

LEGEND

- QUATERNARY**  
**PLEISTOCENE (mainly)**
- 14 CHAMPLAIN BEDS: mainly marine clay, with minor sand; 14a, marine sand; minor gravel and clay
  - 13 GLACIAL DRIFT (mainly): erratic, boulder clay, gravel, sand, and clay. Includes minor Recent deposits of gravel, sand, clay, marl, peat and muck
- ORDOVICIAN**
- 12 BLACK RIVER and TRENTON  
OTTAWA FORMATION: fossiliferous limestone, minor shale, siltstone, and sandstone
  - 11 BECKMANTON AND CHAZY  
Dolomite, dolomitic limestone
- PROTEROZOIC**
- 10 Gabbro, diabase
  - 9 Pegmatite
  - 8 Syenite, porphyritic syenite
  - 7A Granite, granodiorite (not markedly banded); minor syenitic facies  
7B Syenitic facies of granite and granodiorite
  - 6 Diorite, gabbro, meta-gabbro, amphibolite, anorthosite, pyroxenite
- ARCHEAN**
- 5A Mized rocks (in part hybrid gneisses, migmatites)  
5B Nepheline-albite gneiss
  - 4 BRISTOL (HASTINGS?) SERIES  
Thinly banded sedimentary rocks: fine-grained, bluish grey limestone; green to black chloritic schists and phyllites; quartzite
  - 3 GRENVILLE SERIES (1-3, interbedded)  
Crystalline carbonate rocks comprising limestone, dolomite, and dolomitic limestone; minor metamorphic pyroxenite
  - 2 Paragneiss: mainly biotite-garnet gneiss; biotite-hornblende gneiss, quartz-biotite gneiss and schist, sillimanite-garnet gneiss; minor quartzite
  - 1 Hornblende schist and gneiss, hornblende-biotite schist, quartz-biotite-hornblende schist, amphibolite, dioritic and gabbroic rocks

- Bedding (inclined, vertical) .....  
Foliation or gneissosity (inclined, vertical, dip unknown) .....  
Jointing (inclined, vertical) .....  
Drag-folds (arrow indicates direction of slung) .....  
Fault: .....  
Anticlinal axis (assumed) .....  
Synclinal axis (assumed) .....  
Glacial striae .....  
Mineral occurrence ..... X

**SYMBOLS FOR MINERALS AND INDUSTRIAL MATERIALS**

Copper ..... Cu	Limestone ..... Ls
Corundum ..... Co	Molybdenite ..... Mo
Dolomite ..... Dol	Nepheline ..... Ne
Feldspar ..... Fe	Pyrite ..... Py
Gravel and sand ..... Gs	Radioactive minerals ..... Ra
Gold ..... Au	Sillimanite ..... Sil
Gold (reported) ..... Au?	Stone (building) ..... St
Graphite ..... G	Strontianite ..... Sr
Magnetite ..... Mag	Tourmaline ..... T
Hematite ..... Hem	Zinc ..... Zn
Lead ..... Pb	

Magnetite orebody .....

