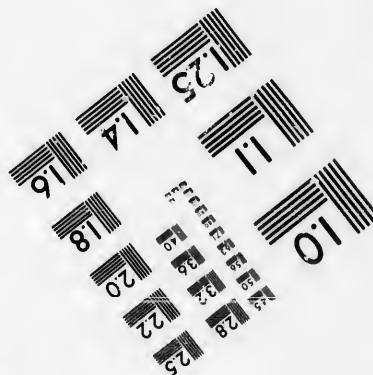
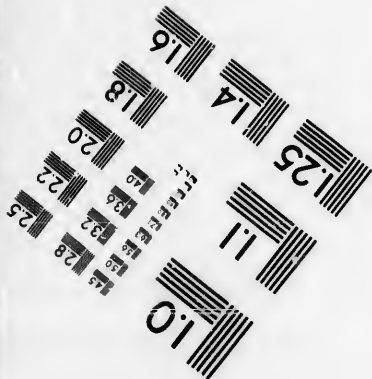
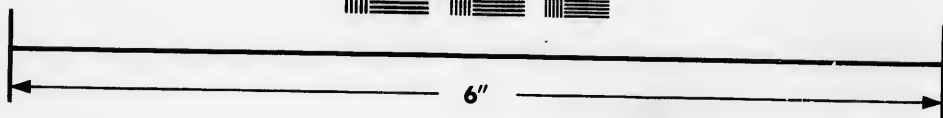
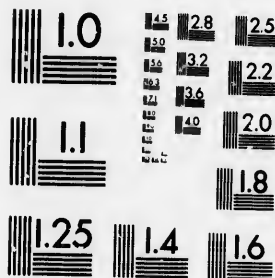


**IMAGE EVALUATION
TEST TARGET (MT-3)**



**Photographic
Sciences
Corporation**

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503



**CIHM/ICMH
Microfiche
Series.**

**CIHM/ICMH
Collection de
microfiches.**



Canadian Institute for Historical Microproductions / Institut canadien de microreproductions historiques



© 1986

Technical and Bibliographic Notes/Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- | | |
|--|--|
| <input checked="" type="checkbox"/> Coloured covers/
Couverture de couleur | <input type="checkbox"/> Coloured pages/
Pages de couleur |
| <input type="checkbox"/> Covers damaged/
Couverture endommagée | <input type="checkbox"/> Pages damaged/
Pages endommagées |
| <input type="checkbox"/> Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée | <input type="checkbox"/> Pages restored and/or laminated/
Pages restaurées et/ou pelliculées |
| <input type="checkbox"/> Cover title missing/
Le titre de couverture manque | <input checked="" type="checkbox"/> Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées |
| <input checked="" type="checkbox"/> Coloured maps/
Cartes géographiques en couleur | <input type="checkbox"/> Pages detached/
Pages détachées |
| <input type="checkbox"/> Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire) | <input checked="" type="checkbox"/> Showthrough/
Transparence |
| <input type="checkbox"/> Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur | <input type="checkbox"/> Quality of print varies/
Qualité inégale de l'impression |
| <input checked="" type="checkbox"/> Bound with other material/
Relié avec d'autres documents | <input type="checkbox"/> Includes supplementary material/
Comprend du matériel supplémentaire |
| <input type="checkbox"/> Tight binding may cause shadows or distortion
along interior margin/
La reliure serrée peut causer de l'ombre ou de la
distorsion le long de la marge intérieure | <input type="checkbox"/> Only edition available/
Seule édition disponible |
| <input type="checkbox"/> Blank leaves added during restoration may
appear within the text. Whenever possible, these
have been omitted from filming/
Il se peut que certaines pages blanches ajoutées
lors d'une restauration apparaissent dans le texte,
mais, lorsque cela était possible, ces pages n'ont
pas été filmées. | <input type="checkbox"/> Pages wholly or partially obscured by errata
slips, tissues, etc., have been refilmed to
ensure the best possible image/
Les pages totalement ou partiellement
obscurcies par un feuillet d'errata, une pelure,
etc., ont été filmées à nouveau de façon à
obtenir la meilleure image possible. |
| <input type="checkbox"/> Additional comments:/
Commentaires supplémentaires: | |

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	14X	18X	22X	26X	30X
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12X	16X	20X	24X	28X	32X

The copy filmed here has been reproduced thanks to the generosity of:

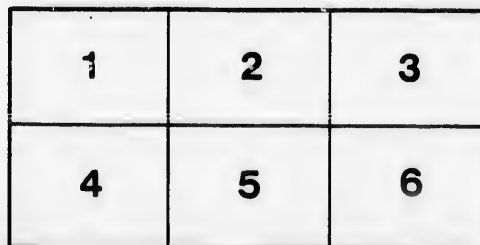
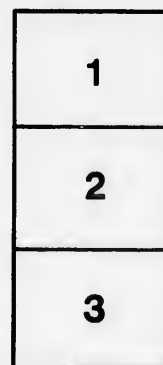
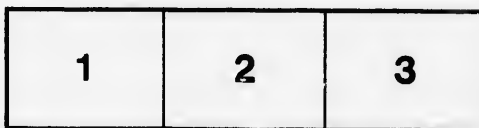
Législature du Québec
Québec

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol \rightarrow (meaning "CONTINUED"), or the symbol ∇ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:



L'exemplaire filmé fut reproduit grâce à la générosité de:

Législature du Québec
Québec

Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier feuillet et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second feuillet, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole \rightarrow signifie "A SUIVRE", le symbole ∇ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.

STAT

HISTORY, P

COMPILED UNDER

W. S. G

THE
STATE OF MICHIGAN:

EMBRACING

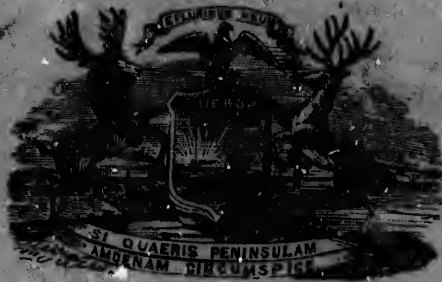
SKETCHES

OF ITS

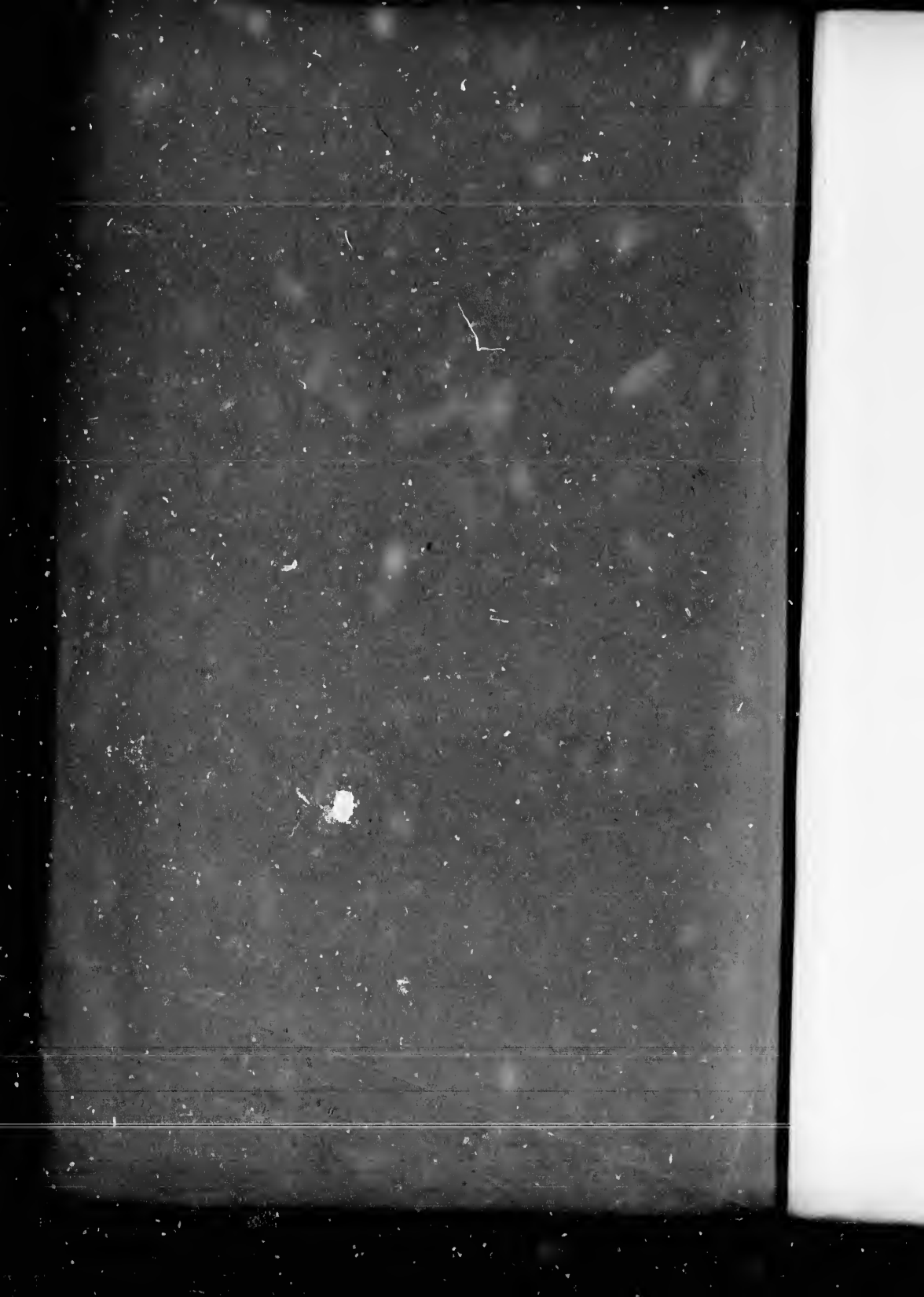
HISTORY, POSITION, RESOURCES AND INDUSTRIES.

COMPILED UNDER AUTHORITY OF THE GOVERNOR IN THE INTEREST OF EMIGRATION,

By S. H. CRACKEN.



LANSING, MICH.:
W. S. GEORGE & CO., STATE PRINTERS AND BINDERS.
1876.







F. E. MYERS, ARCHITECT.

The ENGRAVERS, LANSING, MICH.

STATE CAPITOL LANSING.

ST

HISTOR

COMPL

W

THE
STATE OF MICHIGAN:

EMBRACING

SKETCHES

OF ITS

HISTORY, POSITION, RESOURCES AND INDUSTRIES.

COMPILED UNDER AUTHORITY OF THE GOVERNOR IN THE INTEREST OF EMIGRATION,

By S. B. McCracken.



LANSING, MICH.:
W. S. GEORGE & Co., STATE PRINTERS AND BINDERS.
1876.

The object of institutional history may be looked for in its origin with regard, and precedent, but to be sought and in some cases adapt it to the general mass in themselves to them all done, if entered.

The size of the problem were voluminous, work, purpose of its object little labor; consists in the been employment, and in the

The State practicable, and have cheerfully quoted from, report of the respects, it is and resources industries, in

Upon coming public in the work. In a most general reason that of seem partial, response to the ever, been none hoped for more

That entire Peninsula, the knowledge, and season. The gentlemen favor which are not desired and in present, then

PREFACE.

The object of this publication is to present in brief outline the position, resources, industrial, institutional character, and other general features of the State of Michigan, embracing so much of its history as may serve to introduce it to the reader, for the information of persons who may be looking for places for settlement or investment. The project of the work had its origin with the State Centennial Board of Managers, but being so directly in the interest of emigration, it seemed to come legitimately within the power conferred upon the Governor in that regard, and it has been done under his authority. The work was one for which there was no precedent, and the style and method of which could not exist clearly at first in the mind of the compiler, but had to be wrought out, and in a measure created. Sources of information had to be sought out, and much labor was necessarily done before any visible results were produced, and in some cases work over which much time had been spent had to undergo remodeling to adapt it to the developing character of the work as a whole. The compiler felt much embarrassment in having to deal with so great a variety of topics; for, although not unfamiliar with the general interests of the State, there are few men, however well informed, who will deem themselves sufficiently conversant with all of its great interests, to feel competent to do justice to them all in a work of this character. Such a work would be in no danger of being too well done, if entrusted to a bureau instead of to a single person.

The size of the work as a whole, and the space that should be given to particular topics, were problems requiring more than a single thought for their solution. If the work were made voluminous, but few persons would give it any attention; while, on the other hand, a small work, purporting to represent the varied interests of a great State, might for other reasons fall of its object. A large volume might be made up from random statistics, with comparatively little labor; but next to facts themselves, their chief value as a means of conveying information, consists in their grouping and arrangement. The time and thought best employed largely in this, as well as in inquiry and investigation, and in the preparation and arrangement of such information, who of his work have

The State department reports were readily accessible, and have been as far as practicable, and all persons connected with the departments at Lansing, Michigan, have cheerfully aided in all possible ways. Walling's Atlas of Michigan, especially the report of the State census and statistics of 1874 has been indispensable, but in many respects, it is feared, does great injustice, on account of incompleteness, to the material interests and resources of the State. This is believed to be especially the case as regards manufacturing industries, in which connection reference is made to some further remarks on page eighty.

Upon commencing the work, circulars and letters were addressed to many persons representing public institutions and special interests, asking written statements in a form to be embodied in the work. A few only responded, and the responses of some of these, although complying in a most gratifying manner with the requests which called them out, are omitted, for the reason that other similar interests are not equally represented, and to make use of them would seem partial, and would break the uniformity of the work. In other cases, matter furnished in response to these requests has been used with more or less modification. The compiler has, however, been under the necessity of summarizing many important interests himself, where he had hoped for more detailed statements from those familiar with them.

That entire accuracy has been attained, is not by any means presumed. As to the Upper Peninsula, the compiler has felt throughout much embarrassment, owing to a want of personal knowledge, and the difficulty of communicating readily with that section during the winter season. The matter relating to the Upper Peninsula interests has, however, been submitted to gentlemen familiar with those interests, who have made some corrections, the more essential of which are noted at the end of the work. A just and fair criticism of the work as a whole is desired and invited; for by such means, errors and inaccuracies may be corrected—if not by the present, then by some future

COMPILER.

- I. POLI
S
G
- II. GEOG
- III. MET
- IV. POP
- V. FINA
R
S
- VI. PUBL
- VII. AGRI
D
A
C
- VIII. LUM
T
P
- IX. MINER
U
D
- X. FISHE
- XI. WATE
E
- XII. MANU
by
St
- XIII. RAILR
Ra
Gr
- XIV. TRANS
sul
- XV. EDUC
Sch
leg
- XVI. STATE
Pu
au
- XVII. RELIG
Cer
- XVIII. SCENE
- XIX. MISCE
Fam
ig
Dep
ig
Mur
Bon

CONTENTS.

		PAGE.
I.	POLITICAL HISTORY: Territorial Sovereignty and Government; Organization of the State Government; Constitutional Provisions; Governors of Michigan; Seat of Government and State Capital,	7
II.	GEOGRAPHY AND TOPOGRAPHY,	10
III.	METEOROLOGY AND CLIMATE: Meteorological Means; Climatic Conditions,	11
IV.	POPULATION: Population by Counties; Character and Nativity of the Population; Per Cent of Illiteracy,	13
V.	FINANCIAL CONDITION: Debt of the State, and Provision for its Payment; Taxation and Treasury Aggregates; Cash Receipts and Disbursements; Appropriations; Specific Taxes,	16
VI.	PUBLIC LANDS: Government Lands; State Lands; Railroad and Canal Lands,	20
VII.	AGRICULTURE: Geology of the Soil; Number and Size of Farms; Taxable and Improved Land and Farm Products; Reliability of the Statistics; Comparative Aggregates of Production; Cheese and Butter Factories; State Agricultural Society,	26
VIII.	LUMBER AND TIMBER: Timber Areas of the State; The Lumber Product; Square Timber and Staves; Comparative Timber Areas; Census Returns of the Lumber Product,	39
IX.	MINERAL RESOURCES: Mineral Deposits in the Upper Peninsula; Geology of the Upper Peninsula; Copper and Copper Mining; Iron and Iron Mining; Saline Interests; Slate; Other Mineral Products,	48
X.	FISHERIES: Extent of Michigan Fisheries; Fish Culture and Protection,	74
XI.	WATER POWER: Water as a Motor; The Water Sheds; Distribution of Water Power; Extent to which the Power is Utilized,	77
XII.	MANUFACTURES: Flouring Mills, and Flour Manufactured; General Manufactures by Counties; Aggregates of sundry Manufactures; General Summary for the State,	80
XIII.	RAILROADS: Early Railway Enterprises; Rapid Increase of Railways; Local Aid to Railways; Commissioner of Railroads; Progress of Railway Building; State Land Grants for Railroad Purposes; Railway Routes,	89
XIV.	TRANSPORTATION: Railway Transportation; Transportation in the Upper Peninsula; Water Transportation,	94
XV.	EDUCATION: Early Governmental Provision for Education; Primary and Graded Schools; The State Normal School; The State University; State Agricultural College; Denominational and Private Colleges and Schools,	97
XVI.	STATE INSTITUTIONS: Charitable, Reformatory, and Penal Institutions; The State Public School; Institution for Educating the Deaf and Dumb, and the Blind; Care and Treatment of the Insane, The State Reform School; Prisons,	113
XVII.	RELIGIOUS ORGANIZATIONS: Religious Organizations by Counties; Aggregates of Certain Denominations for the State,	119
XVIII.	SCENERY: Conditions Favorable to Rest and Recreation,	120
XIX.	MISCELLANEOUS: Summary of Michigan Products; Summary of Taxable Land and Farms; The Public Health; The Military; Population of Cities; Banking in Michigan; Lake Marine and Customs Receipts; St. Mary's Falls Ship Canal; Area, Depth, and Elevation of the Great Lakes; Internal Revenue Collections in Michigan; Internal Revenue Taxes Paid by Detroit; Newspapers; The Fur Trade; Marquette and Mackinaw Railway; State Finances; State Officers and State Boards; Corrections and Emendations, Concluding Remarks,	124

The first
Michigan, was
through the
St. Lawrence
the first exte
was in 1641.
stock is clea
furnished ma

Under the
ciated with t
of the war of
States until 1
of her territo
ance of '87,"
"Northwest"
governor, a se
making powe
General Assen
district shoul
ordinance com
three nor mon
diana, Illinois

The first se
the now State
divided prepar
"Indiana Terr
act of January
ritory, the sam
seat of governm
of Michigan w

*The U. S. cen
compiled by part
farther north tha
line, extending to
parallel.

