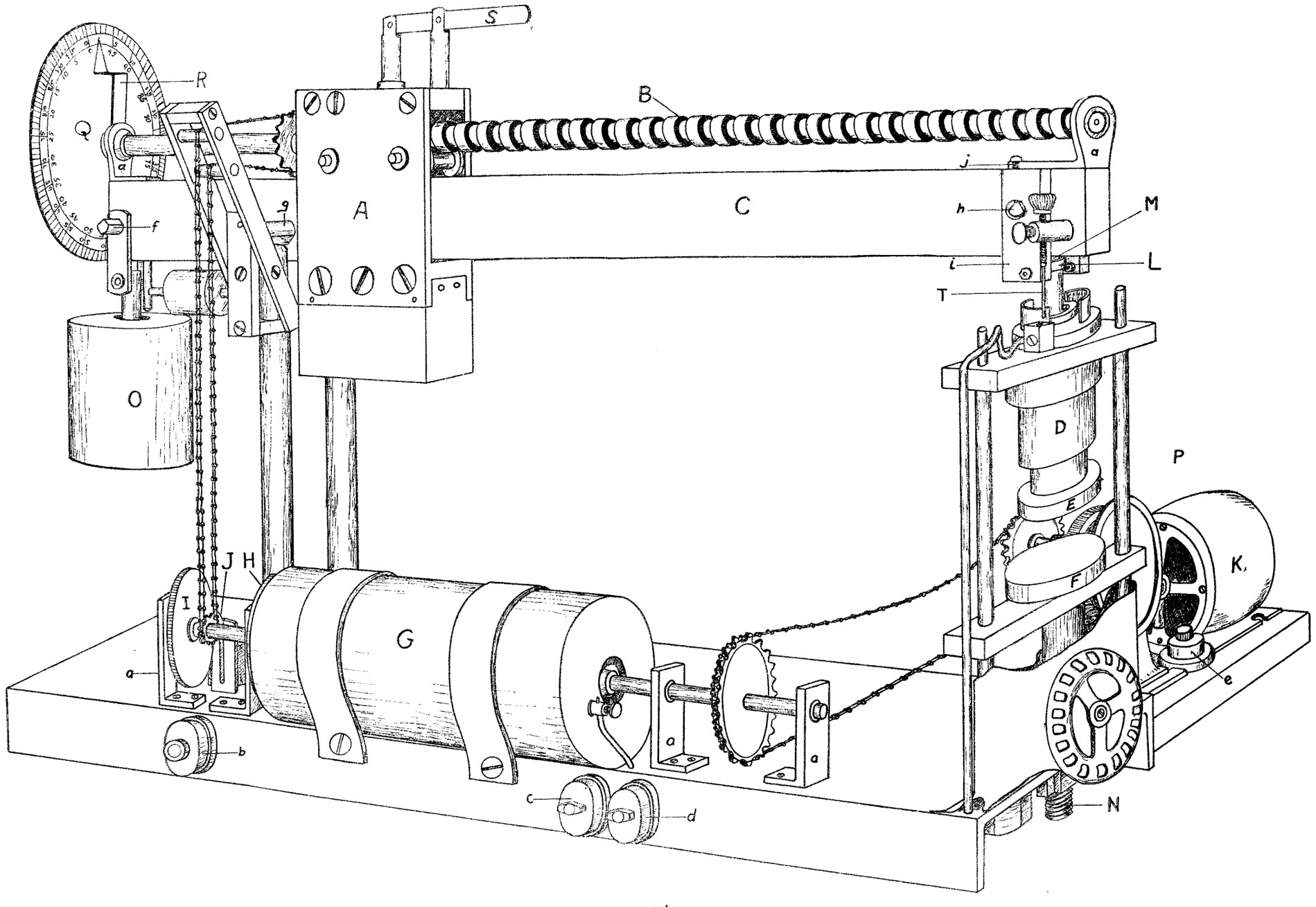


FIGURE 14

CONSTRUCTION OF AUTOMATIC TESTING MACHINE.

