dips steeply to the north. The coal is not worked. The coal-bearing formation may be correlated with the Muleng formation of the Mishan series which is Uppermost Jurassic in age.
	UNCONFORMITY		
Tr-iassic (?)	Pre-Jurassic granite	Biotite granite and biotite-hornblende granite	The granite of the Triassic (?) system is known to occur in broad areas in both the USSR and Manchuria parts of the map. The granite north of the Mu-leng Ho is predominantly biotite granite showing marked decomposition. The granite quarried as building stone from Feng-mi Shan[蜂 蜜 山]north of Lake Hanka is gray biotite granite and biotite-hornblende granite, containing many felsitic veinlets. In the USSR area the granite is exposed in a north-northeasterly direction and constitutes such mountains as Gora Otora, Gora Laugodyn, Gora Sarydynza, etc.
	INTRUSIVE CONTACT		
PRECAMBRIAN (?)	Gneiss	Granite gneiss and paragneiss; thickness not known	The gneiss is chiefly granite gneiss, accompanied by various kinds of paragneiss, and is widely distributed on both sides of the Ussuri River.
	INTRUSIVE CONTACT		
	Crystalline schist	Quartz-mica schist and biotite schist; thickness not known	The crystalline schist comprises quartz-mica schist and biotite schist, and is distributed in the hills north of Hei-tsui-tzu. Some Japanese geologists formerly regarded it as metamorphosed Touman formation or Upper Paleozoic, but lithologically it more closely resembles the Precambrian crystalline schist of southern Manchuria. The schist is found also at two localities in the USSR area of the map.

(Column not drawn to scale)

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