

REPORT ON GEOLOGICAL MAPPING OF SEDIMENTARY ROCKS (EXCLUSIVE OF GRENVILLE) AND GLACIAL AREAS IN NEW YORK STATE

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(Figure 47)

I BRIEF HISTORY AND DESCRIPTION OF GEOLOGICAL MAPS

Geological mapping in New York State started in the early nineteenth century. The first geological map of New York was part of a *Map of the United States of America*, colored geologically, which accompanied Observations on the Geology of the United States by William McClure, 1809 (Amer. Philos. Soc. Trans., ser. 1, v. 6 (front); 54 x 45 cm; scale 1 in. to 76 m.). Various geological sections and geological maps of smaller areas were issued in the following years; and in 1842 Emmons, Vanuxem, Mather and Hall published a *Geologic Map of the State of New York*. This was a colored map published separately on the scale of 1 inch to 12 miles, measuring 92 x 99 cm. The making of geological maps and sections for limited areas continued. These include:

- 1 Geological Map of Clinton County (Emmons 1842)
- 2 Geological Map of Jefferson County (Emmons 1842)
- 3 Geological Map of New York or Manhattan Island (Cozzens, 1843)
- 4 Geological and Mineralogical Map of Part of Orange County (Mather, 1843)
- 5 Geological and Topographical Map of Onondaga County (Geddes, 1860)
- 6 Limestone Areas of Westchester County (Dana, 1880)
- 7 Limestone Areas of Dutchess, Westchester and Putnam Counties (Dana, 1880)
- 8 Geological Map of Richmond County, N. Y. (Britton, 1881)
- 9 Geological Map of Southern Westchester County and Northern New York Island (Dana, 1881)
- 10 Map of Greene County (Davis, 1884)
- 11 Map of Yates County (Wright, 1884)
- 12 Geological Map of Ontario County (Clarke, 1885)
- 13 Geologic Map of the Taconic Region (Dana, 1885)
- 14 Geological Map of Essex County (Hall, 1885)
- 15 Geological Map of New York City (Martin, 1888)
- 16 Region between the Taconic Range and the Hudson Valley (Dale, 1893)
- 17 Lake Champlain and Its Pleistocene Area (Baldwin, 1894)
- 18 Map of Southern Part of Kingston Region (Davis, 1894)
- 19 Geological Map of a Part of Southeastern New York (Merrill, 1895)
- 20 Geologic Map Showing the Distribution of the Portage Group, etc. (Clarke, 1897)

- 21 Geologic Map of a Part of Chenango and Cortland Counties (Clarke, 1897)
- 22 Map of Clinton County (Cushing, 1897)
- 23 Preliminary Geologic Map of Albany County (Darton, 1897)
- 24 Geological Map of Onondaga County (Luther, 1897)
- 25 Map of Central New York Showing Distribution of the Hamilton and Chemung Series (Prosser, 1897)
- 26 Geologic Map of Orange County (Ries, 1897)
- 27 Map Showing Glacial Geology of Western New York (Fairchild, 1898)
- 28 Geological Map of Franklin County (Cushing, 1899)
- 29 Map of Portion of Tarrytown and Ramapo quadrangles (Kümmel, 1899)
- 30 Geologic Map of Amsterdam quadrangle (Prosser, Cumings and Fisher, 1900)
- 31 Geological Maps of Portions of Clinton County (Cushing, 1901)
- 32 Pleistocene Maps of Western New York (Leverett and Taylor, 1901)
- 33 Pleistocene Map of Part of Dunkirk, Cherry Creek and Silver Creek quadrangles (Leverett, 1901)
- 34 Map of Portions of Albany and Rensselaer Counties (Ruedemann, 1901)
- 35 Geologic Map of Portions of St Lawrence and Jefferson Counties (Smyth, 1901)
- 36 Map of Oyster Bay and Hempstead quadrangles, Long Island (Woodworth, 1901; Pleistocene)

In addition to sectional maps and geological sections several geological and economic maps for the State as a whole were issued between the publication of the map of 1842 and 1901. These are:

- 1 Agricultural and Geologic Map of the State of New York. (Emmons, 1844; Same as "1842" map of the four geologists but contains the Taconic system)
- 2 New York State (Hall, 1882; a black and white map, scale 1 inch to 38 m., in report of Public Service of the State of New York)
- 3 Preliminary Geologic Map of New York (Hall, 1894; published separately; compiled by W. J. McGee and known as the McGee map)
- 4 Economic and Geologic Map of New York State. (Merrill, 1894; 1895 (2d ed.); scale 1 in. to 14 m.)
- 5 Map of New York State Showing Distribution of Rocks Useful for Road Material (Merrill, 1897)
- 6 A Relief and Geologic Map of New York State (Merrill, 1898; in color, 83 x 43 cm; scale 1 inch to 24 m.)