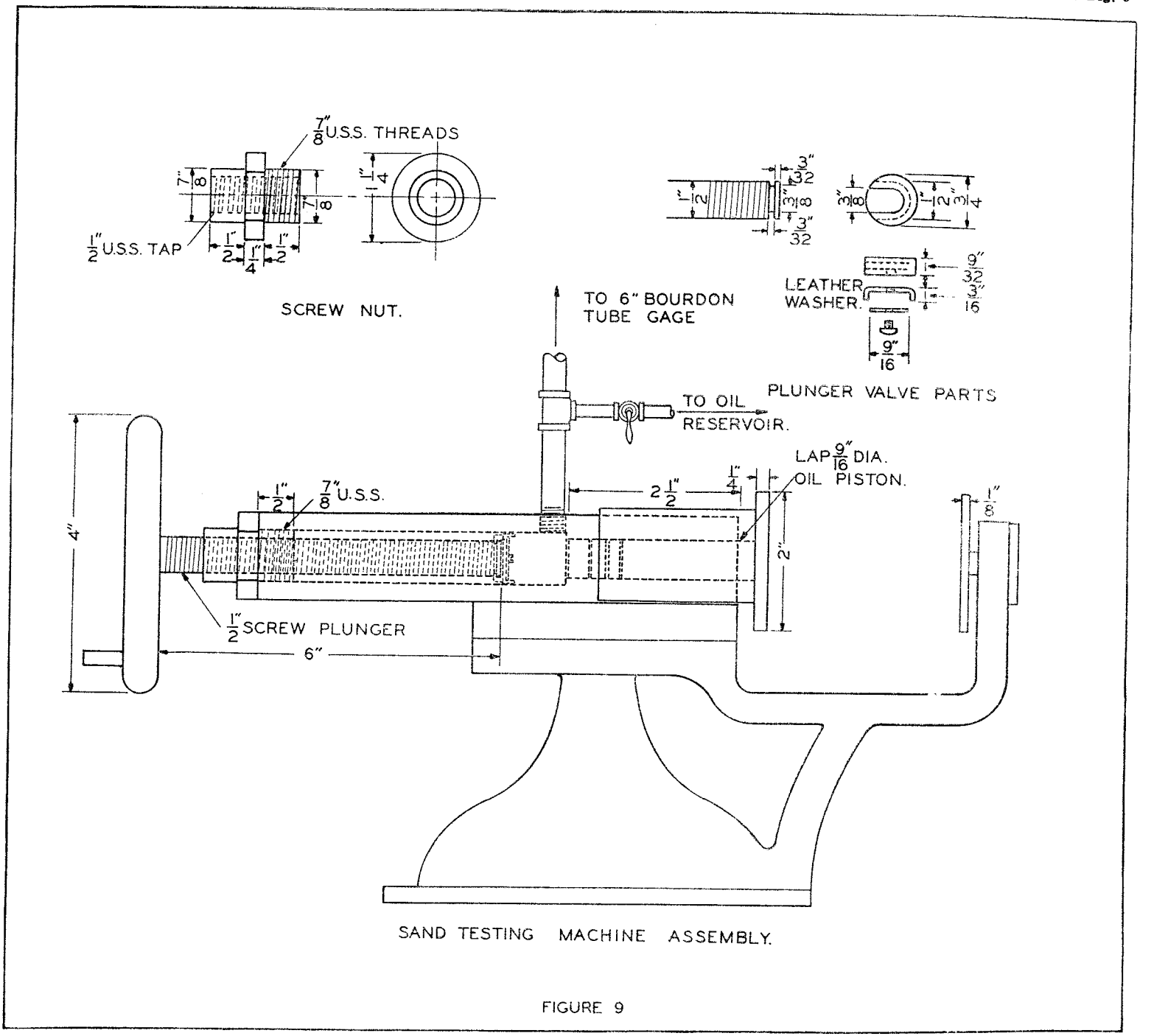
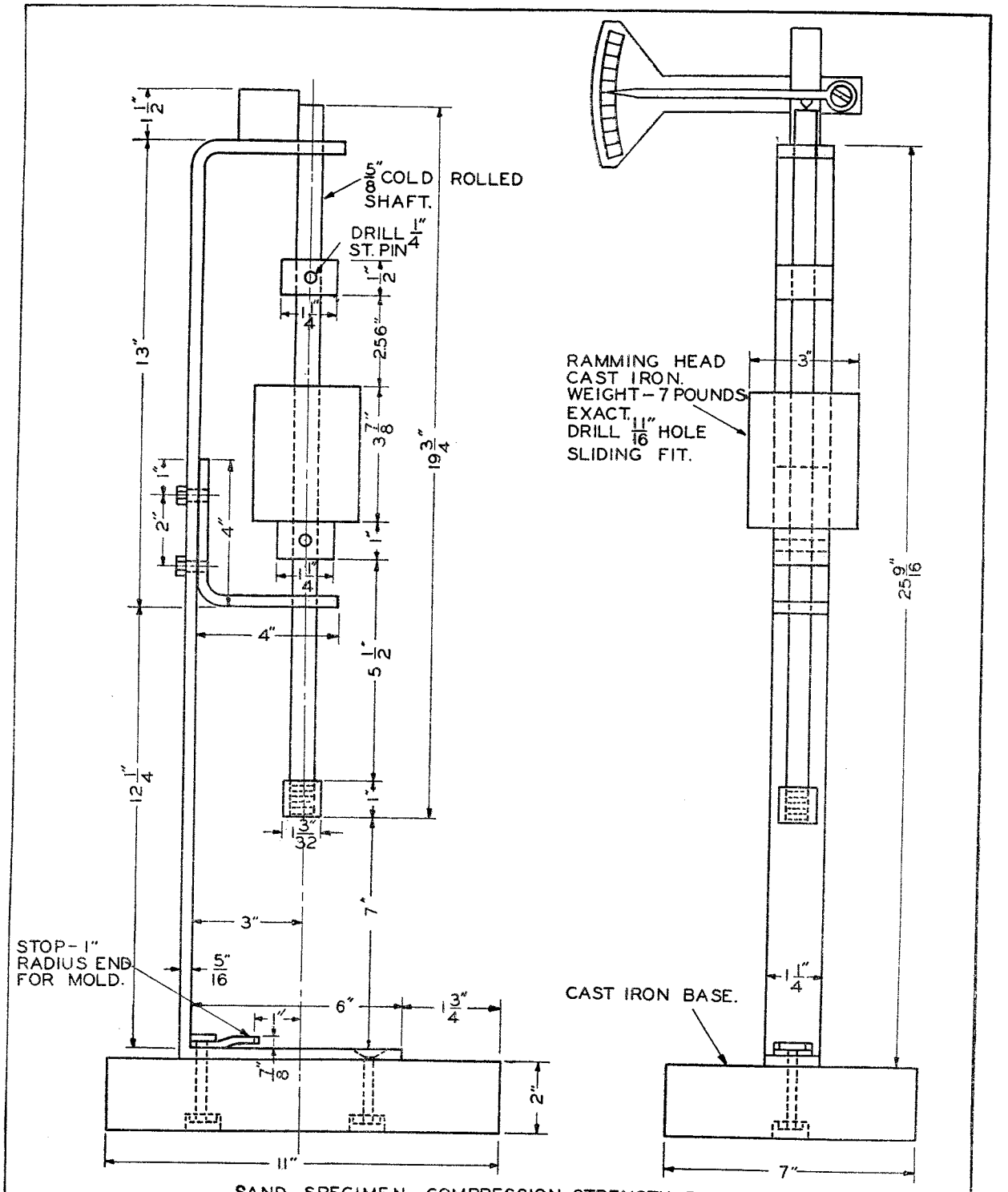


FIGURE 9

Base permeability of different sized mixtures.



