Correspondence re: Great Lakes publications. 1933-1958

13 Oct., 1938

Prof. J. L. Rough,
Dept. of Geology
University of Illinois,
Urbana, Illinois

Dear Prof. Rough:

The prints of your maps of Lakes Superior, Huron and Michigan came a day or so ago and I wish to thank you greatly.

As I understood you used the detailed maps of the Lake Survey to do the contouring whereas my maps were on the published charts. Is this correct?

Will your book contain any cross sections of structure as mine did? I once obtained well logs from the Lower Peninsula to control sections for Lake Huron but they may be out of date now. It was this data which I once intended to publish and the project is still listed as an uncompleted job now that I am retired. But if you will duplicate it then it will be dropped.

Your maps are almost if not quite the first I have know t to pass the Chicago post office without flattening of the tube! I am mailing you a print of the general map of contours of the Great Lakes region which I finished last year. Do you have any corrections or suggestions? I did not use your mailing tube because I have some tracings to mail to Chicago soon. They are for the paper I handed to Bretz when in Chicago on 20 Sept. and have nothing to do with this project.

Hoping to see you in St. Louis, Sincerely yours,

Luke J Scheer
1527 Mayfield drive
Royal Oak, Mich.

B/p of map of Great Lakes Region
pasted

Mailed 9 sept 58

UNIVERSITY OF ILLINOIS
DEPARTMENT OF GEOLOGY
URBANA, ILLINOIS

October 15, 1958

Mr. F. T. Thwaites
41 North Roby Road
Madison 5, Wisconsin

Dear Mr. Thwaites:

The contours of the maps of Lakes Superior, Michigan, and Huron which I sent to you are based on the published detailed charts and on unpublished field data sheets of the U. S. Lake Survey. All of the data are pre-1955.

My book contains a cross-section of Lake Superior, modified slightly from Sect. A-B, Plate I, U. S. Geol. Survey Mono. 52, 1911; and a diagrammatic cross-section of the Michigan structural basin along a line from the western shore of Green Bay to central Michigan to the northeastern shore of Georgian Bay. This I constructed by plotting the boundaries of formations shown on the Geologic Map of Michigan, 1936, and the Geologic Map of the United States, U.S.G.S., 1932, and sketching, free-hand, the probable distribution of the rocks underground. Much remains to be done in detailed analysis of the relationship of bedrock to lake-bottom topography. In the text of the book I give some speculation on the subject. Because the book is scheduled for publication by the middle of next month, and because I have on hand only a single carbon copy of the manuscript, I am not sending you any of this material.

Sincerely yours,

Jack L. Hough

Jack L. Hough

JLH:pk

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
UNITED STATES LAKE SURVEY
630 FEDERAL BUILDING
DETROIT 26, MICHIGAN

ADDRESS REPLY TO:
THE DISTRICT ENGINEER
U. S. LAKE SURVEY
CORPS OF ENGINEERS
630 FEDERAL BUILDING
DETROIT 26, MICHIGAN

REFER TO FILE NO. NCLGG

7 November 1957

Mr. F. T. Thwaites
41 North Roby Road
Madison 5, Wisconsin

Dear Mr. Thwaites:

Thank you for your 26 October letter. We are looking forward to reading your paper on the Door Peninsula.

The Federal Agency you have in mind is probably the Great Lakes Fisheries Investigation, Fish and Wildlife Service, Department of the Interior, Post Office Box #640, Ann Arbor, Michigan. Doctor James W. Moffatt is the Director.

There are 5 survey drawings, 1:120,000 scale, covering the waters in Lake Huron except Georgian Bay outside the 30 foot contour.

The deep sounding in Lake Superior has been completed except for an area 30 miles in width adjacent to the south shore from Marquette to Whitefish Point which is scheduled to be completed during the 1958 field season. The area westerly of a line from Passage Island, through the top of the Keweenaw Peninsula and Stannard Rock to Big Bay Point was sounded during the 1956 season. It is covered by five survey drawings, scale 1:120,000. The remainder of the lake, except for the 30 mile strip mentioned above, was surveyed this past field season and there will be six survey drawings covering this portion. However, the survey drawings of the 1957 work will not be available until April 1958.

NCLGG
Mr. F. T. Thwaites

7 November 1957

Prints of these survey drawings may be purchased at a cost of $1.00 each. A money order or bankable remittance, payable to The Treasurer of the United States, should accompany your order.

If you should visit Detroit, we would be pleased to welcome you at our office. In addition to the above described survey drawings, we have numerous other sheets depicting inshore soundings, surveys of harbors, and detailed surveys of critical offshore areas.

Sincerely yours,

W. T. Laidly

W. T. LAIDLY
Chief Technical Assistant

THE UNIVERSITY OF WISCONSIN

E. F. HANSON
STATE GEOLOGIST

GEOLOGICAL AND NATURAL HISTORY
SURVEY

SCIENCE HALL

MADISON 6, WISCONSIN

ALPINE 5-3311
EXT. 2529

August 8, 1956

8/29/56

Howdy Prof. — Thanks a million for the prompt response — sorry it took so long at this end. See you at La Crosse

Sincerely —

E. M. Griffith

Mr. E. M. Griffith
Water Department, City Hall
Racine, Wis.

