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# THE MINNESOTA GEOLOGIST

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OFFICIAL BULLETIN  
OF

THE GEOLOGICAL SOCIETY OF MINNESOTA

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VOL III

SEPTEMBER 15th, 1946

No. 5

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MIDWEST FEDERATION OF GEOLOGICAL SOCIETIES

CONVENTION

MINNEAPOLIS MINNESOTA

1946

GEOLOGICAL SOCIETY OF MINNESOTA

831 SECOND AVENUE SOUTH  
MINNEAPOLIS 2, MINNESOTA

The Society is devoted to the study of GEOLOGY  
and MINERALOGY for their cultural value.

OFFICERS

Dr. Edward H. Mandell, President	Fred L. Wunderlich, Director
Chas. H. Preston, Vice President	Leone Patricia Knox, Director
Mary Lupient, Treasurer	George A. Rickert, Director
Loretta E. Koppen, Sec'y & Ass't Editor	Joseph W. Zalusky, Director
Alger R. Syme, Editor	

FOUNDER

Edward P. Burch

PAST PRESIDENTS

Junior F. Hayden  
Alger R. Syme  
Charles H. Preston  
Joseph W. Zalusky

MEETINGS: October to May inclusive, 7:30 P.M. every Monday,  
not a holiday, large auditorium, 4th floor, Public Library,  
Hennepin Avenue and 10th Street, Minneapolis, Minnesota.

FIELD TRIPS: June until September inclusive. Visitors are  
very welcome, always.

ANNUAL DUES: Residents of Hennepin and Ramsey Counties \$3.00  
plus \$1.00 additional for husband, wife, or dependant fam-  
ily members; for students and non-residents, \$1.00.

Affiliated with  
MID WEST FEDERATION OF GEOLOGICAL SOCIETIES

ANNUAL MEETINGMID WEST FEDERATION OF GEOLOGICAL SOCIETIES

On Saturday and Sunday, October 19th and 20th, 1946, the Geological Society of Minnesota will act as host to the various groups constituting the Mid West Federation of Geological Societies. Members include the Marquette Geological Society, Chicago, Illinois; Wisconsin Geological Society, Milwaukee, Wisconsin; The Geological Society of Minnesota, Minneapolis, Minnesota; The Joliet Mineralogists, Joliet, Illinois; Michigan Mineralogical Society, Detroit, Michigan; and several other Societies now in the process of joining. We anticipate that this meeting will be one of the Society's best meetings, at least we intend to make it so, if possible. The Minneapolis meeting will give our members an excellent opportunity to meet those with kindred interests from other societies to form contacts and friendships which may develop and be appreciated more as time goes on, to exchange view points, and to enlarge their geological horizon. The program is printed herein. It should be understood that this program is flexible and that there may be a few surprises which you will enjoy. We hope that all our members will attend all meetings of the Convention. The Federation is young and as yet is only in the creeping stage. We feel fully confident that it will expand and grow within the next few years, and that in due time it will ripen into a national organization. Those residing in Minneapolis welcome the Federation and sincerely trust that our guests will feel that their time and energy have been well spent.

This number of the Bulletin is devoted exclusively to the Federation and its Annual Meeting. We have tried to give our guests and the Society members as much geological information regarding our community as possible. While prepared especially for the Convention, we hope our members will find this number both interesting and useful.

GRAND CANYON TRIP

We regret that the available space prohibits us from giving you a detailed account of the ambitious project undertaken by Past President Charles H. Preston, in leading the trip to the Grand Canyon of the Colorado. Twenty-eight of our members assembled in Salt Lake City on August 26th and saw and heard enough geology to keep them busy for some time. The trip was a complete success in every way, and we intend to give you a special detailed report prepared by Mr. Preston in the very near future.

GEOLOGICAL SOCIETY OF MINNESOTA1946-7 LECTURE COURSE

The first meeting of the Geological Society of Minnesota will be held on Monday, October 28th. Dr. George M. Schwartz, Professor of Geology, University of Minnesota, will begin his series of lectures on "Economic Geology". You all know Dr. Schwartz and how fine his lectures were last year. The program appears elsewhere herein. "Ruff said".

