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INFORMAL NOTES ON A VISIT TO NORTHAIR -

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INTRODUCTION

The aggendum of the writer's recent visit to Northair was approximately as follows:

Sept. 9 - A.M. and P.M. Mr. Roy Wares showed in the field the results of his recent mapping.

10 - A.M. Significance of mapping reviewed in office.

P.M. Mr. Dave Brace described to R.W. and writer the status of work at Brandy.

11 - A.M. Mr. Plen Dickson, R.W. and P.G. visited outcrops in the western portion of the Northair property.

P.M. P.D., Mr John Michel, R.W., D.B., and P.G. discussed exploration at Northair and Brandy, with particular reference to drilling at Northair.

It is proposed in the following notes to review some of the significant features of these conversations with the various people involved in exploration at Northair and Brandy. Except for the first section dealing with classifications, the comments are made more-or-less in the order in which they arose in the conversations with various parties.

CLASSIFICATION OF MINERAL DEPOSITS

The primary reason for trying to classify mineral deposits is to try to anticipate what problems might be encountered - by comparison with similar occurrences elsewhere, to predict what repetitions and/or other types of mineralization might exist in the neighbourhood, and the like. It is not (repeat, not!) to "prove" some genetic theory or other.

Most mineral deposits can be pigeon-holed with ease. The Northair deposit is anomalous in that respect, exhibiting, as it does, some ambiguous features and resisting ready identification. In a previous report the writer argued that the veins at Northair share important features with many base- and precious-metal deposits in greenstone belts. While base-metals deposits in this setting are of two principal types (namely, concentrations of Cu and Ni in mafic flows and layered mafic intrusions, and Au-Ag-Cu-Zn-Pb (polymetallic) massive pyritic sulphides in volcanic and/or sedimentary rocks), precious-metal deposits display a wide variety of "habits". (And, just to complicate things, massive sulphides may grade toward precious-metal occurrences by way of the accumulations of gold and silver in lenses and veins of silica associated with some of the former, eg, Buttle Lake mine, Vancouver Is.; Horne mine, Noranda; and Iron King mine, Yavapai Co., Arizona.) In the circumstances, then, the enigmatic nature of the Northair deposit should not come as too much of a surprise. The impression that it is some type of greenstone type occurrence was reinforced by the recognition by Roy Wares of ferruginous sediments(?) consisting of magnetite and chlorite(?) or various fine-grained iron silicates. (Since, at a hint of metamorphism, the iron silicates in an iron formation convert to chlorite, the distinction is probably not very important.) Besides the potential for other deposits of precious metals to occur, the area must also considered to be favourable for the localization of massive sulphides. This conclusion means, in turn, that the results of ground and airborne EM (and Mag?) surveys could be of direct use in exploration and need not be regarded only as keys to the general geology. This theme will be revived in connection with geochemistry (below).

NOMENCLATURE

Surely it is not necessary to defend the need for the most precise nomenclature attainable with the means at hand, to point out, for example, that there will be fat chance of getting a handle on the shape and relationships of rocks units - and, consequently, of conducting exploration rationally - if various workers use different terms (some of which must be wrong!) for the same rocks encountered in the field and in drill core.

Having emphasized that truism, it must be acknowledged that fragmental rocks - whether or not of volcanic derivation - present some of the most difficult problems of nomenclature in all of geology. All the more reason for taking pains. The difficulty, as with so many geologic problems, arises from the inferential nature of terminology. Thus, a fragmental limestone may be an intraformational conglomerate (or breccia), a (reef?) talus deposit, solution collapse breccia, etc., depending to its relations to adjacent rock units and its inferred mode of origin. Treading the minefield of hypothesis is bad enough, but one must also be aware of - and try to allow for - the bias of specialists. Chert is commonly identified by sedimentary petrologists as a sediment; by volcanologists as a fine volcanic ash or dust. The problem was nowhere better stated than by Moorehouse when he wrote:

> Tuffs and pyroclastics are igneous rocks ejected during volcanic explosions of greater or less violence, but they are deposited in air or water and so share the characteristics, structure and association of sediments. Because of this two-fold character, many tuffs and pyroclastics display seemingly contradictory properties and are among the most puzzling rocks with which the field geologist has to deal (1959, p. 224).

Needless to say, the finer the grain-size of the fragmental material, the more acute is the problem of identification.*

Nevertheless, some areas of common agreement, some things on which one can hang one's hat, do exist, and it behooves the field geologist to make the most of them. The occasion for this discussion arises out of a rock-type encountered in drill core at the mine, and, though to a lesser extent, some of the units which crop out on surface. The unit in

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* A short section from "Volcanoes and Their Activity" by A. Rittman are appended to these notes: p. 74 - 84 seem especially relevant.

