GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES

PRELIMINARY SERIES

LEGEND

PALEOZOIC

ORDOVICIAN

19 RED RIVER FORMATION: mottled dolomitic limestone, crystalline dolostone bearing chert nodules

18 WINNIPEG FORMATION: fossiliferous, upper unit of blue-green shale interbedded with sandstone; basal, friable quartzose sandstone

PRECAMBRIAN

17 Leuco-quartz monzonite: medium-grained, pink, massive; occasionally porphyritic; 17a, fine-grained dense, red granitic rock

16 Undifferentiated granodiorite, quartz monzonite and leuco-quartz monzonite and adjacent rocks; massive to weakly foliated

15 Quartz monzonite to granodiorite with dioritic phases in topographically low places; massive, buff-pink, coarsely grained

14 Quartz monzonite: grey to pink, generally massive, coarsely grained; 14a, coarse-grained microcline porphyry; 14b, red, leuco-quartz monzonite fine to medium-grained

13 Granodiorite, minor diorite: coarse-grained; 13a, mixed with quartz monzonite of unit 14; 13b, mixed with quartz monzonite of unit 15

12 Granodiorite: coarse-grained, white, foliated and porphyritic; 12a, foliated with plagioclase augen; 12b, alkali feldspar phenocrysts; 12c, with quartz monzonite 'lits'; 12d, with mafic gneiss 'lits'; may be equivalent in age to unit 9 but lacks its well-developed banding

11 Quartz diorite, diorite, granodiorite: massive to foliated, coarse-grained with blue quartz eyes; 11a, with microline phenocrysts; 11b, with plagioclase phenocrysts; 11c, with monzonitic phases; 11d, hornblende biotite-rich quartz monzonite to granodiorite mixed with 11c; 11e, biotite hornblende-rich granodiorite to diorite

10 Gabbro, quartz gabbro, diorite, quartz diorite: coarse-grained and foliated; in part mixed with amphibolite and trap rock; 10a, ultrabasic and mafic, monomineralic phases

9 Quartz monzonite to granodiorite gneiss, gneissic and hybrid quartz monzonite: 9a, few mafic gneiss inclusions; 9b, numerous zones of mafic gneiss, locally forming stratiform foliation; 9c, abundant granitoid 'lits'

8 Stratiform granodioritic gneiss and gneissic granodiorite: 8a, banded with fine-grained mafic gneiss; 8b, irregularly foliated with thin, tenuous traces of mafic schlieren sporadically distributed

7 Stratiform granitoid gneiss: varicoloured, banded gneisses here and there bearing lenses of quartz-rich metasedimentary rocks and greenschists; 7a, to biotite-quartz feldspar, quartz-hornblende gneiss and monzonitic injection gneiss; 7b, quartz-feldspar-hornblende-biotite gneiss and amphibolite; 7c, garnet-biotite-quartz-andesine, muscovite-biotite quartz-andesine gneiss; minor bands bear sillimanite-cordierite-garnet-biotite-quartz-andesine

recrystallized mafic (lava) rocks

6 SAN ANTONIO FORMATION: impure quartzite, feldspathic and minor amounts of conglomerate; younger than adjacent rocks of unit 11; may be younger than all other rocks

RICE LAKE GROUP

5 Arkose, conglomerate, tuff, phyllite, slate and sericitized blue quartzite; 5a, granitized arkose and impure quartzite

4 Quartzite, impure quartzite and sandstone; minor amounts of arkose, slate, chert and schistose greywacke; altered sediments bear garnet, biotite and staurolite; includes rocks of unit 5 in undifferentiated areas; 4a, tuff with thin intercalated quartzitic layers

3 Iron-formation with fine-grained, dense biotite-hornblende gneiss and small amounts of silicified limestone

2 Rhyolite, trachyte, intermediate porphyritic rocks and breccias; interbanded tuff and subordinate basic flow rocks

1 Andesite, basalt, coarse-grained basalt to gabbro, basic to intermediate porphyritic and amygdaloidal rocks and breccias; small amounts of tuff, slate and chlorite-epidote-feldspar schist; locally altered rocks bear talc, tremolite and serpentine; includes rocks of unit 2; includes iron-formation along the north shore of Wampigow Lake

Heavily drift-covered area
Rock outcrop
Geological boundary (approximate, assumed, gradational)
Bedding, tops known (inclined, overturned)
Bedding, tops unknown (inclined, vertical, dip unknown)
Gneissosity, foliation (inclined, vertical, dip unknown)
Stratiform foliation (inclined, vertical, dip unknown)
Lineation (horizontal, inclined)
Lineation, axes of minor folds (inclined)
Lineaments (may be faults)
Fault (approximate, inclined)
Shear or schist zone (width indicated)
Anticline (approximate)
Syncline (approximate, overturned)
Antiform, Synform (approximate)
Antiform or Synform (approximate position of trace of axial plane)
Glacial striae (direction of ice movement indicated)
Locality where K-Ar age has been determined, in millions of years (B-biotite, M-muscovite). 2455 (M) 2435 (B)
Quarry or Mineral prospect (gold, sulphides) Au
Shaft, mining abandoned (gold) Au

