NOTES ON SOME MARIE BYRD LAND ROCKS

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ABSTRACT

A petrographic qualitative study has been made of forty-four metamorphic and three sedimentary rocks of the Edsel Ford Ranges, Marie Byrd Land, Antarctica, and comparisons made between these rocks and those examined from other Antarctic lands.

INTRODUCTION

A brief review of the literature pertaining to the petrography of the Pacific Antarctic reveals that thirty-four reports have been published which describe rocks collected between the meridians 180° and 90°W., and between the meridians 80° and 50°W.[1] Little attention has been devoted to the study of the metamorphic rocks in the areas delimited by those meridians, and virtually nothing is known about the rocks included between those two sectors. A brief report on the petrography of the metamorphics collected at Scott's Nunataks, King Edward VII Land, has been made by Schetelig.[2] The author[3] has published a report on quantitative microscopical analyses of some schists collected in the Queen Maud Mountains, Marie Byrd Land, and Wade[4] has made a statement about the metamorphic rocks of the Edsel Ford Ranges, Marie Byrd Land.

A number of metamorphic rocks of South Victoria Land have been described by Mawson,[5] Prior,[6] Schetelig,[7] Smith,[8,9] Stewart,[10] and Wool-

[1] Stewart, Duncan, Jr., Petrography of rocks from the Pacific Antarctic: *Proc. Sixth Pac. Sci. Cong.*, 1939, 741–746 (1940).

[2] Schetelig, J., Report on the rock specimens collected on Roald Amundsen's South Pole Expedition: *Videnskapsselskapets Skrifter, I, Mat. -naturv Klasse*, No. **4,** 21–25, Christiania (1915).

[3] Stewart, Duncan, Jr., A contribution to Antarctic petrography: *Journ. Geol.*, **42,** No. 5, 546–548 (1934).

[4] Wade, F. A., Petrologic and structural relations of the Edsel Ford Range, Marie Byrd Land, to other Antarctic mountains: *Bull. Geol. Soc. Am.*, **48,** 1390–1391 (1937).

[5] Mawson, D., Petrology of rock collections from the mainland of South Victoria Land. Contributions to the paleontology and petrology of South Victoria Land: British Antarctic Expedition, 1907–9, under the command of Sir. E. H. Shackleton, *Reports of the Scientific Investigations, Geology,* **II,** Part XIII, 230–232 (1916).

[6] Prior, G. T., Report on the rock specimens collected during the 'Discovery' Antarctic Expedition, 1901–04: National Antarctic Expedition, 1901–1904, Natural History, Vol. I, *Geology* (Field-Geology: Petrography), Part **II,** 124–125 (1907).

[7] Schetelig, J., *op. cit.*, 11–12.

nough.[11] Probably the most noteworthy report on Antarctic metamorphic rocks is the monograph by Stillwell,[12] treating of Adelie Land specimens. Three other reports of the Australasian Antarctic Expedition should be noted, namely, by Coulson,[13] Stillwell,[14] and Tilley.[15]

Acknowledgments

This study has been carried on at the request of Dr. F. Alton Wade who collected the specimens in the Edsel Ford Ranges. Dr. Wade has kindly loaned the author forty thin sections of the metamorphic specimens and three of the sedimentary rocks. He has donated to the University of Michigan Antarctic collections a suite of fifty-one rocks, making the total number of pieces, from various parts of the Antarctic, in the collections at the present time, three hundred and eighty-one.

Characteristics of the Rocks

The metamorphic rocks, of which qualitative microscopical analyses of forty-four thin sections are recorded in Table 1, were collected in the Edsel Ford Ranges, Marie Byrd Land (Fig. 1). The two sandstones examined are from Mt. 73, Claude Swanson Mountains, and correspond mineralogically to the sandstones of the Beacon formation of South Victoria Land.[16] The oolitic limestone was collected at Mt. Corey, and is one of two specimens labeled "carbonate pisolites." The size of a few particles indicates that the diameters are less than two millimeters,

[8] Smith, W. Campbell, and Debenham, F., The metamorphic rocks of the McMurdo Sound region. The metamorphic rocks of South Victoria Land: British Antarctic ("Terra Nova") Expedition, 1910, Natural History Report, *Geology*, **I,** No. 5a, 131–144 (1912).