MID WEST FEDERATION MEETINGS

All meetings of the Federation to be held on October 19th, 1946, will be held in the Museum Auditorium on the Fourth Floor of the Public Library at 10th Street and Hennepin Avenue, Minneapolis, except the banquet.

MID WEST FEDERATION OF GEOLOGICAL SOCIETIES

OFFICERS  
1945-1946

PRESIDENT: Alger R. Syme, Minneapolis, Minnesota.  
VICE-PRESIDENT: Maynard E. Leatsler, Joliet, Illinois.  
SECRETARY: Frank H. Felson, Milwaukee, Wisconsin.  
TREASURER: William E. Mensel, Chicago, Illinois.

EXECUTIVE COMMITTEE

Dr. John R. Ball, Northwestern University  
Chicago, Illinois.  
J. O. Montague, Milwaukee, Wisconsin.

MEMBER SOCIETIES

THE JOLIET MINERALOGISTS,  
Joliet, Illinois.  
MARQUETTE GEOLOGICAL SOCIETY,  
Chicago, Illinois.  
WISCONSIN GEOLOGICAL SOCIETY,  
Milwaukee, Wisconsin.  
MICHIGAN GEOLOGICAL SOCIETY,  
Detroit, Michigan.  
THE GEOLOGICAL SOCIETY OF MINNESOTA,  
Minneapolis, Minnesota.

MID WEST FEDERATION OF GEOLOGICAL SOCIETIES

THE JOLIET MINERALOGISTS

Joliet, Illinois

President	John Brodeske
Vice-President	Robert Price
Secretary	Edith Leatsler
Treasurer	Elizabeth Ireland
Sponsor	Ben H. Wilson
Lecturer	Frank L. Fleener

MARQUETTE GEOLOGICAL SOCIETY

Chicago, Illinois

President	Langdon H. Longwell
Vice-President	Winton E. Platte
Secretary)	
Treasurer)	Marjorie Scanlon
Editors	W. E. Platte
	Mrs. W. E. Platte

WISCONSIN GEOLOGICAL SOCIETY

Milwaukee, Wisconsin

President	Arthur O. Gardner
Vice-President	Charles A. Knobek
Secretary)	Mrs. J. O. Montague
Treasurer)	
Editor	James O. Montague

MICHIGAN MINERALOGICAL SOCIETY

Detroit, Michigan

President	John S. Mihelcic
Vice-President	L. R. Bacon
Secretary	Eloise Goddard
Treasurer	F. Peabody
Editor	Frank P. Zuidema

GEOLOGICAL SOCIETY OF MINNESOTA

Minneapolis, Minnesota

President	Dr. Edward H. Mandell
Vice-President	Charles H. Preston
Secretary	Loretta E. Koppen
Treasurer	Mary Lupient
Editors	Alger R. Syme
	Loretta E. Koppen
Founder	Edward P. Burch (deceased)

TENTATIVE PROGRAM FOR THE 1946 MEETING OF  
MID WEST FEDERATION OF GEOLOGICAL SOCIETIES  
MINNEAPOLIS, MINNESOTA, OCTOBER 19TH AND 20TH, 1946

There will, undoubtedly, be changes in the program, but the character and substance will remain unchanged.

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SATURDAY MORNING, OCTOBER 19TH, 9:30 A.M.

Fourth Floor, Public Library,  
Hennepin Avenue at 10th Street

BUSINESS SESSION:

1. REPORTS - President, Treasurer, Secretary, and Editors of Society Journals.
2. REPORT of Nominating Committee, and election of officers.
3. DISCUSSION:
  - (a) Advisability of establishing some form of a Society Bulletin.
  - (b) Ways and means of securing better cooperation between the Societies, particularly with reference to exchange of information, data, and etc.
  - (c) Advisability of taking definite steps to form a national society.
  - (d) Advisability of establishing certain standing committees.
4. SUGGESTIONS, new business, and new proposals.
5. STUDY of the building stones of the Minneapolis Loop walking (If time permits.)

SATURDAY AFTERNOON, OCTOBER 19TH, 1:30 P.M.

