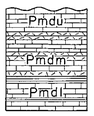
GEOLOGIC COLUMN AND UNIT DESCRIPTION

AGE	ROCK UNIT	LITHOLOGY; THICKNESS WHERE KNOWN	UNIT DESCRIPTION
QUATERNARY	Alluvium	 Sand, clay and gravel; thickness less than 10 meters	Alluvium, consisting of sand, clay and gravel, is distributed in the drainage of the Amur River, the Argun River, the Shilka River and their tributaries which flow in narrow valleys.
	UNCONFORMITY		
MESOZOIC	Cretaceous granite	 Biotite granite, granodiorite, diorite and quartz diorite	Cretaceous granite, consisting of biotite granite, granodiorite, diorite and quartz diorite, is sporadically exposed in the U.S.S.R. It intrudes the Precambrian schist (pЄsh), the Lower Cambrian formation (Plc), the Middle Paleozoic formations (Pm) and the pre-Jurassic granite (g_2). Soviet geologists (NALIVKIN, 1955) assigned its age to Jurassic - Lower Cretaceous.
	INTRUSIVE CONTACT		
	Upper Jurassic formation	 Clay slate, sandstone and conglomerate; thickness unknown	The Upper Jurassic formation is widely exposed along the Amur, the Argun and the Shilka Rivers. It strikes N to N - 60° W, dips 30° - 60° NE, and consists mainly of an alternation of clay slate and sandstone in the upper part and of conglomerate in the lower part. The clay slate is black to blackish brown, has a silky luster, and is intercalated with lenticular sandstone showing a knotty schistosity. The clay slate is locally intruded by the Cretaceous quartz veins by which it was contact-metamorphosed. The sandstone is grayish brown to dark brown, medium- to fine-grained, and is solidly cemented by flat sand grains. The basal conglomerate strikes SE and dips 30° - 60° NE. The pebbles are 4 to 5 cm in average diameter, the largest ones attaining 10 cm in diameter. They are schist, gneiss, granite, and quartz, and are compactly cemented by sand. The formation rests unconformably on the Precambrian schist, the Middle Paleozoic formation and the pre-Jurassic granite.
	Lower-Middle Jurassic formation	 Clay slate, sandstone and conglomerate; thickness unknown	The Lower to Middle Jurassic formation, consisting of clay slate, sandstone and conglomerate, is exposed along the Amazar River.
	UNCONFORMITY		
	Triassic formation	 Sandstone, clay slate and conglomerate; thickness unknown	The Triassic formation, consisting of sandstone, clay slate and conglomerate, is exposed near the junction of the Amazar and the Uteni Rivers.
	UNCONFORMITY		
	Intermediate to basic intrusives	 Diorite, gabbro, norite, monzonite and anorthosite	Intermediate to basic intrusives, including diorite, gabbro, norite, monzonite or anorthosite, is exposed near Gora Yakova. They were intruded into the Precambrian schist during the pre-Jurassic. They may constitute a marginal facies of the pre-Jurassic granite. Soviet geologists assign them to the Paleozoic.
PALEOZOIC	Pre-Jurassic granite	 Porphyritic biotite granite	Pre-Jurassic granite is widely exposed in the northwestern part of the map area. It consists mainly of gray to light reddish porphyritic biotite granite containing phenocrysts of biotite and light pinkish orthoclase 1 to 2 cm in diameter. It intrudes the Precambrian schist, the Precambrian granite gneiss and the Middle Paleozoic formations; it is intruded by the Cretaceous granite, and is overlain by the Jurassic formations. Soviet geologists define it as Paleozoic acidic intrusives.
	INTRUSIVE CONTACT		
	Devonian formation	 Upper (Pmdu): limestone Middle (Pmdm): limestone and mudstone Lower (Pmdl): limestone, shale and mudstone Thickness unknown	The Devonian formation is divided into three parts, upper, middle and lower. The upper part occurring in the hill north of Kadgargay consists of limestone of Upper Devonian age. The middle part along the Amur River consists of limestone, mudstone and reef-like limestone. Its age ranges from Middle to Upper Devonian. The lower part along the Amazar River consists of limestone, shale, reef-like limestone, and mudstone, and is Lower to Middle Devonian in age.
	Undifferentiated Middle Paleozoic formation	 Clay slate, sandstone, marl and crystalline limestone; thickness unknown	The undifferentiated Middle Paleozoic formation on the Manchurian side consists of metamorphosed clay slate, sandstone, marl, and light gray to dark gray lenticular crystalline limestone, ranging in age from Silurian, Devonian to Lower Carboniferous. Available data on the formation in the U.S.S.R. are very few.
	DISCONFORMITY		
	Lower Cambrian formation	 Clay slate and sandstone; thickness unknown	The Lower Cambrian formation, consisting of an alternation of reddish brown clay slate and dark green muscovite sandstone, is exposed in the southwestern part of the map area.
	UNCONFORMITY		
PRECAMBRIAN	Precambrian granite gneiss	 Biotite granite gneiss	Precambrian granite gneiss is exposed near Yen-lien Shan [延連山]. It consists mainly of light to dark gray biotite granite gneiss with phenocrysts of quartz, orthoclase and biotite, and is intruded by quartz veins.
	INTRUSIVE CONTACT		
	Precambrian schist	 Mica schist	Precambrian schist is exposed in the northern and western parts of the map area. It consists chiefly of mica schist for which few data are available.