[9] Smith, W. Campbell, and Priestley, R. E., The metamorphic rocks of the Terra Nova Bay region: *Ibid.*, No. **5b,** 145–165 (1921).

[10] Stewart, Duncan, Jr., The petrography of some rocks from South Victoria Land: *Proc. Am. Philosophical Soc.*, **74,** No. 4, 309–310 (1934).

[11] Woolnough, W. G., Petrological notes on some erratics collected at Cape Royds. Contributions to the paleontology and petrology of South Victoria Land: British Antarctic Expedition, 1907–9, under the command of Sir. E. H. Shackleton, *Reports of the Scientific Investigations, Geology*, **II,** Part XI, 183–186 (1916).

[12] Stillwell, F. L., The metamorphic rocks of Adelie Land: Australasian Antarctic Expedition, 1911–1914, *Scientific Reports*, Series A, **III,** Part I, 1–230 (1918).

[13] Coulson, A. L., Magnetite garnet rocks from the moraines, Cape Denison, Adelie Land: *Ibid.*, Part **5,** 281–305 (1925).

[14] Stillwell, F. L., Amphibolites and related rocks from the moraines, Cape Denison, Adelie Land: *Ibid.*, Part **4,** 259–280 (1923).

[15] Tilley, C. E., Metamorphic limestones of Commonwealth Bay, Adelie Land: *Ibid.*, Part **2,** 231–244 (1923).

[16] Stewart, Duncan, Jr., The petrography of the Beacon Sandstone of South Victoria Land: *Am. Mineral.*, **19,** 351–359 (1934).

therefore oolitic is the preferred term. Skeats[17] has reported on an oolitic limestone erratic from the Cloudmaker, Beardmore Glacier, South Victoria Land.

Quartz showing undulatory extinction is present in all nine of the gneisses examined. Zoning of the acid plagioclases is recorded in eight sections and micrographic intergrowths are seen in five of the gneisses.

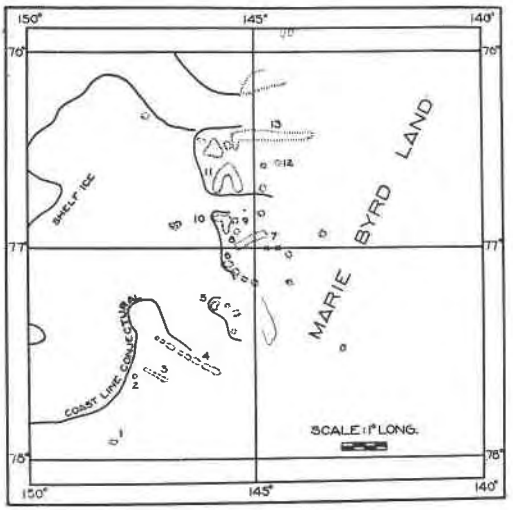

FIG. 1. Sketch map of the Edsel Ford Ranges, Marie Byrd Land (after Chart No. 5412, 1st ed., Sept., 1939, published at the Hydrographic Office, U. S. Navy, and F. Alton Wade).

1. Mt. Grace McKinley.
2. Mt. 5.
3. Garland Hershey Ridge.
4. Haines Mts.
5. Donald Woodward Mt.
6. Mt. Rea.
7. Claude Swanson Mts.
8. Mt. 73, Claude Swanson Mts.
9. Mt. Stancliffe.
10. Mt. Saunders.
11. Chester Mts.
12. Mt. Corey.
13. Raymond Fosdick Mts.