Dear Mr. Griffith:

Enclosed is the carbon of the manuscript, extracts from which I planned to present on 26 September at LaCrosse at request of both you and the late Leon Smith. Please return this when you have finished with it for the original is in the hands of Prof. Rohlich at the Hydraulics Lab for whom I presented this material last spring. The manuscript is the property of the State Geological Survey, but I do not know what plans Mr. Hanson has for its publication.

Returned 8/20/56

Very truly yours,

WISCONSIN GEOLOGICAL SURVEY

F. T. Thwaites

F. T. Thwaites
Geologist, In Charge of
Well Records

FTT:ac
Enc.

MICHIGAN STATE COLLEGE
EAST LANSING

CONSERVATION INSTITUTE
OFFICE OF THE DIRECTOR
432 AGRICULTURE HALL

March 27, 1947

Professor F. T. Thwaites
University of Wisconsin
Madison, Wisconsin

Dear Professor Thwaites:

It was impossible for me to attend the recent Geology Section meeting of the Michigan Academy of Science, Arts and Letters at which your paper on the "Geomorphology of the Basin of Lake Michigan" was presented. Since I am deeply interested in the Great Lakes basins, I am wondering whether it would be possible to have the loan of a copy of your paper for a few days so I could have an opportunity to read it without waiting until the proceedings are published a year or more from the meeting date. (no pun intended)

Yours truly,

L. R. Schoenmann

L. R. Schoenmann, Director
Conservation Institute

LRS:bs

Michigan

Sept. 4, 1947

Prof. L. R. Schoenmann, Director,
Conservation Institute,
East Lansing, Michigan

Dear Professor Schoenmann:

It took longer to catch up after school than I expected but at last I have ready the extra copy of my paper on Lake Michigan including the maps. You are welcome to keep these. The prints are old and certain corrections have since been made on the originals. I hope you will findthe material interesting and that you will agree with my conclusions.

Very truly yours,

Michigan

April 21, 1947

Prof. L. R. Schoenmann, Director,
Conservation Institute,
Michigan State College,
East Lansing, Michigan

Dear Professor Schoenmann:

Yours of March 27 arrived while I was laid up with a bad cold and was also getting ready for a weeks field trip to Devils Lake. I am sorry I had to delay reply so long.

I will be most happy to have you read the manuscript of the paper on Lake Michigan but at present have no extra copy. I do have some of the maps but it will be some time next month before I can send them to you. The next two weeks will be almost entirely taken up with field trips but after that I can catch my breath, I hope.

Very truly yours,

THE UNIVERSITY OF MICHIGAN PRESS

SCHOLARLY PUBLICATIONS ❦ 4201 ANGELL HALL ❦ ANN ARBOR, MICHIGAN

EUGENE S. McCARTNEY, *Editor* ❦ (*Miss*) GRACE E. POTTER, *Associate Editor*

August 28, 1947

Professor F. T. Thwaites
41 Roby Road
Madison 5, Wisconsin

Dear Professor Thwaites:

I decided to have two photostats made of one of your figures as an aid to us in determing the size of the engravings. Since you have spent oceans of time in gathering your data, the figures should be made satisfactory to you.

In the smaller photostat the contour lines run together at the upper right, and the letters in some names of places also run together and are indistinct. I suppose that the engraving will be a little sharper, but we shall not be using coated paper in the volume. To me it seems advisable to use a width of 5½ inches and to have one fold. If we use an insert, we shall use bond paper.

In any event I shall ask the engraver to strengthen the word MICHIGAN.

Please return both photostats. I wish to show them to the engraver.

Editing is slow work these days. Authors seem to be as busy as the printers, and it is hard to get anything done promptly.

Very truly yours,

E. S. McCartney

(In reply please use room number)

Sept. 4, 1947

Dr. E. S. McCartney,
4201 Angell Hall,
Ann Arbor, Michigan

Dear Dr. McCartney:

In reply to yours of August 28 I have examined both the photostats of Fig. 1. The trouble with the smaller one is in large part irregular illumination or printing or both. But I fully agree that the larger size is preferable by all means. I think the trouble with the word Michigan is also illumination for it printed all right. I often retouch with crowquill pen working under a magnifier.

I am sending a copy of the paper to Prof. Schoenmann at East Lansing at his request. The prints sent him are not from the corrected originals.

Comparison with older publications showed me that you have changed your form for references since then. Hope I got them right according to present specifications.

Very truly yours,

Aug. 7, 1947

Dr. E. S. McCartney,
4201 Angell Hall,
Ann Arbor, Michigan

Dear Dr. McCartney:

I am sedning you in a roll the original manuscript maps of Lake Michigan I went over both, added more names following spelling of the Coast Chart, strengthened contours, corrected mistakes, etc. etc. Unfortunately summer weather is not favorable to erasures but I tried to fix up some with white ink. If there is anything wrong please advise and I will make other copies properly retouched.

