

DESCRIPTIVE NOTES

MAP-AREA 46 P/3 CONTAINS A WELL EXPOSED CROSS SECTION OF FEATURES OBSERVED TO THE WEST IN MAP-AREA 46 P/4 AND IS TYPIFIED BY LARGE SCALE INTERSECTIONS OF THE BASEMENT COMPLEX WITH THE COVER OF THE PENNYN GROUP METASEDIMENTS. THE COMPLEX, CONTAINING A VARIETY OF GRANITOID GNEISSIC ROCKS (A_{gdn}) INTRODUCED AT SOME TIME PRIOR TO DEFORMATION BY AMPHIBOLITE DYKES (A_{m}) AND GRANITIC PLUTONS (A_{p}), IS OVERLAIN BY A SUCCESSION OF METASEDIMENTS COMPOSED OF NEARLY EVERY ROCK TYPE COMMON TO THE PENNYN GROUP.

ORTHOGUARTZITE (A_{o}) AND GARNET-SILLIMANITE PARAGNEISS (A_{p}) FORM THE BASAL SEQUENCE AT THE SOUTHERN CONTACTS BETWEEN BASEMENT AND COVER AND ARE FOLLOWED BY A THICK MARBLE UNIT (A_{m}) CONTAINING NUMEROUS THIN BEDS OF CALCIO-SILICATE GNEISS (A_{p}) AND RUSTY PARAGNEISS (A_{p}). THE MARBLE UNIT APPEARS TO THIN SOUTHWARD, IN PART PERHAPS, BECAUSE OF TECTONIC EFFECTS. THE STRATIGRAPHIC SUCCESSION CHANGES UPWARD GRADUALLY FROM MARBLE TO PARAGNEISS WITH MUCH INTERFINGERING. THE PARAGNEISS UNIT CONTAINS TWO THIN BUT EXTENSIVE SHEETS OF GNEISS (A_{gdn}), POSSIBLY ERODED BY MOVEMENT ON LOW ANGLE REVERSE FAULTS. ABOVE THE GNEISSIC SHEETS PARAGNEISS PASSES GRADUALLY INTO BIOTITE QUARTZITE AND QUARTZ-BIOTITE PSAMMITE (A_{p}). THE LINE OF DIVISION BETWEEN UNITS A_{p} AND A_{p} IS ARBITRARY, BASED PRIMARILY ON THE GREATER VISIBLE QUANTITY OF FELDSPAR IN THE FORMER. THE NORTHERN LIMITS OF THE PENNYN GROUP IN THIS AREA ARE OBTAINED BY NUMEROUS GRANITIC INTRUSIONS (A_{p}). THESE ARE ALSO COMMON AT SLIGHTLY LOWER STRUCTURAL LEVELS ALONG THE COAST WHERE THE METAMORPHIC TRANSITION FROM BIOTITE-GARNET PARAGNEISS TO QUARTZ-BIOTITE PSAMMITE IS BEST SEEN, AND WITHIN THE BASEMENT COMPLEX TO THE NORTH.

EARLY STRUCTURES POSSIBLY ATTRIBUTABLE TO D_1 AND D_2 FOLDING FORM PREVALENT FOLIATION WHICH IN METASEDIMENTARY ROCKS PARALLELS COMPOSITIONAL LAYERING. THE LARGE RECURRENT ISOCLINAL FOLD POSTULATED TO LIE IN THE SOUTHERN PART OF THE AREA LIKELY FORMED DURING D_2 . THE ORIGINAL ORIENTATION OF THE FOLD CANNOT BE DEDUCED GIVEN ITS LIMITED LATERAL EXTENT. TO THE NORTH, SOME APPARENTLY EARLY (D_2) MESOSCOPIC FOLDS OBSERVED IN PARAGNEISS NEAR THE LARGE EXPOSURES OF ORTHOGUARTZITE NEAR THE CENTRAL PART OF THE MAP-AREA HAVE NORTHERLY TRENDING AXES. THIN OVERTURNED MESOSCOPIC FOLDS IN THIS AREA ARE LESS ATTENUATED AND APPEAR TO DEFORM BEDDING AND FOLIATION (S_2) AND MAY HAVE FORMED DURING D_3 . SEPARATION OF THESE PHASES IS EQUIVOCAL.

