



THE MINNESOTA GEOLOGIST

OFFICIAL BULLETIN
OF

THE GEOLOGICAL SOCIETY OF MINNESOTA

VOL III

JULY 1946

NO 4

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PALEOZOIC PERIOD
COAL DEPOSITS OF THE U.S.
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A GEOLOGIC COLUMN
BULLETIN BOARD

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.

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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.

EDITORIALS

GRAND CANYON TRIP: Perhaps the most audacious undertaking by the Society is the projected trip to the Grand Canyon, which includes also, a trip to Bryce and Zion Canyons, and many other points of interest passed in going and returning, which you may desire to take in. Past President Charles H. Preston is sponsor for this trip and those who are interested should phone or write him at once. His address is 610 Plymouth Building, Minneapolis 2, Minnesota. Phone, ATLANTIC 3388. About 25 have signified their interest in this trip. To anyone who has not seen the canyon, and in fact to anyone who has, this is an experience well worth any effort you may put forth in going. The important thing to remember is that reservations have to be made at the Canyon well in advance, and should be done as soon as possible. If you are interested, communicate with Mr. Preston immediately. Otherwise, it may be too late.

FIELD TRIPS: The Field Trips this summer, have been good ones. The attendance has averaged 40. Those who have attended have received a real geological benefit. Let us repeat again, those who do not go on these trips are missing a great opportunity provided by the Society.

DR. LAURENCE M. GOULD, President of Carleton College, very graciously lead the July 7 field trip for the purpose of studying glacial geology in the field. What a thrill to observe three distinct "drifts", characteristic of three great glacial periods somewhat coyly concealed in the bank of a road cut. The attendance was 49. We are justly indebted to Dr. Gould for a wonderful trip and for his time so generously and expertly given to us.

MIDWEST FEDERATION OF GEOLOGICAL SOCIETIES: The annual meeting of the Society will be held in Minneapolis during October, probably October 5 and 6. The Directors plan to combine our first meeting with the Federation's meeting and trust that both will benefit. We hope you will all take a keen interest in the Federation meeting. There will be one or two short local field trips, probably two meetings, and a banquet. Best of all, it will give you an opportunity to become acquainted with some of the members and officers of other Societies, exchange views, and form friendships. The September 15th issue of our Bulletin, *THE MINNESOTA GEOLOGIST*, will feature the convention, and give you full details.

THE NEW DIRECTORY will be issued shortly. We wish that you could have been behind the scenes and observe the tremendous amount of work that has been necessary to make this Directory, which we hope will be the best one and the most accurate one ever issued. To secure the information regarding each member, tabulate it, eliminate members who have dropped, include new members, check it against our addressograph plates, draft and re-draft, check, re-check, and double check--it has been a real job. As on single task, ye Editors have mastered the technique of operating the punching machine which hammers out the individual metal addressograph plates, and have made new, or altered more than 50 old plates. There will no doubt still be some errors in the Directory, but we hope you will find it useful. Please report immediately any errors especially in street, number, and zone number.

7 WONDERS OF THE WORLD: Burton Holmes, the great traveler, has recently designated Grand Canyon and Paracutin Volcano, respectively, as No. 1 and No. 2 wonders of the world. It is interesting to note that both are of prime geologic interest.

SIGNIFICANCE OF NAMES IN THE GEOLOGIC COLUMN: MODIFICATION AFTER CARL E. DUTTON

<u>ERA</u>	<u>PERIOD</u>	<u>SIGNIFICANCE OF NAME</u>
<u>CENOZOIC</u>		<u>RECENT LIFE</u>
	QUATERNARY	MEANING FOURTH, obsolete
	RECENT	POST GLACIAL EPOCH
	PLEISTOCENE	MOST NEW GLACIAL EPOCH
	TERTIARY	MEANING THIRD, obsolete classification,
<u>MESOZOIC</u>		<u>MIDDLE LIFE</u>
	CRETACEOUS	CHALK, abundant in this age
	JURASSIC	TYPE LOCALITY, JURA MOUNTAINS
	TRIASSIC	THREE FOLD GROUPING OF THE STRATA
<u>PALEOZOIC</u>		<u>OLD LIFE</u>
	PERMIAN	TYPE LOCALITY, PERM, RUSSIA
	PENNSYLVANIAN	" " , PENNSYLVANIA
	MISSISSIPPIAN	" " , MISSISSIPPI VALLEY
	DEVONIAN	" " , DEVONSHIRE, ENGLAND
	SILURIAN	" " , WALES: NAMED AFTER THE SILURES, AN EARLY WELSH TRIBE
	ORDOVICIAN	" " , WALES: NAMED AFTER EARLY WELSH TRIBE
	CAMBRIAN	" " , WALES: LATIN NAME FOR WALES
<u>PROTEROZOIC</u>		<u>PRIMITIVE LIFE</u>
	Keweenaw	TYPE LOCALITY, KEWEEANAW POINT, MICH.
	Huronian	" " , NORTH SHORE LAKE HURON
<u>ARCHEOZOIC</u>		<u>ANCIENT LIFE</u>
	KEEWATIN	TYPE LOCALITY, CENTRAL AND WESTERN CANADA now obsolete