SAND SPECIMEN, COMPRESSION STRENGTH, RAMMER.
FIGURE 10

Construction of rammer for compression tests.

TABLE XLII

Summary of Tests on Michigan Sands as Reported by Ries and Rosen in the Survey of 1907

No. 1	Township, Range and Section	County	Description	On 20	On 40	On 60	On 80	On 100	On 250	Clay	Average Fineness	Average Fineness Scranton Method	Sp. Gr.	Per Cent Porosity	Weight of Sand	Spec. Grav.	Per Cent of Pore Space	°Logar of K	Pressure in c.m.	Time in Seconds	°Average Size in m.m.	Average Size of Grain in Terms of Sieves "On 20" Exclusive	Average Size of Grain in Terms of Sieves "On 20" Inclusive	Size of Grain in Terms of Sieves Ries' Method	Size of Grain in Terms of Sieves Scranton Method	Per Cent of "Clay"	Per Cent of Material "on No 250" Sieve
R3	T. 3 S., R. 1 W., Sec. 10	Jackson....	Fine core sand, Holton & Weatherwax Co., Jackson, Michigan.....	6.84	6.61	40.09	8.98	23.82	12.56	1.06	52	55	2.68	34.2	171.9	2.68	36.2	1.4512	1.85	1,900	0.2630	97	91	52	55	1.06	12.56
R4	T. 2 S., R. 1 W., Sec. 27	Jackson....	Core sand, same locality as 3.....	3.96	7.10	46.97	11.74	15.32	11.35	3.65	55	54	2.65	35.8	171.2	2.65	35.6	1.4753	2.00	2,400	0.2040	125	120	55	54	3.65	11.35
R5	T. 3 N., R. 2 W., Sec. 30	Ingham....	Under sand, Cory's pit, near Dimondale. Said to be of no value.....	.06	.38	5.41	3.45	14.92	58.49	17.25	152	92	2.63	39.6	152.9	2.63	42.1	1.2340	2.00	15,000	0.0681	407	407	152	92	17.25	58.49
R7	T. 4 N., R. 3 W., Sec. 12	Eaton.....	Molding sand from Reeve's pit, Lansing	.28	.56	1.93	1.80	9.34	60.78	25.27	180	95	2.6	42.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
R10	T. 39 N., R. 23 E., Sec. 14	Delta.....	Sand from town of Wells, near Escanaba	3.29	3.05	15.49	4.24	12.64	35.19	26.11	95	81	2.64	43.	141.9	2.64	46.8	1.0795	2.12	16,500	0.0480	526	509	95	81	26.11	35.19
R11	T. 3 N., R. 11 E., Sec. 14	Oakland....	Core sand and sand-lime brick sand, artificial mixture, Rochester.....	11.13	12.08	21.93	4.33	19.16	30.01	1.35	49	60	2.68	30.6	184.2	2.68	31.7	1.6414	2.00	5,450	0.1640	156	140	49	60	1.35	30.01
R12	T. 4 S., R. 19 W., Sec. 35	Berrien.....	Vrooman's pit, near Riverside.....	.30	.77	4.52	1.63	5.35	57.95	29.44	178	94	2.59	39.5	154.2	2.59	40.9	1.2760	2.00	60,000	0.0324	770	770	178	94	29.44	57.95
R13	T. 7 S., R. 17 W., Sec. 34	Berrien.....	Core sand, Niles.....	4.69	13.34	23.96	5.01	11.95	18.22	22.79	63	66	2.66	42.3	147.2	2.66	45.0	1.1370	1.80	4,200	0.1100	232	222	63	66	22.79	18.22
R15	T. 3 N., R. 11 E., Sec. 14	Oakland....	Sand for car wheels, Rochester.....	25.69	24.67	30.57	5.47	7.16	4.64	1.76	25	33	2.70	28.4	184.4	2.70	32.1	1.6234	2.20	1,250	0.1060	238	182	25	33	1.76	4.64
R19	T. 2 S., R. 8 W., Sec. 2....	Calhoun....	Fine-grained molding sand, Coldwater St., Battle Creek.....	.02	.20	.42	.09	.38	84.52	14.31	212	99	2.72	42.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
R23	T. 1 N., R. 13 E., Sec. 11	Macomb...	Lake sand for cores, Lake St. Clair....	.60	11.79	70.11	6.88	7.32	1.90	1.35	50	44	2.62	35.2	175.8	2.62	33.3	1.5716	2.20	1,200	0.1040	244	243	50	44	1.35	1.90
R25	T. 3 S., R. 1 W., Sec. 6	Jackson....	Core sand, near Jackson. Used also for sand lime brick.....	19.13	39.45	29.68	2.68	2.99	2.47	3.36	29	30	2.72	33.8	176.3	2.72	36.2	1.4512	2.20	775	0.3900	65	56	29	30	3.36	2.47
R26	T. 4 S., R. 19 W., Sec. 35	Berrien.....	Sand for general work, Garden City Sand Co., Vineland.....	.13	.59	20.10	5.81	15.89	33.35	24.09	110	82	2.62	37.5	149.2	2.65	43.0	1.2024	2.00	9,600	0.0745	345	344	181	98	5.36	87.92