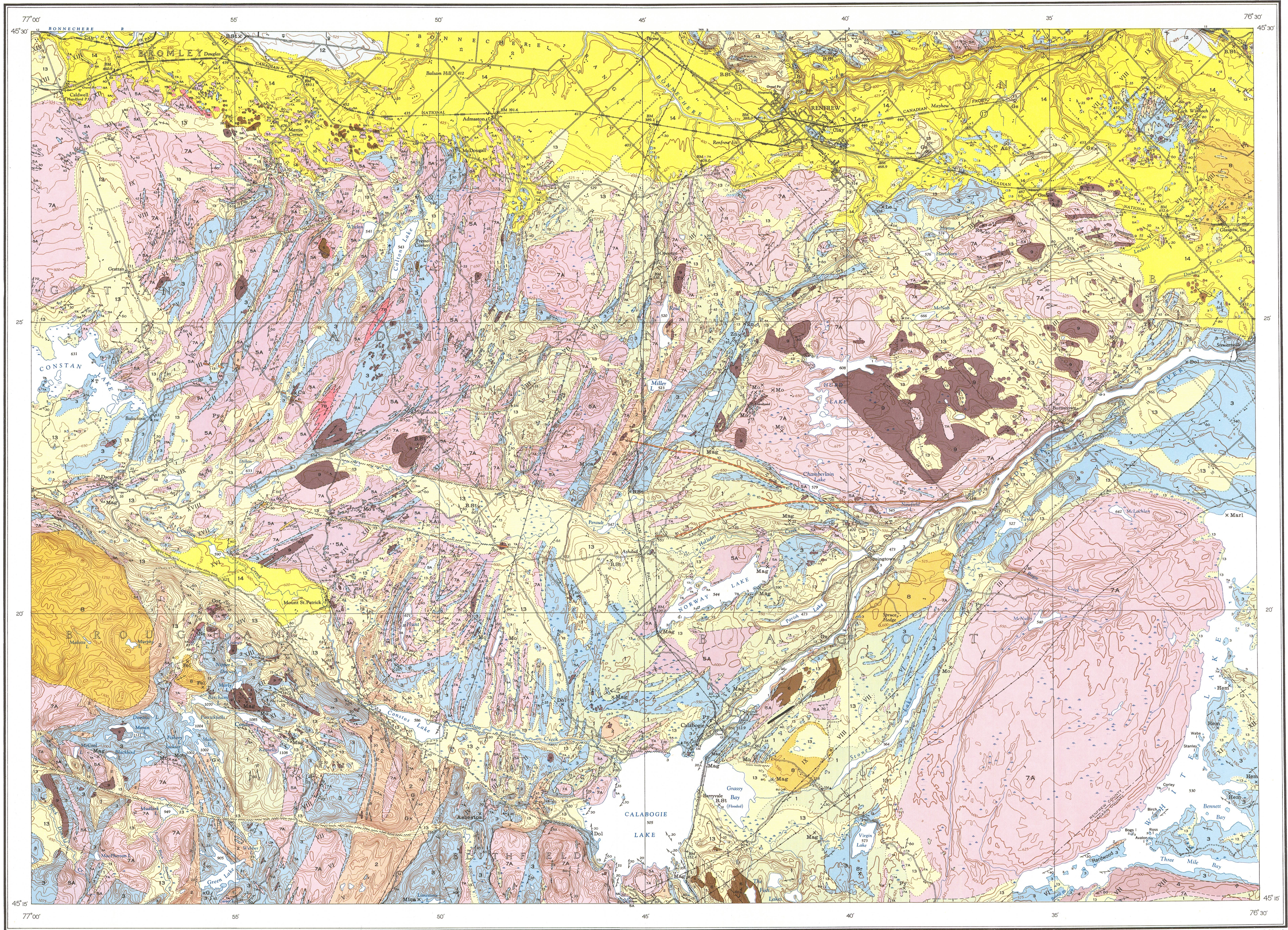
Geology by M.E. Wilson, 1917-1919; G.B. Leech 1949; and H.A. Quinn, 1950  
Geological compilation by H.A. Quinn, 1952

Cartography by the Geological Cartography Unit, 1955

Base map compiled and drawn by the Army Survey Establishment, R.C.E. Department of National Defence

Approximate magnetic declination, 12° 34' West

Air photographs covering this map-area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa, Ontario



DESCRIPTIVE NOTES

The map-area is divided by near-vertical faults into several west to north-west trending blocks of high, relatively rugged ground, underlain by Precambrian rocks alone, and of low, relatively flat ground, underlain mainly by Precambrian rocks but with some outliers of flat-lying Paleozoic rocks and more extensive Pleistocene deposits. That part of the area lying northeast of the St. Patrick scarp is within the Ottawa-Bonnechere graben, and the part southwest of the scarp is within the Madawaska Highlands. Local relief, commonly less than 300 feet in the graben, is normally about 500 feet in the highlands, and is nearly 900 feet along the St. Patrick scarp.

Except for a few, small, downfaulted outliers of Paleozoic strata, bedrock in the map-area consists of Precambrian crystalline rocks of the Grenville sub-province of the Canadian Shield.

The rocks of the Grenville series consist mainly of interbedded hornblende schist and gneiss (1), paragneisses (2), and crystalline limestone (3). The hornblende schist and gneiss are foliated, dark grey to black, commonly fine-grained, rocks, whose main constituents are green hornblende and plagioclase feldspar. Porphyroblasts of red garnet up to 1/2 inch across occur locally. The paragneiss consists mainly of biotite-garnet gneiss, but includes some biotite-hornblende gneiss, quartz-biotite gneiss, sillimanite-garnet gneiss, and undifferentiated minor quartzite. The limestone is a soft, white to grey, medium- to coarse-grained, normally banded rock. Its common accessory minerals are graphite, phlogopite, diopside, tremolite, and serpentine. A few narrow bands of metamorphic pyroxenite occur locally in, or adjacent to, the limestone.