With regard to size the maps measure to the border line lines 25.4 and 26.4 inches wide by 43.4 inches high. Reduction to one sixth would make smallest letters which are important 0.033 inches high and the bulk of the letters 0.04 inches. The maps would then measure ~~4.23~~ and ~~4.4~~ 4.23 4.4 inches by 7.25 inches. This would fit on a single page. If reduced to one fourth the smallest letters would be 0.05 inch high, most letters 0.06 inches high and the size would be 6.38 and 6.60 inches wide by 10.8 inches high. This size would require a folded inser. I will leave it to you to choose between these two.

Very truly yours,

THE UNIVERSITY OF MICHIGAN PRESS

SCHOLARLY PUBLICATIONS ❦ 4201 ANGELL HALL ❦ ANN ARBOR, MICHIGAN

EUGENE S. McCARTNEY, *Editor* ❦ (Miss) GRACE E. POTTER, *Associate Editor*

June 21, 1947

Prof. F. T. Thwaites
41 Roby Road
Madison 5, Wis.

Dear Professor Thwaites:

I am leaving for my vacation tomorrow. I should like to have your manuscript and drawings when I return at the end of July. Please specify what size you wish the drawings to be.

I have now worked through all the manuscripts for the next volume. I think you will understand my concern about citations when I say that no two bibliographies even closely resembled each other. If you are pressed for time, I shall be glad to retype your literature cited.

Very truly yours,

E. S. McCartney

(In reply please use room number)

July 28, 1947

Dr. E. S. McCartney,
4201 Angell Hall,
Ann Arbor, Michigan

Dear Dr. McCartney:

Enclosed please find both orginal and revised copy of my manuscrip on "Geomorphology of the Basin of Lake Michigan". I have thus far been unable to work on the drawings. Errors in the first map which was hastily laid aside in the summer of 1942 are now glaringly apparent once my attention was directed to them. But I will have to go over each and every contour line again making it heavier besides adding some new place names. I now note that some of the lettering is only 0.135 inches high which fact makes final size a problem. This is the worst season of the year for drafting because ink dries so slowly giving rise to long delays. I think that the second map which shows cross sections which was done last winter is better. But I want to leave final size to you. I should think that a folded page with the smaller dimension equal to heigth of a page would be about right. The few who might be interested in having a larger scale can always obtain prints of the original from me.

I retyped the references as well as text and tried my best to follow your specifications despite long habit with other styles. I made some errors in order so at last had to cut up the manuscript and paste onto other sheets. I hope it is all right.

This work was delayed by trying to catch up on work on well records which had to be let slide during the school year. But records continue to pile up and I will just have to take time out and finish this job.

Very truly yours,

March 14, 1947

Dr. George V. Cohee,
U. S. Geolgogical Survey,
Ann Arbor, Michigan

Dear Dr. Cohee:

Enclosed is the manuscript for the forthcoming meeting of the Michigan Academy which you kindly agreed to present for me. The two lantern slides and the black-line prints of the illustrations will have to go under separate cover. Two of the maps are for you to keep as I thought you would like them. The lantern slides I would like returned. I was unable to finish the enlarged maps of the cuestas of the Great Lakes region similar to the very small one in the Outline of Glacial Geology. But I have over 30 students taking mapping, besides large classes in two other subjects and this proved impossible. However, I hope to finish it later, when I can't tell. Of course, it is impracticable for me to come to the meetings. I will not be able to attend the Wisconsin meetings either because they come just when I expect to take the mapping class to Devils Lake. I greatly appreciate you taking care of the Michigan paper. I think that the two drawings will stand reduction to one page. They look all right as standard slides. Now to finish packing everything as time is short!

Sincerely,

Spencer, J. W., Origin of the basins of the

6 Great Lakes of America Am. Geologist, vol. 7, pp. 86-97, 1891

Repri nted from Quart. Jour. Geol. Soc., 46, 1890

Gives map showing contours in Great Lakes and hypothetical drainage.

Recognizes two major basins in Lake Michigan pp. 90-91 Calls Traverse Bay a fiord

Ascribes basins to warping of preglacial valleys

~~10~~ 7 Farnsworth PJ The great lake basins Science 20: 74, 1892
8 Spencer JWW a review of the theory of the Great Lakes
Am. Geol 14: 289-301, 1894

Spencer J W W How the Great Lakes were built. Pop Sci. Mo.
49: 157-172, 1896

11 Graham AW Guide to the geology and paleontology of Niagara Falls
and vicinity N Y S. Mus. Bull 45, 1901

4/5

Chamberlin T. C., General geology (of Wisconsin) Geology of Wisconsin, vol. 1,

pp. 253-259, 1883

The basin of Lake Michigan "battled ground" Michigan basin not as well located for deep erosion as was Mississippi worn edges of strata farther from arch on W side No deep valleys leading into Lake Michigan refers to well records mentions Newberry bottom of basin is smooth as shown on charts
Tilting cannot apply as it would have also affected entire state
Canyon outlet improbable
"All the evidence which we can gather, after eliminating glacial agencies, seems to support the simple, rational view, free from violent hypotheses, that erosion upon the east and west sides of out State in pre-glacial times went forward in like manner and with like results , giving rise on one hand to the Mississippi valley, and on the other to a similar valley occuplying the site of Lake ? Michigan" "it is not beleived that it had the breadth and general depth and symetrical contour which the lake now presents."

