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C O N T E N T S

THEMATIC SKETCH OF
GEORGE A. THIED, PH.D.

THE BULLETIN BOARD

THIS AND THAT

MINERALS

EDITORIALS

ARTICLE OF THE MONTH
"PARICUPIN - A VOLCANO"
By Dr. L. C. Scratch
Professor of Geology.

GEOLOGICAL SOCIETY OF MINNESOTA

531 SECHRD AVE. SO.
MINNEAPOLIS, MINN.

The Geological Society of Minnesota is devoted to the study of geology and mineralogy for their cultural value.

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Our Society meets every Monday evening, not a holiday, in the large auditorium in the Museum, on the 4th floor of the Public Library at Hennepin Avenue and 10th Street, Minneapolis, Minnesota, at 7:30 P. M., from October to May. From May until October, we endeavor to have a field trip each week (when gasoline rationing doesn't interfere). Visitors are very welcome. Dues for those residing in Hennepin and Ramsey Counties are \$3.00 annually, and \$1.00 additional for your wife or husband, or dependent family members, and for those residing elsewhere are \$1.00 per person.

Our Society owes a great deal to the faculty of the Department of Geology of the University of Minnesota. Perhaps we don't express our gratitude as frequently or forcibly as we should, but there is no question that all of us feel very grateful to the several members of the faculty. We are indebted to them, not only for their instruction so patiently and cheerfully given, but also for the inspiration and insight into the subject of Geology they have given us. This applies to each and every member of the faculty. Due to force of circumstances, however, we have been more closely associated with Dr. Thiel. Last year he gave us a course of 17 lectures on General Geology and this year a like course on Historical Geology. We have therefore come to know him somewhat more intimately than would otherwise be the case. We hope you will enjoy reading the following personal history of Dr. Thiel, our instructor and good friend.

Dr. Thiel is entirely a product of Minnesota. He was born and reared at Staples, in this state, and attended the grade schools there. He attended a college preparatory school at St. Paul Park, Minnesota, and entered the University of Minnesota in 1913, from which he received the degree B.A. in 1917. He also obtained his Masters Degree from the University of Minnesota, and in 1923, completed the work for his Doctorate, receiving the degree of Ph.D. in 1923. Although his scholastic honors and attainments are many, he still regards as his greatest academic thrill the occasion of receiving his diploma at eighth-grade graduation exercises in the village "opera house" at Staples. That he was not entirely an academician is proved by the fact that while attending prep boarding school, he burned the flag of the commercial class, surmounting the dormitory while the other students and faculty were attending chapel exercises.

A leg injury received early in life kept him from very active participation in athletics and the necessity of working for his keep kept him from engaging to any great extent in extra-curricular activities while attending the University. Although he took several courses in Geology during his first 4 years in college, he majored in Biology and spent one summer collecting and studying marine forms at the marine biological laboratory at Wood's Hole, Massachusetts, and was well on the way to becoming a Biologist. Geology came somewhat later.

Upon graduating from the University in 1917, he was commissioned in the Sanitary Core of the Army and taught Biology at Yale and at the Ft. Leavenworth Army Medical Training School. He served overseas as officer in charge of laboratory work for a large base hospital, but after the Armistice, spent some time studying the Geology of the Mediterranean Coast. Although Dr. Thiel had always been interested in Geology, it was not until after he had received his Master's Degree and had seen service in France that he definitely decided to adopt Geology as his profession. This is supported by the fact that his thesis for his Masters Degree bore the profound and erudite title of "The Development of the Mammalian Spleen, With Special Reference to its Hemato Poetic Activity". This thesis was later published in the American Journal of Anatomy. He spent the summer of 1923 studying in the field the Geology of Western United States. He regards the view from the top of Long's Peak, Colorado, and the Royal Gorge, Colorado, cut through solid granite, as two of the most inspiring sights he has ever witnessed.