In one section (155x) there is evidence of antiperthite. Tilley[18] has reported the occurrence of antiperthite in a coarse pegmatitic quartz diorite, in an acid member of the charnockite series, in three garnet orthogranulites and in two specimens of igneous gneiss erratics from Proclama-

[17] Skeats, E. W., Report on the petrology of some limestones from the Antarctic. Contributions to the paleontology and petrology of South Victoria Land: British Antarctic Expedition, 1907–9, under the command of Sir E. H. Shackleton, *Reports of the Scientific Investigations, Geology*, **II,** Part XII, 191–192 (1916).

[18] Tilley, C. E., Rocks from Enderby Land: B.A.N.Z. Antarctic Research Expedition, 1929–1931, under the command of Sir Douglas Mawson, Reports, Series A, **II** (*Geology*), Part **1**, 5, 6, 9, 12 (1937).

tion Island, Enderby Land. He[19] has reported antiperthitic plagioclase as occurring in some of the paragneisses and granite and granodiorite gneisses from Cape Bruce, MacRobertson Land. The author[20] has reported the occurrence of antiperthite in three igneous and one metamorphic erratics from the Terra Nova Bay region, South Victoria Land. Bent plagioclase twinning lamellae are seen in three sections of gneisses from the Edsel Ford Ranges. Dark dust-like inclusions which are probably magnetite are noted in the apatites of two slides. This same feature is seen in the sections of intrusives from Marie Byrd Land.

Smith's report[21] on para-diopside granulite erratics indicates that there is similarity in mineral composition between the Terra Nova Bay, South Victoria Land, specimens and the diopside granulite collected by Wade at Donald Woodward Mt. Walkom[22] has described some pyroxene granulites collected as erratics at Cape Royds, Ross Island, South Victoria Land, that show similarity to the granulite collected by Wade.

Discussion

Wade[23] states:

> Of the metamorphic rocks observed and studied the only one which might be considered to represent the basement complex of East Antarctica is the granite gneiss of the Raymond Fosdick Mountains. The metamorphosed sedimentary series has not undergone such intense alteration as the basement gneiss, and no minerals characteristic of high temperature metamorphism were noted in the thin sections examined. Recrystallization varies in intensity, and cataclastic texture is exceptional.

After a review of the literature pertaining to the petrography of Antarctic metamorphic rocks and an examination of Wade's and other thin sections of Antarctic metamorphics, it may be said that none of the rocks collected by him show East Antarctica basement complex affinities. The gneisses from the Raymond Fosdick Mountains are relatively simple in mineralogical composition and exhibit some characteristics under the microscope of the intrusives of the Edsel Ford Ranges, such as zoned feldspar and micrographic intergrowths, and lack features commonly referred to as characteristic of the metamorphosed basement rocks.

[19] Tilley, C. E., Rocks from MacRobertson Land, Antarctica: *Ibid.*, Part **2**, 20, 22 (1937).

[20] Stewart, Duncan, Jr., Petrography of some rocks from South Victoria Land: *Am. Mineral.*, **24**, 158 (1939).

[21] Smith, W. Campbell and Priestley, R. E., *op. cit.*, 156–158.

[22] Walkom, A. B., Report on the pyroxene granulites collected by the British Antarctic Expedition, 1907–1909. Contributions to the paleontology and petrology of South Victoria Land: British Antarctic Expedition, 1907–9, under the command of Sir E. H. Shackleton, *Reports of the Scientific Investigations, Geology*, **II**, 161–168 (1916).

[23] Wade, F. A., *op. cit.*, 1390–1391.

Reference has been made to myrmekite, diablastic structure, micrographic intergrowths and micropegmatite in Antarctic literature. Smith[24] remarks that erratics of pyroxene gneiss, collected at Cape Bernacchi and Marble Point, McMurdo Sound, South Victoria Land, exhibit well-developed myrmekite. He[25] refers, also, to the gneisses of Cape Sastrugi and records that in some types in thin section no signs of metamorphism are apparent, except the development of myrmekite in the plagioclase. The author has noted micrographic intergrowths in a section of muscovite-biotite schist collected by Gould at the base of a cliff two miles east of the foot of Liv Glacier, South Victoria Land. Prior[26] records the fact that in the metamorphics studied by him from South Victoria Land micropegmatite is characteristic of some gneisses. Stillwell[27] states that in a number of the Adelie Land sections diablastic structure is noted. Schetelig[28] notes the presence of myrmekite along the borders of microcline in granite gneiss from Mt. Betty, South Victoria Land. He[29] also records an interesting intergrowth of quartz and bytownite in an amphibolite from Scott's Nunataks, King Edward VII Land. Tilley[30] states that myrmekitic plagioclase is present in three garnet orthogranulites and in three erratics of igneous gneisses from Proclamation Island, Enderby Land. He[31] records myrmekitic structures in the granite and granodiorite gneisses of MacRobertson Land.