1. MINERAL EXHIBIT; explanation - 30 minutes.
2. LECTURE; "Grand Canyon of the Colorado" geology by Charles H. Preston, Past President Minneapolis Society, illustrated with maps and drawings - 20 minutes. Colored Pictures, Junior F. Hayden, Past President Minneapolis Society - 20 minutes.
3. LECTURE; "Cutting and Polishing" by William J. Bingham, President Minnesota Mineral Club - 20 minutes.

4. LECTURE; "Bysers of Yellowstone Park" geology, and beautiful colored pictures by Junior F. Hayden, Past President Minneapolis Society - 30 minutes.
5. LECTURE; "The Quartz Family" by Ben Hur Wilson of Joliet, Illinois, Contributing Editor to the "Mineralogist" - 20 minutes.
6. SIGHT-SEEING TOUR - 4:00 to 5:00 o'clock including old water courses of the Mississippi River, St. Anthony Falls, and Glacial Ice Block Lakes within the City. Leader Joseph W. Zalusky, Past President Minneapolis Society.

SATURDAY EVENING, OCTOBER 19TH

BANQUET: Curtis Hotel 6:00 P.M. \$2.00

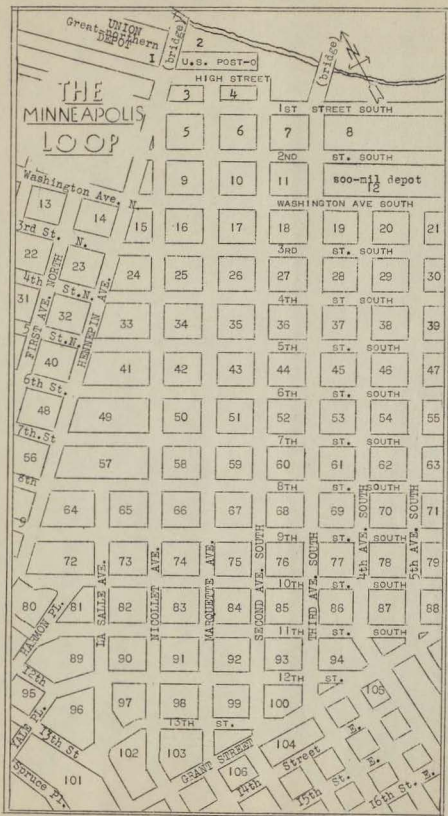
Program:

1. Introductions; officers, guests, and others.
2. Responses by representatives of Societies; introduction of new officers.
3. Lecture; "The Birth of a Volcano" Paracutin, Mexico, with colored moving pictures taken both on the ground and from an air-plane, geology and lecture by Professor L. B. Lawrence of the University of Minnesota.

SUNDAY MORNING, OCTOBER 20TH, 9:30 A.M.

FIELD TRIP: Meet promptly at 10th Street entrance to Public Library. The trip will include:

1. Inspection of good type section of the St. Peter Sandstone, Ordovician Age. Lecture; 10 minutes by Alger R. Syme.
2. Inspection of good section of Platteville Limestone (quarry), Ordovician Age. Collect fossils, lecture by E. H. Brown, 10 minutes.
3. Inspection of Fossil Falls of the Mississippi, Minnehaha Park, lecture by Joseph W. Zalusky, Past President of Minneapolis Society - 10 minutes.
4. LUNCH.
5. View of the Valley of Glacial River Warren, now Valley of the Minnesota River.
6. Visit shale pits (Decorah Shale, Ordovician Age), Twin City Brick Company, St. Paul, collect fossils, lecture by Miss Thelma Sneed - 10 minutes.