THrust faults postulated to be lower bounds to gneissic sheets within the PENNYN GROUP ARE HYPOTHETICAL; NO FIELD EVIDENCE SUPPORTING THEIR EXISTENCE WAS OBSERVED WITHIN THE PERSUASIVELY SHEARED ROCKS. THE POSSIBILITY THAT THE SHEETS WERE ERODED AS SILLS AND SUBSEQUENTLY DEFORMED REMAINS A VIABLE ALTERNATE HYPOTHESIS. THE SOUTHERN OF THE TWO FAULTS SHOWN ON THE CROSS-SECTION IS PARTICULARLY APPROPRIATE, BEING PLACED WITHIN A ZONE OF EXTENSIVE PEGMATITE AND SUGGESTED SOLELY BECAUSE OF GEOMETRIC REQUIREMENTS. SUCH FAULTING, IF IT DID OCCUR, MUST BE ASSOCIATED WITH D_2 OR D_3 FOLDING. LARGE UPRIGHT D_4 FOLDS AFFECT EARLY RECURRENT STRUCTURES AND THRUST FAULTS AND HAVE VARIABLE PLUNGES TO THE WEST AND EAST. SUCH VARIATION IS PRESUMED TO BE CAUSED IN PART BY D_3 TRANSVERSE WARPING ALTHOUGH THE FORM OF SUCH FOLDS IS NOT CLEAR IN THIS AREA. NORTHERLY TRENDING FAULTS FORMED DURING D_4 OFFSET UNITS LEFT-LATERALLY. APPARENT DISPLACEMENT OF ABOUT 1 KM. IS VISIBLE ON THE LARGE FAULT NEAR THE COAST.

METAMORPHISM OF THE PENNYN GROUP PRODUCED TWO LITHOLOGIC UNITS. MOST OF THE GROUP IS IN UPPERMOST AMPHIBOLITE FACIES AND CONTAINS THE ASSEMBLAGES GARNET-BIOTITE-SILLIMANITE AND CORNELLITE-SILLIMANITE-GARNET IN PARAGNEISS AND IN MARBLE. DIOPHIDE-CALCITE AS WELL AS SCAPOLITE AND A HUMITE GROUP MINERAL. ROCKS OF THE UPPERMOST UNIT OF THE GROUP ARE IN GREENSCHIST FACIES AND CONTAIN CHLORITE-MUSCOVITE-QUARTZ IN PELTIC UNITS. PORPHYROBLASTS OF A MINERAL TENTATIVELY IDENTIFIED AS ANDALUSITE ARE COMMON IN META-PASMITIC UNITS AND TRENOLITE OCCURS SPORADICALLY IN CALCAREOUS ROCKS.

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GENERAL GEOLOGY

THE FOX FOLD BELT EXTENDS IN AN EAST-NORTHEAST DIRECTION FROM SOUTHERN MELVILLE PENINSULA TO CENTRAL BAFFIN ISLAND. IT IS COMPOSED OF GRANITOID GNEISSIC ROCKS OF ARCHAIC AGE (2500 Ma AND OLDER) OVERLAIN BY META-SEDIMENTARY ROCKS OF EARLY PROTEROZOIC AGE (APPROXIMATELY 2500 TO 1700 Ma) OF THE PENNYN AND FALLS GROUPS. THESE ROCKS HAVE UNDERGONE POLYPHASE DEFORMATION AND METAMORPHISM MOSTLY DURING THE HUDSONIAN OROGENY. GENERATION AND EMPLACEMENT OF PLUTONIC ROCKS PRECEDED, ACCOMPANIED AND FOLLOWED DEFORMATION. DIABASE DYKES OF PRESUMED LATE PROTEROZOIC AGE CUT OLDER ROCKS.

THE ARCHAIC ROCKS FORM A BASEMENT COMPLEX PREDOMINANTLY OF GRANITOID GNEISS (A_{gdn}) AND FOLIATED GRANITIC ROCKS (A_{p}) WITH RELATIVELY MINOR AMOUNTS OF AMPHIBOLITE (A_{m}) AND PARAGNEISS (A_{p}) AND OTHER META-SEDIMENTARY ROCKS (A_{p} , A_{m}). THE GNEISSIC AND PLUTONIC ROCKS ARE LARGELY OF QUARTZ MONZONITIC TO GRANODIORITIC COMPOSITION; LEUCOCRATIC AND MAFC VARIETIES OF GNEISS ARE ALSO COMMON BUT DO NOT CONSTITUTE A LARGE VOLUME OF THE COMPLEX. GNEISSIC LAYERING AND MINERAL FOLIATION FORMED BY BIOTITE AND HORNBLende ARE UBIQUITOUS BUT NOT ALWAYS CLEARLY VISIBLE. PLUTONIC ROCKS EMPLACED DURING AT LEAST THREE EPISODES OF IGNEOUS ACTIVITY CAN BE DIFFERENTIATED LOCALLY BUT CANNOT EASILY BE MAPPED REGIONALLY BECAUSE THEY ARE COMPOSITIONALLY SIMILAR TO ONE ANOTHER AND TO THE GNEISS WHICH APPEARS TO BE BOTH HOST AND PARENT TO THEM. DEFORMED AMPHIBOLITE BODIES, PRESUMED TO BE DYKES, ARE OFTEN OBSERVED WITHIN THE COMPLEX AND SOMETIMES AT THE CONTACT WITH THE PENNYN GROUP, WITH FEW EXCEPTIONS THEY HAVE NOT BEEN OBSERVED WITHIN THE GROUP AND ARE PRESUMED TO BE PRE-DATE IT. META-SEDIMENTARY AND META-VOLCANIC ROCKS NOT DEMONSTRABLY PART OF THE PENNYN GROUP HAVE IN SOME PLACES BEEN ASSIGNED TO THE BASEMENT COMPLEX BUT THEIR AFFINITY IS UNCERTAIN GIVEN THE EVIDENT INTRICACIES OF STRATIGRAPHY AND STRUCTURE. SOME LITHOLOGIC SIMILARITY TO ROCKS OF THE PRINCE ALBERT GROUP IN NORTHERN MELVILLE PENINSULA EXISTS BUT SUCH CORRELATION IS TENUOUS AT BEST.