STATISTICS OF MICHIGAN.

I. POLITICAL HISTORY.

FIRST EUROPEAN SETTLEMENT.

The first European settlement of the territory comprised within the State of Michigan, was by the French, whose missionaries and traders meandered its coasts through the great lakes and rivers from the head of ocean navigation on the river St. Lawrence. Missionaries are said to have visited Detroit as early as 1620, but the first extended reconnoissance, reaching as far as the falls of the river St. Mary, was in 1641. The first settlements having been made along the coasts, the original stock is clearly traceable in many localities through their descendants, and has furnished many names intimately associated with the development of the State.

TERRITORIAL SOVEREIGNTY AND GOVERNMENT.

Under the French and British dominion, the territory was politically associated with the Canadas, but became part of the territory of Virginia at the close of the war of independence, although it was not formally occupied by the United States until 1796.* Virginia had in the meantime ceded to the United States all of her territory northwest of the Ohio river, and Congress, by the historical "Ordinance of '87," passed July 13th of that year, provided for its government as the "Northwest Territory." The government of the territory was committed to a governor, a secretary, and three judges, to be appointed by Congress. The law-making power was vested in the "Governor and Judges" until such time as a General Assembly or Legislature should be chosen, which might be done when the district should have a population of not less than five thousand persons. The ordinance contemplated the ultimate division of the territory into not less than three nor more than five States, and hence has grown the five States of Ohio, Indiana, Illinois, Michigan and Wisconsin.

The first seat of government of the Northwest Territory was at Chillicothe, in the now State of Ohio. By act of Congress of May 7th, 1800, the territory was divided preparatory to the admission of Ohio into the Union as a State, and the "Indiana Territory" was erected, with the seat of government at Vincennes. By act of January, 1805, the Territory of Michigan was set off from the Indiana Territory, the same system of government being continued as originally provided, the seat of government being established at Detroit. By this act the southern boundary of Michigan was fixed by a line drawn due east from the southerly bend or ex-

* The U. S. census report for 1870, volume 1, pages 573-4, and also Walker's Statistical Atlas, compiled by parties connected with the census bureau, claim that the Virginia line extended no farther north than the forty-first parallel, placing the "Connecticut cession," first north of that line, extending to 42° 2', and then the "Massachusetts cession," extending to near the forty-fifth parallel.

tre of Lake Michigan until it intersect Lake Erie, and the western boundary through Lake Michigan and thence due north to the northern boundary of the United States, the British possessions forming the northern and eastern boundary. This included on the south a strip of territory now forming a part of the State of Ohio, and did not include the northern or Upper Peninsula of the now State of Michigan.

ORGANIZATION OF THE STATE GOVERNMENT.

In the year 1835 the people of Michigan took steps for forming a State government, and held a convention and adopted a constitution for that purpose. The admission of the State into the Union however was delayed until 1837, chiefly in consequence of a disagreement in regard to the southern boundary, the State of Ohio laying claim to the strip of territory previously referred to, which it was claimed on the other hand was within the territory of Michigan, and which embraces within its limits the present city of Toledo. The dispute at one time seriously threatened an armed collision, and military forces were mustered on both sides, in what is popularly and somewhat jocularly known as the "Toledo war." The difficulty was put in course of settlement by the act of Congress of June, 1836, fixing the disputed boundary in accordance with the claim of Ohio, but giving to Michigan, instead, the territory known as the Upper Peninsula. The conditions having been accepted by Michigan, the State was formally admitted into the Union by act of Congress of January 26, 1837.

CONSTITUTIONAL PROVISIONS.

The system of government of the States of the American Union is so well known that it is needless to add (if not already stated) that the State of Michigan has her written constitution as the basis of her government. The Governor, with other State officers, is elected every second year. The Legislature, consisting of a Senate and House of Representatives, is elected concurrently, the sessions being biennial. The judicial power is vested in a Supreme Court, in circuit courts, and in justices of the peace, with power on the part of the Legislature to establish additional courts in cities. A court of probate in each county has jurisdiction of the settlement of the estates of deceased persons. All judges are elective. County affairs are administered by a board of supervisors in each county, and township affairs by township boards, the supervisor of each township being a member of the township board. Constitutional checks are provided against fraudulent and extravagant expenditures by the State and by municipal corporations. The rights of conscience are secured, every person being privileged to worship according to the dictates of his own conscience. The Legislature is forbidden to diminish or enlarge the civil or political rights, privileges, and capacities of any person on account of his opinion or belief concerning matters of religion; to compel any person to attend, erect or support any place of religious worship, or to pay tithes, taxes, or other rates, for the support of any minister of the gospel or teacher of religion; to appropriate the public money or property for the benefit of any religious sect or society, theological or religious seminary; or to restrain or abridge the liberty of speech, or of the press. Imprisonment for debt is prohibited, and personal property to the amount of five hundred dollars, and a homestead of the value of fifteen hundred dollars, are exempt from levy and sale by execution. Liberal provision is made for public education, as will appear elsewhere in this publication. Corporations (except municipal) are formed only by general laws. Aliens are guaranteed equal rights of property, and are entitled to

the elect
clared th

The r
and the s

SAMUEL C
M. DE MO
M. DE AIL
M. DE LA
M. DE LAU
M. DE AIL
M. DE AIL
M. DE AR
BARON DE
M. DE ME
M. DE CO
COUNT DE

JAMES MUL
GUY CARL
FREDERICK

ARTHUR ST

WILLIAM H

STEVENS T.
WILLIAM W
J. WRIGHT C
JOHN S. BAL
ALPHEUS FE
WILLIAM L.
EPAPHRODIT
JOHN S. BAR

The seat o
for its remov
ever passed.
of this State
supplementar
Commission
the site of th
section," ther
building, costl
the summer o
and has ever s
act was passed

*Died while in
Stevens T. Mason
Lieutenant G

POLITICAL HISTORY.

9

the elective franchise after a residence of two years and six months, having declared their intention to become citizens six months preceding an election.

GOVERNORS OF MICHIGAN.

The names of the Governors of Michigan, with their terms of service, and the sovereignty under which acting, are as follows:

UNDER FRENCH DOMINION.

SAMUEL CHAMPLAIN, 1622-1635. M. DE MONTMAGNY, 1636-1647. M. DE AILLEBOUT, 1648-1650. M. DE LAUSON, 1651-1656. M. DE LAUSON (son), 1656-1657. M. DE AILLEBOUT, 1657-1658. M. DE ARGENSON, 1658-1660. BARON DE AVANGOUR, 1661-1663. M. DE MESEY, 1663-1665. M. DE COURCELLES, 1665-1672. COUNT DE FRONTENAC, 1672-1682.	M. DE LA BARRE, 1682-1685. M. DE NOUVILLE, 1685-1689. COUNT DE FRONTENAC, 1689-1698. M. DE CALLIERES, 1699-1703. M. DE VAUDREUIL, 1703-1725. M. DE BEAULIARNOIS, 1726-1747. M. DE GALISSNIERE, 1747-1749. M. DE LA JONQUIERE, 1749-1752. M. DU QUESNE, 1752-1755. M. DE VAUDREUIL DE CAVAGNAC, 1755-1763.
---	--

UNDER BRITISH DOMINION.

JAMES MURRAY, 1763-1767. GUY CARLETON, 1768-1777. FREDERICK HALDIMAND, 1777-1785.	HENRY HAMILTON, 1785-1786. LORD DORCHESTER, 1786-1796.
---	---

TERRITORIAL GOVERNORS.

<i>Northwest Territory.</i> ARTHUR ST. CLAIR, 1796-1800. <i>Indiana Territory.</i> WILLIAM HENRY HARRISON, 1800-1805.	<i>Michigan Territory.</i> WILLIAM HULL, 1805-1813. LEWIS CASS, 1813-1831. GEORGE B. PORTER,* 1831-1834. STEVENS T. MASON, <i>ex officio</i> , 1834-1835.
--	---

UNDER STATE AUTHORITY.

STEVENS T. MASON, 1835-1840. WILLIAM WOODBRIDGE, 1840-1841. J. WRIGHT GORDON,† 1841-1842. JOHN S. BARRY, 1842-1846. ALPHEUS FELCH, 1846-1847. WILLIAM L. GREENLY,† 1847-1848. EPAPHRODITUS RANSOM, 1848-1850. JOHN S. BARRY, 1850-1852.	ROBERT MCCLELLAND, 1852-1853. ANDREW PARSONS,† 1853-1855. KINSLEY S. BINGHAM, 1855-1859. MOSES WINNER, 1859-1861. AUSTIN BLAIR, 1861-1865. HENRY H. CRAPO, 1865-1869. HENRY P. BALDWIN, 1869-1873. JOHN J. BAGLEY, 1873-1877.
--	--

SEAT OF GOVERNMENT AND STATE CAPITOL.

The seat of government remained at Detroit until 1847, when an act was passed for its removal. The act of removal is probably one of the shortest public acts ever passed. After the enacting clause, it provides "that the seat of government of this State shall be in the township of Lansing, in the county of Ingham." A supplementary act was passed, however, providing for the removal.

Commissioners were selected to locate a site within the town of Lansing, and the site of the present city of Lansing was chosen, partly because it was a "school section," there being but a single settler in the immediate vicinity. A frame building, costing, with an addition since made, about \$22,500, was erected during the summer of 1847, and occupied by the Legislature on the first of January, 1848, and has ever since been the "State House." At the legislative session of 1871, an act was passed providing for the erection of a new State Capitol. A "Board of

* Died while in office, July 6, 1834, and was succeeded by the then Secretary of the Territory, Stevens T. Mason.

† Lieutenant Governors acting as Governor.

State Building Commissioners" was provided for, who solicited competitive designs for the new capitol, the preference being given to the design furnished by Mr. E. E. Myers. The cost of the building and incidental expenses, was limited to \$1,200,000, \$100,000 payable in 1872, \$200,000 in each of the years 1873, 1874, 1875, and 1876, and \$300,000 in 1877. A preliminary appropriation of \$10,000 was made for plans, etc., in 1871, and in 1875 special appropriations for heating and ventilating, for changes and improvements, roofing, cornice, etc., were made, amounting to \$175,000. The length of the building, exclusive of porticoes, is 345 feet; width, 191 feet; height of lantern, 265 feet. The edifice is designed to accommodate the Legislature, State offices, Supreme Court, State library, etc. The corner stone was laid on the second day of October, 1873, and the contract time for its completion is the first of December, 1877. A lithographic representation of the new Capitol forms the frontispiece of this work.

II. GEOGRAPHY, AND TOPOGRAPHY.

The State of Michigan occupies a position approximating the center of the continent of North America, and is embraced between the parallels 41° 69' and 47° 47' north latitude, and the meridians of 82° 40' and 90° 53' of longitude west from Greenwich. The center of the State is marked by the position of Carp Lake, in Leelanaw county, which is 670 miles in a straight line from New York. The land area of the State consists of two natural divisions, known as the Upper and Lower Peninsulas, and adjacent islands. The Upper Peninsula has its greatest extent from east to west, and the Lower its greatest extent from north to south. The following exhibits the length and breadth in miles, and the number of square miles, and number of acres, in each peninsula:

DIVISIONS.	Length.	Breadth.	Square Miles.	Acres.
Upper.....	318,104	164,286	22,580	14,451,456
Lower.....	277,000	259,056	33,871	21,677,184

The two peninsulas are separated by the straits of Mackinaw, and are totally dissimilar in character. The Upper is rugged, with numerous rocky exposures, and mountains which in the western portion rise to the height of 2,000 feet. Its products are almost exclusively mineral. The Lower Peninsula consists of plains, occasional prairie, table and timbered lands. Its products, in the cultivated parts, are agricultural, and in the northern part, lumber and timber, with salt, coal, and gypsum in some localities. The specific features of the two peninsulas will more fully appear in the details of this work. Their climates are as distinct as their locations and their topography; and, in all statements respecting the climatic features of the State, they ought to be separately treated. The meteorological means for the whole State convey very inadequate impressions respecting either of its natural divisions. In this connection reference is made to the meteorological data

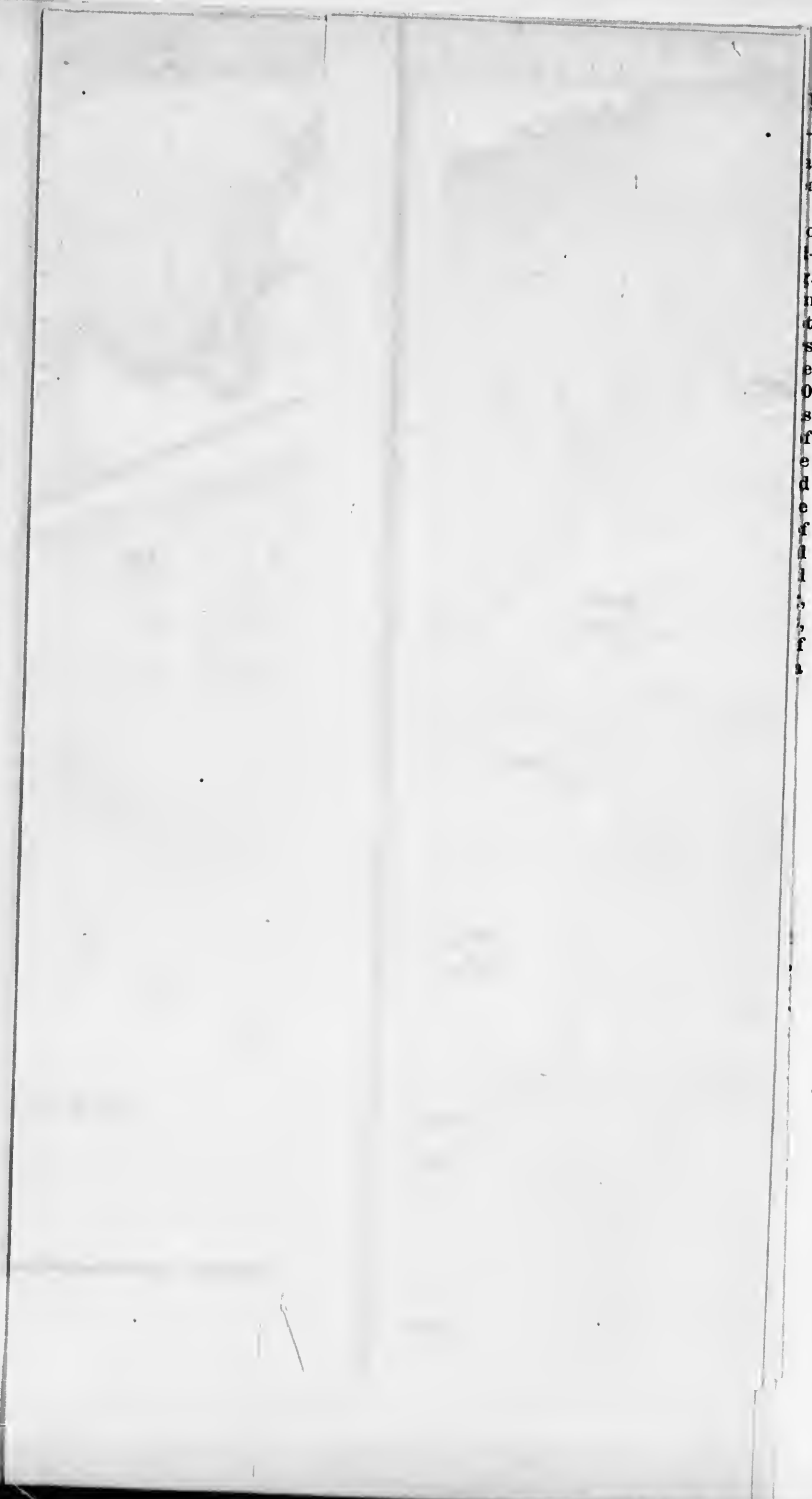
ive de-
hed by
imited by
3, 1874,
00 was
ng and
mount-
5 feet;
ommo-
corner
for its
of the

of the
92' and
e west
Carp
York.
ne Up-
has its
north
e num-

eres.