R27	T. 2 S., R. 1 E., Sec. 18....	Jackson....	Leoni, 5 miles N.E. of Jackson.....	.33	.18	.55	.24	5.47	87.92	5 36	181	98	2.65	43.9	152.2	2.65	42.9	1.2064	2.00	11,100	0.0696	370	361	90	78	26.39	32.37
R28	T. 2 S., R. 7 W., Sec. 18	Calhoun....	Heavier sand, Battle Creek.....	2.51	6.16	16.49	4.74	11.30	32.37	26.39	90	78	2.62	39.6	169.2	2.66	35.7	1.4714	1.85	15,000	0.0885	286	286	155	94	2.71	74.93
R29	T. 3 N., R. 11 E., Sec. 14	Oakland....	Fine sand, Rochester. Unused.....	.00	.08	1.79	1.03	19.42	74.93	2.71	155	94	2.66	35.2	163.6	2.59	36.8	1.4272	2.00	7,200	0.1115	230	230	113	87	2.45	55.00
R32	T. 12 N., R. 4 E., Sec. 34	Saginaw....	Light core sand, sand-lime brick pit, Saginaw.....	.00	.52	8.08	5.66	28.27	55.00	2.45	113	87	2.59	38.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
R35	T. 5 N., R. 6 E., Sec. 9	Genesee....	Molding sand, F. Sadtler farm, Linden	6.26	10.61	24.87	7.78	13.43	27.37	9.65	59	65	2.59	32.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
R36	T. 4 N., R. 3 W., Sec. 12	Eaton.....	Reeves pit, near Lansing.....	1.68	3.08	14.00	4.66	11.59	44.47	20.50	106	83	2.6	39.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
R44	T. 4 N., R. 2 W., Sec. 5	Ingham....	Christopher property, Lansing.....	3.40	3.07	12.99	6.22	20.85	42.77	10.75	88	80	2.71	40.7	150.4	2.71	44.8	1.1334	2.00	6,600	0.0840	303	292	88	80	10.75	42.77
R46	T. 39 N., R. 23 E., Sec. 14	Delta.....	Town of Wells, near Escanaba.....	1.36	3.44	14.78	4.24	12.82	40.74	21.64	107	82	2.48	43.	139.1	2.48	46.2	1.0992	2.00	13,200	0.0585	435	428	107	82	21.64	40.74
R47	T. 4 N., R. 2 W., Sec. 5	Ingham....	Molding sand, Vornberg's property, Lansing.....	.07	.24	3.47	1.78	8.42	66.21	19.78	176	95	2.61	43.8	142.8	2.61	45.6	1.1183	2.00	5,300	0.0912	274	274	176	95	19.78	66.21
R48	T. 6 N., R. 17 E., Sec. 2	St. Clair....	Sand near cemetery, Port Huron. For general work.....	.29	.85	2.20	.65	3.52	58.37	34.08	201	97	2.62	41.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
R50	T. 39 N., R. 23 E., Sec. 14	Delta.....	Same locality as 10, but from east side of river.....	1.88	5.80	24.03	5.26	14.23	32.00	14.88	82	73	2.62	37.4	158.1	2.62	40.0	1.1945	2.20	16,320	0.0573	435	427	82	73	14.88	32.00
R51	T. 39 N., R. 23 E., Sec. 14	Delta.....	Same locality as 10, but from east side of river.....	5.82	6.74	27.39	5.75	12.55	27.54	12.54	65	67	2.63	36.3	158.3	2.63	40.1	1.3043	2.10	12,000	0.0749	345	326	65	67	12.74	27.54
R52	T. 2 N., R. 2 W., Sec. 30	Ingham....	Same as 5.....	.11	.39	6.38	3.79	14.69	57.83	16.78	156	91	2.63	37.5	161.8	2.63	38.9	1.3482	2.00	28,800	0.0509	500	500	156	91	16.78	57.83
R53	T. 4 N., R. 2 W., Sec. 22	Ingham....	Core sand, McCamman property, Lansing.....	1.14	9.42	50.76	9.73	17.30	10.44	1.17	57	42	2.63	36.8	173.8	2.63	34.3	1.5286	2.20	2,000	0.2365	107	106	57	42	1.17	10.44
R54	T. 48 N., R. 25 W., Sec. 10	Marquette .	From cut of L. S. & I.R.R. near Marquette.....	.09	.08	.29	.12	.57	79.02	18.41	220	99	2.73	38.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
R55	T. 4 S., R. 19 W., Sec. 35	Berrien.....	Sand for general work, Kerlikowski's pit, Vineland.....	.03	1.08	13.21	2.08	9.53	57.70	15.06	135	88	2.6	37.4	160.3	2.60	38.7	1.3556	2.20	12,100	0.0792	319	319	135	88	15.06	57.70
R57	T. 4 N., R. 2 W., Sec. 22	Ingham....	Core sand, McCamman property, Lansing.....	15.00	27.95	34.04	4.70	10.67	6.29	1.32	34	30	2.54	28.	183.7	2.54	28.1	1.8146	2.20	1,225	0.3750	66	59	34	30	1.32	6.29
R61	T. 7 N., R. 12 W., Sec. 35	Kent.....	Sand for general work, Black Hills, Grand Rapids.....	.54	2.11	11.38	3.94	11.67	49.57	20.57	127	87	.....	37.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