In none of the reports on the basement rocks of East Antarctica is the zoning of plagioclase in the metamorphics mentioned. As previously stated, eight of the nine sections of gneisses examined from Marie Byrd Land contain zoned plagioclase. The author has noted zoned plagioclase in one specimen of oligoclase-biotite gneiss, collected by Gould, at O'Brien Peak, Queen Maud Mountains, South Victoria Land. Schetelig[32] does record the presence of indistinct zoning of the plagioclase in an amphibolite from Scott's Nunataks, King Edward VII Land. A study by the author of the metamorphics collected by Gould at Supporting Party Mountain, Queen Maud Mountains, Marie Byrd Land, revealed the fact that micrographic intergrowths were present in only one of the eleven thin sections of the seven metamorphic rocks examined and that none of the sections exhibited zoned plagioclase. Considering the careful

[24] Smith, W. Campbell, and Debenham, F., *op. cit.*, 143.
[25] *Ibid.*, 150.
[26] Prior, G. T., *op. cit.*, 124–125.
[27] Stillwell, F. L., *op. cit.*, 25.
[28] Schetelig, J., *op. cit.*, 11.
[29] *Ibid.*, 21–22.
[30] Tilley, C. E., *op. cit.*, 9, 12.
[31] Tilley, C. E., *op. cit.*, 22.
[32] Schetelig, J., *op. cit.*, 21.

investigations that have been carried on and the noticeable lack of a mention of zoned plagioclase in Antarctic metamorphic rocks, this structure might well be considered as a characteristic of some of the gneisses of the Edsel Ford Ranges.

In the rocks collected farther south in Marie Byrd Land, at Supporting Party Mountain, such minerals as garnet and sillimanite were noted. The Adelie Land metamorphics are apparently characterized by such minerals as cordierite, garnet, hypersthene, kyanite, scapolite and sillimanite; the South Victoria Land rocks collected in the McMurdo Sound region, by andalusite, cordierite, garnet and sillimanite, and the metamorphics of Enderby and MacRobertson Lands are characterized by similar minerals. These minerals, as far as is known, are not characteristic of the rocks of the Edsel Ford Ranges.

From what data is available it appears that the majority of the metamorphics examined from the Edsel Ford Ranges were originally sedimentary rocks, with the exception of the gneisses which show in many instances preserved igneous characteristics.

Conclusions

A review of the literature and a study of thin sections of rocks from Marie Byrd Land and other Antarctic lands indicates that the metamorphic types from the Edsel Ford Ranges are quite different mineralogically from the metamorphic basement rocks of certain other parts of the Continent and must be considered of an age other than pre-Cambrian. Further field data must be supplied before the age of the metamorphics can be ascertained.