451,456
677,184

totally
losures,
t. Its
plains,
parts,
al, and
l more
s their
ic fea-
means
of its
al data



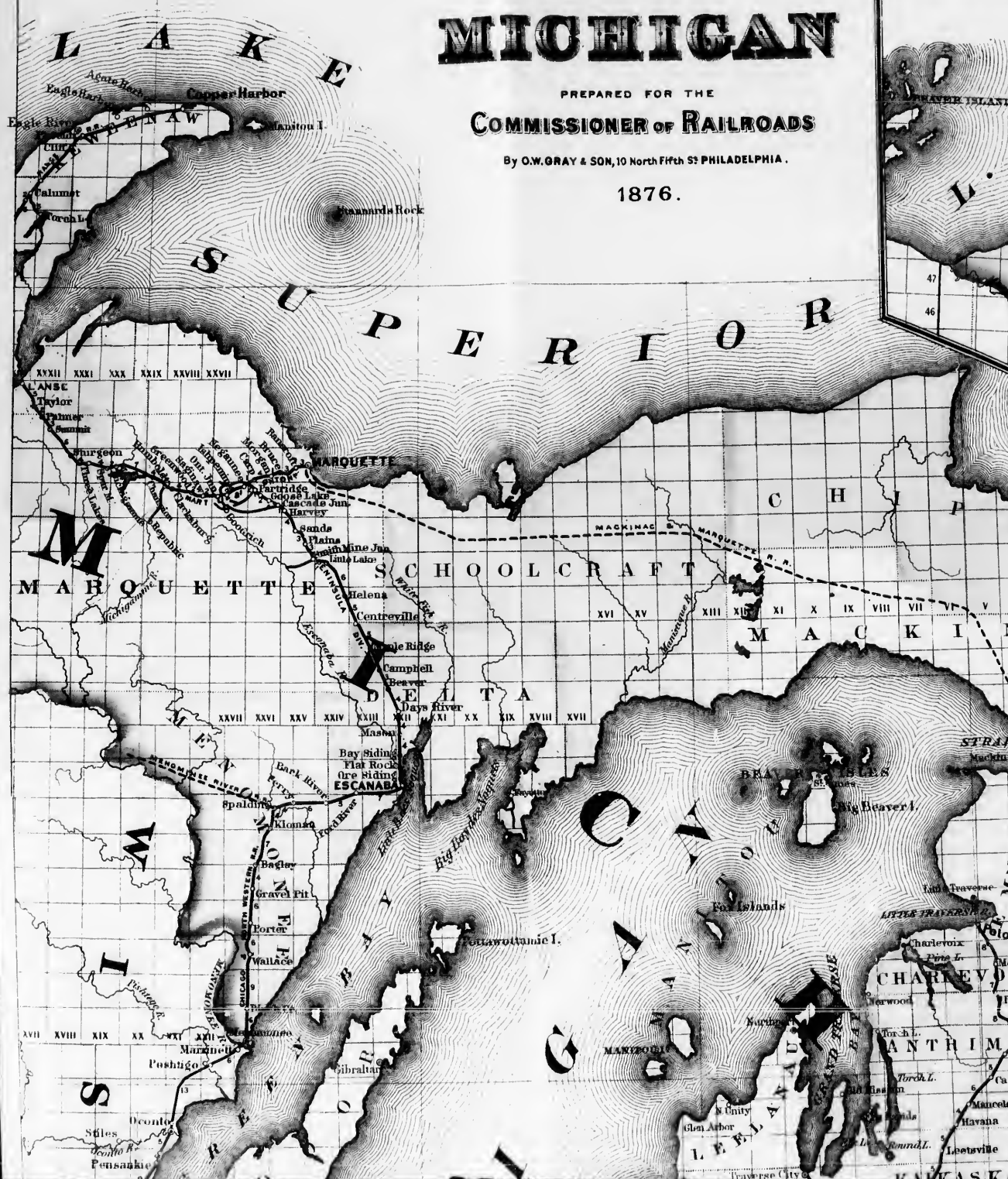
1
-
-
n
o
-
f
n
t
s
e
o
s
f
e
d
e
r
f
l
l
s
f
f
a

RAILROAD MAP OF MICHIGAN

PREPARED FOR THE
COMMISSIONER OF RAILROADS

By O.W. GRAY & SON, 10 North Fifth St. PHILADELPHIA.

1876.





Entered according to Act of Congress in the year 1874 by G.W. & C.B. Colton & Co. in the Office of the Librarian of Congress at Washington.

Albion



St
sl
M
to
18
m
ve
in
w
da
st
co
ne

ca
4
fr
L
T
P
g
t
b

U
I
C
a
I
C
E
f
l
i
i



given under
rles of the
being 404,73

The top
principal di
dence and r
or enclosing
200 miles o
its western
available fo
State also h
smaller lake
unconnected
persons, nam
of means, wh
health seek
waters of ma
interest. Th
summer reso
park which t
upon the isl
also, the ent
similar exte
cursory glanc

Meteorolog
comfort, and
show that Mi
The meteorolo
city of produc
A further fact
State is accust
theless, capable
as shown by th
less degree, up

The followin
observations h
to and includin
Prof. Alexande
Michigan, and
ling's Atlas of

given under the proper head. There are 179 islands included within the boundaries of the State, which have an area from one acre upward, each, their total area being 404,730 acres.

The topography of the State, superficially glanced at, has an interest in two principal directions: Convenience of commerce, and desirability for places of residence and resort. The total length of the lake-shore line is 1,620 miles, embracing, or enclosing the entire of the Lower Peninsula with the exception of less than 200 miles on its southern boundary, and the entire of the Upper Peninsula except its western boundary. To this should be added the numerous bays and rivers available for floatage and navigation, connecting with the larger waters. The State also has within its bounds, but unconnected with the great lakes, over 5,000 smaller lakes, having an area of 712,864 acres. These features are noted here as unconnected with business or commerce, and address themselves to three classes of persons, namely, those in quest of pleasure by fishing, boating, hunting, etc.; people of means, who may be looking for desirable localities for residence; and tourists and health seekers. To the latter also the numerous artesian wells or springs, the waters of many of which are proven to possess strong curative powers, will be of interest. The island of Mackinaw is widely known as a pleasurable and healthful summer resort, and added to its natural attractiveness, may be noted the national park which the government of the United States has established and is improving, upon the island. Merely in the light of pleasure, health, and general interest, also, the entire of the Upper Peninsula commands attention equal to any region of similar extent. These topics suggest themselves naturally in connection with a cursory glance at the topography of the State.

III. METEOROLOGY AND CLIMATE.

Meteorological and climatic conditions are important, as affecting health, personal comfort, and material production. The scientific deductions which appear below, show that Michigan is less liable to extreme cold than sections farther south. The meteorological table shows an average of moisture equal to the highest capacity of production—a fact which is also shown by experience and practical results. A further fact of practical demonstration is, that notwithstanding the soil of the State is accustomed, by its location, to a high average of moisture, it is, nevertheless, capable of maintaining its production under an unusual extreme of drought, as shown by the exceptional season of 1871, continued, in its effects, in greater or less degree, up to 1874.

METEOROLOGICAL MEANS.

The following table showing the precipitation of rain and snow, made up from observations had at different points in the State for a number of years prior to and including 1870, is taken from an elaborate and carefully prepared paper, by Prof. Alexander Winchell, formerly professor of geology in the University of Michigan, and subsequently chancellor of Syracuse university, published in Walling's Atlas of Michigan:

PRECIPITATION OF RAIN AND SNOW.

LOCALITY.	Latitude.	Elevation above sea level.	Number of years.	SPRING.			SUMMER.			AUTUMN.			WINTER.			YEAR.	
				MEAN.		MIN.	MEAN.		MIN.	MEAN.		MIN.	MEAN.		MIN.	MEAN.	MIN.
				Inches.	Ratio.	Inches.	Inches.	Ratio.	Inches.	Ratio.	Inches.	Inches.	Ratio.	Inches.	Ratio.	Inches.	Inches.
Copper Falls...	47° 25'	1200	5	7.25	19	6.08	7.23	19	5.15	9.83	23.4	6.78	12.92	34.7	11.79	37.23	30.00
Ontonagon...	46° 52'	630	12	4.71	19	2.34	7.21	30	4.88	6.25	25.8	4.08	6.02	24.9	3.08	21.20	20.00
Marquette...	46° 32'	625	13	7.13	23	3.08	8.90	29	3.99	8.85	28.5	3.44	6.14	10.7	3.95	31.02	28.84
S. Ste Marie...	46° 39'	610	33	5.07	15.7	1.74	9.43	31	3.69	10.40	34.5	5.45	5.03	10.6	2.40	30.28	12.11
Mackinac...	45° 39'	731	28	4.39	19	1.53	9.08	37	3.11	7.00	28.7	1.58	3.58	14.5	3.35	24.58	11.70
Tawas City...	44° 15'	583	14	4.67	22	2.83	9.01	29	2.33	6.11	30.5	2.44	3.89	18	2.88	25.99	17.69
Grand Haven...	43° 03'	588	4	5.33	21	3.94	8.50	34	7.77	7.72	30.4	4.13	4.04	18.3	3.54	25.92	21.93
Grand Rapids...	42° 58'	390	11	11.37	28.6	6.79	10.08	25.3	5.90	9.73	24.4	5.82	8.62	22	.....	39.81	36.73
Ft. Gratiot...	43° 00'	598	18	8.02	24.5	6.06	9.75	30	6.56	8.86	27	4.93	5.75	17.6	4.35	32.62	25.75
Holland...	42° 42'	505	4	9.37	24	8.10	7.31	19	4.97	12.21	31.5	11.92	9.91	25.5	8.97	38.80	35.99
Lansing...	42° 36'	850	7	8.81	27	6.68	9.67	31.5	5.52	7.06	23.3	2.80	5.52	18.2	3.84	30.33	24.58
Bufile Creek...	42° 16'	510	6½	9.12	29	4.98	7.88	25	4.30	8.94	28.5	4.51	5.45	17.3	3.36	31.39	25.73
Detroit...	42° 19'	345	30	8.60	24.5	4.80	11.15	31.7	4.56	9.28	23.4	4.93	6.05	17.2	1.88	35.00	21.10
Ann Arbor...	42° 19'	868	7	8.14	25	4.43	11.05	34.5	5.77	7.97	23	5.60	4.82	15	3.00	31.98	26.20
Monroe...	41° 53'	584	18	8.11	25.5	4.56	9.85	31	6.10	8.27	26	3.87	5.56	17.4	3.13	31.80	26.17

CLIMATIC CONDITIONS.

From the same authority last quoted, the following observations on the climate of Michigan are taken:

"The sinuosities of the several lines [as shown in the charts] will demonstrate at a glance the peculiar character of the climate of Michigan, and the fact that, both in summer and winter, it is better adapted to the interests of agriculture and horticulture, and probably, also, to the comfort and health of its citizens, than that of any other northwestern State. Its marked peculiarity of climate in these respects, is attributable to the influence of the Great Lakes, by which the State is nearly surrounded. It has long been known that considerable bodies of water exert a local influence in modifying climate, but it has never before been suspected that Lake Michigan, for instance, impresses upon the climatic character of a broad region an influence which is truly comparable with that excited by the great ocean."

"The excess of the warming influence on the east side of Lake Michigan is most apparent. The winter mean of Chicago is 24½°, while that of New Buffalo, in the same latitude, is 28°. The winter mean of Milwaukee is 22°, while that of its *vis-a-vis*, Grand Haven, is 26½°. The winter mean of Fort Howard is 20°, and of Appleton, 19°, while that of Traverse City, farther north than either, is 23½°." Further comparisons show that the season is seven to ten days earlier in spring, and about the same amount later in the fall, on the east than on the west shore; from which this conclusion is reached: "This makes the growing season on the east side of Lake Michigan, from twelve to twenty-one days longer than on the west, to say nothing about exemption from unseasonable frosts, and a much warmer constitution of the soil on the east side."

"The meaning of this is, that the most excessive cold at Mackinac, for a period of 28 years, is not, on the average, greater than at Fort Riley, 480 miles further south. It is one degree less than at Chicago for a term of eleven years. It is but ten degrees lower than the extreme minimum of St. Louis. Extreme weather at Chicago is twelve degrees lower than at New Buffalo. The lowest extreme of

* The winds largely prevailing from the west and southwest, carry the warming influence of the lake over the State.

Milwaukee
while the
is -6°; w
east side
bearing c
remember
extremes
One kill
occur at
nac. Th
of the p
tion a pe
perfectly
The ratio
comparati
* * In

the water
the water
when mov
of the hea
land temp
in case of
generally
distance of
ration. *
science of
during a f
fruits along
are so muc
rior fruit-p

The pop
in 1810, 4.7
cludes the s
per cent. of
or a per cen

The adva
State censu

Milwaukee is fourteen degrees below the extreme minimum of Grand Haven, while the extreme of Fort Howard is thirty below that of Northport. In general, while the extreme minimum along the west side is -16° , that along the east side is -6° ; while the extreme minimum of the west side is -22° to -30° , that of the east side is -10° to -16° . It is proper to direct attention to the important bearing of these additional facts upon the results of soil-cultivation. It will be remembered that it is not the severity of the winter mean, but that of the winter extremes which conditions the immunity of exotic plants from destructive frost. One killing freeze is as fatal as thirty. That one killing freeze is as likely to occur at Fort Riley, or Leavenworth, or Peoria, or even at St. Louis, as at Mackinac. The whole east shore of Lake Michigan is 15° to 20° more secure than any of the places just named. As grapes and peach trees require for their destruction a temperature of -20° , it is apparent that peach orchards and vineyards are perfectly secure along the whole extent of the eastern shore of Lake Michigan. The rationale of these climatic effects is not difficult to discover. It lies in the comparatively low capacity of watering surfaces for absorbing and radiating heat. * * In January, the mean temperature of the land sinks to 19° , while that of the water does not, probably, fall below 40° . The atmosphere in contact with the water must partake, to some extent, of the temperature of the water, and, when moving from the water to the land, must transfer to the land some portion of the heat or cold proper to the lake. The effect is a tendency to equalize the land temperatures in summer and winter. This tendency is most distinctly felt in case of extreme weather. On occasion of our coldest weather, the wind blows generally from the southwest, and, passing diagonally from Lake Michigan for a distance of 100 to 200 miles, must necessarily experience a great degree of amelioration. * * The foregoing generalizations from the numerical data of the science of meteorology are abundantly confirmed by the results of the efforts made during a few years past to introduce the cultivation of peaches, grapes, and other fruits along the entire belt from St. Joseph to Grand Traverse bay. These results are so much a success that it is now generally acknowledged that scarcely a superior fruit-producing region exists within the United States."

IV. POPULATION.

The population of Michigan (other than Indian) in the year 1800 was 551; in 1810, 4,762; in 1820, 8,896; in 1830, 31,639. From 1830 to 1840, which includes the speculative period of 1837-8, the population increased to 212,267, or a per cent. of increase in ten years of 570.90. The population in 1850 was 397,654, or a per cent. of increase during the decade of 87.33.

POPULATION BY COUNTIES.

The advance in population since 1850, as shown by both the United States and State censuses, will appear from the following table:

TABLE OF POPULATION.

STATE AND COUNTIES.	When Organized.	POPULATION.				Per Cent of Each Sex to Total Population, 1874.	
		1851.	1861.	1870.	1874.	Males.	Females.
STATE	1837	507,521	803,661	1,184,282	1,334,031	52.26	47.73
Alecona	1869			766	1,214	56.67	43.32
Allegan	1835	7,786	18,835	32,105	32,381	52.42	47.57
Alpena	1857		674	2,756	4,807	58.41	41.58
Antrim	1863		382	1,985	3,240	56.04	43.95
Barry	1839	7,789	14,411	22,200	22,051	52.55	47.44
Bay	1857		5,517	15,900	24,832	54.99	45.00
Benzie	1869			2,184	2,663	53.39	46.60
Berrien	1831	13,595	25,704	35,104	35,029	51.22	48.77
Branch	1833	15,686	22,458	29,227	29,726	50.69	49.30
Calhoun	1833	22,517	30,770	36,571	35,655	50.92	49.07
Cass	1829	12,411	17,666	21,096	20,525	51.60	48.39
Charlevoix	1869			1,724	2,360	54.23	45.76
Cheboygan	1853		483	2,197	3,070	55.57	44.42
Chippewa	1826	1,933	1,229	1,690	2,170	56.31	43.68
Clare	1871			366	1,354	55.02	44.97
Clinton	1839	8,030	14,646	22,851	23,661	51.40	48.59
Delta	1861		561	2,444	4,741	60.78	39.21
Eaton	1837	10,940	16,497	25,163	26,907	51.56	48.43
Emmet	1853	4,970	1,325	1,211	1,272	52.59	47.40
Genesee	1836	15,629	22,047	33,895	34,568	50.72	49.27
Grand Traverse	1853	900	2,026	4,443	5,349	52.36	47.63
Gratiot	1855		5,739	11,808	13,886	52.59	47.40
Hillsdale	1835	19,151	27,448	31,688	31,566	50.50	49.49
Houghton	1846	2,868	8,224	13,882	19,030	57.87	42.12
Huron	1859	702	3,962	9,048	11,964	55.28	44.71
Ingham	1838	11,192	17,118	25,268	29,193	52.08	47.91
Ionia	1837	10,714	17,984	27,675	28,376	52.11	47.88
Iosco	1857		395	3,175	4,782	59.78	40.21
Isabella	1859		1,844	4,113	6,059	54.01	45.98
Jackson	1832	21,720	25,856	36,040	37,988	52.26	47.73
Kalamazoo	1830	16,749	25,841	32,065	32,284	51.36	48.63
Kalkaska	1871			424	1,259	54.96	45.03
Kent	1836	17,786	33,147	50,410	62,671	51.97	48.02
Keweenaw	1861		5,180	4,206	5,415	59.77	40.22
Lake	1871			548	1,813	55.98	44.01
Lapeer	1835	9,656	15,202	21,342	25,140	52.08	47.91
Leelanaw	1863		2,389	4,577	5,031	53.50	46.49
Lenawee	1826	30,941	40,199	45,601	46,084	50.46	49.53
Livingston	1836	14,141	16,160	19,335	20,329	51.98	48.01
Mackinac	1818	1,639	1,317	1,715	1,496	51.13	48.86
Macomb	1818	18,023	21,803	27,619	28,305	50.75	49.24
Manistee	1855		1,671	6,074	8,471	56.56	43.43
Manitou	1855			891	657	55.40	44.59
Marquette	1851		3,724	14,278	21,946	58.74	41.25
Mason	1855		846	3,266	5,361	55.41	44.58
Mecosta	1829		1,382	5,645	9,132	53.37	46.62
Menominee	1861		496	1,895	3,490	63.40	36.59
Midland	1855		1,251	3,283	5,306	55.12	44.87
Missaukee	1871			130	606	65.18	34.81
Monroe	1817	18,030	22,221	27,475	30,111	50.81	49.18
Moncalm	1850	2,056	5,629	13,641	20,815	54.34	45.65
Muskegon	1859		5,590	14,892	19,375	55.54	44.45
Newaygo	1851	978	3,482	7,292	8,758	55.70	44.29

STATE AD

Oakland ..
 Oceana ..
 Ontonago ..
 Osceola ..
 Ottawa ..
 Presque Is ..
 Saginaw ..
 Saillac ..
 Schoolcraft ..
 Shilawassee ..
 St. Clair ..
 St. Joseph ..
 Tuscola ..
 Van Buren ..
 Washtenaw ..
 Wayne ..
 Wexford ..
 Unorganized

The pop
 diversified.
 ants of the
 1840 was v
 the greater
 liberal ind
 works. D
 their princ
 in Ottawa
 same time,
 revulsions
 population
 and has, to
 the differen
 it is believ
 The foll
 the nativity

Michigan ..
 New Engla
 New York ..
 Ohio ..
 Pennsylvania

POPULATION.