Between 1809 and 1901, there were published 235 geologic maps and sections pertaining to New York State, in whole or in part. These and later maps to 1908 are all listed by Dr Henry Leighton in his *Chronological List of Maps Showing Geology of New York State* (N. Y. State Mus. Bul. 133: 124-49; Fifth Report of the Director for 1908). In 1901, while Dr F. J. H. Merrill was State Geologist, there was published the *Geologic Map of New York State* on the scale of 5 miles to 1 inch. This map is in the form of an atlas of 12 separate sheets. It is still available but in need of revision, particularly in the Upper Devonian. In the early 1900's a few quadrangles were mapped under the direction of the United States Geological Survey and the results were published in the form of a monograph or folio of that Survey. Dr J. F. Kemp mapped the area

around Lake Placid and the region to the east, using the topographic map as a base (Mus. Bul. 21, 1898; Mus. Rep't 52 for 1898, 1900; and Dr H. B. Kummel mapped the Triassic rocks covering portions of Tarrytown and Ramapo quadrangles (Geol. Rep't for 1898, 1899; Mus. Rep. 52 for 1898, 1900). The first complete quadrangle map, published in 1900, was the *Geologic map of the Amsterdam quadrangle* (Mus. Bul. 34) by Prosser, Cunnings and Fisher. Under the directorship of Dr John M. Clarke (1904-25) substantial progress was made in the detailed geologic mapping of the State, for which the base used was the topographic quadrangle on the scale of a mile to the inch issued by the United States Geological Survey. This work has been continued under the directorship of Dr Charles C. Adams (1926-) down to the present day with the result that about one-third of the whole State has been mapped, the larger portion of the quadrangles dealing with sedimentary rocks (exclusive of Grenville) in whole or in part. Each quadrangle map has been accompanied by a bulletin dealing in greater or less degree with the descriptive and structural geology, geological history, physiography, glacial geology and economic geology.

Geological maps show in black and white or in color the rock formations underlying the area studied and their relations. In the case of quadrangle mapping the rock formations are shown in color.

A certain color is by agreement used for each period and variations of this color with patterns are used for the different rock formations of each period. As far as possible this color scheme is used on the New York State quadrangle maps. Besides the rock formations in color may be shown, in black, fault lines, strike and dip, occurrence of ores and quarries. The geologic quadrangle map, of course, takes the name of the topographic sheet used as a base.

2 NEED OF GEOLOGICAL MAPS

The need for the completion of the geologic mapping of the State is emphasized by the constant demand from the public, in letters and in person, for information about the geology of certain areas. At present, for many areas, we can only refer to the generalized map for New York State, published in 1901 and much in need of revision, especially as regards the Upper Devonian, the few old county maps and studies of particular sections. Most of these older maps are out of print and the publications in which they appear available, if at all, only in the larger libraries.

3 VALUE OF GEOLOGICAL MAPPING

The value of the geological quadrangle maps with their accompanying bulletins can not be overemphasized. The accompanying bulletins now are required to cover not only descriptive and structural geology but the physiography, glacial geology and economic geology as well. They are useful in studies for water supply, in location of wells, for locating road-metals and building stone. They have been found very useful in soil studies and are invaluable where buildings are being put up in giving a knowledge of what is to be expected underground. Besides these uses they have a great cultural and educational value which is increasing rapidly with an aroused public interest.

4 STATUS OF GEOLOGICAL MAPPING

About one-third of the whole State has been mapped, the larger part of the mapping in areas underlain by sedimentary rocks. There are 258 quadrangles (35 in part) covering the area of the State of New York, 217 of which, in whole or in part, are underlain by sedimentary rocks. Of this number, 70 have been mapped and reports published upon the areas; 58 cover sedimentary rocks (exclusive of the Precambrian), 38 entirely and 20 in large or small part (see table 1). In addition 20 quadrangles have been covered for glacial geology (see table 2); 38 geological quadrangles are prepared or in preparation, all but four of them sedimentary in whole or in part (see table 7).

In monographs and folios the United States Geological Survey has covered for glacial deposits 13 and for rocks 15 New York State quadrangles (see tables 3, 4).

