新居濱
昭和十三年三月
圖幅第二三九號
地質調査所
地質説明書
新居濱

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第一章

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寒武系 | 石炭紀 | 石炭岩
倉暮層 | 綠色片岩 | 魚雲母片岩
花崗岩岩類 | 花崗岩 | 花崗岩

中央構造線

土佐丘陵

原始海

高知

※一部表現不可
第二節 各説

一、前石炭系

（一）三波川統

山形県北部の層序中生代後期（渐新世）に形成された前石炭系は、上部白亜紀末期から中新世（约3000万年前）にかけて形成されたものとされています。前石炭系は、主に泥岩、頁岩、砂岩、石灰岩から構成されており、特に頁岩が豊富です。前石炭系は、地層の変換が激しく、様々な岩相を示すのが特徴的です。

1. 緑色片岩
   - 緑色片岩は、前石炭系の主な成分の一つで、 контакトメトリー由来の片状長石と緑泥石から成り立ちます。この岩種は、高温・高圧の条件下で形成されるものです。
   - 前石炭系の緑色片岩は、これらの特性をもっており、特に地質学的な研究に有用であるとされています。

2. 砂岩
   - 砂岩は、前石炭系のもう一つの重要な成分で、主に細粒の砂質成分から成り立ちます。砂岩は、特に前石炭系の下部層を構成していることがある。

3. その他
   - 前石炭系には、石灰岩、頁岩、泥岩、巖石など、多様な岩種が含まれています。これらの岩種は、地層の形成過程や自然環境の変遷を反映しています。

前石炭系の層序は、地球の歴史的な変化を反映しており、地球科学の重要な資料となっています。
三、花崗岩類中生界

岩

黒雲母花崗岩

岩

灰白色中粒乃至粗粒。主成分——石英、長石、石英黑雲母。副成分——角閃石、白雲母。

花崗岩

岩

岩

石英信子鍶鐵礦鈹石樣。石英、長石、石英黑雲母。副成分——角閃石、白雲母。

（三）花崗岩

岩

花崗岩

岩

（二）花崗岩
岩石
暗灰色中粒。

(四) 英雲閃綠岩

(五) 石英斑岩

四、上部白雲系和金砂岩層

(一) 砂岩層

本層下部の砂岩ヨリ成り、頁岩ノ薄層を挟有シ、底層ノ近き部分ハ海層ノ有ス。砂岩ノ
五、中新統
砂岩及頁岩層
本統ノ基底ヘハ層岩層シテ砂岩頁岩層ヲ厚モノ不整合
ハ逆さラ導クルノ結果セリ。被覆ハさなるハ深灰色砂岩層ノ
不整合ヲ被覆セリ。至るノ巻ノ厚ヲ約ニノ百メートル
ノ事ヲ考慮シテ各層ノ厚ヲ推定セラル。砂岩及頁岩ノ巻ノ厚ノ
不整合ノ處ノ巻ノ厚ノ不整合ノ巻ノ厚ヲ約ニノ百メートル
ノ事ヲ考察シテ各層ノ厚ヲ推定セラル。
六安山岩類

(一) 黒雲母安山岩

本岩類は該方輝石安山岩黑雲母細片麻岩に変成した。内部を中粒長石の貫入を受けて、びらんを伴う。岩脈を伴うまれに見られる。長石は角長状、黑雲母は双晶が認められる。塊状の変成を示す。
黒雲母斜輝石安山岩

(二) 黒雲母斜輝石安山岩

本岩は、小西麻生産部で発見されたもの。黒雲母斜輝石安山岩の一種で、主に斜輝石と黒雲母が主成分をなし、一部では角閃石や輝石が含まれている。

(三) 斜輝石安山岩

斜輝石安山岩は、斜輝石が主成分を占め、黒雲母や角閃石などの副成分を含んでいる。

(四) 他石安山岩

他石安山岩は、主に輝石や長石が主成分をなし、一部では斜輝石や黒雲母が含まれている。

(五) 他石安山岩

他石安山岩は、主に輝石や長石が主成分をなし、一部では斜輝石や黒雲母が含まれている。

(六) 他石安山岩

他石安山岩は、主に輝石や長石が主成分をなし、一部では斜輝石や黒雲母が含まれている。

(七) 他石安山岩

他石安山岩は、主に輝石や長石が主成分をなし、一部では斜輝石や黒雲母が含まれている。

(八) 他石安山岩

他石安山岩は、主に輝石や長石が主成分をなし、一部では斜輝石や黒雲母が含まれている。

(九) 他石安山岩

他石安山岩は、主に輝石や長石が主成分をなし、一部では斜輝石や黒雲母が含まれている。

(十) 他石安山岩

他石安山岩は、主に輝石や長石が主成分をなし、一部では斜輝石や黒雲母が含まれている。
新更統

第三節 構造

八現世統

河岸及び海岸の下面粘土砂及び礫ヨリ成ル。
第三章
	概 説

甲

本編 peach は、三波川沿岸の産業発達状況を挟んだもべため、テクノ検索により、最新の産業発達状況を巡る。

乙

製品の発展は、三波川沿岸の産業発達状況を巡る。テクノ検索により、最新の産業発達状況を巡る。
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伊豫鶴山