TABLE OF POPULATION.—CONTINUED.

STATE AND COUNTIES.	When Organized.	POPULATION.				Per Cent of Each Sex to Total Population, 1871.	
		1854.	1864.	1870.	1874.	Males.	Females.
Oakland.....	1820	31,757	33,625	40,906	38,082	51.00	48.93
Oceana.....	1855	.....	2,373	7,222	8,360	54.79	45.20
Ontonagon.....	1855	3,624	5,408	2,840	2,406	53.03	46.96
Osceola.....	1869	.....	.....	2,104	3,216	56.16	43.83
Ottawa.....	1837	7,293	15,056	26,650	29,929	52.75	47.24
Presque Isle.....	1871	.....	.....	355	1,615	52.69	47.30
Saginaw.....	1835	1,051	19,683	39,098	48,409	53.64	46.35
Sauillac.....	1848	3,521	8,853	14,565	16,292	53.10	46.89
Schoolcraft.....	1871	.....	.....	799	1,290	63.87	36.12
Shilawassee.....	1837	7,411	13,514	20,822	21,773	51.73	48.26
St. Clair.....	1821	16,825	27,591	36,759	40,688	52.05	47.94
St. Joseph.....	1829	15,021	22,559	26,272	25,906	51.21	48.78
Tuscola.....	1860	1,503	6,983	13,715	16,998	52.65	47.34
Van Buren.....	1837	7,720	17,820	28,835	29,156	51.66	48.33
Washtenaw.....	1836	28,554	34,048	41,440	38,723	50.49	49.50
Wayne.....	1815	64,709	83,292	119,068	144,903	52.89	50.10
Wexford.....	1869	.....	.....	650	3,011	58.18	41.81
Unorganized Counties.....	.....	.....	1,195	.....	.....	.....	.....

CHARACTER AND NATIVITY OF THE POPULATION.

The population of Michigan, like that of all of our newer states, is somewhat diversified. Along the eastern shore, especially at Monroe and Detroit, the descendants of the French colonists are quite numerous. The large increase from 1830 to 1840 was very largely drawn from the eastern States, New York furnishing by far the greater proportion. During the two decades dividing on 1840, there was a very liberal influx of Irish, drawn hither, to a great extent, as laborers on the public works. During the decade 1840 to 1850, the Hollanders were liberal emigrants, their principal objective point being the Holland colony, of which Holland City, in Ottawa county, is the center. A large German emigration set in about the same time, but which has been checked during the past four or five years by the revulsions and depressions in finance and business. The mass of the foreign-born population has, therefore, been in the country from twenty to twenty-five years, and has, to a great extent, ceased to be foreign, assimilating itself as rapidly as the differences in language and customs will permit, and in the industries of life it is believed in all cases vieing fully with the native population.

The following table, compiled from the United States census of 1870, will show the nativity of the principal classes of the population:

BORN IN THE UNITED STATES.

Michigan.....	507,268	Indiana.....	12,140
New England States.....	41,398	New Jersey.....	8,033
New York.....	231,509	Illinois.....	6,055
Ohio.....	62,207	Wisconsin.....	5,986
Pennsylvania.....	28,507	Other States.....	12,946

STATISTICS OF MICHIGAN.

BORN IN FOREIGN COUNTRIES.

British America.....	89,590	Poland.....	947
England.....	35,051	France.....	3,121
Ireland.....	42,013	Switzerland.....	2,116
Scotland.....	8,552	Bohemia.....	1,197
Prussia.....	28,660	Belgium.....	832
Other German States.....	35,483	Austria.....	795
Holland.....	12,559	Denmark.....	1,354
Sweden.....	2,406	Other countries.....	1,158
Norway.....	1,516		

PER CENT. OF ILLITERACY.

The total of persons in the State of ten years and over who could not read, as per United States census of 1870, was 34,613, a small fraction less than 3.5 per cent of the whole population. The number who could not write was 53,127 (including 1,823 Indians), or a fraction over 5.6 per cent of the whole population, classified as follows:

Whites, 10 to 15—males, 4,728; females, 3,294.....	8,022
Whites, 15 to 21—males, 2,973; females, 2,125.....	5,098
Whites, 21 and over—males, 17,543; females, 17,986.....	35,529
Colored, of all ages and both sexes.....	2,675
Indians.....	1,823

Of the foregoing, 22,547 were of native, and 30,580 of foreign birth.

V. FINANCIAL CONDITION.

THE DEBT OF THE STATE, AND PROVISION FOR ITS PAYMENT.

In the year 1843, the State of Michigan was encumbered with a debt of \$3,394,005, which was equal to \$15.98 per capita of the then population. The amount of this debt outstanding, as adjusted and payable on the 30th of September, 1875, was \$15,149,97. Some additions were made to the State debt during the war, so that the total interest-bearing bonded debt of the State at the last named date, less cash on hand applicable to its payment, was \$1,136,315.73.* Of this sum, \$358,000 bears seven per cent. interest, and the balance six per cent.

There is also due to the educational or trust funds, the sum of \$2,996,658.84, which is interest-bearing, but which is not regarded in the light of a public debt, as the State has received the money dollar for dollar, and simply holds it as trustee for the several funds to which it belongs, paying interest for its use, which is expended for the support of educational institutions within the State, and for its benefit.

The constitution (Article XIV., section 1) provides: "All specific state taxes,

* Exclusive of \$46,000 Sault canal bonds, the interest on which is payable from tolls.

except the
be applie
herein rec
due to ed
a part of
vides: "T
thousand
compound
increase of
gnishment
education
The onl
provision,
of the Stat
yielding an
not only m
afford a sur
debt, thus
source now
in fact, tha
tive, an ac
rates as the
best interes
purchased n
per cent.
Legislature
general fun
the terms of
taxes can b
accumulation
debt by the

Direct ta
ernment, and
rate per cen
named, are s
General for
named:

except those received from the mining companies of the Upper Peninsula, shall be applied in paying the interest and principal of the State debt, in the order herein recited, until the extinguishment of the State debt other than the amounts due to educational funds, when such specific taxes shall be added to and constitute a part of the primary school interest fund." Section 2 of the same article provides: "The Legislature shall provide by law a sinking fund of at least twenty thousand dollars a year, to commence in eighteen hundred and fifty-two, with compound interest at the rate of six per cent. per annum, and an annual increase of at least five per cent., to be applied solely to the payment and extinguishment of the principal of the State debt, other than the amounts due to educational funds, and shall be continued until the extinguishment thereof."

The only direct taxes levied for the purposes contemplated by the last foregoing provision, was one-sixteenth of a mill on the dollar of the valuation of the property of the State, running from 1861 to 1868, and one-eighth of a mill from 1862 to 1871, yielding an aggregate of \$468,767.63. The specific taxes applicable to the purpose, not only meet the interest on the entire indebtedness, both bonded and trust, but afford a surplus more than sufficient to pay the maturing principal of the bonded debt, thus meeting the requirement for a sinking fund. The surplus from this source now averages about \$210,000 per annum. The accumulation was so great, in fact, that at the legislative session of 1875, on the recommendation of the Executive, an act was passed authorizing the purchase of unmaturing bonds at such rates as the Governor, State Treasurer, and Auditor General might deem for the best interests of the State. Under this act, bonds to the amount \$125,000 were purchased up to the 30th of September last, at a premium of a fraction over three per cent. To further relieve the surplus, Gov. Bagley, in his message to the Legislature of 1875, recommended the transference from the sinking fund to the general fund of some \$466,828.40 of accumulations from other sources, although by the terms of the constitutional provision, no part of the fund arising from specific taxes can be diverted. The Governor shows, by careful computation, that the accumulations to the sinking fund will be sufficient to wipe out the entire bonded debt by the first of January, 1883.

TAXATION AND TREASURY AGGREGATES.

Direct taxes are levied for paying the ordinary expenses of the State government, and meeting appropriations. The total of this species of taxation, the rate per cent on the equalized valuation, and the rate per capita, for the years named, are shown by the following table, taken from the report of the Auditor General for 1875. Also, in the last column, the treasury aggregates for the years named:

STATISTICS OF MICHIGAN.

VALUATION, RATE OF TAXATION, AND TREASURY AGGREGATES.

YEARS IN WHICH EQUALIZED.	EQUALIZED VALUATION. *	Year's Tax.	Amount of Tax Apportioned.	RATE.		In Treasury for 1840 and following years.
				Mills on \$1.00.	Per Capita.	
1838	\$42,953,495 61	1838	\$85,906 95			
1839	46,192,702 29	1839	92,385 43			
1840	37,833,024 13	1840	75,666 04	2	\$0 36	
1841	34,603,021 85	1841	103,827 62	3	47	\$84,651 71
1842	29,148,039 19	1842	58,296 07	2	25	79,614 01
1843	27,696,940 41	1843	55,393 88	2	21	87,163 19
1844	28,583,007 32	1844	57,166 01	2	21	79,092 96
1845	28,922,090 59	1845	72,305 23	2.5	24	86,985 40
1846	29,369,065 67	1846	73,562 15	2.5	23	106,869 36
1847	27,617,240 13	1847	69,043 10	2.5	19	101,212 45
1848	29,908,769 25	1848	150,719 33	5.039	36	70,932 98
1849	29,188,070 45	1849	102,406 75	3.531	23	146,365 19
1850	29,384,270 66	1850	113,769 56	3.923		139,768 97
1851	30,976,270 18	1851	106,000 00	3.421		137,379 96
		1852	110,000 00	3.551		128,897 24
1853	120,362,474 35	1853	10,000 00	.083		174,159 61
		1854	30,000 00	.249	06	63,523 96
		1855	40,000 00	.332		38,047 15
		1856	65,000 00	.472		54,716 46
		1857	85,065 20	.618		55,385 04
1856	137,663,009 00	1858	85,065 20	.618		113,487 86
		1859	202,663 00	1.472		135,106 81
		1860	154,663 00	1.123	02	208,019 04
		1861	464,166 50	2.697		166,823 91
		1862	483,173 48	2.808		460,619 60
1861	172,055,808 89	1863	440,000 79	2.557		473,813 80
		1864	470,000 75	2.731	57	425,899 22
		1865	642,467 75	3.734		517,121 59
		1866	581,922 97	1.889		632,723 08
		1867	880,739 30	2.859		590,619 89
1866	307,965,842 92	1868	713,747 84	2.317		865,048 43
		1869	465,264 97	1.517		722,409 57
		1870	395,264 97	1.283	33	532,783 27
		1871	757,026 05	1.201		482,418 53
		1872	829,976 05	1.317		577,117 95
1871	630,000,000 00	1873	982,230 50	1.559		928,452 23
		1874	903,434 50	1.434	68	993,883 08
		1875	521,232 50	.827		970,504 99
			\$11,529,613 48			\$11,431,618 49

* By Boards of Supervisors up to 1850, and thereafter by State Board of Equalization.

The taxable lands of the State, which connect themselves with finance in the light of taxation, are shown in a table under the head of "Agricultural Interests."

CASH RECEIPTS AND DISBURSEMENTS.

The following exhibits the net cash receipts and disbursements of the State treasury on account of State revenue for the years stated, as shown by the Auditor General's report for 1874, page 385, appendix, and report for 1875, page 8, appendix:

YEARS.
1836
1837
1838
1839
1840
1841
1842
1843
1844
1845
1846
1847
1848
1849
1850
1851
1852
1853
1854
1855

Aggre
The fo
under app

YEARS.
Nov. 30, 1850
" 1851
" 1852
" 1853
" 1854
" 1855
" 1856
" 1857
" 1858
" 1859
" 1860
" 1861
" 1862
" 1863
" 1864
" 1865
" 1866
" 1867
" 1868
" 1869
" 1870
Sept. 30, 1871
" 1872
" 1873
" 1874
" 1875

* Includes dry amounts of Pontiac Ass'n respective her

FINANCIAL CONDITION.

RECEIPTS AND DISBURSEMENTS.

YEARS.	Receipts.	Disbursements.	YEARS.	Receipts.	Disbursements.
1836	\$116,306 22	\$89,175 66	1856	\$291,661 53	\$428,999 41
1837	487,550 88	448,451 99	1857	269,317 18	508,114 84
1838	1,509,780 01	865,428 56	1858	391,087 10	432,200 23
1839	916,391 03	1,215,236 87	1859	347,488 57	442,229 97
1840	504,420 59	926,181 62	1860	411,204 43	442,002 39
1841	895,721 03	934,317 13	1861	725,393 72	855,587 08
1842	222,433 67	411,626 71	1862	381,454 83	665,546 74
1843	243,369 98	48,588 05	1863	849,612 51	822,617 02
1844	257,801 49	200,408 21	1864	1,440,216 44	1,359,023 63
1845	138,152 91	166,214 72	1865	1,226,853 62	1,219,468 54
1846	247,253 32	190,489 23	1866	1,130,752 49	1,034,850 72
1847	200,816 00	198,929 40	1867	1,043,080 07	1,046,813 80
1848	188,248 61	195,421 55	1868	1,378,811 66	810,461 07
1849	231,432 95	227,111 72	1869	1,193,031 83	1,516,962 00
1850	221,526 43	244,133 13	1870	986,232 50	1,377,386 84
1851	239,065 86	179,034 71	1871	1,040,948 28	748,740 50
1852	279,775 51	262,226 47	1872	1,200,996 81	962,330 96
1853	445,505 21	188,449 82	1873	1,516,450 03	1,686,956 54
1854	342,396 36	198,204 76	1874	1,608,945 16	1,398,855 89
1855	339,834 25	389,242 71	1875	1,653,140 00	1,453,887 43
Aggregates				\$27,616,140 00	\$26,793,808 62

APPROPRIATIONS.