The rocks of the Bristol (Hastings?) series (4) consist of bluish grey crystalline limestone, white to grey quartzite, and green to greenish and bluish grey to black, chloritic, and argillaceous to micaceous phyllites and minor schists. All are fine grained, and are commonly intimately interstratified in beds averaging about 2 to 4 inches in thickness, and closely folded (contorted).

Mixed rocks (5A) consist of migmatites, or hybrid gneisses, in which either meta-sedimentary or meta-volcanic rocks, or both, are intimately to rudely injected by granitic rocks and, in many places, partly transformed into granitic rocks. Only one small band of nepheline-albite gneiss (5B) is known.

The six small plugs and sills of basic intrusive rock (6) in the area consist mainly of meta-gabbro, composed almost entirely of about equal proportions of hornblende and basic plagioclase. Smaller parts of some of these bodies are composed of diorite, gabbro, amphibolite, pyroxenite, or anorthosite.

Granite and granodiorite (7A) are abundant, occurring in masses that vary in size from small sills and dykes a few inches wide to irregular bodies and stocks up to 5 miles wide by 9 miles long. Most of these bodies are composed of pink to pinkish grey, fine- to medium-grained, foliated to massive biotite granite. At some localities the rock contains more plagioclase, and is a granodiorite. Minor parts of some bodies are low enough in quartz to constitute syenitic facies (7B).

Syenite and porphyritic syenite (8) occur in five small stocks, the largest of these underlies much of Mount St. Patrick. These rocks consist mainly of pink potassic feldspar or microperthite, with either biotite or hornblende as the chief variety mineral. Sphene, apatite, and magnetite are common accessory minerals. All bodies of these rocks give strong positive magnetic anomalies due to the disseminated magnetite in them.

Pegmatite (9) is abundant, and cuts all of the older Precambrian formations. Most of it is a massive, pink rock of about the same composition as granite; where it occurs in or near crystalline limestone it is commonly white or pale grey. The little syenite-pegmatite seen is a dull pinkish red, coarse-grained, massive rock consisting almost entirely of potassic feldspar.

Gabbro and diabase (10) are the youngest Precambrian rocks. They occur as vertically dipping dykes up to 100 feet or more wide, and commonly occupy shallow, linear depressions.

The rocks of the Grenville and Bristol series have been complexly folded, and the intricacy of the folds has been still further complicated by flowage of the limestone members of the series. Much later, the rocks were broken into a series of subparallel tilted blocks by high-angle normal faults.

Six small, downfaulted outliers of flat-lying Paleozoic rocks of Ordovician age overlie the Precambrian rocks unconformably. The lower 50 feet of the outlier near Loch Winnoch consists mainly of massive, brown weathering dolomite and dolomitic limestone of Beckmantown age (11), but may include a very thin bed of Chazy beds. The upper part of this outlier and the whole of all of the other outliers are composed of the Ottawa formation (12), consisting mainly of fossiliferous limestone, with lesser shale, siltstone, and sandstone.

The map-area contains a great variety of minerals, but most occurrences are small, and of interest only to mineral collectors. Deposits of most significance contain magnetite, hematite, or molybdenite, or consist of building stone, gravel, sand, or clay. About 46,000 tons of magnetite were produced from several deposits between 1883 and 1901. Most of these are banded, tabular to lenticular replacement bodies of pyrometamorphic type occurring along or near contacts between crystalline limestone and foliated hornblende rocks—mainly hornblende schist and gneiss. Many of them are in lenses and bands of crystalline limestone and calcareous pyroble skarn within the hornblende rocks near the main limestone contacts.

Algoma Ore Properties Limited holds a magnetite deposit of substantial size in the Campbell-Caldwell ore zone about a mile east of Calabogie on their 4,800-acre property there. This zone is 100 to 400 feet wide, 3,000 feet or more long, strikes northwesterly, and dips to the southeast at 40 to 45 degrees. Most of it is in the eastern half of lot 16, con. IV, Bagot tp., near the southern boundary of the lot. This large property also includes the old Bluff Point and Marel magnetite mines. Among the several other magnetite deposits known are the old Williams or Black Bay mine and the Cuhane mine.