THE PENNYN GROUP CONSISTS OF PARAGNEISS (A_{p} , A_{p}) AND MARBLE (A_{m}) WITH SOME QUARTZ-BIOTITE PSAMMITE (A_{p} , A_{p}) AND CALCIO-SILICATE GNEISS (A_{p}) AND MINOR QUARTZITE (A_{p}). GARNET, BIOTITE AND SILLIMANITE SCHISTS (A_{p}), AND META-VOLCANIC ROCKS (A_{p} , A_{p} , A_{p}). COMPLETE UNDERSTANDING OF THE STRATIGRAPHIC SUCCESSION IS LACKING AS MOST UNITS ARE DISCONTINUOUS AND LENSOID AND THE POSSIBLE FACTORS OF THE EXISTENCE OF FACIES CHANGES, INCONGRUITIES AND CRYPTIC EARLY STRUCTURES RENDER ITS DELINEATION DIFFICULT. A GENERAL ORDER TO THE UNITS CAN BE INDICATED, NONETHELESS. A THIN (50-100 M) BASAL SEQUENCE INCLUDES ORTHOGUARTZITE, RUSTY SILLIMANITE SCHIST, A SUSPECTED META-REGOLITH AND MINOR AMPHIBOLITE, MARBLE AND QUARTZ-FELSPATHIC GRIT. THIS SEQUENCE IS OVERLAIN BY A PREDOMINANTLY CALCAREOUS UNIT OF MARBLE, CALC-SILICATE GNEISS AND INTERBEDDED QUARTZ-BIOTITE-FELSPAR PARAGNEISS. THE CALCAREOUS UNIT IS FOLLOWED BY A THICK UNIT OF PARAGNEISSIC ROCKS WITH A THIN BED OF SCHISTOSE PARAGNEISS AT ITS BASE, AND A UNIT OF MARBLE, CALC-SILICATE GNEISS AND BIOTITE QUARTZITE. AT THE HIGHEST OBSERVED STRUCTURAL AND STRATIGRAPHIC LEVELS IS A UNIT OF QUARTZ-BIOTITE-MUSCOVITE PSAMMITE AND GREYWACKE. THE TOP OF THIS UNIT HAS NOT BEEN OBSERVED. THE RELATIONSHIP OF PRESENT TO ORIGINAL THICKNESS OF THE FOLD IS WELL DISCUSSED BY THE RIVAL PROCESSES OF THINNING DURING DEFORMATION, REPETITION BY FOLDING AND DILATION BY SYNTECTONIC PLUTONISM.

Brown and rusty weathering, schistose, biotite-garnet-sillimanite paragneiss. The PENNYN GROUP APPEARS TO LIE UNCONFORMABLY ON THE BASEMENT COMPLEX. TECTONISM HAS OBTAINED ANY ANGULAR DISCORDANCE AND UNCONFORMABLE RELATIONSHIPS ARE INFERRED BECAUSE OF THE CLEAR LITHOLOGIC CONTRAST AND THE COMMON PRESENCE OF THE THIN ORTHOGUARTZITE UNIT WITH RARE FELSPATHIC GRIT BEDS LYING UPON A VARIETY OF ROCK TYPES IN THE COMPLEX. THE UPPERMOST UNIT OF THE PENNYN GROUP MAY BE SEPARATED FROM THE REST OF THE GROUP BY AN UNCONFORMITY. CONTRAST IN INTENSITY OF METAMORPHISM AND DEFORMATION AND UNEXPLAINED STRUCTURAL DISCORDANCE SUPPORT SUCH AN INTERPRETATION BUT RAPID TRANSITIONS OR FAULTING REMAIN VIABLE ALTERNATE EXPLANATIONS.

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