1901 Graban A.W. Guide to the geology and paleontology of Niagara Falls and vicinity New York State Mus. Bull 45, 1901 1901

to next page

10 Leverett, Frank The Illinois glacial lobe U. S. Geol. Survey Mon. 38, pp. 12-14, 1899 Plate V

Shows 7 profiles with wells but no geology filled in.

"This line between Milwaukee and Grand Haven seesm to mark nearly the summit of a ridge between two basins------

"In the profile a few miles to the north, leading from Port Washington, Wisconsin, to Muskegon, Michigan, the lake bottom is shown to be singularly irregular. The appearance presented is that of a series of escarpments facing westward, similar to the escarpment of Lockport (commonly known as Niagara) limestone s short distance west from Lake Michigan, but it is not entirely certain that they are rock escarpments."

"Evidence that the present smooth bottom of the Lake Michgian basin in its southern end is due to the planeness of the drift surface instead of the smoothness of the rock floor is found in borings near Michigan City."

also
10A Wells of northern Indiana USGS WSP 21, 1899

"The remarkable depth and the smoothness of the south-central portion of the basin shown in the profile east from Racine seem to favor the view that glacial erosion was there an agency of much consequence"

11 Graban .AW 1901 from last page

1913 Spencer JWW Relations of the great lake basin to the
12 Niagara limestone GSAB 24: 229-232, 1913

13 Smith, R. A., The occurrence of oil and gas in Michigan Michigan Geol. and Bio. Survey Pub. 14, 1914pp. 206-207

"Mr. Hinshaw ~~rk~~ related these facts------and conceived the idea that these lake depressions are due in part to the ablation, or solution of the salt in the Salina and that brecciation was caused by the slumping indident to the removal of the salt beds below. While the validity of all the evidence has not been invesitagated, the theory as advanced contains elements of plausibility and is worth consideration."

1916

14

Martin, Lawrence, Physical geography of Wisconsin Wisconsin Geol. and Nat. Hist. Survey Bull 36, (2nd edition, 1932) pp. 237-241

Presets proof of rock basin character of Lake Michigan Fig. 81, p. 238 shows width of basin in contrast with the rock valleys farther west. Green Bay a basin which hangs above rest of Lake Michigan similar to hanging valleys of Alaska Fig. 109 p. 285 gives idea of preglacial drainage

16

Graham A W The Niagara cuesta from a new viewpoint Geogr. Rev 9: 264-276, 1920

15 Alden, W. C., Quaternary geology of southeastern Wisconsin: U. S. Geol. Survey Prof. Paper 106, pp. ~~127~~ 126-128, 1918

Points to lack of dissiection of Niagara surface in eastern Wisconsin
Up o to 200 ft drift at Milwaukee but no large valleys known
Refers to early paper by Claypole
Leverett, 1895

P resents no conclusions of his own

16 last page

16A Logan W N The subsurface strata of Indiana
Ind. Dept Cons. Pub 108. 1931

---

17 Newcombe, R. B. Oil and gas fields of Michigan
Michigan Geol. Survey Pub. 38, 1933 p. 7

The southern peninsular is bordered in every direction except to the south by a major body of water." "The question arises as to what has happened throughout geologic time where these great expanses of water now exist."

pp. 17-18 Lake basins Refers to Spencer, Am. Geol. 7, 90, 91, 1891 on division of basin of Lake Michigan into two parts. Also refers to Grabau, Guide of Niagara Falls etc. 1901 on Lake Huron Scott, I. D. Inland lakes of Michigan, Michigan Geol. and Bio. Survey Pub. 30, 1921

map of salt basins fig. 9, p. 74 Plate I in pocket shows base of drift

17A Rausch. G.O Devonian of Wisconsin Kansas Geol. Soc.
9th ann Field conference Guide Book: 261-267, 1935.

Shepard F. P., Origin of the Great Lakes basins Jour. Geology,

vol. 45, 1937 pp. 76-88

18 Map of Lake Superior page size, 25 fathom interval p. 86

map of north part of Lake Michigan p. 87 20 fathom interval

Stresses enclosed basins and steep sides of the lakes as evidence of glacial erosion

Landes K K and others Geology of the Mackinac Straits region

19 and subsurface geology of Northern Southern Peninsula

Mich Geol. Survey Pub. 44, 1945

Indiana wells

10A Leverett, Frank, Wells of Northern Indiana USGS WSP 21, 1899

Mich city 252' depth to rock 1 m W only 172 to rock

16A Logan W N The sub-surface strata of Indiana

Ind. Dept Cons. Pub. 108, 1931

Dunes State Park, p649. depth 160 to rock

17A Raasch G. O Devonian of Wisconsin Kansas Geol. Soc.