Dr. Thiel has authored many books, and scientific papers and articles. He is co-author of the textbook on Geology used at the University of Minnesota and elsewhere. He has written 4 bulletins for The Minnesota Geological Survey, and nearly 100 scientific articles and papers on various geologic subjects, which have been

published in the bulletins of The Geological Society of America, The Bulletin of Economic Geology, American Journal of Science, and other scientific publications,

Dr. Thiel's specialty is sedimentation and sedimentary Petrography. If you have not read his book on the St. Peter Sandstone, we commend it to you. Dr. Thiel is a member of The National Research Council, The Geophysical Union, American Association for the Advancement of Science, and at the present time, is President of the Minnesota Academy of Science, and is on the editorial staff of the Society of Economic Geologists. He is also Departmental Major Advisor to students in the Department of Geology at the University.

There are two very good reasons why we, as a Society, are particularly interested in Dr. Thiel. Firstly, because he is a wonderful instructor, and has the ability of describing complicated and intricate geologic processes and conditions in simple language so that each of us can comprehend. Secondly, he has always enthusiastically sponsored the cultural value of Geology. At the present time, he is engaged in making a survey of the natural sciences for the purpose of orienting the subject of Geology with other natural science subjects, because he feels that Geology has not heretofore received as much attention as it should, on the part of those teaching natural science subjects in the elementary schools. It is hoped that this survey will lay the foundation for more general study of the subject of Geology by young students, who may never pursue the subject professionally, but who, nevertheless, will, from such study, more generally appreciate Earth History.

Although Dr. Thiel has devoted his life to the academic study of Geology, he has never lost sight of or touch with, shall we say, the outside world, that is, with people and events outside the academic field. He has a wide acquaintance and his genial ways make him a most agreeable companion, husband and father. He is married and has one daughter attending grade school. It would be hard indeed to find a person more readily "approachable" than Dr. Thiel. You cannot come within the sphere of his influence without being conscious of his friendly and tolerant attitude towards you. He seems never to be impatient, no matter how strangely irrelevant your ideas may be and no matter how busy he is, he always takes adequate time to clarify the situation for you. He is without doubt a great teacher, and to have been his pupils has been a great privilege to our members. Of him we can truly say, "He is a gentleman and a scholar". Hats off, to Dr. Thiel! ARS.

BULLETIN BOARD

- 2-28-44 THE CRETACEOUS PERIOD: Its major geologic and biologic events.
- 3-6-44 THE TERTIARY OR PRE-GLACIAL EVENTS OF THE CENOZOIC ERA: The beginnings of the development of the present landscape of North America and Minnesota.
- 3-13-44 PLEISTOCENE PERIOD: Special reference to glacial deposits of Minnesota and neighboring states.
- 3-20-44 QUESTIONS AND ANSWERS: Dr. Thiel will answer 75 questions covering the entire course. This will be an excellent review and is given at the request of many of our members.
- 3-27-44 MINNESOTA FOSSILS: By Miss Thelma Sneed.

CALCIUM: A gallon of sea water contains only 6/100ths of an ounce of calcium. Yet the lowly oyster builds up a heavy shell of calcium and the still more lowly coral builds whole islands from this very diluted supply.

CANADIAN MINERALS: Canada is producing 95% of the nickel, 20% of the zinc and mercury, 15% of the lead, 12 $\frac{1}{2}$ % of the copper and 75% of the asbestos output of the United Nations.

COAL: Coal supplies 55% of all mechanical energy in the United States, powers 95% of railroad locomotives, generates 55% of the electricity, heats 4 out of 7 homes, and is absolutely essential in the making of all steel.

COAL BY-PRODUCTS: In producing coke from Utah coal at the Government's great new \$180,000,000.00 steel plant at Geneva, in that state, they recover as by products from each ton of coal: 26 $\frac{1}{2}$ lbs. of ammonium sulphate, 4 $\frac{1}{2}$ gallons of light oil, 2-3/4 gallons of motor fuel, 3-1/10 gallons of benzol, 1/5 gallon of toluol, 11 $\frac{1}{2}$ gallons of tar and 11,500 cubic feet of gas, having 582 B.t.u.'s per cubic foot.