GEOLOGICAL SOCIETY OF MINNESOTA

MINNEAPOLIS LOOP DIRECTORY

	Block No.		Block No.
<u>AUTO CLUB:</u>	102	<u>HOTELS:</u>	
		Curtis, 10th & 3rd Ave. So.	86
<u>BANKS:</u>		Dykeman, 27 6th St. So.	49
Farmers & Mechanics, 20 S. 6th St.	42	Frances Drake, 10th & 5th Ave. So.	78
1st National, 5th & Marquette	43	Leamington, 10th & 3rd Ave. So.	85
Marquette National, 517 Marquette	43	Nicollet, Nicollet & Washington	15
Midland National, 405 2nd Ave. So.	36	Radisson, 45 7th St. So.	57
Northwestern National, 620 Marquette	50	Sheridan, 1112 Marquette	83
<u>CHURCHES:</u>		<u>LIBRARY:</u>	
Baptist, 1020 Harmon	80	Convention Meetings, Hennepin at 10th	80
Catholic Basilica, Hennepin & 16	-	<u>RESTAURANTS:</u>	
" St. Olaf, 805 2nd Ave. So.	68	Charles, 716 4th Ave. So.	61
Episcopal Cathedral, Hennepin & Oak Grove	-	D'Napoli, 816 Hennepin	-
" 905 4th Ave. So.	78	Forum, 36 7th St. So.	49
Lutheran, 4th Ave. So. & Grant	105	Grill, 85 9th St. So.	74
Methodist, Lyndale & Hennepin	-	Harry's, 74 11th St. So.	82
" Grant & Marquette	106	Millers, 20 7th St. So.	49
Presbyterian, 1205 Nicollet	98	Richard's Treat, 114 6th St. So.	43
<u>DEPARTMENT STORES:</u>		Stouffers, 89 7th St. So.	58
Baker's, Nicollet	42	YMCA, 30 9th St. So.	64
Ejorickman's, Nicollet	83	<u>THEATRES:</u>	
Dayton's, Nicollet	57	Century, 40 7th St. So.	49
Donaldson's, Nicollet	50	Lyric, 711 Hennepin	57
Harold's, Nicollet	65	Newsreel, 729 Hennepin	57
Justers, 43 6th St. So.	49	Orpheum, 910 Hennepin	-
Powers, Nicollet	34	Radio City, 36 9th St. So.	65
Thomas', Nicollet	66	RKO Pan, 704 Hennepin	56
Young-Quinlan, Nicollet	74	State, 805 Hennepin	64
<u>DEPOTS:</u>		World, 16 7th St. N.	48
Bus Depot, 29 7th St. N.	56	<u>TOURIST INFORMATION:</u>	
Union RR Depot, foot of Hennepin Ave 1	-	Washington Avenue South	
Milwaukee-Soo, 3rd Ave. & Washington	12	Opposite Nicollet Hotel	