question has been identified as a conglomerate, although, in the writer's opinion it would be better described by terms like agglomerate or volcanic breccia (prefixed, if desired, by its putative composition). Since the difficulty with pyroclastic rocks and rock names has already been acknowledged, perhaps it would be desirable to approach the subject through sedimentology, beginning with the meaning of "conglomerate". Allowing for the bias of specialists noted above, a sedimentary petrologist might be expected to give the most inclusive definition (analogous to "claiming" chert). According to Pettijohn, then: "the term *conglomerate* (German: Konglomerat; French: conglomerat) is applied to indurated gravels. As in the case of gravel the terms *pebble, cobble or boulder*.... may be prefixed...." (1957, p. 244). "A *gravel* (German: *Schotter*, for coarse gravel; *Kies*, for fine gravel; French: *gravier*)" Pettijohn had noted on the previous page "is an unconsolidated accumulation of rounded fragments larger than sand." (Ibid., p. 243). The writer checked about half-a-dozen references - including text-books and glossaries - and found a surprising degree of unanimity. Although differences exist regarding the minimum proportion of fragments to matrix, the bottom limits of grain size and degree of "roundness" (as employed by sedimentary petrologists), all agreed on the essential nature of particle shape and size in framing a definition. The word is that rare bird in geologic jargon: a truly descriptive term!* So whatever the offending rock unit is, it is clear-

* The fact that debate exists over limits does not mean the word is not descriptive: one can differ over the limits of purple, red, orange, yellow, green, blue and violet, but that does not mean that these terms cannot be objectively used.

ly not a conglomerate. Since it is a fragmental rock, composed of some 5 to 10 percent (by volume) of angular fragments measuring up to 5 to 6 cm in diametre, these (and the fine-grained matrix?) appear to be volcanic, (and is evidently not a conglomerate). it must be a pyroclastic rock - volcanic breccia, tuff-agglomerate, etc. depending on the break-down favoured by the organization or individual involved.

The distinction between sub-aerial and sub-aqueous deposition is not essential for or primary to the correct identification of pyroclastic rocks: it is secondary. Since the differences can be extremely hard to spot, this is just as well. Both water and air are fluids (even if they differ in viscosity) and laminations, cross- or fore-set bedding, graded bedding, ripple marks, and the like, can all be observed forming in contemporary sediments or reproduced in a laboratory. While it is said that ripple marks formed in air and water may be distinguished by the ratio of wave-length to amplitude, it is doubtful if this criterion would provide much joy to mining geologists (especially when dealing with deformed rocks?). A sense of priorities must be maintained at all times.

The writer makes no apology for discussing such a seemingly esoteric or academic subject. When Buttle Lake was first visited two-and-a- half years ago the main reason given for not thoroughly investigating the "north flank" which contains the H-W Zone was that, since any mineralization found there is "distal", it could not be of much value! That single word, "distal", either pre-formed the policy (without thoughtful debate) or provided a convenient rationalization for a set position. The writer tried - not altogether successfully - to get rid of such garbage words as feeder or vent zone, proximal, distal, volcanogenic, and the like.

GEOCHEMICAL AND GEOPHYSICAL SURVEYS

Experience has shown that geochemical surveys are capable of detecting the presence of mineralization on the Northair property. At the same time the expression of the known deposits is acknowledged to have been complex, the three identified zones differing in their geochemical response.

During the discussions with Glen White and others, it was observed that, although samples were collected for a large part of the Northair ground and the trace metal contents determined, the results have not yet been compiled on a map. In light of the subtlety of the geochemical "finger-print" of known mineralization, the cost of plotting these data on a map(s) (compared to the amounts spent on exploration?), the pressing need for additional ore, and so on, an attempt to analyse this information would seem to represent a worthwhile endeavour (if only on a "rainy day"?).

It seems to the writer that the need still exists to try to improve the discrimination of geochemical results. One way of accomplishing this worthy goal would be to find more diagnostic metals (than Au, Ag, Cu, Zn and Pb), such as mercury or, as proposed by Glen White, manganese. Manganese is a very common constituent (maybe too common?) of many types of concentrations of precious-metals, especially those containing silver, as well as of most massive sulphide hosts. Another, proposed by Roy Wares, would be to prepare a few soil profiles in anomalous areas. Speaking about anomalies, a statistical analysis of what is anomalous would also seem to be in order. Before leaving the subject of geochemistry in the Northair property it might be worth noting that the explicit recognition of a massive sulphide potential (see "Classification of Mineral Deposits", p. 2) surely influences the interpretation of survey results.

Considering what is already known about the general geology of the Brandy area, plus the outcome of prospecting and of geochemical and geophysical surveys conducted by Noranda and the Company, the preliminary review of the recent flying was distinctly encouraging. It now seems appropriate to (a) get the data on paper as soon as possible (this requires, among other things, a recent photo base) and (b) a determination of the nature of the conductors and sources of trace metals by the most practicable means available (pitting, trenching, eventually drilling).

Tucson, Arizona.
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Signed:

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REFERENCES CITED

Moorehouse, W.W., 1959. The study of rocks in thin sections: Harper's Geoscience Series, Harper and Row, Publishers, New York and Evanston, 514 p.

Pettijohn, F.J., 1957. Sedimentary rocks (Second Edition): Harper's Geoscience Series, Harper and Brothers, New York, 718 p.