TABLE 1. MINERALOGICAL COMPOSITION OF SOME METAMORPHIC ROCKS FROM MARIE BYRD LAND

Mineral	Specimen																							
	119	155	155x	175	186	259	265A	265B	177	90	92	93	94	156	163	89	167	607	216B	37	391	40	16	38
Quartz	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
Cryptocrystalline quartz	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	p	–	–	–	–
Feldspar (undet.)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Orthoclase	–	–	–	–	–	p	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Microperthite	–	–	p	p	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	p	–	–
Acid plagioclase	–	–	–	p	–	–	–	–	–	–	–	p	–	–	–	–	p	p	p	–	–	p	p	p
Oligoclase	–	p	p	–	–	p	p	p	p	p	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Oligoclase-andesine	p	–	–	–	p	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Andesine	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Bytownite	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Diopside	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Green hornblende	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Biotite	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	–	–	–	–	p
Chlorite	–	–	p	p	–	p	p	p	–	p	–	p	–	p	–	–	p	p	p	–	–	–	–	p
Muscovite	–	p	p	p	–	p	p	p	p	p	p	p	p	p	–	p	p	p	p	p	p	–	p	p
Apatite	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
Zircon	p	p	p	p	p	p	p	p	p	p	p	p	p	–	p	p	p	p	p	p	–	p	p	p
Tourmaline	–	–	–	–	–	–	p	–	–	p	p	p	p	–	p	p	–	p	p	p	p	–	p	p
Yellow rutile	–	–	–	–	–	p	p	p	p	–	–	–	–	–	p	–	–	–	–	?	–	–	?	–
Pistacite	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Zoisite	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Sphene	–	–	–	p	–	–	–	–	–	–	–	–	–	–	–	–	–	–	p	–	p	–	–	p
Fluorite	–	p	p	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Rutile (?) needles	–	p	p	–	–	–	–	–	–	p	–	–	–	–	p	–	p	–	–	p	–	p	p	p
Magnetite	–	p	p	p	p	p	p	p	p	p	p	p	p	–	p	p	–	p	p	p	p	p	p	p
Ilmenite	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	p	p
Pyrite	–	–	–	–	p	–	p	p	–	–	–	–	–	–	–	p	–	–	p	–	–	–	p	p
Hematite	–	p	p	p	p	p	p	p	p	p	–	p	–	–	p	p	–	–	p	–	p	p	p	p
Limonite	–	p	p	p	p	–	p	–	p	p	p	p	p	–	p	p	–	–	p	p	p	p	p	–
Leucoxene	–	–	–	–	–	–	–	–	p	p	–	–	–	–	p	–	–	–	–	p	p	p	p	p
Calcite	–	–	–	–	–	–	–	–	–	p	–	–	–	–	–	–	–	–	–	–	p	p	p	p
Sericite	p	p	p	p	p	p	p	p	p	p	–	–	–	–	–	–	p	p	p	p	–	–	–	–
Kaolin	–	p	p	p	p	p	p	–	p	–	–	–	–	–	–	–	p	p	–	–	–	–	–	–

p = present in thin section.

119. Biotite gneiss. Raymond Fosdick Mts.
155. Biotite gneiss. Erratic Mt. Rea.
155x. Biotite gneiss. Erratic. Mt. Rea.
175. Biotite gneiss. Raymond Fosdick Mts.
186. Biotite gneiss. Raymond Fosdick Mts.
259. Biotite gneiss. Raymond Fosdick Mts.
265A. Biotite gneiss. Raymond Fosdick Mts.
265B. Biotite gneiss. Raymond Fosdick Mts.
177. Muscovite-biotite gneiss. Chester Mts.
90. Biotite schist. Mt. Rea.
92. Biotite schist. Mt. Rea.
93. Biotite schist. Mt. Rea.
94. Biotite schist. Mt. Rea.
156. Biotite schist. Mt. Rea.
163. Biotite schist. Donald Woodward Mt.
89. Biotite-muscovite schist. Mt. Rea.
167. Muscovite-biotite schist. Mt. Rea.
607. Muscovite-biotite schist. Mt. Grace McKinley.
216B. Quartz schist. Mt. 73, Claude Swanson Mts.
37. Limonitic quartz schist. Garland Hershey Ridge.
391. Calcareous quartz schist. Mt. Corey.
40. Sericite-quartz schist. Haines Mts.
16. Calcareous sericite-quartz schist. Haines Mts.
38. Calcareous sericite-quartz schist. Haines Mts.