BUILDING STONE - MINNEAPOLIS BUILDINGS

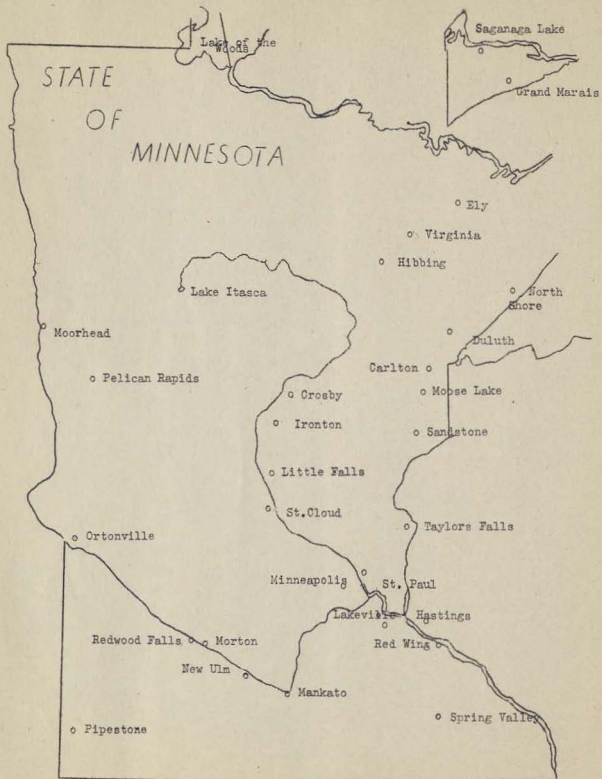
Block No.	Building	Stone
	(Arranged according to block number on accompanying map)	
1	Union Depot	Hinckley Sandstone
2	U. S. Post Office	Base - St. Cloud Gray Granite
		Above - Mankato Dolomite
26	Metropolitan Life Building	Base - Ortonville Granite
	3rd and 2nd Avenue South	Above - Fond du Lac Sandstone
26	Oneida Bldg., 4th & Marquette	Fond du Lac Sandstone, good example
33	Lumber Exchange Bldg., 5th & Henn.	Fond du Lac Sandstone
34	Powers Dept. Store	Base - Morton Gneiss
	5th and Nicollet	Above - Kasota Stone - Dolomite
35	Hodson Bldg., 2nd Ave. S. & 4th St.	Base - Indiana Limestone
35	Boutelle, 5th & Marquette	Base - St. Cloud Red Granite
36	N. W. Bell Telephone Bldg.	Base - Morton Gneiss - fine example
	3rd Ave. S. and 5th Street	Above - Kasota Dolomite
37	Court House	Ortonville Granite
	3rd Ave. S. - 4th to 5th	Polished blocks in 4th St. entrance
42	Baker Co., Nicollet 5th to 6th	Base, West End - Black Gabbro, Ashland, Wis. 1st story - Kasota Dolomite
42	Federal Reserve Bank Bldg.	Base, East End - St. Cloud Rockville Granite
	5th and Marquette	Rockville Porphyritic Granite - good example
42	Farmers & Mechanics Bank	Base - Red Granite, Milbank, S. D.
	6th and Marquette	Above - Kasota Dolomite
		Entrance - Montana Travertine
43	First Nat. Bank Bldg. 513 Marq.	Base - Rockville Granite (good example)
43	First Nat. Bank Bldg.	Base - St. Cloud Pink (coarse) Granite
	Corner 5th and Marquette	
43	Rand Tower, 6th and Marquette	Base - St. Cloud Gray Granite
		Above - Indiana Limestone (Fine Marble in Lobby)
43	Marquette Nat. Bank Bldg.	Base - St. Cloud Pink Granite
	517 Marquette	Above - Handsome Red Sandstone (unknown)
44	Frontenac Bldg., 509 2nd Ave. S.	Base - Rockville Minnesota Granite
		Above - Indiana Limestone
49	Kresge Bldg., Nicollet & 7th	Base - Rockville Porphyritic Granite
50	N. W. National Bank Bldg.	Entrances on 6th & 7th Vermont Gray Granite
	620 Marquette	Base - Black Gabbro, Mellon, Wis.
51	Metropolitan Bank Bldg.	Base - Rockville Porphyritic Granite
	6th & Second Avenue South	Fine Example
57	Daytons Dept. Store	Base - St. Cloud Pink Granite
58	Woolworths, Nicollet & 7th	Base - Black Gabbro, Mellon, Wis. (fine example) Above - Indiana Limestone
58	Physicians & Surgeons Bldg.	Base - Rockville Porphyritic Granite
	7th and Marquette	Entrance - Mankato Dolomite
59	Jewish Club, 2nd Ave. S. 7 & 8th	Base - Buff Kasota Stone - good example (new)
59	Minneapolis Gas Light Co.	Entrance - Morton Gneiss - good example
	8th and Marquette	
59	Ronoake Bldg., 7th & Marquette	Base - St. Cloud Pink Granite
		Above - Indiana Limestone
59	Baker Bldg., 7th & 2nd Ave. S.	Base - Morton Gneiss (fine example)
		Above - Kettle River (Hinckley) Sandstone

