

A GEOLOGIC AND ECONOMIC SKETCH OF DOOLTH
PENINSULA, WEST COAST OF CHICHAGOF ISLAND, ALASKA.

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INTRODUCTION

In view of the recently manifested interest in the economic possibilities of Doolth Peninsula, West Coast of Chichagof Island, Alaska, on which the "Chichagof Mine" is situated, the following sketch, - based on personal studies - is believed to be timely. For full data on the district, so far as it has been studied, the reader is referred to U. S. Geologic Survey Bulletin 504 by Adolph Knopf, and Bulletin 692-b, by R. M. Overbeck. What follows refers to the Doolth Peninsula only, unless otherwise stated.

LOCALITY, GEOLOGY AND STRUCTURE

Doolth Peninsula is a tongue of land extending Southerly from the main mass of Chichagof Island, and penetrating into the chain of small Islands and islets, that are the present day visual evidence of the sunken coastal plain.

Its' Easterly boundary is Klag Bay, the Southerly limit is a narrow channel separating it from the coastal islets. Westerly it is bounded by Ogden Passage, and at its' Northerly end it is attached to the main mass of Chichagof Island.

The Peninsula as a whole is composed of sedimentary "wackes" of a prevailing gray color, with a very minor amount of slate remnants along its easterly boundaries.

The so-called slates that are found interbedded with the graywackes, are, in the majority of cases, sheared and semi-schistose wackes. They are localized along lines of fractures.

None of the beds are known to be fossil-bearing, but if the fossil-bearing segmental remnant in Slocum Arm is proven to belong to the Jurassic Era of the Mesozoic Period, - (R. M. Overbeck, U. S. G. S. Bulletin No. 692-b, 1917), the northerly two-thirds of the Peninsula must be considered as being very early Mesozoic.

The series known to be ore-bearing, are essentially intermediate in composition.

The part of the series at the northerly end of the Peninsula, where they are in modified contact with the adjacent Paleozoic rocks, is characterized by its' relatively greater compactness and the size of the rock components, -from the overlaying part of the series; as well as by its' iron content being dominated ferric iron.

The change of the ratio of the ferric to the ferrous iron is very gradual toward the upper part of the series, where the ferrous and the ferric iron content is about equal.

All the magnesia is assigned to the original mineral components.

There has been but very little gain in Calcium as a whole, and the greatest change evident is noted at the known ore deposits; all the injections emanating from basic igneous activity, were competent in the earliest as well as in the latest geologic history of the Peninsula.

The series overlying the ore-bearing sector, are characterized by the incipient segregation of some of the feldspar components into pseudo-crystalline aggregates, giving some of the beds a characteristic "spotted" appearance.

There is also a notable change in the state of the iron content, which is essentially in the ferrous state, considering the series as a whole.

In certain favorable localities, there has been a notable increase in the magnesia content also.

The contact between the upper "spotted" series and the earlier ore-bearing sector is an erosion surface, on which the later spotted series rests unconformably.

Unconformity exists also between the "spotted" series, and the overlaying fossil bearing series.

The apparent strike of all the series is between North 60 to 70 degrees West. It is impressed.

Dikes, representing different periods in the history of the Peninsula, are known over the whole area of the sector.

Their strike varies from approximately North 15 degrees East to North 80 degrees West.

In composition they range from basic to sub-acidic; and in

texture from crystalline to finely aphanitic, suggesting devitrified glass.

Some of the earliest dikes are so far altered that their recognition is only possible through correlation, and the application of the laws of metasomatism, so far as they are known.

The structural conditions on the Peninsula, while appearing simple,- are in reality relatively involved.

There have been two distinctly separate periods in its' history, in which dominant shearing was developed.

As the direction of the forces that caused the second period of shearing, was almost directly opposite to that causing the first period, the impress of the second shearing period was localized along the first formed zones of shearing.

The two periods of shearing, with their attendant and complimentary movements, and the development of the topography, had so far changed the interrelationship of the beds comprising the series, that their identity can be determined with reasonable certainty, only with Microscopic and Chemical analyses supplementing field studies.

The surface of the Peninsula is relatively recent, although the present topography is believed to be a modified and accentuated form of an earlier somewhat similar one.