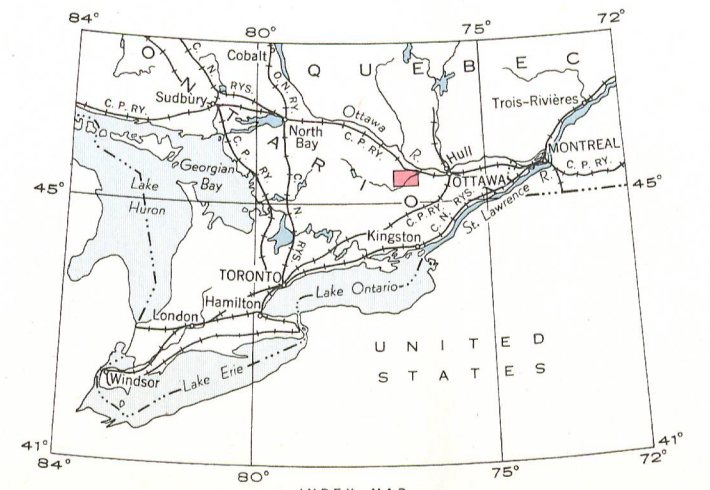
Several occurrences of hematite east of White Lake are all in crystalline limestone, and many of them occupy fault fissures. Similar hematite-bearing fissures a few miles beyond the map-area cut Paleozoic rocks. A fairly typical deposit, in lot 23, con. XI, Darling tp., consists of a vein of massive blue hematite, 5 to 6 feet wide, striking north 65 degrees west in crystalline limestone.

Many occurrences of molybdenite are known, and some 150,000 pounds of this mineral has been produced from nine of them, most of it between 1915 and 1918. The main producers were the Hunt, Zenith, and Ross-O'Brien mines. About 90 per cent of the molybdenite produced has been derived from deposits in metamorphic pyroxenite occurring along or near contacts between crystalline limestone and granite-gneiss or granite-pegmatite.

A zinc-bearing area about 4 miles southwest of Renfrew is held by Cadioux Mines Limited and Renspur Zinc Mines Limited. The mineralized zone, in lots 1 and 2, cons. III and IV, Admaston tp., is in crystalline limestone and trends northeasterly; it has a known length of 3,300 feet and a width of 400 feet or more. Disseminated grains of resinous, brown sphalerite, commonly accompanied by a little pyrite, pyrrotite, chalcocite, and, locally, by a little galena, occur within this zone in lenticular bodies up to 125 feet long and 15 feet or more wide. Most of these bodies dip to the southeast at about 80 degrees and rake to the northeast at very low angles.

Graphite is of widespread occurrence in the map-area, and tourmaline is abundant. A little tremolite asbestos has been mined from a deposit in lot 22, con. IV, Blufffield tp., and all of the small tonnage of celestine (strontium sulphate) mined in Canada has been obtained from a deposit near Virgin Lake.

The map-area was surveyed with the airborne magnetometer in 1947 and 1948 and results of this work are given in Geophysical Paper 67 of the Geological Survey of Canada. Anomalies of greatest magnetic intensity are found over bodies of syenite containing relatively small amounts of disseminated magnetite. Anomalies over most of the known deposits of magnetite have a magnetic relief of 1,200 gammas or less, and are not particularly conspicuous. The Campbell-Caldwell ore zone of Algoma Ore Properties Limited shows the greatest magnetic intensity of any of these deposits—about 2,300 gammas. This anomaly also reflects the southeasterly dip and northeasterly rake of the ore zone. Other deposits of magnetite are probably indicated by some of the other anomalies shown. Crystalline limestone, hybrid gneiss, and some bodies of granite have comparatively low magnetic intensity and relief.



MAP 1046A  
**RENFREW**  
RENFREW AND LANARK COUNTIES  
ONTARIO  
Scale: One Inch to One Mile = 1/63,360  
Miles

REFERENCE

Main highway .....	Mill or factory .....
Road and buildings .....	Mine or open cut .....
Road not well travelled .....	Triangulation station .....
Cart track .....	Bench-mark .....
Trail .....	County boundary .....
Cutting, embankment .....	Township boundary .....
Power transmission line .....	Concession and lot number .....
Telephone line (trunk route) .....	Intermittent stream .....
Bridge .....	Marsh .....
Church .....	Cut-off .....
School .....	Contours (interval 25 feet) .....
Post Office .....	Height in feet above mean sea-level .....
Cemetery .....	

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