TABLE 1 (*Continued*). MINERALOGICAL COMPOSITION OF SOME METAMORPHIC ROCKS FROM MARIE BYRD LAND

Mineral	Specimen																			
	102	109	219	17	34	189	52	64	105	36	215a	215b	230G	39	288	152	161	181	230A	168
Quartz	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
Cryptocrystalline quartz	–	–	–	–	p	–	–	–	–	–	–	–	–	–	p	–	–	p	p	–
Feldspar (undet.)	–	–	–	–	–	–	–	p	–	–	–	–	–	–	–	–	–	–	–	–
Orthoclase	p	–	p	–	–	–	p	–	–	–	–	–	–	–	p	–	–	p	–	–
Microperthite	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Acid plagioclase	p	p	p	–	p	–	–	–	–	–	–	–	–	–	p	–	p	p	p	–
Oligoclase	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Oligoclase-andesine	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Andesine	–	–	–	–	–	?	–	–	–	–	–	–	–	–	–	–	–	–	–	?
Bytownite	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Diopside	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	p
Green hornblende	–	–	–	–	–	p	–	–	–	–	–	–	–	–	–	p	–	–	–	–
Biotite	–	–	–	–	–	p	–	–	–	–	–	–	–	–	p	–	p	p	–	–
Chlorite	–	–	p	p	–	–	p	p	–	p	p	p	p	p	p	p	p	p	p	p
Muscovite	p	p	p	p	p	–	–	–	–	–	–	–	–	p	p	p	–	p	p	–
Apatite	p	p	p	p	p	p	–	p	p	–	–	–	–	p	p	p	p	p	p	–
Zircon	p	p	p	–	p	p	–	–	p	–	–	–	–	–	p	p	p	p	p	–
Tourmaline	p	p	p	–	p	–	–	p	–	–	–	–	–	p	p	–	–	p	p	–
Yellow rutile	?	–	–	?	p	–	–	?	?	–	–	–	–	p	–	–	–	p	p	–
Pistacite	–	–	–	–	–	–	–	–	–	–	–	–	–	?	–	–	–	–	–	–
Zoisite	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	p	–	–	–	p
Sphene	–	p	p	p	–	–	–	–	–	–	–	–	–	–	–	p	–	–	–	p
Fluorite	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Rutile (?) needles	p	–	–	–	p	–	–	–	–	–	–	–	–	–	p	p	p	p	p	–
Magnetite	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	–
Ilmenite	–	–	–	–	–	–	–	–	–	p	–	–	–	–	–	–	–	–	–	p
Pyrite	–	–	p	p	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hematite	p	p	p	p	p	p	p	–	p	–	p	p	–	p	p	p	p	p	p	–
Limonite	p	–	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	–
Leucoxene	p	p	p	p	p	–	p	p	p	p	–	–	–	p	p	–	–	p	p	–
Calcite	p	p	p	p	p	–	–	p	p	p	–	–	p	p	–	p	p	p	–	p
Sericite	p	p	p	–	p	p	p	p	p	–	p	p	p	p	–	–	–	p	p	–
Kaolin	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

p = present in thin section.

102. Calcareous sericite-quartz schist. Haines Mts.
109. Calcareous sericite-quartz schist. Haines Mts.
219. Calcareous mica-quartz schist. Mt. 73, Claude Swanson Mts.
17. Calcareous muscovite-quartz schist. Haines Mts.
34. Calcareous limonitic quartz schist. Garland Hershey Ridge.
189. Amphibolite schist. Raymond Fosdick Mts.
52. Argillite. Erratic, Mt. Saunders.
64. Argillite. Mt. 5.
105. Calcareous phyllite. Haines Mts.
36. Slate. Garland Hershey Ridge.
215a. Slate Mt. 73, Claude Swanson Mts.
215b. Slate. Mt. 73, Claude Swanson Mts.
230G. Slate. Erratic. Mt. Stancliffe.
39. Calcareous slate. Haines Mts.
288. Quartzitic sandstone. (Slate contact.) Mt. Saunders.
152. Quartzite. Donald Woodward Mt.
161. Quartzite. Donald Woodward Mt.
181. Quartzite. (Slate contact.) Mt. Saunders.
230A. Quartzite. Erratic. Mt. Stancliffe.
168. Diopside granulite. Donald Woodward Mt.