(Column not drawn to scale)

ECONOMIC VALUE

Gold

Placer gold in the Recent deposits was derived from the quartz veins that were probably intruded into the Jurassic formation, the pre-Jurassic granite, and the Precambrian granite gneiss during the Cretaceous. Gold localities are distributed along the following rivers: Kan-tung-kou-ta Ho [乾東大河], Chi-hsing Kou [吉興溝], A-li-ya Ho [阿利雅河], Hsing-hua Kou [興華溝], Hsi-nan Kou [西南溝], Po-lo-shu-ssu-lo-fu-k'o Ho [博羅舒斯洛甫喀河], Sa-bō-shi-ka Ka [薩坡什喀河], Amazaru Ka [阿玛固爾河] and Shen-hsien-tung Ho [神仏洞河]. Outline of the Chi-hsing-kou and Pa-ko-ch'ia [八才卡] gold mines surveyed by T. UCHINO in 1935 is as follows:

	Chi-hsing-kou	Pa-ko-ch'ia*
Locality	10 km SE of O-lo-ho-ha-ta along the Argun River	45 km E of Hsi-k'ou-tzu along the Argun River
Transportation	Accessible by wagon	Eastern part of road, about 18 km, is not accessible by wagon
Depth to bedrock	2.7 to 9.4 m, averaging 6 m	4 m
Lithology and thickness to gold placer	Surface soil, sand, coarse gravel and clay; 3.7 - 4.6 m	Surface soil, sand, fine gravel and clay; 1.5 - 2 m
Frozen zone in summer	Permanently frozen zone occurs at a depth of 1 m (16 Aug. - 4 Sep. 1935)	Permanently frozen zone occurs at 0.5 - 1 m (16 Aug. - 4 Sep. 1935)
Workable months	Six months between April and October	Six months between April and October
Ground water level	0.3 - 1.5 m	0.3 - 1 m
Surface condition	Generally swampy, locally gravelly, covered by forests	Swampy, covered by steppes or forests, locally gravelly
Water supply	Fairly abundant	Poor
Width of the Recent deposits	About 300 m	100 - 300 m
Area of formerly exploited site	1.5 km by 200 m	700 m by 150 m
Thickness of gold placer	About 2 m	1.5 - 2 m
Gold content	0.37184 gr per cubic yard	0.66496 gr per cubic yard
Grade of gold	90%	85%

* Not named on map, but indicated by village in outcrop area of pЄgn.

Limestone

The Middle Paleozoic limestone near Chi-hsing-kou was formerly calcined for lime when the gold mining was prosperous.

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