9th Ann. Field Conference Guide book: 261-267, 1935

name, initial, "Title", Journal vol. #: (pp), date

example Thwaites, F.T., "The Paleozoic Rocks Found in Deep wells in Wisconsin and Northern Illinois," Jour. Geol. 31: 529-555, 1923

John F Caley,
Geol Survey Canada, Ottawa
Memoir on SW Ont, (4)

Evans OF

concerned with terrace only

Bathymetric studies of the Lake Michigan basin.
Geogr. Rev. 25. 667-670, 1935

Spencer JWW

short - outlines probable outlets

Relationships of the Great Lakes to the
Niagara limestone GSA 24, 229-232, 1913

Graham AW

Stratigraphy of the Traverse group of Michigan
Mich GS Rept 1901, 163-210, 1902

Williams WH 16 North shore of Lake Huron, Ont. Can GS Sum Rept 1915, 136-137, 1916, 183-185 next year

~~Wilbert AB 07 Nov~~
~~Bell 66~~

MY Williams ~~14d~~ 13a ~~15b~~ 14a

Silurian of the eastern part of Manitoulin Island
I G C 12, Canada, G B 5, 89-98, 1913

Silurian of Manitoulin Island and western Ontario
Can GS Sum Rept 1913, 275-281, 1914

Antrim -
shale & lime ~~#8~~ ~~8~~ 183'
lime 104
shaly lime 93
shale 37
lime 40
Bell sh 80
lime -

Warthin, A.S. Jr and Cooper, G.A. Traverse rocks of
Thunder Bay region, Michigan AAPG 27, 571-595, 1943

Maps M Y Williams 1

Williams M Y Silurian geol. and fauna of Ontario peninsula and Manitoulin id. adj. islands Canada G S Mem 111, 1919

oil possibilities of Manitoulin Island

C. G S Sum Rept 1920, pt D, 18-25, 1921

Ingall E D

Deep borings in Ontario etc - C G S Sum rept 1924 pt C, 240-246 1926

Moore E S

The Keweenawan series at the eastern end of Lake Superior (ab)

~~Cont~~ British A. A S. Rept 94th mtg. 346, 1926;

not important P A G 46. 320, 1926

Collins W H North shore of Lake Huron C. G. S. Mem 143. 1925

worthless Spencer J W W Preglacial slope and crest of the Niagara escarpment ab G S A B 32, 54-56, 1921

Spencer Canada G S on Niag Falls

Grabau Guide to Niagara Falls. N Y S. Mus. 45, 1901

Johnson W A Deep borings C G S Sum Rept 1930, A, ~~110~~ 67-84, 1931

have Smith R A. The occurrence of oil & gas in Michigan Mich G & B Survey Pub 14, 1914 pp 206-207

STATE OF MICHIGAN

DEPARTMENT OF CONSERVATION

LANSING

February 4, 1943

Dr. F. T. Thwaites, Geologist
In Charge of Well Records
Geological and Natural History Survey
Madison, Wisconsin

Dear Dr. Thwaites:

This is in further reply to your letter of January 28th addressed to Dr. Smith.

Enclosed are eight well logs, six of which were requested in your letter. Two others were included which we think will give you additional information. During the past five years we have had several wells in our southwestern counties which reached the Trenton formation and if you think these would aid you in correlation we shall be glad to mail them to you. Over ten thousand wells have been drilled in the state and logs for most of them are available so let us know of any particular area where you need additional information and we will send you what we have.

Very truly yours

R. P. Grant

GEOLOGICAL SURVEY DIVISION
R. P. Grant
Petroleum Geologist

RPG:L
enc.1

Feb. 6, 1943

Dr. R. P. Grant, Petroleum Geologist,
Department of Conservation,
Lansing, Michigan

Dear Dr. Grant:

Thank you very much for yours of the 4th and the logs of wells along the west side of the Lower Peninsula.

I only get time to work on the geomorphic interpretation of the beds of the Great Lakes once in a while. A student named Metterstrom, if I recall correctly, from Chicago also tried to work on the same problem but dropped it. So far I have obtained definite results some of them new at least as far as published inforation goes. The deeper basins of both Michigan and Huron which show a pitted topography of knobs and basins are definitely on the salt-bearing formations. This idea is not new, however, having been suggested in the "Ocurrence of oil and gas in Michigan" published many years ago. The topography of the islands is evidently controlled by the Dundee and Traverse cuesta which show so clearly in Lake HUron. South of Manistee these cuestas cross Lake Michigan in a southwesterly direction. They are badly obscured by drift but the interpretation as cuestas is confirmed not only by form but also by direction which is not that of moraines. It also agrees with the Devonian of this state. The southern basin of Lake Michigan is on the Devonian shales and Mississipian shales above the Traverse. My object in obtaining the detailed well logs is to be able to interpret the topography in terms of rock character. I expect the dolomite beds associated with the salt-bearing formations below the Dundee are very thin-bedded.

I have found little information on the outcrops of these beds on the islands in Lake Michigan but expect from what I have seen of the islands that the outcrops are not very good.

The only large area of glacial topography I have been able to find is the Traverse Bay region east of the islands. Here the lake bottom seems just like the land to the east. Lake Huron cannot have very thick drift over most of its bottom for there rock control appears much clearer than in Michigan.

The net result of my study to date is that glacial erosion alone can explain the major features of the lake bottoms. The cuestas appear to be unbroken by stream valleys.