<u>Block No.</u>	<u>Building</u>	<u>Stone</u>
65	Albrecht Fur Co., Nic. 8th to 9th	Base - Rockville Granite
65	Harolds, Nicollet 8th to 9th	Mankato Buff Dolomite
66	Medical Arts Bldg. 9th and Nicollet	Base - Isle Granite - good example
66	Jacobs Jewelry Store, 811 Nic	Morton Gneiss in panels - good example
		Base - Rockville Granite - very fine example
67	Eschay Tower	Indiana (Bedford) Limestone
68	St. Clafs Church, 8th & 2nd Ave.	Platteville Limestone, lower beds
		Ordovician Age
73	Home Trade Shoe Co., 924 Nicollet	Polished Tan Mankato Dolomite
74	Ivey Candy Store, 924 Nicollet	Base - Rockville Granite
74	Phelps Bldg., 923 Nicollet	St. Cloud (coarse) Pink Granite
74	Young & Quinlans, 9th & Nicollet	Mankato Dolomite - good example
82	Chatham Bldg., 1008-14 Nicollet	Winona Type Buff Dolomite Limestone
83	Ladd Bldg., Stendal Shoe Store 10th and Nicollet	Exterior trim - Mantorville Dolomite Limestone - Ordovician - Galena
94	Vocational High School	Bedford, Indiana Limestone
98	West Minister Presbyterian Church 12th and Nicollet	Platteville Limestone - very good example
104	Municipal Auditorium	Bedford, Indiana Limestone
105	Central Lutheran Church 5th and Grant	Bedford, Indiana Limestone
	Pillsbury Hall, U. of Minnesota Geology Building	Combination Fond du Lac Sandstone and Hinckley Buff Sandstone

SAME ARRANGED ALPHABETICALLY ACCORDING TO NAME OF BUILDING

<u>Building</u>	<u>Block No.</u>	<u>Stone</u>
Albrecht Fur Co., Nic. 8th to 9th	65	Base - Rockville Granite
Baker Bldg., 7th and 2nd Avenue S.	59	Base - Morton Gneiss (fine example) Above - Kettle River (Hinckley) Sandstone
Baker Co., Nicollet 5th to 6th	42	Base - West End - Black Gabbro, Ashland, Wis. 1st Story- Kasota Dolomite
		Base - East End - St. Cloud Rockville Granite
Boutelle,, 5th and Marquette	35	Base - St. Cloud Red Granite
Central Lutheran Church 5th and Grant	105	Bedford Indiana Limestone
Chathan Bldg., 1008-14 Nicollet	82	Winona Type Buff Dolomite Limestone
Court House, 3rd Ave. S. 4th to 5th	37	Ortonville Granite - polished blocks in 4th Street Entrance
Daytons Dept. Store	57	Base - St. Cloud Pink Granite
Farmers & Mechanics Savings Bank 6th and Marquette	42	Base - Red Granite, Milbank, S. D. Above - Kasota Dolomite
Federal Reserve Bank Bldg, 5th & Marq.	42	Entrance - Montana Travertine
		Rockville Porphyritic granite - fine example
First Nat. Bank Bldg. 513 Marquette	43	Base - Rockville Granite - good example