NORTH POLE AND OIL: Dr. Wallace E. Pratt, Geologist with the Standard Oil Company of New Jersey, is authority for the statement that one of the greatest and most promising regions for the discovery of additional petroleum reserves is the great basin which surrounds the North Pole.

VALUABLE DUST: Sir Oliver Lodge filled an ordinary fruit jar with cigar smoke and by introducing an electrically charged copper wire into the jar found that the smoke vanished instantly. The smoke particles became charged by the electric impulse, so that they repelled each other and flew outward to stick to the glass. Dr. Cottrell, his helper, perfected the invention for use in smelters, cement plants and other industrial plants where there is a great quantity of fine material in the air. It is not unusual for a Cottrell installation to remove 50 tons of dust per day from one smelter chimney. By this method, considerable quantities of minerals, such as lead, sulphur, arsenic and ammonium and many others are recovered. It is also used to purify the air circulated in large buildings.

DELTA: The three oldest civilizations in the world were developed and built on the margins of the deltas of three great rivers, namely the Nile, the Euphrates and the Indus. It is thought that these civilizations developed between 7,000 and 4,000 B.C. It was in the soft clay and alluvial soil of these deltas that man probably first learned to cultivate the seeds of plants, to raise other plants from the seeds. All the basic inventions of our civilization were made during that period, and nothing so revolutionary has happened before or since, says Clark Wessler of the American Museum of Natural History.

SILICON: Although Silicon is never found alone, its compounds make up more than one-fourth of the Earth's crust. Its most common compound is Silicon Dioxide, (Si O₂), or as it is more generally called, Silica, made up of one atom of Silicon and two of Oxygen.

CONTRIBUTIONS, for the support of the Bulletin have been coming in very well indeed, and we desire at this time to express our sincere appreciation to those who have contributed for this purpose. As of February 21st, contributions have been made by the following persons: Miss Celia Fischer, Mr. E. P. Burch, Miss Leone P. Knox, Mr. C. H. Preston, Mr. C. B. Howard, Mr. H. H. Edgerton, Mr. George Rickert, Mrs. Helene M. Becker, Mr. L. R. Harder, Dr. Edw. R. Mandell, Dr. Geo. A. Thiel, Miss Bessie Long, Miss Winnie Noerenberg, Mr. J. F. D. Clark, Mr. W. J. O'Brien, Mrs. Helen J. Sommers, Fred L. Wunderlich, Miss Caroline Vanstrum, Mrs. W. S. Anderson, Mrs. E. L. Koppen, Theo. Zickrick, Mr. E. L. Nelson, Mrs. Lillian Faine. The expense of publishing the Bulletin for the first year will be about \$50.00, and we are just past the half-way mark. Any amount will be greatly appreciated. We still need about \$35.00 or \$40.00.

UNITED STATES VETERANS HOSPITAL: In case you want to visit Mr. Hanley, visiting hours at the United States Veterans Hospital are from 2:30 to 4:00 and from 7:00 to 9:00 on Tuesdays, Thursdays, Saturdays and Sundays.

BULLETINS: A considerable number of members complained that they did not receive the last issue of the Bulletin. If you do not receive this Bulletin at the proper address, or if you learn through others that it has been published and you do not receive your copy within a week, write a postal card to the Editor, giving your correct full name, and street address, and your zone number.

OLD BULLETINS: We have received numerous requests for Bulletins No. 1, 2 and 3. If you have any of these numbers and do not intend to keep them, will you give same to the Editor.

OFFICERS: Please note the panel of new officers on the inside cover page. It is good for you and the Society, for you to know who the officers are.

APPLICATION FOR MEMBERSHIP: Please note blank application for membership on last page. Please use it, if possible to secure a new member.