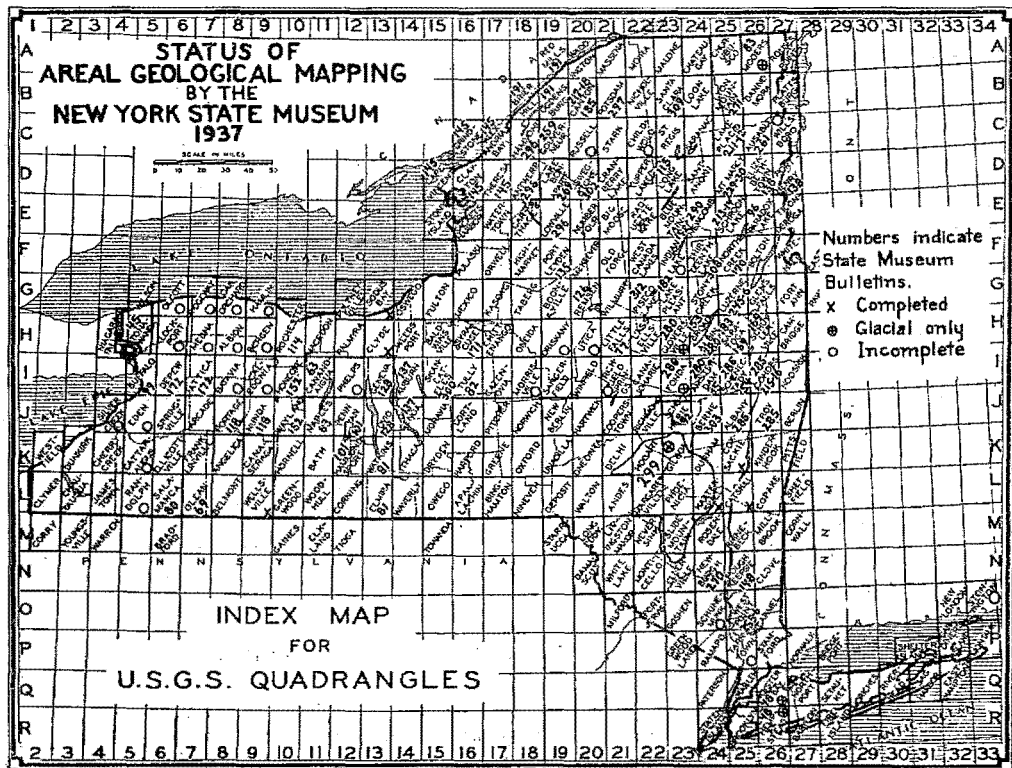


Figure 47 Map showing status of areal geological mapping of the State by the New York State Museum, 1937

TABLE I
 New York State geological quadrangles: sedimentary rocks.
 Published by New York State Museum

YEAR	QUADRANGLE	BULLETIN NO.	AUTHOR	AVAILABILITY
1900.....	Amsterdam.....	34	C. S. Prosser, E. R. Cumings & W. L. Fisher.....	Out of print
1901.....	Parts of Wilson, Niagara Falls, Tonawanda — Niagara Falls and vicinity.....	45	A. W. Grabau.....	Out of print
1903.....	Olean.....	69 (in part)	L. C. Glenn & C. Butts.....	Out of print
1904.....	Canandaigua, Naples.....	63	J. M. Clarke & D. D. Luther.....	Out of print
1905.....	Little Falls ¹	77	H. P. Cushing.....	Out of print
1905.....	Salamanca.....	80 (in part)	L. C. Glenn & C. Butts.....	Out of print
1905.....	Watkins, Elmira.....	81	J. M. Clarke & D. D. Luther.....	Out of print
1905.....	Tully.....	82	J. M. Clarke & D. D. Luther.....	Out of print
1906.....	Schoharie (in part) — Schoharie valley.....	92	A. W. Grabau.....	Out of print
1906.....	Buffalo.....	99	D. D. Luther.....	Out of print
1906.....	Penn Yan, Hammondsport.....	101	D. D. Luther.....	Out of print
1907.....	Rochester, Ontario Beach.....	114	C. A. Hartnagel.....	Out of print
1908.....	Nunda, Portage.....	118	J. M. Clarke & D. D. Luther.....	Out of print
1909.....	Remsen ¹	126	W. J. Miller.....	Out of print
1909.....	Geneva, Ovid.....	128	D. D. Luther.....	Out of print
1910.....	Port Leyden ¹	135	W. J. Miller.....	Out of print
1910.....	Auburn, Genoa.....	137	D. D. Luther.....	Out of print
1910.....	Elizabethtown, ² Port Henry ²	138	J. F. Kemp & R. Ruedemann.....	Out of print
1910.....	Thousand Island Region ¹ — Alexandria Bay, ¹ Cape Vincent, ¹ Clayton, Grindstone, ² Theresa.....	145	H. P. Cushing, R. Ruedemann & C. H. Smyth.....	Out of print