The following table shows the amounts paid the several institutions named, under appropriations made by the Legislature:

YEARS.	EDUCATIONAL INSTITUTIONS.		REFORMATORY AND PENAL		ASYLUMS.			Aggregate.
	Normal School.	Agricultural College.	Reform School.	State Prison.	For Insane.		For Deaf, Dumb, and Blind.	
					Kalamazoo.	and Third.		
Nov. 30, 1850...	\$470 30	-----	-----	\$6,000 00	\$363 02	\$181 51	\$7,014 83	
" 1851...	3,060 69	-----	-----	6,000 00	1,491 45	105 73	10,657 87	
" 1852...	3,556 80	-----	-----	9,000 00	59 73	29 87	12,646 40	
" 1853...	3,306 53	-----	-----	9,500 00	1,325 00	(66) 49	14,794 02	
" 1854...	5,740 85	-----	-----	10,500 00	15,999 81	2,573 99	41,814 65	
" 1855...	3,404 10	\$10,354 95	\$11,633 89	40,625 37	41,530 84	17,654 21	125,207 36	
" 1856...	7,884 82	34,184 50	11,492 81	41,999 00	24,472 50	19,888 75	141,589 42	
" 1857...	6,001 77	48,619 01	18,773 76	37,999 00	23,919 26	32,999 41	178,404 21	
" 1858...	2,920 24	3,158 85	15,000 00	34,999 00	22,000 00	37,500 00	115,578 19	
" 1859...	7,716 17	17,676 45	17,000 00	16,373 03	20,661 73	22,000 00	101,427 98	
" 1860...	8,632 75	13,219 43	27,174 99	16,579 55	30,500 00	30,000 00	126,106 63	
" 1861...	5,139 59	9,567 50	17,137 52	5,169 45	22,000 00	17,000 00	76,034 97	
" 1862...	6,774 29	13,506 62	20,181 76	8,900 00	32,000 00	33,000 00	112,462 64	
" 1863...	6,932 84	8,900 00	16,000 00	5,000 00	28,200 00	23,500 00	87,592 81	
" 1864...	7,083 26	10,000 00	17,516 45	13,000 00	35,000 00	35,000 00	110,539 50	
" 1865...	5,198 70	15,000 00	41,906 25	45,000 00	35,550 00	36,000 00	177,954 95	
" 1866...	5,829 51	15,000 00	22,483 54	68,000 00	29,000 00	17,000 00	157,313 05	
" 1867...	4,912 69	20,000 00	44,787 63	23,000 00	22,819 37	44,500 00	269,469 63	
" 1868...	8,981 20	45,000 00	56,025 53	2,000 00	71,000 00	77,500 00	251,268 88	
" 1869...	13,917 32	25,000 00	36,326 95	700 00	63,100 00	81,500 00	300,040 47	
" 1870...	15,033 97	28,750 00	22,000 00	5,300 00	71,000 00	68,500 00	184,310 59	
Sept. 30, 1871...	15,281 86	25,000 00	18,500 00	14,000 00	93,300 00	45,000 00	185,331 82	
" 1872...	19,481 97	18,250 00	22,000 00	5,300 00	127,400 00	40,063 00	281,256 50	
" 1873...	15,284 07	25,000 00	18,500 00	14,000 00	69,700 00	54,139 02	263,770 62	
" 1874...	22,963 07	38,562 87	34,400 00	83,000 00	73,500 00	45,022 83	393,966 70	
" 1875...	16,091 86	18,600 11	26,000 00	42,000 00	-----	-----	45,022 83	
	\$229,629 31	\$437,577 29	\$588,968 67	\$850,318 97	\$1,025,812 71	\$338,120 31	* \$4,511,141 35	

* Includes \$217,773.97 appropriated to the State Prison from 1836 to 1849, inclusive. Also sundry amounts appropriated to the University, State Public School, State House of Correction, and Pontiac Asylum. Financial statements regarding those institutions are embodied under their respective heads.

STATISTICS OF MICHIGAN.

SPECIFIC TAXES.

The following is a classified statement of specific taxes received at the State treasury during the fiscal years 1866 to 1875, inclusive:

	Banks.	Insurance.	Railroad.	Mining.	Express.	Telegraph.	Plank Rd.	River Im- provement.	Miscella- neous.	Totals.
1866.	\$900 00	\$40,039 74	\$157,401 19	-----	-----	-----	-----	-----	-----	\$198,340 93
1867.	84,212 30	52,210 22	163,915 97	551 60	-----	-----	-----	-----	-----	250,425 52
1868.	35,281 47	67,267 56	173,681 30	5,253 87	\$1,937 11	\$126 13	-----	-----	\$35 43	283,547 44
1869.	2,765 00	77,207 04	175,487 70	9,420 89	983 88	1,160 00	-----	-----	-----	268,030 51
1870.	-----	80,972 25	212,308 05	-----	-----	-----	-----	-----	-----	304,610 72
1871.	-----	89,845 51	263,918 93	8,984 63	-----	-----	-----	-----	-----	365,713 26
1872.	Car Co's.	95,975 32	222,063 83	36,051 04	1,742 29	1,392 00	\$36 60	\$150 00	9 50	338,171 92
1873.	-----	113,131 84	211,239 56	18,778 37	2,016 54	2,236 43	72 44	275 00	-----	347,554 74
1874.	2,742 83	107,201 78	332,948 02	22,887 16	2,230 79	2,498 87	192 22	562 04	-----	471,283 71
1875.	6,199 18	123,476 91	306,210 88	21,806 71	1,695 45	2,406 01	88 33	1,449 92	-----	547,333 30

VI. PUBLIC LANDS.

No State in the Northwest (accessibility to the seaboard markets being considered) offers better opportunities for settlement upon public lands, than Michigan.

GOVERNMENT LANDS.

There are five United States land districts in the State, as follows:

THE DETROIT DISTRICT.—This district includes all the counties east of and including Hillsdale, Jackson, the eastern half of Ingham, the lower tier of towns in Shiawassee, the two southern towns in Genesee, Oakland, Macomb, St. Clair, the eastern tier of towns of Lapeer, Sanilac, and all of Huron, except the two western tiers of towns. Also, Alpena, Montmorency, eastern half of Cass, all Cheboygan except the western tier of towns, Presque Isle, and the island of Mackinac. Office, Detroit. Register, J. B. Bloss; Receiver, J. M. Farland.

SAGINAW DISTRICT.—Includes all the counties not included in the Detroit District, east of and including Shiawassee, the four northeastern towns of Gratiot, Midland, Gladwin, the eastern half of Rosecommon, and the eastern half of Crawford. Office, East Saginaw. Register, W. R. Bates; Receiver, F. J. Burton.

GRAND RIVER DISTRICT.—Includes all of the State west of the Detroit and Saginaw Districts, south of and including Mason, Lake, Osceola, and Clare counties. Office, Ionia. Register, E. Stevenson; Receiver, J. L. Jennings.

CHEBOYGAN DISTRICT.—Includes all north of the Grand River and west of the Saginaw and Detroit Districts, in the Lower Peninsula. Office, Traverse City. Register, S. C. Moffatt; Receiver, Perry Hannah.

LAKE SUPERIOR DISTRICT.—Includes the whole of the Upper Peninsula. Office, Marquette. Register, A. Campbell; Receiver, J. M. Wilkinson.

Communications were addressed to each of these offices, asking statistics of the public lands in market. Replies have been received only from the Detroit, Grand River, and Grand Traverse districts.

There
Presque I
acre, exce
granted la

In this
county, an
counties.
lands of th
at \$1.25 an

This di
in Emmet

The fac
the State
lands lying
depression
sought for

The Sta
swamp lan
lands, such
made, in th
settlement
required in

The ann
tember 30,
number of a

CLAS

Primary Sch
University
Normal Sch
Asylum
Salt Spring
Asst
Agricultural
Swamp land
Swamp (exc
Swamp (hom
Primary Sch
Internal imp

Totals . .

* Deducting
923.65 acres.

DETROIT DISTRICT.

There are in this district 161,500 acres of land, situated in the counties of Alpena, Presque Isle, Cheboygan, Otsego, and Montmorency. They are held at \$1.25 per acre, except when situated within six miles of railroads to which the government granted land subsidies, where they are held at \$2.50 per acre.

GRAND RIVER DISTRICT.

In this district there are about 30,000 acres unsold, 12,000 of which are in Mason county, and the balance chiefly in Lake, Clare, Muskegon, Newaygo, and Oceana counties. Much of the land in Mason county is timbered with hard wood, but the lands of this district generally have a large proportion of plains. They are held at \$1.25 and \$2.50 per acre, and are being largely taken under the homestead act.

CHEBOYGAN DISTRICT.

This district has about 100,000 acres, chiefly agricultural lands, situated mostly in Emmet and Cheboygan counties, at \$1.25 and \$2.50 per acre.

SALES OF GOVERNMENT LAND.

The fact that for the year ending September 30, 1875, \$21,923.31 was paid into the State treasury as five per cent. of the proceeds of cash sales of government lands lying within the State (the multiple showing a total sales during a year of depression equal to \$404,496.89), shows that government lands in Michigan are still sought for.

STATE LANDS.

The State lands unsold are chiefly those donated for educational purposes, and swamp lands; and although in some cases held at higher rates than government lands, such higher rates are really in consideration of improvements already made, in the form of roads and railroads, while the easy terms of payment make settlement upon them practicable with even less ready means than would be required in making purchase and settlement farther west.

LANDS SOLD AND AMOUNT ON HAND.

The amount of lands sold at the State land office for the year ending September 30, 1875, with the aggregate purchase price and amount paid, and the number of acres still on hand, is shown by the following table:

CLASS OF LAND.	Acres sold.	Purchase price.	Amount paid.	Acres unsold.
Primary School.....	7,493.39	\$28,953 81	\$21,263 21	398,079.65
University.....		150 00	75 00	200.00
Normal School.....		320 00	160 00	
Asylum.....	80.00	470 00	390 00	1,680.00
Salt Spring.....	40.00	160 00	160 00	1,595.03
Asset.....	290.00	1,455 25	777 63	4,270.90
Agricultural College.....	4,838.99	14,916 97	4,749 24	165,504.57
Swamp land.....	91,818.81	117,509 04	108,830 26	2,514,364.43
Swamp (excess on licenses).....	22.09	29 15	29 15	
Swamp (homesteads patented).....	6,661.22			
Primary School indemnity.....				49,230.22
Internal improvement.....				380.31
Totals.....	111,324.50	\$163,964 22	\$136,434 49	*3,135,314.71

* Deducting 232,377.65 acres reserved for various purposes, leaves actually in market 2,983,928.65 acres.

STATISTICS OF MICHIGAN.

TERMS AND CONDITIONS OF SALE.

The only lands held by the State in any considerable quantity, as will be seen, are the Primary School, Agricultural College, and swamp lands. The minimum price of Primary School lands is four dollars per acre for farming lands, fifty per cent. of which is payable at the time of entry, the balance at the option of the purchaser, with interest at seven per cent., payable annually. The minimum price of the Agricultural College lands is three dollars per acre for farming lands, twenty-five per cent. at the time of entry, and the balance on same terms as above. Pine and other timbered lands in this class, five dollars per acre. The swamp lands, so called, many of them, comprise some of the best farming and timbered lands in the State. Many of the legal subdivisions have no swamp at all upon them, but the sections upon which they are situated were noted upon the government survey as swamp land, from the presence of swamp or overflowed land upon some portions of such sections, and hence came within the terms of the cession by the general government. The minimum price of these lands is one dollar and twenty-five cents per acre, twenty-five per cent. payable at the time of entry, land to be occupied within one year; other terms of payment same as noted above for other lands. Settlers have the right of pre-emption, however, and are entitled to a patent for eighty acres, after five years' occupancy and improvement, and upon complying with certain conditions as to drainage. When lands of either class are held as valuable for timber, the entire purchase price is payable at the time of entry.

TABLE OF LANDS BY COUNTIES.

The following table shows, by counties, the number of acres of land of the three classes named, held by the State: *

COUNTIES.	Primary School Lands.	Agr. Coll. Lands.	Swamp Lands.	COUNTIES.	Primary School Lands.	Agr. Coll. Lands.	Swamp Lands.
Alcona	4,440	26,150.43	28,354.09	Manitou	2,015.55	-----	2,744.75
Allegan	1,983.76	-----	2,576.03	Marquette	43,148.87	-----	+226,545.79
Alpena	7,640	1,280	111,983.81	Mason	2,465.46	-----	8,327.83
Antrim	5,120	11,098.53	3,608.04	Mecosta	601.91	-----	2,325.84
Bay	2,743.72	-----	9,837.16	Menominee	15,502.25	-----	101,234.06
Benzie	2,400	6,080	5,495.98	Midland	1,335.12	-----	3,555.29
Charlevoix	2,160	3,925.09	6,088.03	Missaukee	3,640	3,915.94	24,225.18
Cheboygan	9,247.44	5,135.04	44,142.41	Monroe	256.91	-----	3,881.31
Chippewa	36,936.21	-----	+443,972.44	Montmorency	7,200	9,922.95	43,767.91
Clare	2,355.49	-----	6,951.36	Muskegon	2,878.28	-----	4,632.86
Crawford	5,723.50	-----	17,238.99	Newaygo	2,515.84	-----	5,074.85
Delta	17,749.50	-----	147,372.39	Oceana	680	-----	3,640.20
Emmet	5,877.50	-----	18,084.71	Ogemaw	3,762.69	-----	7,327.38
Gladwin	1,731.97	-----	8,762.59	Ontonagon	38,039.90	-----	93,909.48
G'd Traverse	2,045	1,000	5,358.47	Oscoda	2,639.40	-----	3,664.40
Gratiot	1,080	-----	4,656.83	Oseoda	6,200	17,105.27	4,663.89
Houghton	26,800.35	-----	+70,059.82	Otsego	5,888.38	6,470.13	12,747.02
Huron	6,537.50	-----	27,609.12	Presque Isle	8,831	960.00	124,663.34
Iosco	5,694.83	26,995.88	25,556.07	Rosecommon	4,605.80	-----	31,789.56
Isabella	1,720	-----	1,886.98	Saginaw	2,776.89	-----	4,227.03
Kalkaska	6,280	6,515.31	12,372.92	Sanilac	7,440	-----	27,354.50
Keweenaw	4,608.40	-----	+4,067.13	Schoolcraft	37,002.97	-----	+404,644.84
Lake	2,997.05	-----	3,782.99	St. Clair	360	-----	4,410.81
Leelanaw	1,547.75	-----	2,518.25	Tuscola	3,640	-----	16,348.59
Mackinac	19,089.85	-----	+293,485.46	Wexford	3,720	28,360	3,480.66
Manistee	3,468	10,520	11,964.43				

* Omitting those counties in which only small and inconsiderable amounts are reported.
 † The swamp lands in the Upper Peninsula marked thus (†), are at present withheld from private entry, pending the award of grants made for railroad purposes in that section.

RAILROAD AND CANAL LANDS.

Congress, by various acts passed in the years 1856, 1864, and 1866, provided that alternate sections of land to a given extent should be granted to Michigan for the purpose of building certain railroads. The principal grants were to the Flint and Pere Marquette, the Jackson, Lansing and Saginaw, and the Grand Rapids and Indiana railway companies.

FLINT AND PERE MARQUETTE RAILWAY LANDS.

The Flint and Pere Marquette Railway offers for sale the entire unsold portion of its land grant, consisting of 250,000 acres in the central portion of the Lower Peninsula, between Saginaw bay and Lake Michigan. The lands lie on both sides of the road west of the Saginaw river, and in the following counties:

County.	Acres.	County.	Acres.
Saginaw	5,400	Osecola	9,900
Midland	14,400	Lake	65,200
Gladwin	2,200	Newaygo	36,000
Clare	21,000	Oceana	9,900
Isabella	7,800	Mason	65,100
Mecosta	13,100		

The lands in the seven first named counties lie east of the Muskegon river, and are farming lands, with the exception of 17,500 acres in Clare county and 1,500 acres in Mecosta county, mainly valuable for pine, of which there is a heavy growth. The lands west of the Muskegon are about equally divided between farming and pine lands.

The lands in Saginaw and Midland counties are generally level, with sufficient fall, however, for good drainage, and are mainly timbered with hard woods—oak, beech, maple, lynn or basswood, elm, etc., with some scattering pine. The lands in Gladwin, Clare, Isabella, Mecosta and Osecola counties are gently rolling, of a loamy, gravelly soil, with numerous springs of pure water. The timber is principally beech and maple, with occasional belts of pine.

The east side of Lake and Newaygo counties is substantially like the foregoing, with a larger proportion of pine. In the west part of Lake county are found considerable sandy plains, very easily cleared and cultivated.

Mason and Oceana counties lie on the east shore of Lake Michigan, in the celebrated fruit belt of Michigan. The lands are timbered with beech, maple, basswood, hemlock, pine, etc., the soil loamy and productive.

The pine lands have been carefully estimated, so as to show the quality, and quantity, in thousand feet, board measure, of the timber on each forty-acre lot, and the price of such timber lands will range from \$1.25 to \$2.50 per thousand feet "stumpage." Nearly all these timber lands, although valuable mainly for the pine, will be valuable for farming purposes when the pine shall be removed. What are called farming lands as distinguished from timber lands, are those where the principal timber is hardwood, such as beech, maple, rock elm, etc. These are good farming lands and are held at from five to ten dollars per acre. Terms of payment on farming lands are one-quarter down, and balance in three to five annual payments, with annual interest at seven per cent. On timber lands, one-quarter down and bal. In three annual payments, with interest as above—the land to be paid for before the timber is cut. The office of the company is at East Saginaw—Wm. L. Webber, Commissioner.

LANDS OF THE GRAND RAPIDS AND INDIANA RAILROAD.

The limits of the grant to the Grand Rapids and Indiana Railway are twenty miles on either side of the original line of survey of the route of the road, and

comprises 1,160,382 acres, some 833,219 of which have been confirmed to the Company and prepared for market, and the same have been explored, examined and classified, and a history of each specific forty or eighty acres written upon the maps and plats of the land department. To do this correctly and effectually, has required "a corps of competent and skilled experts, known as land-lookers," who have been actually engaged in the woods, during the working season for three years. The lands of the Company now held for sale are located as follows:

County.	Acres.	County.	Acres.
Montcalm—about	10,000	Wexford	129,000
Newaygo	22,000	Missaukee	68,000
Mecosta	25,000	Grand Traverse	66,000
Isabella	500	Kalkaska	94,000
Clare	300	Manistee	4,000
Oseola	87,000	Antrim	88,000
Lake	61,000	Charlevoix	62,000

Already about 150,000 acres have been disposed of for nearly \$2,000,000. These lands are timbered with beech and maple, elm and other hard wood, and are accessible to the best market, by water and rail, and are in a part of the State unequalled for health, well watered, and contiguous to the great fruit raising section of the east shore of Lake Michigan.

