Geology of the Southeastern Part of Hu-peh-shêng.

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Topography. The district under consideration lies on the left side of the Yang-tsze river between Wu-ch'ang-hsien and the frontier of Kiang-si and Hu-peh and embraces the three divisions, Wu-ch'ang-hsien, Ta-yeh-hsien, and Hsing-kuo-chou. Four folded mountain ranges run almost parallel from east-northeast to west-southwest bending to southeast in the eastern part near the Yang-tsze. These ranges, beginning at the south I venture to call the Nan-pai, the Hsing-kuo, the Ta-yeh and the Wu-ch'ang ranges respectively.

The southern or Nan-pai range is the highest, attaining a height of about six hundred meters, while the height of the northern or Wu-ch'ang range does not exceed two hundred meters, being the lowest of the four ranges. The Wu-ch'ang range is composed of Mesozoic sandstone and clayslate, while the three other ranges consist of Palæozoic limestone.

The Yang-tze river after passing through the gorges in I-ch'ang enters the so-called Hu-kuang basin, where it meanders toward Yo-chou. In Yo-chou it bends abruptly and then runs rather straight course to Wu-ch'ang. Uniting with the Han river, one of its large tributaries, the river turns to the southeast thus reaching the district under consideration, where it cuts the mountain ranges rather transversally. In the rainy season the water of the Yang-tze river often rises from forty to fifty feet about low water mark, so that it overflows both banks and also back up the waters of its tributaries. Thus for the adjustment of water levels between the main river and its tributaries embankments with floodgates are built mostly at.
the mouths of the tributaries. The numerous tributaries of the district run almost longitudinally between the parallel ranges. Among them the Fu-chi-shui should be mentioned.

Between the mountains there are numerous lakes, of which the Wan-hu, the Ta-yeh-hu, the Wei-yüan-hu, the Pao-an-hu, and the Hua-chia-hu are worthy of mention. They are rather small in area and scatter here and there in winter, being connected with one another or with the Yang-tsze river by small streams, but in the rainy season they together with the lower part of the tributaries unite forming large lakes. The flood plains around the lakes are very fertile and bear large crops of rice, beans, hemp, cotton etc.

Geology. The district consists of sedimentary and igneous rocks as follows.

Sedimentary Rocks
   Palæozoic Group
      Chi-chou Series
      Hsing-kuo Series — Permocarboniferous
   Mesozoic Group
      Huang-shih Series — Jurassic
      Red Sandstone Series — Unknown period
   Cainozoic Group
      Lake and river deposits

Igneous Rocks
   Granite and granite-porphyry

   Palæozoic Group. The Chi-chou Series is composed of clay slate, sandstone and quartzite, with thin limestone and coal seams intercalated. It forms low hills in the vicinities of the Ta-yeh and the Pao-an lakes.

   The Hsing-kuo Series consists of alternating strata of thick limestone, clay slate and sandstone with coal seams, and overlays the Chi-chou Series conformably. The limestone contains the fossils of corals and brachiopods, by which the Series has been proved to be-
long to the Permocarboniferous. The Series forms the three mountain ranges of Ta-yeh, Hsing-kuo and Nang-pai. In the former two ranges the anticlinal axis runs almost in the middle of the ranges, while in the latter a synclinal fold is found. Generally the strike is nearly east—west but bends southeastwards near the Yang-tsze river.

Mesozoic Group. The Huang-shih Series is mainly composed of sandstone accompanied with clayslate and coal seams. It crops out in the Wu-ch’ang range and forms a synclinal folding running from northwest to southeast with gentle inclination. Mr. Richthofen described the Series as belonging to the Permian; but the plant fossils collected by me tend to prove that the Series belongs to the Jurassic.

The Red Sandstone Series consists of red sandstone with conglomerate and shale. It forms low hills and terraces at the foot of mountain ranges and also near the Yan-tsze river and its tributaries. The red bluff near Huang-chou, a place familiar to Chinese and Japanese through a famous ancient Chinese poem, is composed of red sandstone. The geological age is not yet determined, though it surely corresponds to the Hsing-k’uo Series in the neighbourhood of I-ch’ang in northwestern Hu-peh.

Cainozoic Group. The terraces along the flood plains of rivers and lakes are mainly composed of yellowish clay, while the Alluvium in the upper course of tributaries consists of sand and gravel.

Igneous Rocks. Granite occurs in the form of masses and dykes and has intruded the Paleozoic as well as the Mesozoic in which strong metamorphism is noticed.

There are several kinds of granite such as granitite, amphibole-granitite, amphibole-granite and pyroxene-granite. That which crops out in Pai-ma-lung near Fu-chi-k’ou is granitite; that in the environs of Chiang-chiao is amphibole-granitite; and that near Wu-ch’ang-hsiien and in the neighbourhood of Pai-sha-pu is amphibole-granite, the dyke in the Ta-yeh iron mine being also amphibole-gra-
nite. Dykes found in Lung-ko-shan and Tung-tang-ssü are pyroxene-granite.

Granite-porphyry occurs as dykes in the Huang-shih Series west of Huang-shih-chiang.