1911.....	Poughkeepsie ¹	148	C. E. Gordon.....	Out of print
1911.....	Honeoye, Wayland.....	152	D. D. Luther.....	Out of print
1911.....	Broadalbin ¹	153	W. J. Miller.....	In print
1914.....	Saratoga Springs, ¹ Schuylerville ¹	169	H. P. Cushing & R. Ruedemann.....	In print
1914.....	Syracuse.....	171	T. C. Hopkins.....	Out of print
1914.....	Attica, Depew.....	172	D. D. Luther.....	In print
1916.....	Brier Hill, Ogdensburg, ¹ Red Mill.....	191	H. P. Cushing.....	In print
1920.....	Canton.....	217-18	G. H. Chadwick.....	In print
1921.....	West Point ²	225-26	C. P. Berkey & M. Rice.....	Out of print
1925.....	Gouverneur ²	259	H. P. Cushing & D. H. Newland.....	Out of print
1925.....	Ausable ²	261	J. F. Kemp & H. L. Alling.....	Out of print
1926.....	Newburgh ¹	270	F. Holzwasser.....	Out of print
1930.....	Albany, Cohoes, Troy, Schenectady.....	285	R. Ruedemann (Glacial ch. by J. H. Cook).....	In print
1934.....	Lowville ²	296	R. Ruedemann.....	In print
1934.....	Potsdam ²	297	J. C. Reed.....	In print
1935.....	Skaneateles.....	300	Burnett Smith.....	In print
1935.....	Berne.....	303	W. Goldring (Glacial ch. by J. H. Cook).....	In print

¹ Sedimentary in large part.

² Sedimentary in small part.

TABLE 2
 New York State geological quadrangles: glacial deposits
Published by New York State Museum

YEAR	QUADRANGLE	BULLETIN NO.	AUTHOR	AVAILABILITY
1901	Oyster Bay, Hempstead	48	J. B. Woodworth	Out of print
1905	Mooers	83	J. B. Woodworth	Out of print
1911	Schenectady	154	J. H. Stoller	Out of print
1916	Saratoga	183	J. H. Stoller	Out of print
1920	Cohoes	215-16	J. H. Stoller	In print
1929	Gloversville, Broadalbin, Fonda, Amsterdam	280	A. P. Brigham	In print
1935	Delhi (in part), Hobart (in part), Gilboa (largely), Durham (in part), Margaret- ville, Phoenicia, Kaaterskill (in part), Neversink (in part), Slide Mountain (largely), Rosendale (in part), Ellenville (in part)	299	J. L. Rich	In print
1935	Skaneateles (Cenozoic map accompanying geologic map)	300	Burnett Smith	In print

TABLE 3
 New York State geological quadrangles: sedimentary rocks
 Published by U. S. Geological Survey

PUBLICATION	YEAR	QUADRANGLE	AUTHOR
Folio 83 (in part) (New York).....	1902	Harlem, ¹ Staten Island, ¹ Brooklyn ²	F. J. H. Merrill and assistants
Folio 157 (in part) (Passaic).....	1908	Staten Island ¹	N. H. Darton, W. S. Bayley, R. D. Salisbury, H. B. Kimmel
Folio 169 (Watkins Glen-Catatonk)....	1909	Watkins, Elmira, Ithaca, Waverly, Dryden, Owego, Harford, Apalachin.....	H. S. Williams, E. M. Kindle
Folio 190 (Niagara).....	1913	Wilson, Olcott, Tonawanda, Lockport.....	E. M. Kindle, F. B. Taylor

¹ Sedimentary in large part.

² Sedimentary in small part.