The route of the road penetrates the immense pine regions of Northern Michigan, from which Chicago and other lake cities have so largely drawn a portion of their wealth and business power during the years that are past. The track crosses in Michigan the St. Joseph, Portage, Kalamazoo, Grand, Rogne, Tamarack, Muskegon, Clam Manistee, Boardman, and other notable rivers and streams. The road in Michigan passes through Sturgis, a village of 1,200 population; Kalamazoo, 12,000; Grand Rapids, 26,000; Rockford, 1,800; Cedar Springs, 1,500; Morley, 1,000; Howard City, 1,000; Big Rapids, 3,200, and Clam Lake, 1,800.

The great fruit region of the eastern shore of Lake Michigan, extending from St. Joseph, in Berrien county, to Grand Traverse Bay, lies in close proximity to the line of the road, and when it is considered that the farming lands, many of them, are covered with maple, beech, ash, oak, lynn, birch and cedar, interspersed with openings of plains, with soils of clay and sandy-loam, and rich river bottoms, all well watered with living springs, running creeks, and beautiful lakes, this section of Michigan must eventually become one of great importance and wealth. At this time the population of the counties directly north and north-west of Grand Rapids, is quite 250,000, and rapidly increasing, while the business growth and manufacturing interests of Grand Rapids, Rockford, Cedar Springs, Morley, Howard City, Big Rapids, Clam Lake, Manton, Fyfe Lake, Kalkaska, Boyne Falls and Petoskey, all on the line of the road, are evidences of the rapidity with which the natural wealth of the section is being developed.

The Company's office is at Grand Rapids, Wm. A. Howard being Commissioner, and P. R. L. Pierce Secretary, of the land department. The lands are held at from \$4 to \$10 per acre, one quarter down, and the balance on time payments.

LANDS OF THE JACKSON, LANSING AND SAGINAW RAILROAD.

The limits of this grant are fifteen miles on each side of the original line of survey of the route of the road. Up to the present time some 591,000 acres have been confirmed and patented to the Company. The Jackson, Lansing & Saginaw Railroad passes directly through the grant, and the lands are situated on each side of it. The Grand Rapids & Indiana Railroad also extends along the west side of the grant and through the midst of the lands in the northern counties,

Portion
Huron
The
wood,
Oak is
Other v
ash, the
from th
the map
creeks a
The
as follow
County.

Gratiot
Saginaw
Bay
Ogenaw
Roscomm
Missauke

These
and loca
ments, w
longer t
Commis

Of the
St. Mary
construct
Houghton
"Mineral
no data a
Horatio B

Aggrega
follows:

Governmen
State land

Railway la
Canal lands

* Not report
after the part
20). The rep
acres, mostly
per acre.

Portions of them are situated near the waters of Lake Michigan, others near Lake Huron and Saginaw bay, while all are within easy access of these waters.

The lands are well timbered—white pine, Norway pine, maple, beech, bass-wood, ash, hemlock, elm, and cedar are the varieties most generally met with. Oak is found in some sections. Over one-third of the lands are "pine lands." Other valuable timbers are found in great abundance, such as the bass-wood, the ash, the cedar, etc. In other parts the soil is more sandy. Plains quite free from timber, and nearly ready for the plow, are also to be found. A glance at the map will show that the whole region is well watered. It abounds in springs, creeks and lakes of the purest water.

The amount of unsold lands of the company in the several counties is stated as follows:

County.	Acres.	County.	Acres.
Gratiot	800	Kalkaska	36,083
Saginaw	3,183	Crawford	148,252
Bay	8,436	Otsego	130,000
Ogemaw	24,000	Antrim	33,000
Roseconmou	83,000	Cheboygan	74,000
Missaukee	6,668		

These lands are held at two dollars per acre and upwards, according to quality and location, one-fourth down, and the remainder in three equal annual installments, with interest annually at seven per cent. Farming lands will be sold on longer time if desired. The Company's office is at Lansing—O. M. Barnes, Commissioner.

SAULT ST. MARIE CANAL LANDS.

Of the grant of 500,000 acres of land made by Congress for the construction of the St. Mary's Falls Ship Canal, which passed into the hands of the Company on the construction of the work, about 130,000 acres, situated in the counties of Keweenaw, Houghton and Ontonagon, remain unsold. About 100,000 acres lie upon the "Mineral Range," and the remainder are agricultural lands contiguous. There is no data at hand from which to state the terms on which these lands are held. Horatio Bigelow, of Boston, Mass., is President of the company.

RECAPITULATION.

Aggregated, the public lands open to entry and settlement in Michigan are as follows:

	Acres.
Government lands*	451,500.00
State lands: Primary School	447,318.87
Agricultural College	165,504.57
Swamp lands	2,514,364.43
Other State lands	8,126.84
Railway lands	1,514,202.00
Canal lands	130,000.00
	5,231,016.71

* Not reported for the Lake Superior district. The Saginaw district was not reported until after the part of this work in which the U. S. lands are included was printed (see bottom of page 29). The report since received states the amount of public lands in the district at about 160,000 acres, mostly farming lands, about 30,000 acres of which are held at \$2.50, and the balance at \$1.25 per acre.

VII. AGRICULTURE.

The variety of agricultural production, and its distribution by counties, are shown by the tables which follow. In aggregate products, the older counties of necessity appear to better advantage than the newer, but the per cent. of production will be found to hold good in all parts of the State where improvement and cultivation have yet reached. It is hazardous nothing to say (because proven by experiment so far as it has been had) that with a difference of more than four and a half degrees of latitude, the same crops, substantially, and with the same average of production, that are successfully grown on a line drawn east and west, with its extremes resting on Monroe and Berrien counties, will be grown with equal success in Presque Isle, Cheboygan, and Emmet counties. The only part of the State that can properly be designated as distinguished for any special production, is the well-known "Fruit Belt," extending along the shore of Lake Michigan, from the southwest corner of the State, practically to the Straits of Mackinac. Peaches and berries are thus far the distinguishing productions of this region, while prospectively grapes will no doubt be largely cultivated, as they depend upon the same general conditions of soil and climate. But while these are the specialties of the "Fruit Belt," they are also successfully raised with other fruits of the orchard in the central, southern, and eastern parts of the State.

GEOLOGY OF THE SOIL.

The limits of this work will permit but a cursory glance at the composition and capacities of soil, and nothing further will be offered under this head than a few comments by Prof. Winchell, in an address before the State Agricultural Society in 1865. After explaining at some length the probable geological formation of the soil, he says:

"This was constituted the basis of our soils. No other soils in the long history of the world have been founded upon a preparation so vast and so complete. The great abundance of superficial materials has caused the rocks to lie, for the most part, several feet beneath the surface. The depth of this subsoil secures at least two important advantages: First, the droughts of summer cannot dry out the soil, for capillary attraction continually replenishes it from below. Secondly, we have an inexhaustible store of the saline contents of soils, which are perpetually drawn to the surface with the moisture which rises in obedience to capillary action, and are deposited at the surface, when that moisture escapes in vapor."

Of variety of productions the same writer says:

"Our soils afford us every variety of crops which flourish in the temperate zone. There is no State which yields better returns of the cereals. In regard to fruits, it would seem as if Pomona herself had selected Michigan for her chosen abode. I am proud to travel over the northwest and hear the acknowledgment made, that for their fine apples they are indebted to Michigan.* The same is true of strawberries and other smaller fruits. Behold how nature herself has selected Michigan as the field for the perfection of some of her wild fruits. The

* Reliable data shows that in the summer and fall of 1875—not a prolific year—about \$1,500,000 in value of apples was shipped from the central and southern counties of the State.

raspber
northwe
nuts pro
and the
staple r
successfi
State ca
produce
still unc
prime r
ter depo
pect of
Under
remarks

The U
in the S

Under 3
Three an
Ten and
Twenty a
Fifty and

This h
of small f

T

The fo
I. The
1864, and
1864, 1870,
tles of the
II. The
the averag
counties of
III. The
II. in rega
IV. The
of the Stat
in the Stat
V. The
cing coun
of sheep sh
For the
counties of
sula, are no
counties."

raspberry of Michigan enjoys a fame wider than the continent; and half of the northwest is supplied with our huckleberries and cranberries. * * Of all the nuts produced in America, the chestnut and pecan alone are wanting in Michigan, and the former even is not entirely unknown. The grape has not yet become a staple article of production; but where the peach will flourish the vine may be successfully reared. Next, in regard to pasturage and hay, I believe no other State can come into competition. Other States may export more, and may even produce more; but let it be remembered that the greater part of our State is still under the shade of the forest. Our horses, I am pleased to learn, are in primo request among cavalry officers. And as a wood-producing State—a character depending on the qualities of the soil—Michigan stands high, with a fair prospect of soon standing pre-eminent."

Under the head of "Meteorology and Climate" will be found some further remarks applicable under this head.

NUMBER AND SIZE OF FARMS.

The United States census report for 1870 gives the number and size of farms in the State at that time as follows:

Under 3 acres.....	134	One hundred and under 500.....	12,175
Three and under 10.....	6,763	Five hundred and under 1,000.....	57
Ten and under 20.....	13,170	One thousand and over.....	5
Twenty and under 50.....	38,795		
Fifty and under 100.....	27,687	Total.....	98,786

This last schedule is of interest, especially as showing prominently the feature of small farms in the farming industry of the State.

TAXABLE AND IMPROVED LAND AND FARM PRODUCTS.

The following five tables, compiled from the State census report of 1874, show:

I. The number of acres of taxable land, as reported in the censuses of 1854, 1864, and 1874, and the number of acres of improved land, as reported in 1854, 1864, 1870, and 1874, exhibiting for the State and for the principal improved counties of the State;

II. The number of acres, and the number of bushels of wheat harvested, and the average yield per acre, for the State, and for the principal wheat-growing counties of the State, for the years 1853, 1863, and 1873;

III. The same relative facts as to the production of corn, as are shown in table II. in regard to wheat;

IV. The total product of the articles named, in the principal producing counties of the State, and of the whole State, for 1873, and the totals of similar production in the State in 1863;

V. The number of the different kinds of live stock named, in the principal producing counties, and in the State, for 1874, with the totals for 1864, and number of sheep sheared in 1873.

For the sake of brevity, the least producing counties, which includes the newer counties of the Lower Peninsula, and generally the counties of the Upper Peninsula, are not specified, their aggregates being included under the head of "other counties."

STATISTICS OF MICHIGAN.

I. ACRES OF TAXABLE AND IMPROVED LAND.*

STATE AND COUNTIES.	TAXABLE LAND.			IMPROVED LAND.			
	Census of 1851.	Census of 1861.	Census of 1871.	Census of 1851.	Census of 1861.	Census of 1870.	Census of 1871.
STATE	7,921,561	12,086,661	26,530,168.85	2,113,985	3,677,615	5,088,957	5,510,839.93
Allegan	176,499	270,379	509,269.27	22,978	7,990	104,298	144,028
Barry	197,261	258,990	337,167.80	27,897	54,380	140,319	148,707
Bay .....	.....	145,562	465,252.54	.....	4,134	7,645	14,484.50
Berrien	247,183	334,761	336,620.05	46,058	90,122	130,147	151,117.24
Branch	274,526	281,478	317,386.75	69,485	122,611	150,309	168,403.50
Calhoun	322,262	389,152	439,629.40	121,023	191,055	219,031	242,529
Cass	226,930	291,861	302,981.75	67,960	123,293	162,471	160,603.50
Clinton	200,960	262,524	358,251.67	28,870	67,007	113,301	144,568.25
Eaton	266,769	321,930	356,950.76	37,253	77,380	145,761	139,818
Genesee	232,069	279,921	391,757.46	54,058	95,341	172,189	170,541.50
Gr. Traverse	59,209	51,789	262,721.88	111	4,503	14,694	15,036
Gratiot .....	.....	151,624	352,059.45	.....	16,841	46,879	50,688
Hillsdale	310,345	339,578	367,212.75	95,830	169,010	192,070	215,398.50
Huron .....	.....	144,014	435,107.66	.....	6,089	25,281	28,119.50
Ingham	200,967	239,508	340,277.34	44,864	83,690	127,739	139,877.56
Ionia	243,836	242,175	338,717.50	47,296	91,636	158,097	152,369
Isabella .....	.....	20,112	345,742.64	.....	2,475	15,077	18,129
Jackson	383,437	428,106	437,152.75	140,674	214,967	251,669	251,077
Kalamazoo	297,118	343,143	343,467	95,036	174,054	200,118	210,886
Kent	308,213	407,988	528,773.28	62,054	135,963	203,716	218,981
Keweenaw .....	.....	133,409	202,960.96	.....	2,270	408	11,987
Lapeer	291,626	304,589	415,063.50	44,291	78,439	108,129	127,557
Leelanaw .....	.....	22,491	149,347.80	.....	2,771	11,476	13,367
Lenawee	346,352	391,131	459,752.22	143,296	210,268	263,249	250,562.62
Livingston	311,791	346,853	359,472	101,147	144,186	179,748	185,662
Macomb	225,327	257,348	289,896.73	85,415	106,077	153,691	153,222.75
Manistee .....	.....	318,268	259,363.56	.....	1,154	2,401	6,534
Mason .....	.....	33,343	252,325.04	.....	776	4,374	6,434.25
Mecosta .....	.....	44,902	342,013.52	.....	2,668	10,704	10,624
Midland .....	.....	21,390	777,454.78	.....	1,761	5,251	7,091.55
Monroe	249,265	280,558	342,235.27	60,775	100,955	123,385	127,360.16
Montcalm	128,913	251,552	441,304.30	5,977	24,131	48,422	57,539.55
Muskegon .....	.....	113,308	270,157.01	.....	8,761	16,745	26,174
Newaygo	69,030	210,489	495,400.50	3,058	12,911	21,987	29,101
Oakland	489,225	511,017	536,858.25	213,728	278,747	335,464	331,166.25
Oceana .....	.....	137,881	296,520.28	.....	3,879	11,844	19,375
Osceola .....	.....	.....	327,844.46	.....	.....	4,582	8,616
Ottawa	190,838	191,112	334,773.22	13,378	46,101	82,902	87,033.12
Saginaw	61,928	169,523	489,032.93	2,672	24,585	33,385	67,926.42
Sanilac	66,640	167,920	548,100.52	6,788	21,142	45,863	63,018.55
Shiawassee	145,185	263,276	329,304.86	30,043	64,913	110,840	118,781.50
St. Clair	36.4	282,188	427,583.16	22,258	66,746	105,223	101,589.50
St. Joseph	302,543	293,680	305,532.50	106,670	161,361	195,538	197,404
Tuscola	41,913	127,788	470,418.03	2,481	19,785	48,400	60,591
Van Buren	197,278	301,305	380,456.24	30,838	83,751	124,522	147,561.50
Washtenaw	410,697	410,991	437,739.13	177,924	224,024	283,601	269,715
Wayne	325,380	359,408	377,099.33	95,451	137,708	172,213	186,254.75
Other counties	110,650	1,046,999	9,642,709.15	5,164	11,945	35,796	74,820.41

* The facts of this table are relevant to finance in the light of taxation, as well as to agriculture. The title "improved land," comprehends all improved lands, whether used for agricultural purposes or not.

II. WHEAT HARVESTED, AND AVERAGE YIELD PER ACRE.

STATE AND COUNTIES.	1851.			1863.			1873.		
	Acres.	Bushels.	Average.	Acres.	Bushels.	Average.	Acres.	Bushels.	Average.
STATE	473,451	7,128,104	15.05	843,881	9,688,627	11.48	1,134,484	15,456,202	13.62
Allegan	4,610	55,965	12.13	10,291	210,454	12.01	26,812	350,883	13.31
Antrim				77	676	8.77	708	10,852	15.32
Barry	8,176	109,444	13.38	25,100	272,386	10.81	39,011	555,584	4.24
Bay				149	1,291	8.66	514	11,042	21.48
Berrien	8,422	139,295	16.53	26,039	341,363	13.10	33,354	442,554	13.26
Branch	14,964	207,974	13.89	27,905	407,949	14.61	39,013	486,089	12.47
Calhoun	31,543	480,649	15.23	56,923	835,583	14.67	65,777	951,828	14.47
Cass	16,407	209,022	12.73	37,751	397,741	10.53	43,403	588,241	13.55
Clinton	6,736	98,738	14.66	14,654	97,903	6.68	36,979	565,552	15.29
Eaton	9,596	112,928	11.76	16,751	165,454	9.87	26,581	432,550	16.27
Genesee	10,178	164,106	16.14	16,485	117,826	7.14	32,173	478,710	14.87
Gr. Traverse	12			1,031	12,154	11.78	2,272	28,441	12.51
Gratiot				3,034	18,871	6.21	9,290	133,997	14.42
Hillsdale	22,120	341,247	15.42	35,301	479,809	13.59	42,962	550,562	12.81
Huron				1,398	13,784	9.85	4,089	67,407	16.48
Ingham	11,094	145,669	13.12	18,684	181,302	9.70	30,715	478,922	15.59
Ionia	11,992	171,162	14.27	34,107	214,562	6.29	38,221	594,519	15.55
Isabella				484	3,261	6.73	2,812	43,491	15.46
Jackson	46,063	654,201	14.20	56,006	733,558	13.09	61,349	739,675	12.05
Kalamazoo	20,880	353,811	16.94	49,976	682,032	13.64	63,478	829,321	13.06
Kent	12,360	170,281	13.77	43,405	336,374	7.74	41,932	569,353	13.57
Lapeer	8,747	141,863	16.21	15,197	168,715	11.10	22,764	352,075	15.46
Leelanaw				311	2,975	9.56	1,827	26,023	14.24
Lenawee	28,252	546,102	19.32	40,358	477,825	11.83	41,588	554,726	13.33
Livingston	25,192	360,425	14.30	33,295	290,734	8.73	43,081	568,580	13.19
Macomb	16,303	200,665	12.30	19,800	220,732	11.14	21,270	277,610	13.05
Mecosta				426	4,877	11.44	2,450	43,617	17.80
Monroe	13,558	163,077	12.02	15,327	179,606	11.71	17,997	201,173	11.17
Montcalm	1,594	17,150	10.75	4,943	56,525	11.43	10,251	160,372	15.64
Muskegon				1,298	16,678	12.84	2,320	30,355	13.08
Newaygo	594	4,446	7.48	2,174	19,317	8.88	3,095	53,003	13.26
Oakland	49,175	779,044	15.84	55,352	605,590	10.94	68,616	846,714	12.33
Oceana				644	7,459	11.58	3,074	41,809	13.60
Osceola							988	13,927	14.09
Ottawa	1,227	19,571	15.95	8,068	87,885	10.89	14,450	217,594	15.05
Saginaw	337	7,216	21.41	3,222	20,542	6.37	5,636	104,333	18.51
Sanilac	541	10,930	20.20	4,172	30,211	9.39	11,250	147,118	13.07
Shiawassee	6,111	74,171	12.13	14,950	109,301	7.31	30,541	463,412	15.17
St. Clair	1,482	23,074	15.56	10,033	102,207	10.18	15,339	210,140	13.69
St. Joseph	24,676	365,621	14.81	45,049	517,495	11.48	55,223	593,241	10.74
Tuscola	117	3,162	27.02	4,001	36,385	8.89	9,185	146,070	15.90
Van Buren	4,622	63,611	13.76	21,587	295,135	13.67	30,729	377,813	12.29
Washtenaw	43,528	759,572	17.45	47,723	714,909	14.98	62,319	876,401	14.06
Wayne	11,392	171,260	15.03	13,235	181,145	13.68	14,330	176,033	12.28
Other counties	850	2,540		985	8,976		3,816	57,667	

STATISTICS OF MICHIGAN.