STATE OF MICHIGAN
DEPARTMENT OF CONSERVATION
P. J. HOFFMASTER, DIRECTOR

STATE GEOLOGICAL SURVEY DIVISION
R. A. SMITH, STATE GEOLOGIST

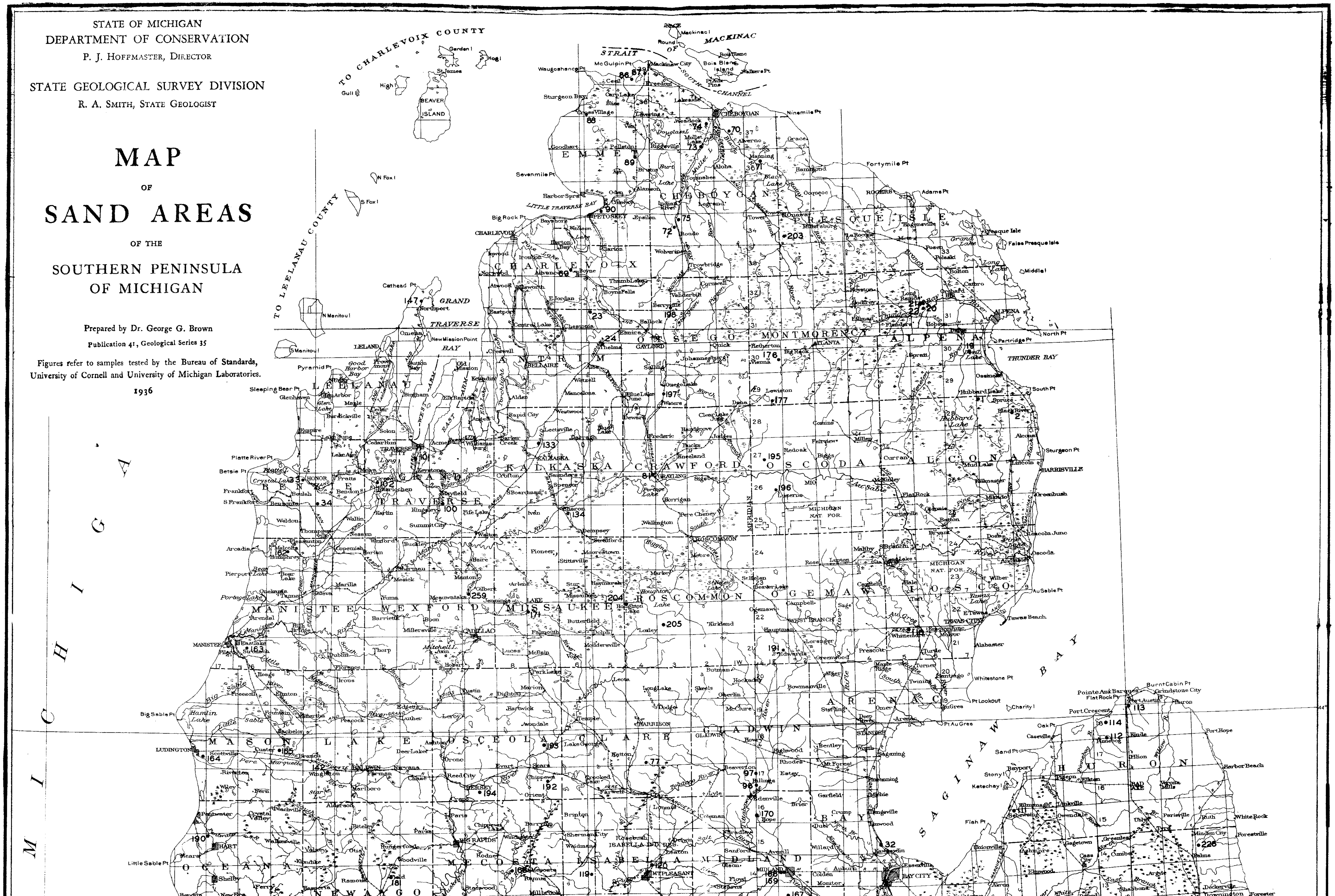
MAP
OF
SAND AREAS
OF THE
SOUTHERN PENINSULA OF MICHIGAN

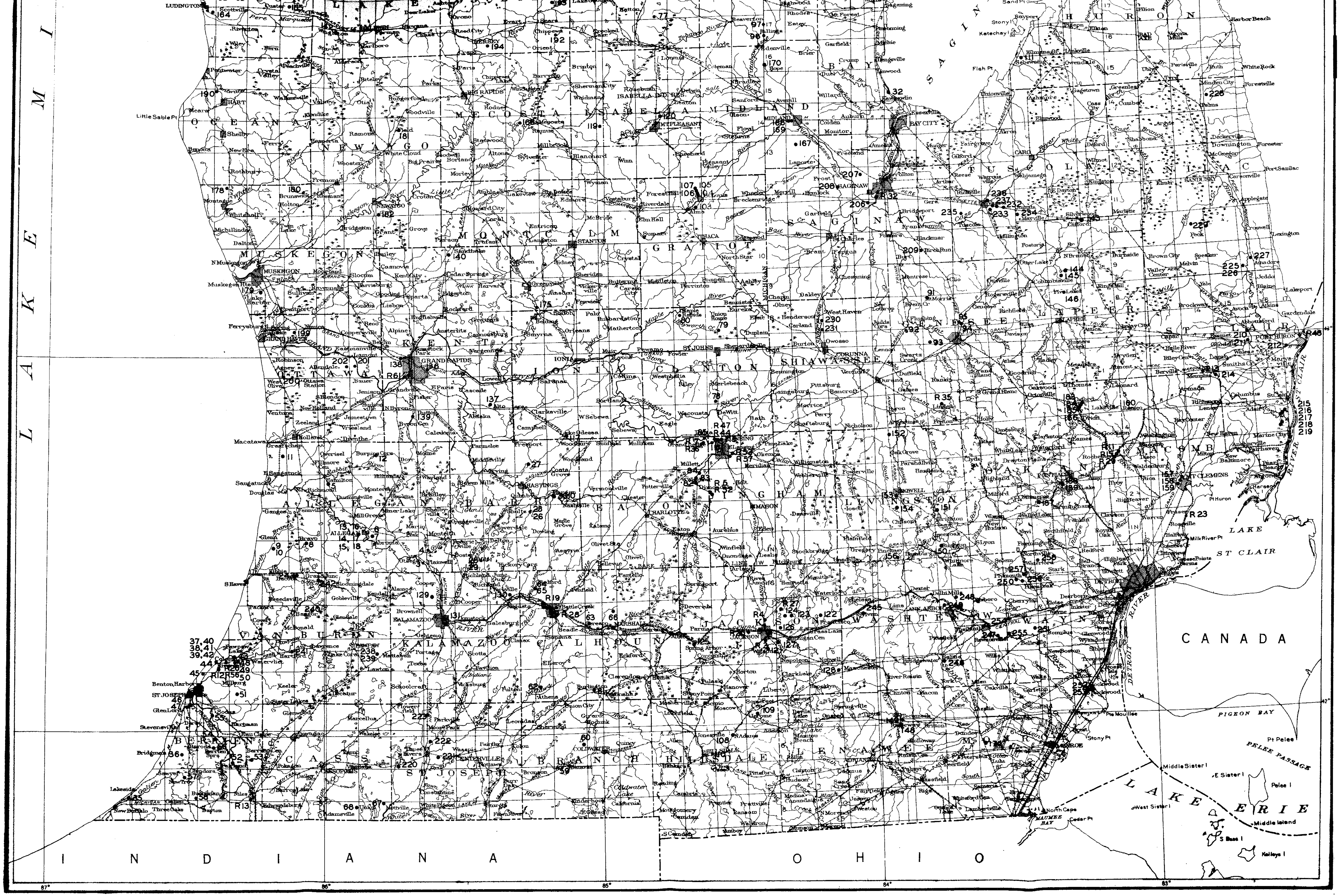
Prepared by Dr. George G. Brown

Publication 41, Geological Series 35

Figures refer to samples tested by the Bureau of Standards, University of Cornell and University of Michigan Laboratories.