TABLE 4
 New York State geological quadrangles: glacial deposits
 Published by U. S. Geological Survey

PUBLICATION	YEAR	QUADRANGLE	AUTHOR
Monogr. 41.....	1901	Olean.....	F. Leverett
Monogr. 41.....	1901	Dunkirk, Cherry Creek, Silver Creek.....	F. Leverett
Folio 83 (New York).....	1902	Staten Island, Brooklyn, Harlem.....	R. D. Salisbury, C. E. Peel, H. B. Kimmel
Folio 157 (Passaic).....	1908	Staten Island.....	R. D. Salisbury, C. E. Peel, H. B. Kimmel
Folio 169 (Watkins Glen-Catatonk).....	1909	Watkins, Elmira, Ithaca, Waverly, Dryden, Owego, Harford, Apalachin.....	R. S. Tarr and assistants
Folio 190 (Niagara).....	1913	Wilson, Olcott, Tonawanda, Lockport.....	E. M. Kindle, F. B. Taylor

TABLE 5
Alphabetical list of all sedimentary quadrangles published

NAME	YEAR	PUBLICATION ³	NAME	YEAR	PUBLICATION ³
Albany	1930	Bul. 285	Nunda	1908	Bul. 118
Alexandria Bay ¹	1910	Bul. 145	Ogdensburg ¹	1916	Bul. 191
Amsterdam	1900	Bul. 34	Olcott	1913	U. S. G. S. Folio 190
Apalachin	1909	U. S. G. S. Folio 169	Olean	1903	Bul. 69
Attica	1914	Bul. 172	Ontario Beach	1907	Bul. 114
Auburn	1910	Bul. 137	Ovid	1909	Bul. 128
Ausable ²	1925	Bul. 261	Owego	1909	U. S. G. S. Folio 169
Berne	1935	Bul. 303	Penn Yan	1906	Bul. 101
Brier Hill	1916	Bul. 191	Portage	1908	Bul. 118
Broadalbin ¹	1911	Bul. 153	Port Henry ²	1910	Bul. 138
Brooklyn ²	1902	U. S. G. S. Folio 83	Port Leyden ¹	1910	Bul. 135
Buffalo	1906	Bul. 99	Potsdam ²	1934	Bul. 297
Canandaigua	1904	Bul. 63	Poughkeepsie ¹	1911	Bul. 148
Canton	1920	Bul. 217-18	Red Mill	1916	Bul. 191
Cape Vincent ¹	1910	Bul. 145	Remsen ¹	1909	Bul. 126
Clayton	1910	Bul. 145	Rochester	1907	Bul. 114
Cohoes	1930	Bul. 285	Salamanca	1905	Bul. 80
Depew	1914	Bul. 172	Saratoga Springs ¹	1914	Bul. 169
Dryden	1909	U. S. G. S. Folio 169	Schenectady	1930	Bul. 285
Elizabethtown ²	1910	Bul. 138	Schoharie (in part)	1906	Bul. 92
Elmira	1905	Bul. 81 &	Schuylerville ¹	1914	Bul. 169
	1909	U. S. G. S. Folio 169	Skaneateles	1935	Bul. 300
Geneva	1909	Bul. 128	Staten Island ¹	1902	U. S. G. S. Folios 83
Genoa	1910	Bul. 137		1908	& 157
Gouverneur ²	1925	Bul. 259	Syracuse	1914	Bul. 171
Grindstone ²	1910	Bul. 145	Theresa	1910	Bul. 145
Hammondspport	1906	Bul. 101	Tonawanda (in part)	1901	Bul. 45
Harford	1909	U. S. G. S. Folio 169	Tonawanda	1913	U. S. G. S. Folio 190
Harlem ¹	1902	U. S. G. S. Folio 83	Troy	1930	Bul. 285
Honeoye	1911	Bul. 152	Tully	1905	Bul. 82
Ithaca	1909	U. S. G. S. Folio 169	Watkins	1905	Bul. 81 &
Little Falls ¹	1905	Bul. 77		1909	U. S. G. S. Folio 169
Lockport	1913	U. S. G. S. Folio 190	Waverly	1909	U. S. G. S. Folio 169
Lowville ²	1934	Bul. 296	Wayland	1911	Bul. 152
Naples	1904	Bul. 63	West Point ²	1921	Bul. 225-226
Newburgh ¹	1926	Bul. 270	Wilson (in part)	1901	Bul. 45
Niagara Falls (in part)	1901	Bul. 45	Wilson	1913	U. S. G. S. Folio 190

¹ Sedimentary in large part.

² Sedimentary in small part.