III. CORN HARVESTED, AND AVERAGE YIELD PER ACRE.

STATE AND COUNTIES.	1853.			1863.			1873.			
	Acres.	Bushels.	Average.	Acres.	Bushels.	Average.	Acres.	Bushels.	Average.	
STATE.....	327,642	7,635,473	23.30	427,529	11,007,293	25.74	641,329	20,792,011	32.42	
Allegan.....	7,818	113,504	14.51	10,196	241,895	23.72	19,045	560,061	29.40	
Antrim.....				37	1,135	30.67		597	12,711	21.29
Barry.....	7,026	148,879	21.18	10,947	214,189	19.56	17,089	621,982	36.39	
Bay.....				117	2,587	22.11		474	28,853	60.87
Benzie.....								734	15,622	21.28
Berrien.....	12,158	402,935	33.14	19,998	610,176	30.51	27,795	829,718	29.85	
Branch.....	13,415	373,820	27.86	17,447	498,372	28.56	27,210	878,294	32.27	
Calhoun.....	16,072	389,021	24.20	19,118	528,338	27.63	27,711	1,079,161	38.94	
Cass.....	21,858	576,439	26.37	26,912	694,374	25.81	33,509	815,571	22.96	
Clinton.....	4,496	118,686	26.39	6,498	169,472	26.08	13,827	496,207	35.88	
Eaton.....	5,160	106,951	20.72	7,498	168,698	22.49	25,808	649,043	25.14	
Genesee.....	7,093	113,972	16.06	8,685	198,158	22.81	14,162	394,882	27.88	
Gr. Traverse.....	13	250	19.25	370	9,386	25.36	1,168	30,495	26.10	
Gratiot.....				2,277	52,665	23.12	6,058	208,105	31.25	
Hillsdale.....	13,614	345,604	25.38	22,644	555,669	24.53	29,881	1,276,919	42.73	
Huron.....				219	3,698	16.88		595	14,427	24.24
Ingham.....	6,033	104,964	17.39	8,993	193,803	21.56	15,318	621,723	40.58	
Ionia.....	6,605	151,680	22.96	7,485	159,426	21.29	15,996	474,015	29.63	
Isabella.....				578	8,639	14.94	1,758	57,398	32.64	
Jackson.....	17,189	374,829	21.80	21,915	642,174	29.30	29,263	1,172,851	40.16	
Kalamazoo.....	17,317	563,741	32.55	22,471	714,572	31.79	27,201	867,498	31.89	
Kent.....	8,977	207,728	23.14	16,507	219,768	13.31	19,186	564,902	29.44	
Lapeer.....	6,616	129,754	18.25	6,079	141,904	23.34	9,704	295,265	30.42	
Leelanaw.....				499	11,216	22.47	1,313	26,754	20.37	
Lenawee.....	23,236	591,353	25.57	29,027	726,778	25.03	32,871	1,395,092	42.44	
Livingston.....	10,204	207,779	19.66	14,546	317,896	21.85	17,396	511,568	29.40	
Macomb.....	14,064	29,473	16.31	9,701	232,988	24.01	15,033	373,339	24.83	
Manistee.....				59	1,224	20.74		648	19,723	30.43
Mason.....				98	2,581	26.33		496	13,558	27.33
Mecosta.....				219	3,220	14.70	1,210	37,579	31.05	
Midland.....				153	3,650	23.85		503	18,309	36.39
Monroe.....	9,745	179,435	18.41	15,879	347,110	25.00	18,426	602,969	32.72	
Montcalm.....	982	19,601	19.93	2,080	39,579	19.02	5,420	173,630	32.03	
Muskegon.....				703	18,423	26.20	2,123	49,546	23.33	
Newaygo.....	465	5,144	11.06	1,642	19,080	11.61	2,829	66,615	23.54	
Oakland.....	23,801	478,696	20.11	22,315	796,301	35.68	30,894	945,533	30.60	
Oceana.....				624	15,019	24.06	2,465	55,205	22.39	
Osceola.....							740	15,081	20.37	
Ottawa.....	2,838	62,498	22.02	4,661	103,774	22.26	12,072	347,692	28.80	
Saginaw.....	253	6,903	27.28	2,177	40,054	18.39	5,314	199,955	37.62	
Sanilac.....	175	3,616	20.66	273	4,817	17.64	888	28,194	31.75	
Shiawassee.....	4,111	64,947	15.79	6,428	129,670	20.17	10,750	391,745	36.44	
St. Clair.....	1,993	47,278	23.72	2,763	45,923	16.62	6,080	191,127	31.43	
St. Joseph.....	27,845	644,482	23.14	26,596	644,026	24.21	29,771	843,670	28.33	
Tuscola.....	367	6,454	17.58	2,332	42,599	18.26	5,564	187,901	33.77	
Van Buren.....	6,824	210,254	30.81	13,374	405,587	29.66	23,739	662,087	27.89	
Washtenaw.....	17,080	438,583	25.67	20,746	673,735	32.47	26,208	952,282	36.33	
Wayne.....	11,895	315,244	26.70	14,540	346,024	23.79	19,939	681,200	34.16	
Other counties.....	394	7,001	17.77	75	2,025	26.87	2,008	36,854	18.35	

COUNTY

Allegan
Antrim
Barry
Bay
Berrien
Branch
Calhoun
Cass
Clinton
Eaton
Emmet
Genesee
Gr. Tra
Gratiot
Hillsdal
Huron
Ingham
Ionia
Isabella
Jackson
Kalamazoo
Kent
Lapeer
Leelanaw
Lenawee
Livingston
Macomb
Manistee
Mason
Mecosta
Midland
Monroe
Montcalm
Muskegon
Newaygo
Oakland
Oceana
Osceola
Ottawa
Saginaw
Sanilac
Shiawassee
St. Clair
St. Joseph
Tuscola
Van Buren
Washtenaw
Wayne
Other Co

Total,

AGRICULTURE.

IV. GRAIN, OTHER THAN WHEAT AND CORN, AND OTHER FARM PRODUCE.

Average.	COUNTIES.	Grain, other than Wheat and Corn, Bushels.	Potatoes, Bushels.	Hay, Tons.	Wool, Pounds.	Pork, Lbs. Marketed.	Cheese, Pounds.	Butter, Pounds.	Cider, Barrels.
32.42	Allegan	264,485	112,024	31,548	114,040	1,039,790	34,308	1,101,970	2,465
	Antrim	17,819	40,215	2,093	365	16,325		41,309	7
29.40	Barry	260,063	105,846	23,409	173,576	1,237,337	4,981	886,969	4,253
21.29	Bay	23,875	61,472	5,816	1,041	8,192		83,935	
36.39	Berrien	217,012	97,400	23,798	98,000	2,240,067	49,636	539,444	7,920
60.87	Branch	245,222	135,366	23,489	191,648	2,613,828	70,188	935,342	9,403
21.28	Calhoun	417,681	144,533	31,377	486,355	2,331,092	16,498	1,019,921	11,309
20.85	Cass	152,130	88,035	18,509	131,618	4,852,011	6,092	455,184	7,886
32.27	Clinton	449,423	90,300	28,106	175,909	1,040,847	21,916	811,826	3,529
38.94	Eaton	428,393	109,473	27,714	194,393	1,123,936	184,468	910,554	4,743
22.96	Emmet	9,635	24,808	225	120	9,147		2,567	8
35.88	Genesee	655,127	183,000	34,962	300,096	876,132	140,800	904,482	4,333
25.14	Gr. Traverse	41,767	56,017	5,247	1,355	3,517	150	94,642	7
26.10	Gratiot	197,731	67,478	13,662	46,629	263,333	3,473	387,893	60
31.25	Hillsdale	290,335	119,394	39,158	308,799	2,930,753	243,046	1,281,995	9,718
42.73	Huron	118,077	67,560	8,631	14,235	24,479	140	137,904	93
24.24	Ingham	372,438	122,383	33,400	237,169	1,208,072	114,203	1,025,039	6,831
40.58	Ionia	444,836	146,884	33,484	299,816	911,359	47,479	760,819	3,897
29.63	Isabella	60,479	35,285	4,819	7,388	38,502	250	111,978	2
32.64	Jackson	374,854	158,115	82,267	568,497	1,882,172	6,968	900,139	12,820
40.16	Kalamazoo	177,660	96,888	22,870	283,911	2,743,476	16,128	728,266	7,192
31.80	Kent	503,433	263,866	43,552	251,072	1,145,944	17,285	961,868	2,272
29.44	Lapeer	462,122	133,269	23,866	184,557	676,566	16,800	659,162	2,792
30.42	Leelanaw	41,928	54,154	3,436	1,677	3,355	200	58,364	
20.37	Leevesee	410,446	145,638	70,380	472,521	4,363,879	2,005,909	1,831,950	14,306
42.44	Livingston	438,521	121,763	34,738	435,171	1,001,756	2,255	725,941	5,512
29.40	Macomb	668,284	188,896	27,965	262,178	926,089	73,105	709,126	3,269
24.83	Manistee	21,076	32,735	1,919	528	15,141	10	38,550	
30.43	Mason	16,481	44,199	2,145	40	4,150	10	35,306	
27.33	Mecosta	69,410	50,523	6,638	4,073	15,521		80,367	2
31.05	Midland	27,585	22,416	3,401	872	3,919	100	54,023	
36.39	Monroe	412,456	117,964	31,337	119,277	1,268,507	69,353	741,267	8,812
32.72	Montcalm	140,841	84,549	13,970	52,696	219,852	6,165	299,247	297
32.03	Muskegon	58,358	43,591	7,718	9,438	46,575	150	115,927	5
23.33	Newaygo	61,220	45,665	9,106	9,952	44,400		151,103	30
23.54	Oakland	879,291	332,106	51,648	595,180	2,092,097	263,957	1,824,391	10,307
30.60	Oceana	40,580	59,337	6,714	2,811	93,590	135	132,493	12
22.39	Osceola	30,303	30,135	2,307	1,830	5,420		34,161	
20.37	Ottawa	336,638	166,387	26,190	56,901	365,240	14,799	650,860	289
28.80	Saginaw	267,974	165,243	22,857	25,512	106,746	12,715	465,368	135
37.62	Sauilac	359,688	91,394	16,124	37,447	168,945	8,760	340,954	35
31.75	Shiawassee	356,432	110,286	29,667	186,277	793,646	34,380	743,353	3,507
36.44	St. Clair	693,973	201,239	29,895	103,456	344,137	128,351	719,312	1,158
31.43	St. Joseph	123,047	110,423	20,369	161,190	2,294,276	555	642,350	9,306
28.33	Tuscola	232,195	146,162	17,075	49,982	151,071	24,235	432,430	30
33.77	Van Buren	149,330	82,912	22,034	127,879	1,843,985	117,692	644,474	5,583
37.89	Washtenaw	443,741	143,008	51,927	797,892	1,763,199	86,996	727,679	13,332
6.33	Wayne	620,950	262,338	39,849	141,600	1,226,637	258,035	845,709	4,887
4.16	Other Co's	121,613	306,009	18,666	2,042	55,105	186	184,264	
	Total, 1873	13,209,758	5,618,863	1,134,077	7,729,011	48,434,106	4,101,912	27,972,117	182,347
	" 1863	4,058,271	843,347	7,260,934	33,135,002	1,580,945	13,835,452	64,810	

STATISTICS OF MICHIGAN.

V. LIVE STOCK IN THE STATE IN 1874, AND TOTAL FOR 1864.

COUNTIES.	Horses One Year Old and Over.	Mules.	Work Oxen.	Milch Cows.	Neat Cattle One Year Old and Over.*	Swine Over Six Months Old.	Sheep Over Six Months Old.	No. of Sheep Shaved in 1873.
Allegan	7,196	135	1,730	9,669	9,476	10,660	31,192	27,568
Barry	6,817	130	1,132	7,369	9,633	12,340	41,280	44,955
Bay	1,415	13	338	1,443	879	779	292	234
Berrien	7,826	141	374	7,822	6,771	16,248	25,565	24,092
Branch	9,890	94	318	10,504	11,140	16,032	46,604	41,864
Calhoun	10,664	134	449	10,804	9,490	22,712	81,465	90,849
Cass	6,547	101	162	6,144	6,361	22,693	30,974	29,719
Clinton	6,799	103	1,915	9,156	11,405	10,705	43,064	42,312
Eaton	7,650	78	1,278	10,272	10,335	10,979	43,090	43,034
Genesee	8,201	73	1,233	10,227	10,427	9,210	66,219	65,562
Gr. Traverse	583	26	443	1,171	1,205	675	422	284
Gratlot	2,729	90	1,365	4,625	5,539	5,093	12,350	11,582
Hillsdale	9,578	153	377	11,583	9,732	16,924	59,119	63,296
Ingham	1,366	59	1,382	2,573	2,719	2,634	4,051	3,240
Ionia	7,018	61	939	8,697	8,930	11,588	54,545	49,348
Isabella	993	28	653	1,331	1,314	10,584	67,061	71,546
Jackson	12,247	187	380	10,428	9,577	14,754	112,974	118,547
Kalamazoo	9,411	88	278	8,260	7,673	16,740	55,534	63,854
Kent	10,391	124	1,609	11,587	10,955	13,200	60,571	57,195
Lapeer	6,720	63	1,216	7,446	8,618	7,281	38,815	38,603
Lenawee	12,548	179	360	17,187	14,461	18,812	90,919	99,259
Livingston	7,736	79	627	7,438	9,230	9,301	90,225	90,480
Macomb	8,788	37	246	9,954	7,941	9,295	57,211	55,879
Marquette	1,558	119	141	572	59	219		
Mecosta	947	28	733	1,223	1,127	945	1,300	1,079
Midland	658	31	301	686	700	453	270	216
Monroe	8,291	124	242	9,580	9,917	10,555	32,048	30,106
Montcalm	3,214	79	1,238	3,500	3,128	3,995	13,544	13,959
Muskegon	1,862	67	446	1,946	1,507	1,875	2,706	2,648
Newaygo	1,039	35	767	1,496	1,800	1,733	3,051	2,646
Oakland	14,136	149	333	14,397	11,626	13,698	126,370	128,193
Ottawa	4,691	66	1,171	7,878	7,404	6,316	16,456	14,296
Saginaw	4,595	52	949	6,670	6,827	5,197	6,476	6,441
Sanilac	3,321	24	1,660	4,979	6,030	4,138	9,492	8,710
Shiawassee	5,985	83	1,407	8,419	9,094	8,132	43,403	41,580
St. Clair	7,853	55	1,083	11,039	10,957	8,843	26,894	24,343
St. Joseph	7,736	104	103	7,078	6,027	16,847	32,683	35,217
Tuscola	3,194	33	1,890	5,301	5,569	4,208	12,222	10,656
Van Buren	7,175	98	778	7,506	6,031	12,935	31,128	29,367
Washtenaw	10,908	103	166	11,044	11,084	12,336	143,162	156,934
Wayne	13,930	132	257	13,857	8,114	9,742	31,916	31,843
Other counties	8,938	277	4,671	9,939	7,268	8,265	2,862	2,241
Total, 1874..	281,394	3,906	38,901	321,732	307,554	401,719	1,651,903	1,676,176
" 1864..	179,101	1,115	60,643	225,188	210,785	335,288	2,053,356	

* Other than work oxen and milch cows.

The by coun

STAT ANI COUNT

STATE ..