<u>Building</u>	<u>Block No.</u>	<u>Stone</u>
First Nat. Bank Bldg. Corner 5th and Marquette	43	Base - St. Cloud Pink (coarse) Granite
Poshay Tower	67	Indiana (Bedford) Limestone
Frontenac Bldg., 509 2nd Ave. S.	44	Base - Rockville Minnesota Granite Above - Indiana Limestone
Harolds, Nicollet 8th to 9th	65	Mankato Buff Dolomite
Hodson Bldg., 2nd Ave. S. & 4th St.	35	Base - Indiana Limestone
Home Trade Shoe Co., 924 Nicollet	73	Polished Tan Mankato Dolomite
Ivey Candy Store, 925 Nicollet	74	Base - Rockville Granite
Jacobs Jewelry Store, 811 Nicollet	66	Base - Rockville Granite - very fine example
Jewish Club, 2nd Ave. S. 7th to 8th	59	Base - Buff Kasota Stone - good example (new)
Kresge Bldg., Nicollet & 7th	49	Base - Rockville Porphyritic Granite
Ladd Bldg., Stendal Shoe Store 10th and Nicollet	83	Exterior trim - Mantorville Dolomitic Limestone - Ordovician - Galena
Lumber Exchange Bldg., 5th & Henn.	33	Fond du Lac Sandstone
Marquette Nat. Bank Bldg. 517 Marquette	43	Base - St. Cloud Pink Granite Above - Handsome Red Sandstone (unknown)
Medical Arts Bldg., 9th & Nicollet	66	Base - Isle Granite - good example Morton Gneiss in panels - good example
Metropolitan Bank Bldg. 6th and Second Avenue South	51	Base - Rockville Porphyritic Granite fine example
Metropolitan Life Building 2nd Avenue S. and 3rd Street	26	Base - Ortonville Granite Above - Fond du Lac Sandstone
Mpls. Gas Light Co., 8th & Marquette	59	Entrance - Morton Gneiss - good example Combination Fond du Lac Sandstone and Hinckley Buff Sandstone
Pillsbury Hall, U. of Minnesota Geology Building	104	Bedford, Indiana Limestone
Municipal Auditorium	36	Base - Morton Gneiss - fine example Above - Kasota Dolomite
N. W. Bell Telephone Bldg. 3rd Ave. South and 5th St.	50	Entrances on 6th and 7th - Vermont Gray Granite - Base - Black Gabbro, Mellon, Wis.
N. W. National Bank Bldg. 620 Marquette	26	Fond du Lac Sandstone - good example
Oneida Bldg., 4th & Marquette	74	St. Cloud (course) Pink Granite
Phelps Bldg., 923 Nicollet	58	Base - Rockville Porphyritic Granite Entrance - Mankato Dolomite
Physicians & Surgeons Bldg. 7th & Marquette	34	Base - Morton Gneiss Above - Kasota Stone - Dolomite
Powers Dept. Store, 5th & Nicollet	43	Base - St. Cloud Gray Granite Above - Indiana Limestone (fine marble in lobby)
Rand Tower, 6th & Marquette	59	Base - St. Cloud Pink Granite Above - Indiana Limestone
Ronoke Bldg., 7th & Marquette	68	Platteville Limestone lower beds Ordovician Age
St. Olaf's Church 8th & 2nd Avenue South	1	Hinckley Sandstone
Union Depot	2	Base - St. Cloud Gray Granite Above - Mankato Dolomite
U. S. Post Office	94	Bedford, Indiana Limestone
Vocational High School	98	Platteville Limestone - very good example
West Minister Presbyterian Church Nicollet & 12th	58	Base - Black Gabbro, Mellon, Wis. fine example - Above - Indiana Limestone
Woolworths, 7th and Nicollet	74	Mankato Dolomite - good example
Young & Quinlans, 9th & Nicollet		



PLACES OF GEOLOGIC INTEREST, IN MINNESOTA.

PLACES OF GEOLOGIC INTEREST IN MINNESOTA

- CARLTON: Thomson Slates.
- CROSBY-IRONTON: Iron mines of the Cuyuna Iron Range - Manganiferous Iron Ore.
- DULUTH: Gabbro; intrusion of Thomson Slates by Gabbro; Duluth Harbor, Ancient beaches of Glacial Lake Duluth; (Boulevard Drive).
- ELY: Soudan Iron Formation; Ely Greenstone - oldest known rock, (Archean Age). Underground hard Magnetite Ore Mines.
- GRAND MARAIS: Minnesota "Thunder Eggs"; Lava flows.
- HASTINGS: A number of well defined faults.
- HIBBING: Center of Mesabi Iron Range - greatest iron ore mines in the world.
- LAKE ITASCA: Source of the Mississippi River.
- LAKEVILLE: Kansan, Illincian and Wisconsin glacial drifts, in one road cut.
- MANKATO: Contact between Cambrian and Ordovician; Kasota Building Stone quarries.
- MINNEAPOLIS: St. Anthony Falls; Ice Block Lakes; Several old courses of the Mississippi River; Fossil Falls.
- MOORHEAD: Glacial Lake Agassiz.
- MOOSE LAKE: Shoreline and beach gravel of Glacial Lake Duluth.
- MORTON: "Rainbow Granite" quarries. (gneiss).
- NEW ULM: Sioux Quartzite, and excellent conglomerate.
- NORTH SHORE: Basalt flows; Thomsonites;
- ORTONVILLE: Ortonville Granite quarries.
- PELICAN RAPIDS: Beaches and bench gravels of Lake Agassiz; Site of "The Minnesota Man".
- PIPESTONE: Catlinite, famous Indian pipestone.
- RED WING: Barn Bluff fault; contact of Cambrian and Ordovician.
- REDWOOD FALLS: Granite outcrops: Cretaceous; decomposed granite, 100 feet thick.
- ST. CLOUD: Granite Quarries: Center of the granite cutting and fabricating business.
- SAGANAGA LAKE: Saganaga granite, Archean Age.
- SANDSTONE: Quarries in Hinckley Sandstone, Keweenaw Age.
- ST. PAUL: Shale pits of Twin City Brick Co. (Decorah).
- SPRING VALLEY: Iron Ore deposits in limestone.
- TAYLORS FALLS: Famous Pot Holes; abandoned gorge; a recent conglomerate; river terraces; extensive Keweenaw lava flows; Labradorian and Keewatin drifts.