³ N. Y. State Museum publication, unless indicated as United States Geological Survey folio

TABLE 6
Alphabetical list of all glacial quadrangles published

NAME	YEAR	PUBLICATION ¹	NAME	YEAR	PUBLICATION ¹
Amsterdam.....	1929	Bul. 280	Lockport.....	1913	U. S. G. S. Folio 190
Apalachin.....	1909	U. S. G. S. Folio 169	Margaretville.....	1935	Bul. 299
Broadalbin.....	1929	Bul. 280	Mooers.....	1905	Bul. 83
Brooklyn.....	1902	U. S. G. S. Folio 83	Neversink (in part).....	1935	Bul. 299
Cherry Creek.....	1901	U. S. G. S. Monogr. 41	Olcott.....	1913	U. S. G. S. Folio 190
Cohoes.....	1920	Bul. 215-16	Olean.....	1901	U. S. G. S. Monogr. 41
Delhi (in part).....	1935	Bul. 299	Owego.....	1909	U. S. G. S. Folio 169
Dryden.....	1909	U. S. G. S. Folio 169	Oyster Bay.....	1901	Bul. 48
Dunkirk.....	1901	U. S. G. S. Monogr. 41	Phoenicia.....	1935	Bul. 299
Durham (in part).....	1935	Bul. 299	Rosendale (in part).....	1935	Bul. 299
Ellenville (in part).....	1935	Bul. 299	Saratoga.....	1916	Bul. 183
Elmira.....	1909	U. S. G. S. Folio 169	Schenectady.....	1911	Bul. 154
Fonda.....	1929	Bul. 280	Silver Creek.....	1901	U. S. G. S. Monogr. 41
Gilboa (large part).....	1935	Bul. 299	Skaneateles.....	1935	Bul. 300
Gloversville.....	1929	Bul. 280	Slide Mountain (large part).....	1935	Bul. 299
Harford.....	1909	U. S. G. S. Folio 169	Staten Island.....	1902	U. S. G. S. Folios 83, 157
Harlem.....	1902	U. S. G. S. Folio 83	Tonawanda.....	1913	U. S. G. S. Folio 190
Hempstead.....	1901	Bul. 48	Watkins.....	1909	U. S. G. S. Folio 169
Hobart (in part).....	1935	Bul. 299	Waverly.....	1909	U. S. G. S. Folio 169
Ithaca.....	1909	U. S. G. S. Folio 169	Wilson.....	1913	U. S. G. S. Folio 190
Kaaterskill (in part).....	1935	Bul. 299			

¹ N. Y. State Museum publication, unless indicated as United States Geological Survey folio or monograph.

TABLE 7

Quadrangles prepared or in preparation by and under the supervision of the New York State Museum

1 Albion	20 Medina
2 Batavia ¹	21 Morrisville
3 Bolton ³	22 Oak Orchard
4 Brockport	23 Olcott
5 Caledonia ¹	24 Oriskany
6 Catskill	25 Phelps
7 Cattaraugus	26 Randolph
8 Childwold ³	27 Richfield Springs ¹
9 Chittenango	28 Ridgeway
10 Clyde	29 Russell ^{1, 3}
11 Coxsackie	30 Silver Creek ¹
12 Eden ¹	31 Schunemunk
13 Fort Ann ²	32 Sodus Bay
14 Glens Falls ²	33 Tarrytown ²
15 Gloversville ^{1, 2}	34 Ticonderoga ²
16 Hamlin	35 Utica ²
17 Indian Lake ³	36 Wellsville
18 Kaaterskill	37 Whitehall ²
19 Lockport	38 Willsboro ²

¹ In need of revision.

² Sedimentary in part.

³ Precambrian and crystalline only.

NOTE. Certain quadrangles will appear as one bulletin, as follows: (1) Silver Creek-Eden; (2) Lockport, Olcott, Medina, Ridgeway; (3) Albion, Oak Orchard, Brockport, Hamlin; (4) Batavia, Caledonia; (5) Sodus Bay, Clyde; (6) Catskill, Kaaterskill; (7) Whitehall, Ticonderoga.

5 PROGRAM OF MAPPING

The geological mapping of the sedimentary quadrangles will be continued by the paleontological staff in cooperation with the colleges and universities and the Federal Survey. It is planned, when funds permit, to bring the New York State Geological Map (Merrill, 1901) up to date and republish it. Our goal is the completion of the geological mapping of the State, with revision of older maps in areas where there has been considerable revision of the formations. Mapping will be held up in certain areas, such as the western Upper Devonian, for the completion of faunal studies and correlations of the formations. This is now under way and advancing with gratifying rapidity.