VT OFR VG 94-2

Geologic Mapping in the Proctor Quadrangle

Vermont Geological Survey Contract No. 0960270

Project work and report by: Timothy Cronan and Michael Slattery
Submitted by: Dr. Helen Mango, Contracting Geologist
Department of Natural Sciences
Castleton State College
Castleton, VT 03735

This report accompanies a map describing the bedrock geology of an area covering the northeast portion of the 7.5 minute Proctor quadrangle. The rocks of the map area are described as being part of the Middlebury Synclinorium sequence and range in age from Precambrian to Middle Ordovician. A description of the rock types present in the map area is included with this report. Mapping of this area was undertaken in cooperation with the state of Vermont in an effort to collect data on unmapped portions of quadrangles. E-an Zen mapped a portion of the Castleton 15' quadrangle in 1964 and extensively described both the synclinorium rocks as well as the Taconic rocks, whose stratigraphy and structure were his main focus. Mapping for this project occurred in the Cox Mountain area and continued south to Pine Hill, and corresponds to an area left blank on Zen's 1964 map of the Castleton quadrangle. The structure of the area after mapping indicates an overturned anticline, with both limbs dipping to the east. The eastern limb of the anticline is cut by the Pine Hill fault, a thrust fault placing Precambrian rocks of the Mount Holly series in contact with the Ordovician Ira Formation.

The map area contains two areas of moderate elevation. Both Pine Hill (1436') and Cox Mountain (1412') provide exposures of

rocks as well as aiding in the mapping of the Pine Hill Fault which crosses both areas, creating relief. Outcrop of the Ira Formation is readily found and readings can be taken of bedding and cleavage. Precambrian rocks are exposed in areas of relief but attitudes of beds can rarely be obtained, with the exception of nearly vertical quartzite beds up to 1 foot thick near Cox Mountain. The Cambrian Cheshire quartzite outcrops on Pine Hill east of Precambrian rocks but does not continue northward in the map site.

There exist two dolomite units in the map area which occur at neighboring stratigraphic intervals. Mapped and described by Zen in 1964, the Upper Cambrian Undifferentiated Clarendon Springs and Danby Formations (Cdc) and the Lower to Middle Cambrian Winooski Dolostone (Cw) are both gray dolostones, making distinctions between the two difficult. Zen described the Clarendon Springs Formation as containing fist-sized clusters of milky quartz. This description, along with the current mappers' own observations that the Winooski Dolostone in outcrop form exhibited "threadscore beeswax" weathering, aided in mapping the two units.

This mapping project, done in cooperation with the state of Vermont, given undergraduate students an opportunity to use knowledge gained in field experience to produce a quality geologic map. A knowledge of stratigraphy and structure was necessary to understand the rock relationships in the area and to map these relationships. The authors of this report believe that this map provides an accurate representation of the rock relationships present in the area.

STRATIGRAPHY OF A PORTION OF THE PROCTOR QUADRANGLE MAPPED BY CSC STUDENTS TIM CRONAN AND MIKE SLATTERY

Middle Ordovician

Ira Formation (Oi) - Lustrous black to grey phyllites representing youngest rocks in synclinorium sequence. Phyllites are siliceous to graphitic and locally sandy.

Lower Ordovician

Bascom Formation (Obc) - Massive white marble encountered in map site north of Florence. The massive white marble is considered to be near the base of the formation and overlying units are heterogenous layers of quartzite and dolomite.

Shelburne Formation

Columbian Marble Member (Osc) - Coarse white to grey marble originally described by Zen and found in the map site north of Florence.

Intermediate Dolostone Member (Osid) - Massive iron-grey, grey weathering dolostone.

Sutherland Falls Marble Member (Ossf) - White to cream colored marble locally absent in section but present north of Florence.

Upper Cambrian

Undifferentiated Clarendon Springs and Danby Formations (Cdc) - Massive grey sugary dolostone with local cross- bedding and abundant clusters of milky quartz. This lithology grades downward into similar dolostone with interbedded vitreous quartzite up to 6 feet thick. (Danby lith.)

Lower to Middle Cambrian	Winooski Dolostone (Cw) - Grey to buff weathering pale dolostone in shades of orange and grey. locally recognized by threadscore beeswax weathering helping in distinction between two similar dolostones in the section.
Lower Cambrian	Cheshire Quartzite (Cc) - Vitreous grey to white quartzite weathering buff to grey. In the map area these rocks outcrop east of PreCambrian rocks near Pine Hill.
PreCambrian	Mount Holly Series (PCmh) - undifferentiated biotite - plagioclase gneiss and biotite - microcline gneiss along with quartzites and biotite - chlorite schists. Rocks of this series locally contain magnetite grains upon examination with a hand lens. PreCambrian rocks are found on the east (upthrown)side of the Pine Hill Thrust in the map area.

P1 1st TP, next to last sentence should read: "The structure of the area, after mapping, was found to be, etc, etc. ....

P2 1st TP Last sentence

The word "outcrops" is best reserved as a noun. It is preferable to say: "crops out"; or even better, "is exposed" for the verb.

2nd TP second sentence.

... by Zen (1964), the Upper Cambrian = undifferentiated Clarendon Springs, etc ....

last TP 1st sentence use the verb "gave" instead of "given"

Note: The geologic map should be accompanied by at least one cross-section.