MINERAL SYMBOLS

Copper	Cu	Pyrrhotite	po
Gold	Au	Serpentine	sup
Hematite	hem	Silica sand	sc
Nickel	Ni	Silver	Ag
Ochre	ochre	Sulphides	s
Pyrite	py	Tin	Sn

Geology by A.W. Johnston (1938), J.F. Davies (1949, 1950, 1951), G.A. Russell (1948, 1949), A.W. Baillie (1952) and I.F. Ermanovics (1968)

Compilation and interpretation by I.F. Ermanovics (1968)

To accompany GSC Paper 69-42 by I.F. Ermanovics

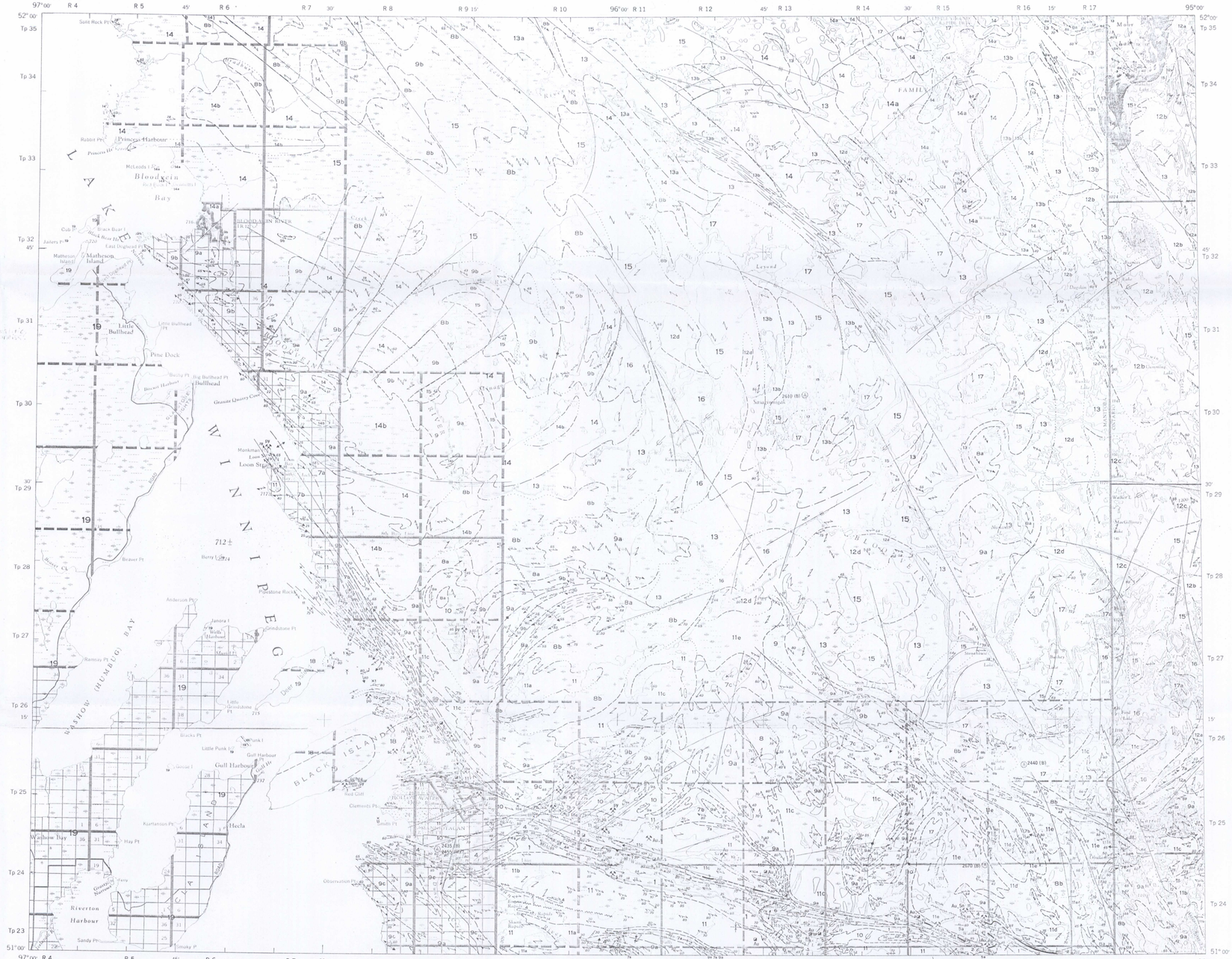
Geological cartography by the Geological Survey of Canada, 1969

Base-map from parts of maps published at the same scale by the Surveys and Mapping Branch in 1965, 1967

Geographical names subject to revision

Magnetic declination 1969 varies from 07° 8' easterly at centre of east edge to 09° 27' easterly at centre of west edge. Mean annual change decreasing 0.5' annually

Elevations in feet above mean sea-level



INDEX MAP

MAP 11-1969
PAPER 69-42
GEOLOGY

HECLA AND CARROLL LAKE

MANITOBA - ONTARIO

Scale 1:250,000

Miles 4 0 4 8 12 Miles
Kilometres 6 0 6 12 18 Kilometres

427A	63 A 426A	425A	53 D 26-1958	53 C 1201A
	62 P 11-1969		52 M 25-1958	52 N 1200A
	62-I		52 L	52 K

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

HECLA AND CARROLL LAKE
MANITOBA - ONTARIO