I have started a map of Lake Michigan with sections cut into it like the structure sheet of a folio. I also want to draw more detailed sections on a larger scale later. If you are interested I will be glad to furnish blueprints of these maps as they progress. Only the depth map of Michigan is at the blueprint stage as yet.

Thanking you again,

Very truly yours,

Mr. Thwaites -

I recently ran on this ref. to Caribou
Ind - information concerning which you were
seeking last spring

H. J. Buckham

Ref to Caribou Isd, so. of Michipicoten Isd, L Sup

Rept. Ont. Bureau of Mines, vol VIII, Part II 1899, p 143

".. found the rock to be brown St. Mary's ss., like all the other isds. in the southeastern part of L Sup.

458 Sycamore Road,
Santa Monica, Calif.
December 5, 1933.

Prof. F. T. Thwaites,
Science Hall,
Madison, Wisconsin.

Dear Doctor Thwaites:

You will recall the discussion we had a couple of years ago about the origin of the Great Lakes. I prepared a paper presenting my side of the case for the Illinois Academy of Science. Their funds gave out and it was never publishes. A short time ago I decided to revise it and send it into some journal. As it quotes you extensively refering to your old "Outline of Glacial Geology" I thought it might be advisable to submit the manuscript to you before sending it in. I haven't seen your new Outline and don't know whether you hold the same views.

I wish you would look this over and see if I have been fair to your views. Also I should be awfully glad to know of any statements which you think are incorrect or if you care to give it to have your opinion. I should like to see the subject of the origin of these basins given more attention. As you probably know textbooks of geology are quite good at dodging the issue. Perhaps you would like to write an article giving a different point of view and we could send them in together. I wish geologists did that sort of thing more.

I am spending the winter in California on a sabbatical leave studying submarine canyons off this coast and having a most interesting time of it. I am receiving help from all sorts of institutions making it possible to get a great deal of information out on the ocean.

Very sincerely yours,

Francis P. Shepard

Francis P. Shepard

Oct. 16, 1944

Dr. George V. Cohee,
C/f Department of Geology,
University of Michigan,
Ann Arbor, Michigan

Dear Dr. Cohee:

Thank you for yours letter of the 12th with enclosed stamps. I am glad you agree with my tentative conclusions. I examined the outcrops at Tannery Falls, Munising and at Miners Castle. The lowest beds I could see along the highway contained much green stain but no glauconite. High up on the road to Miners Castle the rock is siltstone although at the very top there is sandstone. I thought the last is Jordan and the siltstone is Lodi member of the Trempealeau. We missed going to AuTrain Falls but Bergquist's description of glauconitic dolomite strongly suggested the St. Lawrence member of the Trempealeau. At no place did I find any coarse, poorly sorted sandstone which would suggest the Ironton member of the Franconia. We also stopped to see the exposures on the Point northwest of Munising and at many places on the road to Marquette. However, we had one of the boys along and I had to hold onto him with one hand, watch him with one eye, and observe geology with the other so my examinations were not what might be desired. Food was so rotten in Munising that we could not stay over to see the Pictured Rocks or the islands. Next time (if there is ever a next time for me) I want to camp.

Landes corrects me in my original conclusion that the row of islands in Lake Michigan are on the Dundee cuesta. He finds they are on older rocks below the Detroit River. This helps explain the much-pitted nature of the Lake bottom inside the islands. Doubtless many of these pits are kettles controlled by irregular bed rock surface. I think I explained to you my ideas about the glacial erosion of the salt and gypsum-bearing formations.

Well, the lake bottom project has been laid away and the letters about it will go into the folder with other papers about it, probably for the duration. I just will not be able to touch it before so far as I can see. I started the revision of the Outline of Glacial Geology last summer and as I can make something off that it must have priority!

If there is anything else I can do for you just let me know. A lot more samples just came in but none of them show the Devonian. We have discouraged deep drilling in that area because of the poor quality of the water. They got "rainbows" of oil there. I have long thought that the Niagaran oil near Lake Forest, Illinois, is due to the recent presence of Devonian above.

With best regards,

Sincerely,

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Ann Arbor, Michigan

October 12, 1944

Dr. F. T. Thwaites
Department of Geology
The University of Wisconsin
Madison 6, Wisconsin

Dear Dr. Thwaites:

Thanks for sending me the log of the Downing Box Co. and the blue print of your map on the bottom of Lake Michigan. We are very glad to have these for reference. Enclosed is 15 cents in stamps for the cost of blue printing your map of Lake Michigan.

I enjoyed reading the two papers which you gave me, and the correlations I have been able to make from the sample studies are in accord with the correlations you give in your conclusions. At present, I favor your conclusion regarding the Munising sandstone in the 1934 paper where you included the Dresbach along with the Franconia sandstone to make up the Munising. I collected samples of the sandstone on top of the hill above the falls and at the base of the falls. The lower sample resembled Dresbach more than Franconia, whereas, the sample from the top of the hill was glauconitic, pink, and had a large number of fine angular quartz grains. From this evidence I felt that both Franconia and Dresbach were present at Munising Falls.