SUBMERGENCES AND LAND FEATURES OF THE PALEOZOIC ERA

In the last issue of the MINNESOTA GEOLOGIST, we presented a summary of the submergences and land features of the Proterozoic Era. In this issue, we present a summary of the submergences and land features of the Paleozoic Era. As authority for the statements and conclusions herein, we have taken "Fundamentals of Historical Geology" by Paul E. Dutton, Ph.D., Assistant Professor of Geology at Wayne University. Professor Dutton was formerly on the faculty of the University of Minnesota.

We do not pass directly, however, from the Proterozoic to the Paleozoic Era, and in considering this section of the geologic column, we should have in mind the Lipalian Interval between these two eras. This interval represents an enormous stretch of time. The record of this long period is lost because apparently all over the world erosion exceeded any deposition that was made, and there is no record, therefore, with which to interpret the period. The period is so named from a Greek word meaning "lost." Everywhere, therefore, the Paleozoic rocks lie unconformably on those of the Proterozoic. The latter show the effects of deep erosion indicative of a long period of time.

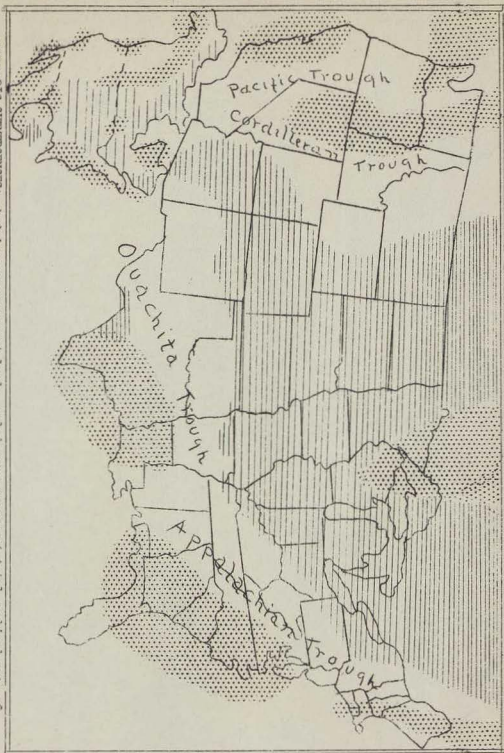
The Paleozoic Era is divided into seven great periods. Beginning with the Cambrian, and closing with the Permian. The predominant character of the formations of this group is their marine origin. The physical geography of the North American continent during the Paleozoic Era can be inferred from information concerning the rocks of this era. During all of this era, trough-like basins accumulated many thousands of feet of sediment in the present site of the Appalachian Mountains and the western mountainous zone of the continent, as well as in troughs of lesser magnitude. The source of sediment were the land areas bordering on these troughs. The central part of the continent was not characterized by these conditions, but consisted of the northern portion essentially the area north of the Great Lakes which was predominantly emergent during much of this era, and the southern portion which was submerged many times by water spreading out of the flooded troughs.

The most significant point concerning the geographic changes during the Paleozoic Era are the submergent and emergent conditions of the continent. The general pattern of the entire era was that of two large troughs of submergence situated in the site of the present Appalachian Mountains and a portion of the Cordilleran region. Troughs of lesser importance were also present as recorded by Paleozoic strata in British Columbia, California, Oklahoma, Texas and New Mexico. Under normal conditions the submergence began and ended by floods restricted to the ends of the trough. During the sequence of events, the maximum stage of submergence occurred in and near the middle of the period. This condition of maximum submergence lead to the deposition of limestones over wide areas.