1936

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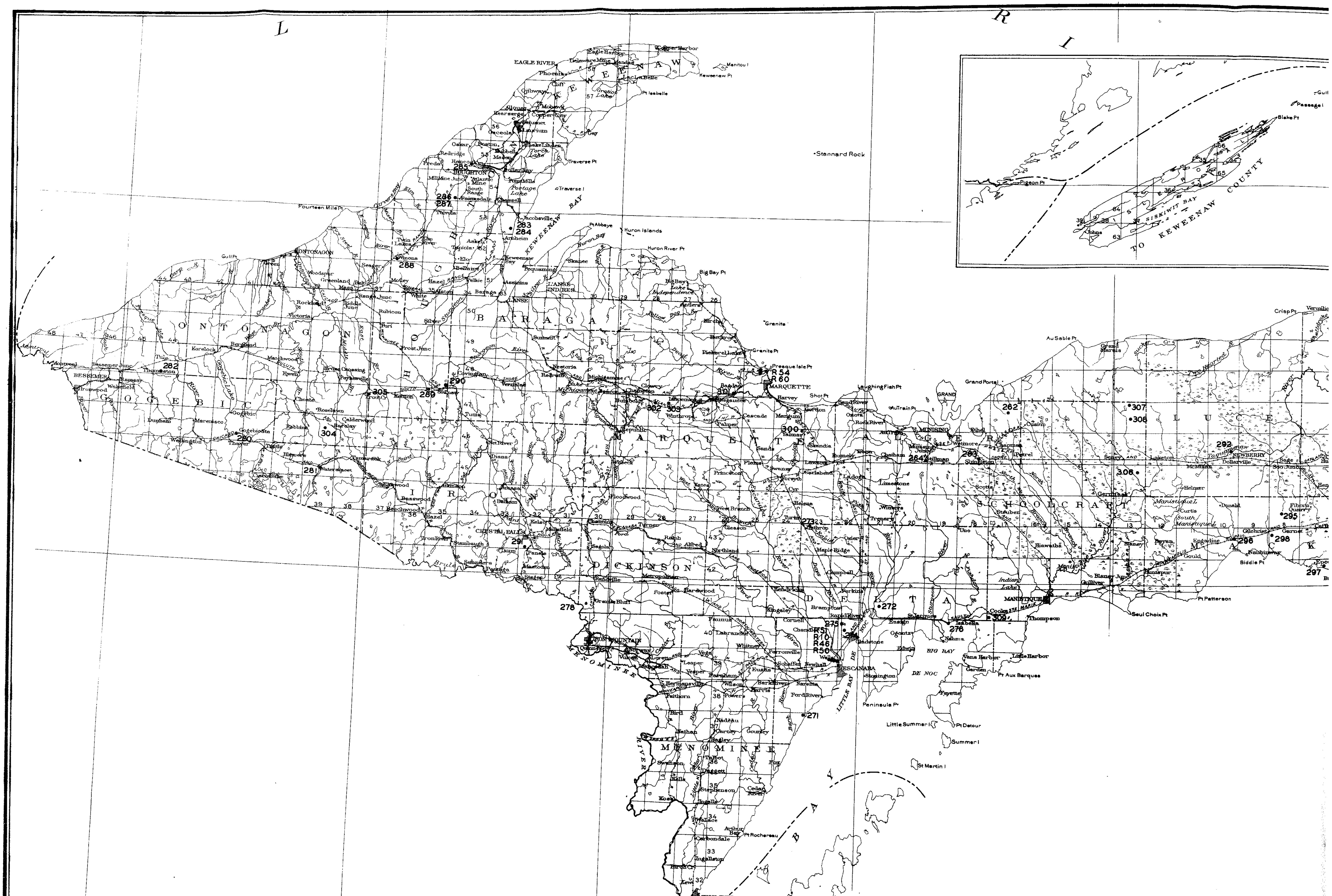
ISABELLA
MIDLAND
BAY
TUSCOLA
SANILAC
MUSKEGON
MONTCALM
GRATIOT
SAGINAW
OTTAWA
KENT
IONIA
CLINTON
SHIAWASSEE
GENESEE
LAPEER
ST CLAIR
ALLEGAN
BARRY
EATON
INGHAM
LIVINGSTON
OAKLAND
MACOMB
VAN BUREN
KALAMAZOO
CALHOUN
JACKSON
WASHTENAW
WAYNE
BERRIEN
CASS
ST JOSEPH
BRANCH
HILLSDALE
LENAWEE
MONROE
LUDINGTON
HART
MUSKEGON
GRAND HAVEN
GRAND RAPIDS
BIG RAPIDS
MT PLEASANT
MIDLAND
BAY CITY
SAGINAW
STANTON
ITHACA
ST JOHNS
CORUNNA
FLINT
LAPEER
PORT HURON
IONIA
LANSING
CHARLOTTE
MASON
HOWELL
PONTIAC
MT CLEMENS
DETROIT
HASTINGS
KALAMAZOO
MARSHALL
JACKSON
ANN ARBOR
ST JOSEPH
CASSOPOLIS
CENTERVILLE
COLDWATER
HILLSDALE
ADRIAN
MONROE
DETROIT RIVER
ST CLAIR RIVER
PIGEON BAY
PELEE PASSAGE
MAUMEE BAY
Little Sable Pt
Pt Pelee
Pelee I
Middle Sister I
E Sister I
West Sister I
Middle Island
S Bass I
Kelleys I
North Cape
Cedar Pt
Stony Pt
Pte Mouillee
Milk River Pt
Pt Huron
Fish Pt
Katechay I
Stony I
87°
86°
85°
84°
83°
42°
43°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BARAGA
MARQUETTE
IRON
DICKINSON
MENOMINEE
DELTA
ALGER
SCHOOLCRAFT
LUCE
MACK
EAGLE RIVER
Eagle Harbor
Copper Harbor
Delaware Mine
Phoenix
Cliff
Ojibway
Allouez
Mohawk
Kearsarge
Copper City
Calumet
Laurium
Osceola
Gay
Lac La Belle
Manitou I
Keweenaw Pt
Pt Isabelle
Gratiot Lake
Oskar
Boston
Lake Linden
Hubbell
Mason
Torch Lake
Redridge
Freda
Hancock
285
HOUGHTON
Dollar Bay
Traverse Pt
Traverse I
Atlantic Mine
South Range
Portage Lake
286
287
Painesdale
Chassell
Toivola
Jacobsville
283
284
KEWEENAW BAY
Pt Abbaye
Huron Islands
Huron Bay
Huron River Pt
Skanee
Pequaming
L'ANSE IND. RES.
L'ANSE
Baraga
Assinins
Keweenaw Bay
Arnheim
Askel
Tapiola
Elo
Bellaire
Pelkie
Big Bay Pt
Big Bay
Lake Independence
Antlers
Yellow Dog R
Birch
Bulcroft
Granite
Granite Pt
Pickerel Lake
Presque Isle Pt
R 54
R 60
MARQUETTE
Stannard Rock
Fourteen Mile Pt
Gull Pt
ONTONAGON
Green
Woodspur
Greenland
Belt
Mass
Range Junc
Rockland
Riddle Junc
Victoria
Rubicon
Pori
Prost Junc
Silver
Winona
288
Seager
Motley
Hazel
Alston
White
Twin Lakes
Elm River
Montreal
Bessemer Junc
BESSEMER
Ramsay
Ironwood
Wakefield
Tula
282
Thomaston
Korelock
Bergland
Matchwood
Ewen
Bruce Crossing
Paynesville
305
Trout Cr
Kenton
289