The most dominant features of the present topography were caused by drag-thrust in the adjacent sector,- somewhat parallel with the long axis of the Peninsula,- and by later igneous activity in the same; that had caused normal faulting and lateral thrust-displacement,- together with rotation of segments, on established fault planes,- transverse to the long axis of the Peninsula.

Three major sheared zones are known. The First-Chichagoff Mining Company is working on the most Northerly one. The Chichagoff Development Company's activity is confined to the middle sheared zone, while the Klag Bay Mining Company has begun exploration and development on the South shear zone. 114-15

As the North and the South sheared zones are localized in the vicinity of the earliest formed dominant fractures of the Peninsula their persistence in depth seems reasonably certain.

THE OREBODIES:

All the orebodies, so far known, are normal occurrences of their type, and typical in all respects of the so-called "deep seated deposits". They are localized at "crossings", and their shape and the direction of their axes depends on the structural and chemical conditions of the place of their being.

As there have been two distinctly separate periods of vein filling, with attendant metalization, and, as the existence of a third metalizing period, without appreciable vein filling -- is definitely established, the size of the individual orebodies and their metallic content is variable.

The parts of the deposits, in all the assured zones, that are assignable to a single period only; are not believed to possess economic value; while those parts, in which all the metalizing periods were competent, are considered relatively high grade in gold content.

The gangue of the deposits is essentially quartz, with a very minor remnant of calcium carbonate in the economically valuable portions, although relatively high gold contents are known to have occurred in some parts of the deposits, where quartz was almost totally absent.

The usual change in content of the Alkalies is noted at known ore occurrences.

Gold is the only economically valuable metal content, at present. Galena, and striated iron pyrites occur, and a very minor amount of magnetite, sphalerite and some manganese are known.

The sphalerite and manganese are believed to be characteristic of the remnants of the oldest surface, while the occurrence of magnetite is believed to be characteristic of the last metalogenetic period, and recent surface.

The injections that had caused vein filling, are believed to have been laterally ascending.

All the known economically valuable deposits are considered to be of epigene origin, and their metallization also; although, as is usual, secondary enrichment and supergene metallization, - (apologies to Ramsay) has been noted at places, in the different orebodies, in negligible amounts. Their occurrence is of academic interest only.

A number of discoveries had been made, in which the metallization is altogether of Supergene origin. They are characteristically

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cally normal to their surroundings, and typical to their occurrences on relatively recent surfaces. None are considered of speculative value. NOTE:- It must be understood that the foregoing remark, regarding the effect of Supergene Metallization, refers to the occurrences on Doolty Peninsula only.

Along the interior of Chichagof Island as a whole, remnants of relatively older surfaces are believed to exist, as segments, in which:- provided that structural conditions are favorable,- the existence of economically valuable deposits of Supergene origin is considered not impossible.

Future exploration, under competent direction, is the only method by which trustworthy data applicable to the interior may be collected.

POSSIBILITIES AND CONCLUSION:

The middle sheared zone is the only one, on which a notable amount of exploration and development was done, so far. (Engineering and Mining Journal-Press, May 17th, 1924).

The Hirst-Chichagoff Mining Company had begun active development only recently, and from evidence available at present, it seems that their workings had penetrated the zone at which all the metalogenetic forces were competent.

The gold content of the last-opened portion of their ore shoot is stated to be fully up to the accepted standard of the locality.

The Klag Bay Mining Company had started work on the "Jumbo Group" and proposes to carry on active exploration. Their holdings comprise the total length of the South sheared zone, in which respect they are in a better position as regards the area that may be explored than those who are working on the middle and North sheared zones, as those zones comprise various holdings on their length.

All the orebodies so far developed were normal to their type, and possessed all the typical characteristics.

Some of the droppings were almost barren of values; some were relatively low in gold content,- while on one -- because of recent erosion, and a small amount of supergene metallization, the values at the surface were relatively high.

Their physical appearance varied, depending on local conditions, but they all conformed to fundamental laws of their type.

The existence of characteristic bodies of "Igneous" rocks,- that are visible on the present surface -- are positively known to occur in depth;- although they were overlooked, because of change in appearance due to successive alterations.

In conclusion: The writer offers, that, if exploration is undertaken on the Peningula at places where the structural and physical conditions appear favorable, and where the results of the various igneous activities are found to be impressed - 'in their normal sequence' - combined with sufficient surfacial evidence at such places: the belief in the possible existence of economically valuable orebodies is thought to be not unreasonable.

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