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### Blue Hills Copper Mine

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## TRIPS E AND J

### Blue Hill Copper Mine

Leaders: Lester Greenwood and John Hogan, Geologists.  
Black Hawk Mining Co.

### HISTORY

The most productive mine in the area was the Douglas, which was operated from 1878 - 83 and again during the first world war from 1917 - 18. This property is localized along a copper-rich, zinc poor zone of mineralization and is reported to have produced from two to three million pounds of copper.

Numerous other shafts and pits dot the area and attest to the activity that was part of the famous Maine mining boom.

### REGIONAL GEOLOGY

The regional setting is the Ellsworth Formation, of Silurian (?) age. This formation is generally considered to be in the greenschist facies or somewhat higher.

There are numerous large intrusives - mostly granites - which intrude the Ellsworth along the coast. The section with which we are interested here is thought to be about middle Ellsworth.

### LOCAL GEOLOGY

#### Allen Quartzite Member

Dense grey to mauve quartzite, includes some banded to weakly banded sections, conglomeratic and biotitic in part.

#### Transition Zone:

A zone of interbedded quartzite, biotitic quartzite, and quartzitic gneiss and biotite gneiss layers. Grey to dark brown with purple zones. This area is also characterized by numerous granite tongues, pods, lenses, and by granitization of the local rock.

#### Biotite Gneiss Member

Dark brown to tan, spotted - mottled, with grey and blue-black porphyroblasts. Rich in biotite, quartz and secondary minerals porphyroblastic in texture.



Shows some local bedding and in part is more schistose than gneissic. In places this unit has a conglomerate with a few brown pebbles at the base. Thickness - 300 feet.

#### Transition Zone

A zone of interbedded pea conglomerates, altered volcanics-amphibotites, with zones of over 50% free quartz with dark grey quartzitic fragments. Thickness 20-40 feet.

#### Pond Quartzite Member

A dense grey to blue grey quartzite with well-developed bedding generally very regular but occasionally crenulated. A conglomerate with 1/4 to 1 inch grey and brown pebbles is found at the base. Thickness - 200 feet.

#### Banded Quartzite Member

Composed almost entirely of delicate finely banded, often crenulated, quartzite with green-chlorite, brown biotite, orange calcium silicates, white feldspar, and grey quartz. A conglomerate at base of this formation contains 1/4" pebbles and is usually distinct. Thickness - 175 feet.

#### Douglas Quartzite Member

A dense grey quartzite with granular texture, contains some broad open folds. A pea conglomerate is found at the base. Thickness 250 feet.

### IGNEOUS ROCKS

#### Granites

Coarse-grained grey porphyritic biotitic granite with prominent potash feldspar phenocrysts.

#### Feldspar Porphyry

Tabular feldspar phenocrysts 1/8 inch in a fine grained grey to black groundmass.

#### Diorite

Coarse to fine grained dark green, dense, with clots of hornblende crystals.



## Volcanics

The Pond Quartzite and the transition zone between the biotite gneiss and the Pond Quartzite contain lenses of what is thought to have been somewhat basic flows or tuffs. This rock as seen now is an amphibolite.

### METAMORPHISM

The investigations underground here at the mine site are just starting. Very little microscopic work has been done up to this time. It is expected that more detailed information on the mineralogy will be obtained shortly. The Ellsworth Formation is generally considered to be greenschist facies or slightly higher. At the mine site contact metamorphic effects are superimposed upon these of the regional metamorphism. Tentatively the area in which the mine workings are operating is placed in the amphibolite facies.

### HYDROTHERMAL ALTERATION

Alteration of granites near ore zones is characterized by the presence of dark green feldspar alteration. There is also a type of alteration which causes dark green to light green patches and clots in the feldspars, and is attributed to epidote and or chlorite. Other evidences of hydrothermal solutions are shown by bleaching of some joints and fractures and by filling of other joints and fractures with pyrite, fluorite, rhodochrosite and ore minerals. Chloritic alteration is noted in all units especially in the altered volcanics.

### ORE ZONES

Copper, lead and zinc are the metals to be recovered from this mine. It is expected that the chalcopyrite will be found in the Pond Quartzite Member near the Banded Quartzite horizon. The chalcopyrite occurs as an intergranular replacement in the quartzite and is controlled by the bedding. It is not clear why the chalcopyrite exhibits a preference for certain bedding horizons and not others.

Zinc mineralization occurs as sphalerite and is found at the footwall of the Biotite Gneiss Member and in the transition zone between the biotite gneiss and Pond Quartzites. Sphalerite occurs as a massive replacement of granite and quartzite, and as a partial replacement of amphibolites.

Lead mineralization occurs as galena and is found as massive to partial replacement of amphibolites and granites in the transition zone between the Biotite Gneiss and Pond Quartzite Members.



## SURFACE FACILITIES

The Black Hawk facility consists of two major buildings and several core shacks and pump houses. The service building encloses the collar of the shaft and contains the Black Hawk offices, Accounting Dept., Assaying Dept., Geology Dept., and Engineering Dept., the contractors office and the dry room. The headframe, an A frame type, which is adjacent to the service building, is 112 feet high to the center of the sheave block and is built around two ore bins, one of 700 tons capacity and one of 80 ton capacity. The second major building incloses the hoisting equipment and compressor. The hoist is a 3 1/2' x 6 1/2' double drum Nordberg hoist powered by a 300 HP motor. The compressor is a Joy 3300 cfm and is powered by a 600 HP electric motor. Electrical power comes in to the property 33,000 volts on Bangor Hydro Line and is transformed to 2300 volts, 550 volts and 110 volts in a transformer station which is next to the hoist house.

## FIELD TOURS

- Tour of surface facilities
- Surface tour of old Douglas Mine
- Surface tour of old Mammouth Mine
- Inspection of typical rock types from underground.