I wish that more data were available to establish the relationship of the Munising and Jacobsville sandstones. There is a very sharp contact between the two sandstones in the Neebish Island well but I cannot be sure of the relationship in subsurface farther west. I hope that you will be able to work on that problem some day.

Sincerely yours,

George V. Cohee

George V. Cohee

GVC/d

Encl.

UNIVERSITY OF MICHIGAN
ANN ARBOR
DEPARTMENT OF GEOLOGY

October 12, 1944

Dr. F. T. Thwaites
Department of Geology
The University of Wisconsin
Madison 6, Wisconsin

Dear Doctor Thwaites:

I was interested to hear of your studies of the formations beneath the lakes. While Professor Ehlers and I were working around the Beaver Islands we decided that some day we would try to obtain a boat with the proper gear so that we could sample some of the submerged reefs. I suppose that you have considered this method of attack.

Unfortunately, I did not give sufficient detail in my letter of October 3 regarding the ages of the new formation names. The Bois Blanc formation is older than the Detroit River and the St. Ignace lies below the Bois Blanc and above the Salina. The geological map of Michigan is very much in error in the Straits area and a revised map of that part of the state is to be published in our bulletin. ~~Good~~ Dundee limestone probably lies beneath the drift on the north side of Little Traverse Bay. Waugoshance Point is in and on the strike of the Bois Blanc formation. Between these two formations and covering a belt about 18 miles wide (north-south) is the Detroit River formation.

The chain of islands and reefs between Waugoshance Point and Big Beaver are made by the resistant cherty limestone and dolomites of the Bois Blanc formation, in my opinion. In any event, they cannot be made up of Dundee rocks.

I suspect that this will be much clearer when our bulletin becomes available.

Sincerely yours,

Kenneth K. Landes

Kenneth K. Landes

KKL/emd

UNIVERSITY OF MICHIGAN
ANN ARBOR
DEPARTMENT OF GEOLOGY

October 3, 1944

Dr. F. T. Thwaites
Department of Geology
University of Wisconsin
Madison, Wisconsin

Dear Professor Thwaites:

George Cohee, upon his return, asked me to write you concerning the bedrock exposures in the Beaver Islands. Professor Ehlers and I are about to go to press with a bulletin on the Mackinac Straits area in which will be included a revised geologic map of ~~the geology~~ of this area.

Exposures are scanty on the Beavers, but we did find outcrops of three different formations. Rocks of Onondaga age, which we are calling the Bois Blanc formation, are to be found near the northeast tip of Big Beaver, at the southwest tip of Garden Island, at the northwest corner of Hog Island, and on the western side of Gull Island. At the end of the westernmost point on Garden Island we found a sandy dolomite carrying Oriskany fossils. We are naming this formation the Garden Island formation. At the northern tip of Garden Island and on Whiskey Island, dolomites of Bass Island age were found. We are naming these rocks the St. Ignace formation.

All of High Island and the southern 4/5 of Big Beaver are covered with thick deposits of drift. We suspect that the southern half of Big Beaver is underlain by rocks of Detroit River age, but have no evidence on Big Beaver itself. To the southwest the Fox Islands are covered with drift also, but we did find a lot of limestone in the beach shingle on North Fox, which we believe came from Detroit River outcrops beneath the lake. We also found what we believed to be Detroit River shingle on Isle Le Galet.

I am putting you down for notification when the bulletin becomes available. If I can answer any additional questions in the meantime, please let me know.

Sincerely yours,

Kenneth K. Landes

Kenneth K. Landes, Chairman

KKL/emd

Oct. 16, 1944

Dr. Kenneth K. Landes,
Department of Geology,
University of Michigan,
Ann Arbor, Michigan

Dear Dr. Landes:

Thank you for yours of October 13 setting me straight on the correlation of the new formational names you propose to introdce. I had been going on the statement on the Centennial map which places the Dundee as of Onondaga age.

The conclusion that the row of sialnds is not the Dundee cuesta helps explain the peculiar topography of the lake bottom inside the islands. I at first thought this was entirely glacial with kettle holes. Probably it is largely drift but the kettles are the result of irregular rock surface as explained in my paper on pitted outwash long ago. The long narrow and deep Traverse Bay arms would then be the result of deep valleys in the rock. In Lake Huron the botton just northeast of the DundeepTraverse cuestas is very rough with many enclosed depressions. I regard this as due to glacial erosion of salt and gypsum-bearing rocks. The topography overlying shale is much more regular and smooth.
I did not have good geologic control in the northern part of Lake Michigan and this caused my error which I am most happly to have corrected.

With regard to getting rock from shoals my experience in Lake Superior was that most of the "rocky" ground on the chart was paved with glacial boulders. Of course, that lake was about 60 feet lower in postglacial time and the waves then washed away much drift. You might have better luck in Lake Michigan. On the whole I would think that the California method of work in a diving suit might be better. But the expense of any of these methods is so great that only an oil company can afford it!

Meantime, the project has been put away probably for the duration as many other things must come first. I will greatly appreciate getting a copy of your report when it appears.