Sidnaw
290
Covington
Choate
Roselawn
Calderwood
Barclay
304
Gogebic
Dunham
Marenisco
Gogebic Sta
280
Thayer
Wellington
Robbins
Turtle
Elmers
Tamarack
281
Watersmeet
Ellwood
Basswood
Beechwood
Hazel
Iron River
Stambaugh
CRYSTAL FALLS
291
Alpha
Amasa
Balsam
Kelso
Mansfield
Atkinson
Net River
Diana
Tuma
Paint
Saunders
Pentoga
Mastodon
Stager
Brule
Sagola
Channing
Randville
Metropolitan
Foster
Hardwood
Granite Bluff
278
IRON MOUNTAIN
Quinnesec
Norway
Vulcan
Loretto
Waucedah
Faunus
Labranche
Whitney
Vega
Leaper
Vesper
Hermansville
Faithorn
Powers
Wilson
Harris
Bark River
Schaffer
Newhall
Perronville
Escanaba
ESCANABA
Wells
Gladstone
Narenta
Ford River
271
Stonington
Bird
Nadeau
Nathan
Carney
Gourley
Bagley
Swanson
Talbot
Daggett
Kells
Stephenson
Cedar River
Koss
Ingalls
Wallace
Arthur Bay
Pt Rochereau
Carbondale
Ingallston
Birch Cr
Kew
BAY
LITTLE BAY DE NOC
Peninsula Pt
Republic
Humboldt
302
303
Champion
Clowry
Michigamme
Nestoria
Redruth
Summit
Lake Michigamme
Ishpeming
Negaunee
Baadad
301
Winthrop
Palmer
Cascade
Harvey
Shot Pt
Mangum
300
Yalmar
Sands
Skandia
Rumely
Eben
Chatham
Lawson
Carlshend
Ladoga
Limestone
Plains
Swanzy
Princeton
Forsyth
Cyr
Helena
Yates
West Branch
Turner
Ralph
Alfred
Northland
Gleason
Turin
273
Lathrop
Osier
Maple Ridge
Campbell
Hendricks
Perkins
Kingsley
Brampton
Rapid River
Cornell
Chandler
275
274
R 51
R 10
R 46
R 50
272
Ensign
Ogontz
Edwin
BIG BAY
DE NOC
Trenary
Winters
Laughing Fish Pt
Sand River
Gordon
Onota
Rock River
AuTrain Pt
AuTrain
GRAND
MUNISING
Munising Junc
264
Stillman
Wetmore
Ethel
Chapman
Petrel
263
Shingleton
Cusino
262
Grand Portal
Au Sable Pt
Grand Marais
Sucker Cr
Two Hearted R
Crisp Pt
Vermilion
307
308
292
NEWBERRY
Dollarville
McMillan
Laketon
Seney
306
Sage
Soo Junc
Helmer
Germfask
Manistique L
Donald
Curtis
South Manistique L
Fibon Quarry
295
Gilchrist
Garnet
298
Engadine
296
Naubinway
Biddle Pt
Gould
Epoufette
297
Scotts
Steuber
Uno
Hiawatha
Blaney
Royan
Blaney Junc
Gulliver
Hunt Spur
Indian Lake
MANISTIQUE
Cooks
309
Thompson
St Jacques
Isabella
276
Nahma
Vans Harbor
Little Harbor
Garden
Pt Aux Barques
Fayette
Seul Choix Pt
Pt Patterson
Little Summer I
Pt Detour
Summer I
St Martin I
Pigeon Pt
Blake Pt
Passage I
Gull
ISLE ROYALE
SISKIWIT BAY
Johns
TO KEWEENAW COUNTY