Review by ?, 19?

EXPLANATION

Timothy J. Cronan
Michael Slattery
26 July 1994

- Oi — Ira Formation
- Obc — Bascom Formation
- Osc — Columbian Marble member
- Osid — Intermediate Doloctone Member
- Ossf — Sutherland Falls Marble Member

} Shelburne Formation

- Cdc — Undifferentiated Clarendon Springs and Danby Formations
- Cw — Winooski Dolostone
- Cc — Cheshire Quartzite
- pEmh — Mount Holly Series

~~~ Contact

– – – contact, approximate

..... contact, very approximate

Fault contact, thrust

Strike & dip of bedding

+ strike of vertical bedding

strike of vertical bedding
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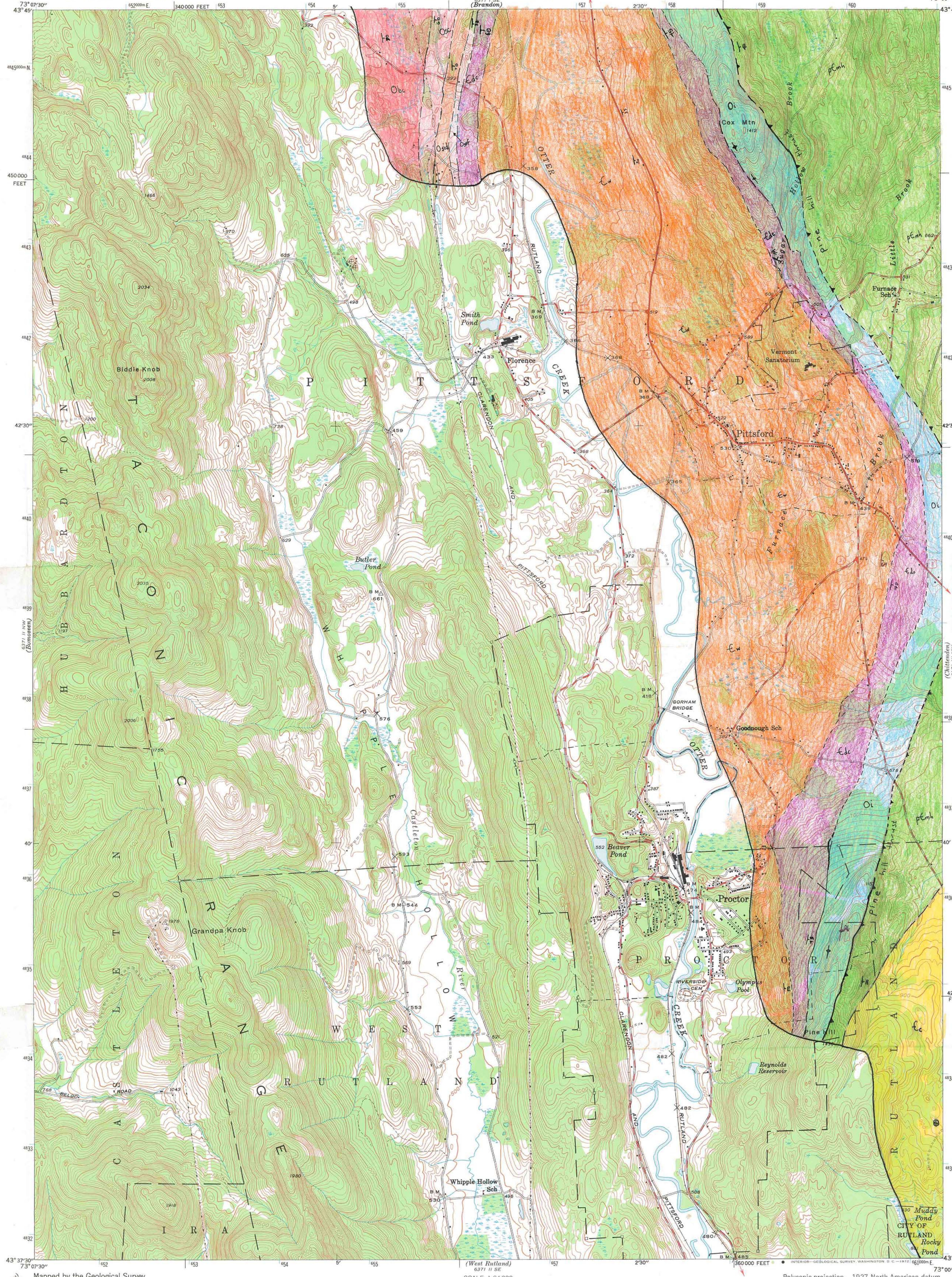
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

VERMONT
(RUTLAND COUNTY)
PROCTOR QUADRANGLE
7½-MINUTE SERIES



Mapped by the Geological Survey
1944

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
U. S. Route — State Route

UTM GRID AND 1944 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 MILE — 7000 FEET — 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Polyconic projection. 1927 North American datum
10,000-foot grid based on Vermont rectangular coordinate system
1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue

PROCTOR, VT.
N 4337.5—W7300/7.5
1944
AMS 6371 II NE—SERIES V813