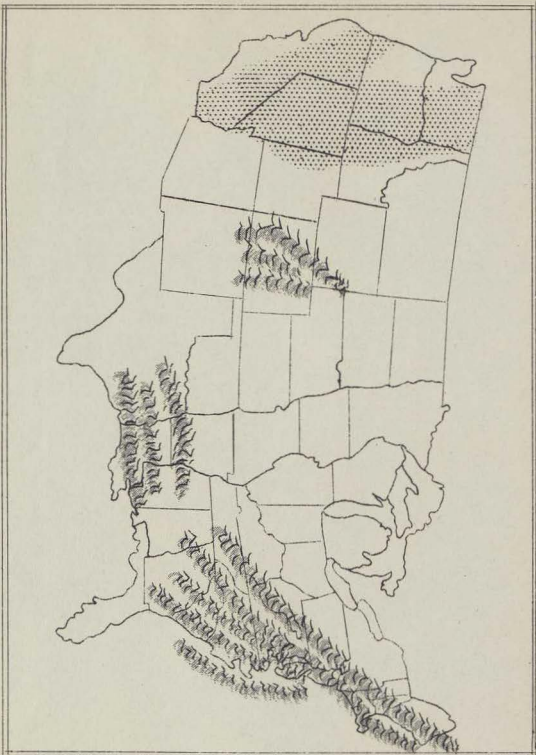
The division of geologic time is based upon diastrophism, including both epirogenic diastrophism, involving great uplifts of the continent without deformation of the strata, and orogenic diastrophism, or mountain making movement which is accompanied by deformation of the strata.

At the close of the Ordovician period, northeastern United States and Canada was affected by the Taconic disturbance. At the close of the Devonian, the Acadian disturbance profoundly altered the northern part of the Appalachian geo-syncline and at the close of the Mississippian period, folding began in the interior highland. The climax of Diastrophic events was the destruction of the Appalachian geo-syncline at the close of the Paleozoic Era, by the Appalachian revolution which created the rock structures in the present mountain system composed of Paleozoic rocks. Succeeding geologic time and its characteristic geography will differ from the Paleozoic Era by the absence of this trough in the United States.

PALEOZOIC SUBMERGENCES: shaded areas represent land; ruled areas represent total combined area of the shallow seas; troughs are geosynclines, or ocean areas.
(Paleogeographic Series II; No. 48)



Paleogeographic Series II: No 49: Dominant surface features of the United States at the close of the Paleozoic Era and at the beginning of the Mesozoic Era. Shaded area is Cordilleran Trough.



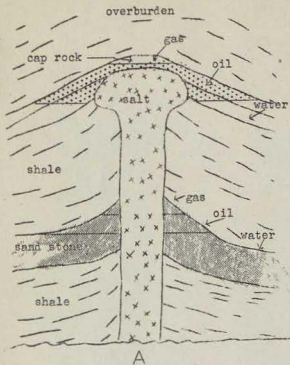
GEOLOGY IS AS SIMPLE AS THAT

The following article was written by Dorothy A. Treat of the Staff of the National Audubon Society, under the title "Rock Stories and How to Read Them."

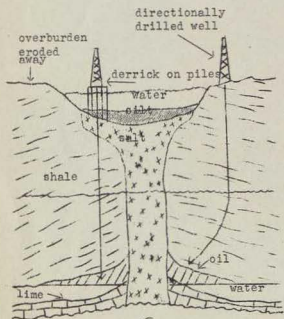
BEHIND IT ALL THERE LIES A ROCK. If you stop to think about it, everything in the world is concerned with rocks. They are the foundation on which we live and build our cities. Rocks constitute the earth itself. They are the raw materials from which soil is made and out of which all vegetation grows. Rocks are composed of minerals. In them are the ores and metals that play such a vital part in our lives.

THE MOST PERMANENT THING IN THE WORLD IS CHANGE. We have only to think of the earth and all the life on it to realize the truth of this seeming paradox. In the study of rocks we are particularly aware of this. Although a rock may seem to be something hard and indestructible, actually it is continuously being altered and even huge masses of rock such as mountain ranges, while fairly permanent when compared to a human life span, are merely incidents in the history of the earth. The Rocky Mountains, for example, are new. Before they existed, a vast sea occupied the area, and before that there were plains and other mountains and other plains. Those who understand something of how rocks are formed can read these events by examining the rocky walls of river valleys. Fossil remains of plants and animals, now part of some of these rocks, bear evidence of life in the area while these changes were taking place.

Ability to read a little of the story of earth changes in any area is not as difficult as you might imagine. If you can distinguish the more common members of the three great classes of rocks and if you know something of the forces at work to alter them, even though your knowledge be gleaned only from brief paragraphs, it seems probable that you could go forth wherever you are and read for yourself at least a few of the events in earth history which have happened there.