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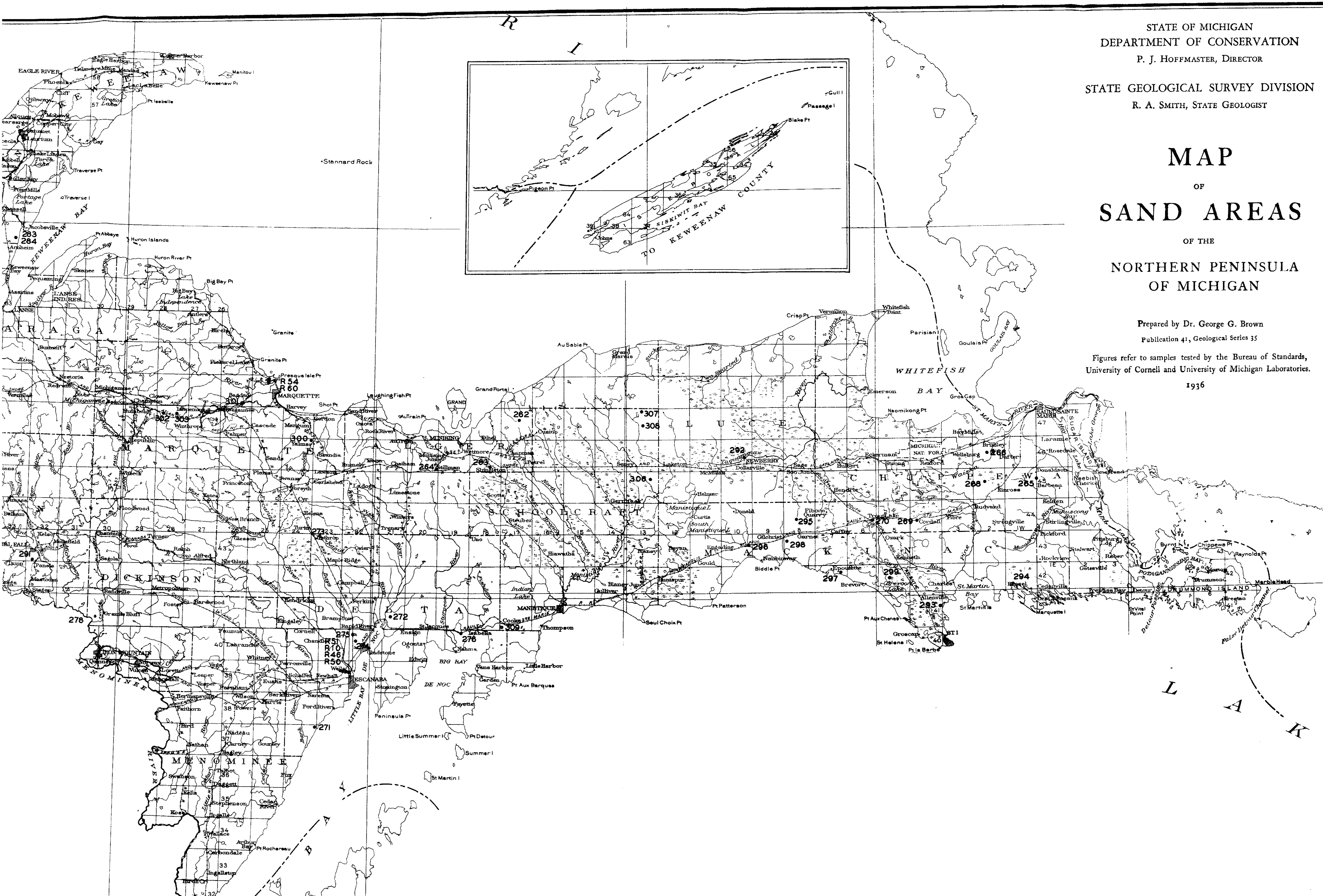
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