DR. THIEL'S LECTURE COURSE: Dr. Thiel's lecture course on Historical Geology is drawing to a close. The last lecture will be on March 13. At that lecture, we will distribute to you a list of 75 questions on Historical Geology. During the week following, you can fill in your own answers to these questions. On the evening of Monday, March 20, Dr. Thiel will answer these questions for you. At that meeting, bring the questions and your answers, compare them, and see how nearly right you were. As Andy would say, "Get a check on yourself." This is merely for your own satisfaction. It is an interesting review of the course and should serve to emphasize the more important facts and to clarify things for you. We did this last year and it was so well received that many have requested us to repeat it this year.

* * * * *

AND THEREBY HANGS A TALE--

As Gracie Fields would say, "And here's a bit of a story for ya." A little old man, hard of hearing, was listening to a lecture on Geology. The speaker had just stated that the Earth would last for another two billion years. Suddenly the little old man interrupted to ask the speaker to repeat the figure, and when he had done so, the little old man replied, "Oh, I was scared. For a minute I thought you had said two million years."

PARICUTIN, MEXICO'S NEW VOLCANO

By Dr. L. C. Graton
Noted Harvard Geologist

NOTE: Practically all geologic events are the results of geologic processes extending over tremendous periods of time, and it is rare indeed that a geologic event occurs so suddenly that we can see it taking place. We have recently been favored, however, by such an event in the sudden and explosive creation of a volcano in Mexico, now known as "Paricutin", pronounced "Par-ro'-coo-teen". The following article was condensed by the magazine NEWS DIGEST, from a radio address by Dr. Graton.

Luckily the owner of the cornfield in which the Paricutin volcano burst forth was at the spot where and when the phenomenon began. In late afternoon of February 20, Dionisio Pulido, intelligent Tarascan Indian, was preparing his land for planting. For two weeks his native hamlet of Paricutin, 200 miles west of Mexico City had been experiencing earthquakes of growing intensity. Alert on this account, Pulido suddenly heard a deep rumbling underground. Before his startled gaze there surged upward from a slight depression a column of dusty yellow soil. With increasing roar and mounting vigor the column changed to darker color, as fragments of rock from greater depth emerged from a growing rent in the earth. Then rapidly succeeding explosions of deafening intensity began hurling high in air fragments which in the waning daylight were brightly incandescent. These, falling back, started building a cone of debris around the vomiting vent.

This was witnessed the very birth of the new volcano, named Paricutin,

When one day old, the cone had attained a height of about 100 feet and a base four times as wide. Also, through one side of the base, there was emerging a flow of molten but viscous lava which began to spread out as a rough layer. During the next three weeks it covered nearly a square mile to a depth of some 50 feet. Meanwhile, the explosions, caused by sudden release of gases, continued from within the crater, spraying the ascending lava into fragments of varying sizes: rounded masses from a few pounds to several tons each, known as bombs; smaller, porous fragments called cinder; tiny sizes, volcanic ash or sand; and on down to impalpable dust. All this quickly chilled as ejected. Most of it fell directly back to build the cone even higher. Although this upsurging column looked black by day, at night, the red-hot bombs, shot out at various angles, produced titanic fireworks of stunning beauty.

By mid-March, the lateral flow of lava ceased. And immediately the activity within the crater changed in nature. Explosions, still incessant and powerful, sounded more muffled. The proportion of smaller fragments increasing, a spouting black pillar of mixed debris and gases rose to a height of two miles. Great

quantities of ash were spread about, first covering the adjacent fields and the new lava flow with a gritty, sombre pall, and gradually extending this, both in thickness and to an ever-widening circle eventually tens of miles in radius. Finest black dust fell at times even as far as Mexico City.

Twice, however, in April and in June, there was brief reversion to the earlier phase of activity. Lava flows broke through at other parts of the base of the cone, while a far smaller amount of ash was ejected from the crater. In each instance, however, the new flows ceased within a few days, and the crater resumed emission of ash in enormous quantities, the condition which now obtains.

The volcano caused much excitement in Mexico, especially in the surrounding country. At all hours of the day or night people came to see this chapter in the geologic drama. But it is quite a journey from the nearest city to the volcano, about 20 miles by automobile over an ash-clogged road and then about three miles on burro-back.