A



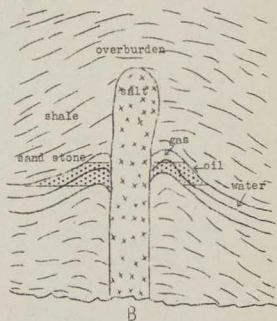
C

SALT DOMES

Under great pressure salt becomes plastic and is sometimes pushed upward by pressure from below carrying with it the adjacent strata. Three types of salt domes are illustrated.

"A" Salt plug with overhang. Oil is in both cap rock and the flank. Note how the upward movement of the plug has "dragged" the strata upward and sealed off the oil, gas and water at the contact.

"B" Salt plug has subsided from previous elevation. Oil is in the flank. Note how the downward movement of the plug has,



B

in this instance, dragged the strata downward and created an anticline in which the oil, gas and water are trapped. Note too that the oil, gas and water are in the anticline and not in the seal at the contact.

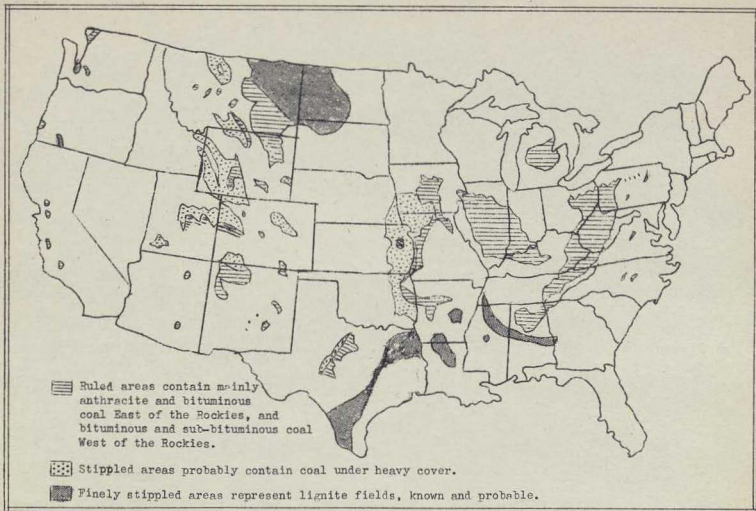
"C" Here the plug has been revealed by erosion and is now at the surface. The salt has dissolved out forming a lake. Here the oil, gas and water are trapped at the contact.

BULLETIN BOARD

SPECIAL ANNOUNCEMENT

The Annual Meeting of the Midwest Federation of Geological Societies will be held in Minneapolis in the month of October, probably October 5 and 6. Plans have been made to start our own lecture program for the year 1946-47 at the same time. We are also planning to devote the next number of the Bulletin to the convention. This Bulletin will be mailed at the usual time on September 15, and will contain full details of the program.

- July 21 NOERENBERG'S RESIDENCE at Lake Minnetonka.
PURPOSE - general get together. Lecture by Chas. H. Preston.
Subject to be selected.
- August 3, 4 LITTLE FALLS, Minnesota; LEADER, Elmer H. Brown.
PURPOSE - to study the contacts of the shists and granite, find staurolites, examine Algonian granite, etc.
- August 18 PRESTON HOME, Lake Minnetonka; LECTURE by Edward W. Hawley on
"The Wonders of the Heavens."
- September 1, 2, GRAND CANYON, Arizona; LEADER, Chas. H. Preston.
3 PURPOSE - to visit and study the Grand Canyon. Dates are approximate only.
- September 1, 2, WAVERLY and CEDAR RAPIDS, Iowa; LEADER, Dr. Wesley R. Hiller.
3 PURPOSE - to study various Ordovician and Devonian formations, secure geodes and fossils.
- September 14, SPRING VALLEY, (Minnesota), PRESTON, LANESBORO and VICINITY;
15 LEADER, Alger R. Syme.
PURPOSE - to study the Oneota, Shakopee and Root Valley formations of southeastern Minnesota, the geology of Root Valley, iron formation of Spring Valley, and the contacts of each.
- September 29 DENHAM, Minnesota; LEADERS, Mr. and Mrs. Lawrence W. King.
PURPOSE - to study the metamorphism of the southern exposure of the Thomson formation, intrusions thereof by the Algonian granite, and other interesting and unusual features of the contact.



Sketch showing coal fields of the United States, after Campbell, Parker and others in General Economic Geology, by William H. Emmons, Professor of Geology University of Minnesota, Retired.

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