伊豫鶴山は愛媛県宇部郡土居村にあり、土居野子山南村より登立スリウム峯ノ北方四五余

明治二十六年以降昭和五年迄四十年間ノ採鉱高ハ八十八万四千五百九十五石ノシテ

片鱗高ハ三十八万一千八百九十八石ナリ。鶴石ノ産出ヲ少シテ多々変化所大日本人造肥料小野田工場及び佐賀陽製錬所ノ販売ヲ

溫泉共ノ便ヲナリス。
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EXPLANATORY TEXT
OF THE
GEOLOGICAL MAP OF JAPAN
Scale 1:75,000

NIIHAMA
Zone 31 Col. XVIII
Sheet 239

By
HOKOTO SATO
(Written in 1937)

(Abstract)

GEOLOGY

The Niihama sheet-map area comprises chiefly the rugged mountainous region of the central portion of the Central Mountain Range running approximately in east-west direction through the island of Shikoku, and partly the hilly lands at the foot of the range just mentioned and on the seaboard of the Inland Sea of Setouchi situated to the north of the Island.

Sambagawa Series. The oldest rocks in this area are represented by the crystalline schists of Pre-Carboniferous age, consisting of green-schists and sericite-
graphite-schists in alternation intercalated with thin layers of piedmontite-quartz-schist, and the Oboke schistose rock. The green-schists may be divided into epidote-actinolite-schist, actinolite-epidote-schist and epidote-chlorite-schist, according to their predominant mineral components, but they show gradual transition from one to another. Besides the above, there is recognized a biotite-schist which is considered to have been altered from the sericite-graphite-schist near the direct contact with amphibolite intruded into this formation. The most remarkable contact-metamorphic effect of the amphibolite on the crystalline schists is noted by the presence of the albite spots which decrease gradually in amount and size in proportion to the distance from the amphibolite. The piedmontite-quartz-schist and the Oboke schistose rock occur usually as thin beds of about 10 m. thick, and the latter, which is named after the locality where the rock shows a typical development, seems to have been derived from a tuffite of acidic character. This metamorphic series has a general strike running nearly from WSW to ENE, making considerable foldings. This formation attains about 8,000 m. in thickness, and may be correlated to the Sambagawa series in the Chichibu district of Kwanto.

Amphibolite, Peridotite and Serpentine. They are believed to be of comagmatic origin, occurring as intrusive sheets or small bosses in the Sambagawa series. Judging from their occasional schistosity developed usually in the peripheral portion of the intrusive masses, they might have been subjected to the same regional metamorphism with the crystalline schists after their intrusions.

Permo-Carboniferous. Besides the crystalline schists of the Sambagawa series, there is a younger mica-schist series of probably Permo-Carboniferous age. These metamorphic rocks comprise granitic gneiss and mica-schist, occurring in contact with the granitic rocks on Miyoshima and Ōshima in Niigun, and in Tano-mura and Tokuda-mura in Shūkō-gun.

Granitic Rocks of Mesozoic Age. They may be divided into biotite-granite, hornblende-biotite-granite, granodiorite, quartz-biotite-diorite and quartz-porphyry. The biotite-granite forms a part of the great batholith widely exposed in Setouchi and Chūgoku, and the hornblende-biotite-granite, granodiorite and quartz-diorite seem to be the differentiation products of the same magma, representing the marginal faces of the biotite-granite. The quartz-porphyry is found to occur as dykes penetrating the biotite-granite and hornblende-biotite-granite. The dykes measure 10—250 m. in width. The intrusion of the granitic rocks is thought to precede the deposition of the Upper Cretaceous, because the basal sandstone of the formation lies upon the erosion surface of the grano-diorite.