The commonest question I have heard about the volcano, particularly from those living nearby is how long the volcano's activity will continue. The answer can only be guessed at, with the help of analogy. In this great volcanic region a few majestic peaks like Colima, Popocatepetl and Orizaba, tower above literally thousands of cinder cones ranging from a few hundred to one or two thousand feet high. Almost certainly, Paricutin is merely the newest member of this family of lesser volcanoes.

Something over 1,000 feet high after 6 months of activity, it has equalled or surpassed the size of most of its sisters. That Paricutin's rate of growth is typical for the class is indicated by the fact that one of the group, only 50 miles away, broke out as a new volcano in 1759, and after 9 months of eruption had built a main cone a little higher than Paricutin now is. But since the volume of a cone must be multiplied eight times to give a doubling in height, Paricutin would have to continue growing at the present rate until 1947 to be twice as high as now. One might hazard the guess that it will not live so long.

Fortunately, there has been no loss of life. Advance of the lava flows has not been at a dangerous pace. The first great flow stopped some hundreds of yards short of Paricutin hamlet, one of the larger flows in June engulfed some of the nearest houses, but by then the populace had been evacuated.

The chief loss is caused by the blanket of ash. The houses of Paricutin are half buried by it. A larger town, twice as far away, is mainly depopulated and many roofs have caved in. Great areas of the turpentine forests are likely to die. All forage and crops have been overwhelmed for many miles around. Although the fresh ash holds the needed chemical elements, these will not be in a condition available for plant growth until after thorough alteration by the slow process of weathering. Hence, wherever the old soil is buried under new ash to the depth sensibly reached by plowing, the land must long remain unproductive. As this fatal thickness of ash is extending each day the volcano continues in action, some hundreds of square miles of fertile cultivation may thus be erased for several generations.

Paricutin, probably destined to remain relatively small and simple, is unlikely to repeat some of the most spectacular features of the world's great volcanoes. Yet it fully justifies the geological study now being directed upon it. A

volcano is, at best, difficult to analyze. A new volcano, being itself least complex, may simplify many of the toughest questions. Although Paricutin will not solve, it will surely add valuable light upon such fundamental problems as the depth at which volcanoes originate, the origin and the intensity of the heat at that depth, how the power manifested in volcanic eruption is brought into operation, and why volcanoes are relatively rare and sporadic instead of being common in time and place.

Since our planet was once wholly in the molten state but has since solidified at least on the exterior, volcanoes, and the closely related phenomena, hot springs, geysers and fumaroles, represent man's only direct contact with the interior heat and the varied processes connected with it. Many branches of geological science thus have most intimate relation to volcanism.

For example, although I have tried to see as many volcanoes and hot springs in various parts of the world as it has been feasible for me to reach, my own interest has not been in these thermal features for themselves alone, but chiefly for the help in explaining the origin of that great family of ores of the metals which likewise have their source in the hot depths. Gradually, at the hands of many investigators, volcanoes and ore deposits are each contributing to understanding of the other--one of the countless illustrations of the interdependence of pure science and its useful application.

NEW MEMBERS

Our Bulletin, together with the excellent lecture series we are offering our members and the field trip program during the summer, together make a very attractive proposition for new members, for annual dues of \$3.00, or \$4.00 for man and wife. No doubt many new members could be obtained if we would each make a personal effort. Following is an application form which you can detach and use to solicit a new member:

- APPLICATION FOR MEMBERSHIP -

GEOLOGICAL SOCIETY OF MINNESOTA

I hereby apply for membership in the GEOLOGICAL SOCIETY OF

MINNESOTA:

Name _____ Residence _____ Phone _____

Business _____ Business Address _____ Phone _____

I agree to pay the usual membership fee of \$3.00, plus \$1.00 for my wife (husband) or other dependent family member, if I reside in Hennepin or Ramsey County, Minnesota, or \$1.00 per person if I reside elsewhere. NOTE: If you include another member of your family, write their name on the line indicated below.

Other family member _____ Signature _____

Relationship _____ Address _____



Alma Bozchard
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mpls.