# THE GEOLOGIC COLUMN

ERA	MIL-LIONS YEARS	PERIODS	OUTSTANDING EVENTS	LIFE	IND-STRY	MINNESOTA FORMATIONS	
C O N C O M M O N E R Y	0 10 20 30 40 50 60 70 80 90 100	Recent	Rise of civilization Development of man	Age of Man		Loess, alluvium, and other recent deposits	
		COAST RANGE REVOLUTION					
		CASCADIAN REVOLUTION					
		Pleistocene	Stone-age man Glaciation extensive				Wisconsin Drift Keewatin Fatician Iowan
							Illinoian Kewanee Nebraskan
LARAMIDE REVOLUTION							
C O N C O M M O N E R Y	100 150 200	Cretaceous	Dinosaur die out	Age		Colomina (Benton) Formation Dakota Series Ostrander member	
		Jurassic	Beginning of Sierra Nevada Large Dinosaurs appear	of			
		Triassic	First Dinosaurs Volcanism--Pulicades		Reptiles		
APPALACHIAN REVOLUTION							
C O N C O M M O N E R Y	220 240 300 350 400 500	Permian	Extensive glaciation, Cold-arid--rise of reptiles.	Age of Amphibians			
		Pennsylvanian	Warm humid climate, Coal measures.				
		Mississippian	Paleozoic Alps--First land vertebrates.				
		Devonian	First Forests				
		Silurian	Long fishes--rise of land plants.		Age of Fishes		Cedar Valley limestone
		Ordovician	First fishes				
C O N C O M M O N E R Y	570	Cambrian	Fossils abundant First time--Trilobites and brachiopods dominant.	Invertebrate life dominant.		Huyuketa Formation Selma Formation Decorah Shale Member Platteville Formation Glenwood Member St. Peter Sandstone Shakopee Dolomite Rout Valley Sandstone Onusta Dolomite (Soapstone) St. Croixian Series Jordan Sandstone St. Lawrence Formation Frustronian Formation Oriskany Formation	
		ALPINE INTERVAL					
KILLARNEY REVOLUTION							
C O N C O M M O N E R Y	850 1000	Keeweenaw	Leaching of Soudan Iron Formation - Extensive lava flows.	Evolution of Primitive form of life		Shookley-Ford-du-lac Sandstone Duluth Gabbro Pauquette Formation	
		Upper Huronian Anisian	Great Iron deposition Oldest glaciation			Virginia-Bure Slates Newish Iron Formation Pogogamun-Stoux Quartzite.	
		ALCOWAN REVOLUTION					
							Alcowan Granites Fennell Range Giant Range St. Cloud Granites
C O N C O M M O N E R Y	1800	Middle Huronian	Intensive Folding	uni-cellular			
		Lower Huronian Tussockmoss	Igneous Intrusives	life.		Knife Lake Slates Ogishka Conglomerates	
LAURENTIAN REVOLUTION							
C O N C O M M O N E R Y	1500 2000	Laurentian	Rocks much altered	Primitive life		Saganaga Granite	
		Keewatin	Geologic History Obscured			Soudan Iron Formation Kiy Granitones	
		COSMIC TIME					
	3000						