Thanking you again,

Sincerely,

Oct. 6, 1944

Dr. George V. Cohee,
U. S. Geological Survey,
Ann Arbor, Michigan

Dear Dr. Cohee:

Thank you for yours of the 4th and enclosures, also for getting Dr. Landis to write me. I gave the note to Mr. Bean. I do not know when I will be able to resume work on the project of the form of the bottoms of the Lakes. We just got to it in Physiography of Eastern United States which also brought me back to it. I mailed you a copy of the blueprint of the bottom of Lake Michigan along with another copy of the Downing Box Co. well at Milwaukee. This was included in the list of prints sent one before but might have been left out in mailing. The big map only cost me 15 cents which I paid myself, not the Survey.

Dr. Landis somewhat confused me in that he has given new names to the formations of the islands and described Detroit River float southeast of Onondaga formations. I should think the Detroit River debris came either from the deep part of the lake or from valleys which indent the escarpment. The escarpment or rather cuesta which is indicated by the islands cannot very well be other than part of the same Devonian cuesta which is so well shown in Lake Huron.

If you have any comments on the two papers I published on northern Michigan I would be glad to get them. It is still possible that I might get to work on the relation of the Jacobsville to the Munising some day.

Sincerely,

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Ann Arbor, Mich.

October 4, 1944

Dr. F. T. Thwaites
Department of Geology
University of Wisconsin
Madison, Wisconsin

Dear Doctor Thwaites:

I want to thank you for the courtesy and help which you gave me last Wednesday while at your office. The additional sample studies which you gave me were a great help in completing the picture of the subsurface stratigraphy in the northern peninsula of Michigan and in eastern Wisconsin.

Enclosed are the three well logs which you wanted from the Michigan Survey and which they have furnished for you; also the list of Trenton wells in Michigan, with tabulated data regarding the depth to the top and base of the Trenton, which were obtained from the well logs. I hope that this list will be of service to you.

Will you please give the enclosed note to Mr. Bean. If I can be of further service to you in any way, please feel free to call upon me.

Sincerely yours,

George V. Cohee

George V. Cohee

GVC/emd

Enclosures

Oct. 6, 1944

Dr. Kenneth K. Landes ,
Department of Geology,
University of Michigan,
Ann Arbor, Michigan

Dear Dr. Landes:

Thank you for your letter of Oct. 3 with data on the rocks in the islands of Lake Michigan. Dr. Cohee doubtless told you what the problem is that I started work on in 1942, namely the identification of the Devonian cuesta under Lake Michigan. I just mailed him a blueprint of the contour map of the lake bottom which I completed at that time. If you would care for a copy I can send you one. I used not only the genreal chart but also the detailed coast charts so it is as accurate as I could make it. Also I converted fathoms into feet. Judging from this map I concluded that the islands lie along the Dundee-Traverse cuestas which are so clear under Lake Huron. So far as I can see your data supports this with the exception that the Detroit River debris in the drift must come either from valleys in the escarpment or from the deep part of the lake basin. The cuestas seem to turn into the mainland north of Frankfort in part although one can be traced about 15 or 20 miles out in the lake to somewhat south of Frankfort. They reappear in the vicinity of Ludington and run across to Wisconsin. The cuesta is double as in Lake Huron, the northes western one reaching our side at Sheboygan and the other near Milwaukee.
There are also minor escarpments in the Salina-Detroit River area which I take it are on the firmer dolomites. This project has been laid aside for the duration except for the times when we get to it in my course in Physiography of Eastern United States. Of course, I also discussed it with Dr. Cohee. I will greatly appreciate the bulletin when it comes out and hope someday to finish my studies.

Thanking you again, I am,

Sincerely,

STATE OF MICHIGAN

DEPARTMENT OF CONSERVATION

LANSING

P. J. HOFFMASTER, DIRECTOR

February 18, 1943

Dr. F. T. Thwaites
University of Wisconsin
Madison, Wisconsin

Dear Mr. Thwaites:

Your letter of February 6th has been received. The delay in replying has been due to my absence from the office on field work.

We shall be very pleased to receive blue prints of your lake maps as they progress.

We have recently completed a map of our Southern Peninsula showing contours on the bed-rock surface. The draftsman is now preparing the map for publication and a copy will be mailed to you as soon as prints are available. We shall welcome your comments on this map, especially in the Grand Traverse Bay region.

Very truly yours

R. P. Grant

GEOLOGICAL SURVEY DIVISION
R. P. Grant
Petroleum Geologist

RPG:dg

STATE OF MICHIGAN

DEPARTMENT OF CONSERVATION

LANSING

February 3, 1943

Dr. F. T. Thwaites, Geologist
In Charge of Well Records
Geological and Natural History Survey
Madison Wisconsin

Dear Doctor Thwaites:

I have your letter of January 28 and note with much interest that you have been making a new map of the bottom of Lake Michigan on a 100 foot contour interval, and that you desire the records of certain wells. I am having our Mr. Rex Grant furnish these so far as they are available. It is quite possible that we may have quite a number of other wells that would fit into your picture, as we have drilled several thousand other deep wells in the State since Publication 38 was issued.

If we may be of service in any way we shall be very pleased to have the opportunity.

Very sincerely yours

R. A. Smith

R.A. Smith

ras/b