Upper Cretaceous. It consists of sandstone in the
LOWER PART AND THE ALTERNATING BEDS OF SANDSTONE AND SHALE IN THE UPPER. IT IS BELIEVED TO BE CORRELATED TO THE SO-CALLED IZUMI SANDSTONE WHICH IS DEVELOPED TYPICALLY IN PROV. IZUMI. THE GENERAL STRIKE OF THIS FORMATION IS WSW TO ENE, WITH DIP-ANGLES VARYING FROM 35° TO 60° TOWARD SSE. ON THE SOUTHERN BORDER, THE UPPER CRETACEOUS IS OBSERVED TO HAVE BEEN BROUGHT TO CONTACT WITH THE SAMBAGAWA SCHISTS BY A GREAT FAULT WHICH IS KNOWN AS THE MEDIAN DISLOCATION LINE DIVIDING SOUTHWESTERN JAPAN INTO THE INNER AND OUTER ZONES. THE MAXIMUM THICKNESS OF THIS FORMATION IS ESTIMATED AT ABOUT 3,200 M.

**Miocene.** It rests unconformably upon the Sambagawa schists and is covered by lava-flows of biotite-rhombic-pyroxene-andesite and rhombic-pyroxene-andesite. It is composed of a basal conglomerate and alternating beds of sandstone and shale, which are unconformably covered by tuff-breccia beds. In several localities, some undeterminable fragments of fossil plants are found in the sandstone. This formation seems to form a structural basin with a gentle inclination of 15° in average, the total thickness being about 300 m. or more.

**Andesitic Rocks of Tertiary Age.** They comprise biotite-andesite, pyroxene-andesite, biotite-rhombic-pyroxene-andesite and rhombic-pyroxene-andesite, the former two occurring as dykes and the latter two as lava-flows. Although it is clear that all of these andesitic rocks are of later extrusion than the Miocene deposition, the sequence of eruption of these rocks is not confirmed as the mutual relations in occurrence are not able to observe in the field.

**Quaternary.** Pleistocene deposits may be divided into two beds; the older bed lies on the hilly land at the foot of mountains, covering the Sambagawa schists, Upper Cretaceous and granitic rocks, and the younger one forms river terraces about 15 m. high in average. Both older and younger beds are composed of clay, sand and gravel. Recent sediments are composed of clay, sand and gravel, forming alluvial plains along rivers and coasts.

**ECONOMIC GEOLOGY**

**Copper Ore.** Many cupriferous pyrite deposits are found in the crystalline schists of the Sambagawa series. These deposits occur in bedded form nearly parallel to the schistosity of the country rocks, and are deformed by dynamo-metamorphism after deposition of ores. The ore-deposition is of metasomatic genesis, occasionally associated with fissure-filling. The ore is massive, fine-grained in texture, generally associated with banded ore formed by impregnation. Copper content of the ore is 3.5% in average, more than 40% of sulphur being contained. The ores poor in copper and rich in sulphur are used in manufacture of sulphuric acid. The large ore-deposits of the Besshi mine is clearly related to the
amphibolite genetically, but in the cases of the other mines any ore-bringer can not be recognized in the vicinity of the ore-deposits. The Besshi mine, the most prominent deposit among the cupriferous pyrite deposits in Japan, is situated in the lofty mountain district about 12 km. to the south of Niihama. It has been worked since 1690 and the deepest level now being worked attains more than 1,200 m. along the dip from the outcrop. The ore-deposit crops out on the northern slope of the Central Mountain Range, extending about 1,600 m. along the strike. Two ore bodies, consisting of massive cupriferous pyrite ore, are united to form a thick ore shoot at the east end of the ore-deposit. The thickness of respective ore body is usually about 1 m., the united one being 7.2 m. in maximum. Between these two ore bodies, there are two more ore bodies of different types consisting of banded ore and high-grade chalcopyrite ore. The banded ore means the green-schist thinly interbanded with thin layers of pyritic ore, and its thickness varies from 60 cm. to 6 m. Although this banded ore is generally low-grade in copper, the vein-formed high-grade chalcopyrite ore cutting through the banded ore contains about 10% of copper, and its thickness varies from 1.5 m. to 6 m. This high-grade ore was found to continue downward to 12th level, but it is not met with in the present working places in the lower levels. Besides the Besshi mine, the cupriferous pyrite deposits of the same type are now under working at several mines such as Shirataki, Iyo, Kamegamori and Motoyasu, but these deposits are of rather small dimensions in comparison with those of the Besshi mine.

**Antimony ore.** In several places in the terrain of crystalline schists, small antimony ore-deposits are found to occur as veins, but they have no economic importance at present. The Ichinokawa mine which was well known as the leading producer of antimony ore in the world about 35 years ago, is now abandoned.

**Chrome ore.** Chromite deposit in dunite near Mt. Higashi-akaishi was worked about 13 years ago at the Akaishi mine, but when the writer visited, the mine was out of work and the character of the deposit was not studied.