Allegan
Barry
Berrien
Branch
Calhoun
Cass
Clinton
Eaton
Genesee
Gr. Trave
Hillsdale
Ingham
Ionia
Jackson
Kalamazoo
Kent
Lapeer
Lenawee

* This col

Peaches

COUNTY

Allegan
Barry
Berrien
Branch
Calhoun
Cass
Clinton
Eaton
Genesee
Gr. Traverse
Gratlot
Hillsdale
Ingham
Ionia
Jackson
Kalamazoo
Kent
Lapeer
Lenawee
Livingston

AGRICULTURE.

FRUIT, GRAPE, AND WINE PRODUCT.

The two tables following show the area under cultivation, and the production, by counties, and for the State, of the articles named, and for the years specified:

Area of Orchards, and Bushels of Apples Raised.

STATE AND COUNTIES.	Area of Orchards, Acres.*	Apples, Bushels.		COUNTIES.	Area of Orchards, Acres.*	Apples, Bushels.	
		1872.	1873.			1872.	1873.
STATE	237,008	7,243,146	5,928,275	Livingston	6,777	252,354	206,544
Allegan	7,696	69,293	99,247	Macomb	6,485	342,251	134,897
Barry	5,743	152,481	105,636	Mason	503	1,677	3,673
Berrien	14,001	266,816	370,225	Monroe	6,995	213,951	270,440
Branch	7,727	303,839	302,040	Montcalm	2,320	30,204	24,431
Calhoun	8,071	322,713	325,427	Muskegon	1,979	14,233	9,519
Cass	6,207	143,233	178,063	Newaygo	1,279	9,029	9,624
Clinton	6,904	186,396	105,205	Oakland	12,932	517,642	357,878
Eaton	6,934	232,925	137,779	Oceana	1,590	5,910	12,612
Genesee	7,033	276,571	146,608	Ottawa	5,089	65,072	39,494
Gr. Traverse	1,133	3,241	4,952	Saginaw	1,953	29,510	21,961
Gratiot	2,419	24,467	15,181	Sanilac	1,503	19,726	18,624
Hillsdale	9,186	367,212	356,245	Shiawassee	5,950	235,099	114,811
Ingham	6,419	253,763	182,361	St. Clair	4,534	125,774	77,047
Ionia	7,046	230,464	129,355	St. Joseph	5,576	149,925	186,485
Jackson	9,430	334,116	392,264	Tuscola	2,635	28,402	21,917
Kalamazoo	7,040	200,620	174,630	Van Buren	8,609	209,484	162,705
Kent	9,972	282,780	115,856	Washtenaw	9,260	355,007	333,819
Lapeer	4,750	226,887	113,040	Wayne	8,034	236,909	221,770
Lenawee	10,568	406,044	432,129	Other counties	5,316	17,126	17,681

* This column includes total area of apple, peach, pear, plum, and cherry orchards.

Peaches Raised—Area of Vineyards—Grapes, Wine, and Dried Fruits Produced.

COUNTIES.	Peaches Raised, Bu., 1872.	Peaches Raised, Bu., 1873.	Vineyards, Acres and 100ths, 1874.	Grapes Produced, Lbs., 1872.	Grapes Produced, Lbs., 1873.	Wine Produced, Gal., 1873.	Dried Fruit Marketed, Lbs., 1873.
Allegan	32,737	6,230	52.10	1,065	1,731	241	40,560
Barry	3,642	173	5.63	293	297	200	38,304
Berrien	140,450	2,357	243.75	3,501	5,408	4,000	39,591
Branch	3,441	52	5.06	813	867	600	317,410
Calhoun	4,953	30	13.62	433	665	110	212,008
Cass	7,031	468	42.25	538	494	900	76,722
Clinton							18,447
Eaton	1,185	32	4.25	225	146	40	52,687
Genesee			16.75	130	468		14,053
Gr. Traverse	34	297	6.51	156	212		
Gratiot			5	41	63		1,432
Hillsdale	973		7	296	394		313,362
Ingham	250	27	7.50	453	484		120,732
Ionia	1,058	56	20.88	381	437		31,465
Jackson	1,900	57	5.75	211	246		294,073
Kalamazoo	14,627	61	43.50	3,657	3,314		61,457
Kent	15,561	503	38.13	474	791	30	18,951
Lapeer	736	51	9.74	118	134		52,725
Lenawee	367	15	16.25	264	365		256,907
Livingston	1,013	61					152,728

Peaches Raised—Area of Vineyards—Grapes, Wine, etc.—Continued.

COUNTIES.	Peaches Raised, Bu., 1872.	Peaches Raised, Bu., 1873.	Vineyards, Acres and 100ths, 1874.	Grapes Pro-duced, Lbs., 1872.	Grapes Pro-duced, Lbs., 1873.	Wine Pro-duced, Gal., 1873.	Dried Fruit Marketed, Lbs., 1873.
Macomb	215	36	5.31	166	123	500	28,698
Monroe			158.40	1,689	2,209	34,300	45,537
Muskegon	1,263	260	58.75	1,286	1,902		
Oakland	164	287	19.25	256	399		
Oceana	1,764	375	7.50	110	108	480	64,774
Ottawa	11,679	761	116.04	2,721	3,773	1,410	1,498
Shiawassee							4,581
St. Joseph	4,599	120	5	235	210	18	28,914
Van Buren	62,929	9,072	42	690	881	6,028	90,888
Washtenaw	3,022	88	7.25	367	530	100	89,402
Wayne	335		40.75	844	769	120	149,044
Other counties ..	1,155	382	21.88	1,625	1,867	1,509	26,261
							16,602
Total, State ..	318,554	22,069	1,029.64	23,235	29,601	50,851	2,664,709

AGGREGATES AT DIFFERENT PERIODS.

A study of the foregoing tables will show in what counties the various articles are produced or the most largely produced; but the more concise summary of the aggregate production in the State, as shown by the following table, will be found convenient:

	Census of 1874.	Census of 1870.	Census of 1864.	Census of 1854.
Wheat—acres harvested preceding year ..	1,134,484		843,881	473,451
Wheat—bushels raised preceding year ..	15,456,202	16,295,772	9,688,627	7,128,104
Wheat—average number bushels per acre ..	13.62		11.48	15.05
Corn—acres harvested preceding year ..	641,329		427,529	327,642
Corn—bushels raised preceding year ..	20,792,911	14,374,638	11,007,293	7,635,473
Corn—average number of bushels per acre ..	32.42		25.74	23.30
Grain—(other than wheat and corn) bush-els raised preceding year ..	13,209,758	10,112,483	4,195,244	2,290,541
Potatoes—bushels raised preceding year ..	5,618,863	10,231,033	4,058,271	2,942,526
Hay—tons cut preceding year ..	1,134,077	1,285,536	843,346	496,351
Wool—pounds sheared preceding year ..	7,729,011	8,864,896	7,260,934	2,680,747
Pork—pounds marketed preceding year ..	48,434,106		33,155,602	11,274,571
Cheese—pounds made preceding year ..	4,101,912	1,760,426	1,580,945	779,530
Butter—pounds made preceding year ..	27,972,117	24,300,139	13,835,452	7,926,552
Fruit—pounds dried for market preceding year ..	2,664,709			
Cider—barrels made preceding year ..	182,347		61,816	
Wine—gallons made preceding year ..	50,851	22,015	5,556	
Fruit and Vegetables—cans (2 lb) canned for market preceding year ..	1,003,803			
Maple Sugar—pounds made present year ..	4,319,793	1,786,641	4,048,099	1,642,250
Horses, one year old and over, number of ..	281,394	229,247	179,101	91,713
Mules, number of ..	3,906	2,362	1,115	106
Work Oxen, number of ..	38,901	36,482	60,643	67,057
Milk Cows, number of ..	321,732	251,276	225,188	139,299
Neat Cattle, one year old and over (other than oxen and cows), number of ..	307,554	285,449	210,785	141,316
Swine over six months old, number of ..	401,719	404,701	335,288	239,901
Sheep over six months old, number of ..	1,651,899	1,984,964	2,053,356	964,331
Sheep sheared the preceding year ..	1,676,176			

As to
and stat
obtaini
above re
the Stat
reliable
census r
the grea
approxin

From
1874, the

There
cls. Thi
average p
total yie
cent. mor
ceus of

There
average o
vested in
more than

In 1864
heading,
only the
wheat and
classed in
was includ
in 1874 is
buckwheat

The yie
4,612,170 bu

The hay
cent. of the
for 1870.

In 1873
per cent. e
pounds. I

RELIABILITY OF THE STATISTICS.

As to the accuracy of the foregoing exhibits, the compiler of the State census and statistics for 1874, comments at considerable length upon the difficulty of obtaining accurate information in regard to minor products, but says: "The above remarks are in no way applicable to the statistics of the staple products of the State. It is believed that for these the statements possess a high degree of reliability." The compiler of the statistics of agriculture in the United States census report of 1870, expresses a similar opinion, and hence it is believed that the great staples of the State—wheat, corn, wool, pork, etc.—are reported with approximate accuracy.

COMPARATIVE AGGREGATES OF PRODUCTION.

From the very intelligible summaries contained in the State census report of 1874, the following are given:

WHEAT.

There were 1,134,484 acres of wheat harvested in 1873, yielding 15,456,202 bushels. This is 34.43 per cent. greater breadth than was harvested in 1863. The average per acre was 13.62 bushels. The average in 1863 was 11.48 bushels. The total yield was 839,570 bushels less than in 1869, and 5,767,575 bushels, or 59.52 per cent. more than in 1863. The number of acres harvested was not shown in the census of 1870.

CORN.

There were 20,792,911 bushels of corn harvested in 1873, from 641,329 acres, an average of 32.42 bushels per acre. This is 6,418,273 bushels more than was harvested in the year ending June 1, 1870, and 9,785,618 bushels, or 88.90 per cent. more than was harvested in 1863. The average per acre in 1863 was 25.74 bushels.

ALL OTHER GRAIN.

In 1864, oats, rye, barley, buckwheat, and millet were included under the above heading. For the census of 1874 the strict letter of the law was followed, and only the number of bushels of "all other grain raised" (*i. e.* all grain except wheat and corn) required or reported. Only the four kinds first named are thus classed in Table 1 for 1870, and it is not probable that much if any other grain was included in 1874. The total number of bushels reported under this heading in 1874 is 3,997,725, or 30.62 per cent. more than the total of oats, rye, barley, and buckwheat reported in 1870.

POTATOES.

The yield of potatoes was 1,560,592 bushels greater in 1873 than in 1863, and 4,612,170 bushels, or 82.08 per cent. less than was reported in 1870.

HAY.

The hay crop of 1873 exceeded the crop of 1863 by 290,731 tons, or 34.47 per cent. of the former crop; and was 151,459 tons, or 13.35 per cent. less than reported for 1870.

WOOL AND SHEEP.

In 1873 the total wool clip of Michigan was 7,729,011 pounds, an increase of 6.44 per cent. compared with the yield of 1863. The average yield per head was 4.61 pounds. In the Introductory remarks to the statistics of 1864 the average per

head in 1849 is stated at 2 pounds 11 4-5 ounces; in 1853, 2 pounds 12½ ounces; in 1859, 2 pounds 12¼ ounces, and in 1863, 3 pounds 8½ ounces. If the whole number of sheep reported in 1870 were the number sheared in that year, the average yield per head was 4.46 pounds. The average yield per head for six years, stated in pounds and decimals of a pound, is as follows: 1849, 2.73; 1853, 2.78; 1859, 2.77; 1863, 3.53; 1870, 4.46; 1873, 4.61.

The total clip in the State in 1870 amounted to 8,864,896 pounds. The number of sheep sheared in 1873 was 1,076,176; the whole number of sheep reported in 1870 was 1,984,964, or 308,788 more than the number sheared in 1873. The number sheared in 1873 has been estimated by the Secretary of State for 47 townships, cities, and wards, from which the reports showed the amount of wool but not the number of sheep sheared. The basis upon which the estimate was made for any locality, was the average yield per sheep in the townships of the same county from which full reports were received.

PORK MARKETED.

There were 15,298,504 pounds of pork marketed in 1873 more than in 1863—an increase of 46.16 per cent.

BUTTER AND CHEESE.

The number of pounds of butter made in 1873 exceeded the number of pounds reported in 1870 by 3,671,978, or 15.11 per cent. of the production of 1870, and exceeded the production of 1863 by 14,136,665 pounds, or 102.17 per cent. The production of cheese in 1873 was 4,101,912 pounds, or 133 per cent. greater than reported in 1870, and 2,520,967 pounds, or 159.45 per cent. greater than the production in 1863. The common practice among dairymen of sending their milk to the cheese factory for manufacture, renders it not improbable, under the present system of taking the census, that some of the cheese may have been reported twice, once at the factory and once by the dairyman.

CIDER AND WINE.

There were 182,347 barrels of cider made in 1873—117,531 barrels, or 181.33 per cent. more than was manufactured in 1863. Cider was not reported in the census of 1870. The wine product of 1863 was reported at 5,556 gallons, for 1873, 50,851 gallons, an increase of 45,295 gallons, or more than 8.15 per cent. The quantity reported in 1870 was 22,015 gallons. According to the present census there were four wine making establishments in the State in 1873—one in Bertrand, Berrien county, one in the third ward, Monroe City, one in Holland City, and one in Paw Paw, Van Buren county. The statistics do not show the quantity manufactured at these establishments, but the aggregate amount reported from the townships, city and ward where they are located is 42,350 gallons, of which 31,500 gallons were reported from the third ward, Monroe City.

MAPLE SUGAR.

The maple sugar made in 1874 was reported at 4,319,793 pounds, in 1870, 1,786,641 pounds, and in 1864, 4,048,099 pounds. In 1860 the number of pounds reported manufactured was 3,973,780. The product of 1874 exceeded that of 1870 by 2,533,152 pounds, or 141.78 per cent., and that of 1864 by 271,694, or 6.71 per cent.

LIVE STOCK.

There were 281,394 horses in Michigan in 1874—an increase of 52,147 over 1870, and 102,293 over 1864. The number of mules was 3,906—1,544 more than in 1870, and 2,791 more than in 1864. The number of milch cows was 321,732—70,456 more

than 1
than c
compar
six mo
in 1864
than in
old wa
with 18

The
lished
both of
tables,
1874, ar

Orchard
Vineyar
Raspber
Strawbe
Currant
Melons

Qua

Apples—
Peaches—
Pears—n
Plums—1
Cherries—
Grapes—
Strawber
Currants
Melons a
Value of

The f
named.
report of
highest r
of 1873 f
the first a
fifteenth
the entire
fifteenth c

Value of

"
"
"
"
"
"

than in 1870, and 96,544 more than in 1864. The number of neat cattle (other than oxen and cows) one year old and over, was 307,554—an increase of 22,105 compared with 1870, and 96,769 compared with 1864. The number of swine over six months old was 401,719. This is 2,982 less than in 1870, and 66,431 more than in 1864. The number of work oxen in the State in 1874 was 38,901—2,419 more than in 1870, and 21,742 less than in 1864. The number of sheep over six months old was 1,651,899—a decrease of 333,065 compared with 1870, and 401,457 compared with 1864.

FRUIT AND GARDEN VEGETABLES.

The fruit statistics of Michigan have not heretofore been collected and published either in the State or United States censuses. The totals for the State, both of the amount of land devoted to the production of fruit and garden vegetables, and of the fruit products of 1872 and 1873, as reported in the census of 1874, are presented in the following statements:

Land Devoted to the Production of Fruit and Garden Vegetables.

	Acres.
Orchards—apple, peach, pear, plum, and cherry.....	237,008.00
Vineyards.....	1,029.64
Raspberry bushes.....	947.52
Strawberry vines.....	1,648.32
Currant and gooseberry bushes.....	387.37
Melons and garden vegetables.....	8,421.00

Quantity and Value of Fruit and Garden Vegetables Raised in 1872 and 1873.

	1872.	1873.
Apples—number of bushels.....	7,243,146	5,928,275
Peaches—number of bushels.....	318,554	22,069
Pears—number of bushels.....	33,932	40,857
Plums—number of bushels.....	6,301	3,667
Cherries—number of bushels.....	60,958	66,746
Grapes—number of cwt.....	23,235	29,601
Strawberries—number of bushels.....	50,420	48,922
Currants and gooseberries—number of bushels.....	36,484	40,562
Melons and garden vegetables—number of bushels.....	685,004	930,686
Value of all such fruit and garden vegetables.....	\$3,537,519	\$3,386,866

VALUE OF STAPLE FARM PRODUCTS.

The following statement shows the estimated value of the several products named. The prices, except of fruit and garden vegetables, are obtained from the report of the Board of Trade of Detroit for 1874, and are the average of the highest rates that ruled in Detroit on the first day of each of the last five months of 1873 for wheat, on the first day of each of the last three months for corn, on the first and fifteenth days of the last three months for potatoes, on the first and fifteenth days of the last two months for pork, on the first and fifteenth days of the entire twelve months for butter and cheese, and on June 15th and the first and fifteenth days of August, November, and December for wool:

Value of wheat raised in 1873.....	\$23,416,146
“ corn raised in 1873.....	10,500,420
“ potatoes raised in 1873.....	4,682,385
“ pork marketed in 1873.....	2,554,898
“ butter made in 1873.....	6,713,308
“ cheese made in 1873.....	591,358
“ wool sheared in 1873.....	3,511,179
“ fruit and garden vegetables raised in 1873, as shown by census.....	3,386,866

STATISTICS OF MICHIGAN.

CHEESE AND BUTTER FACTORIES.

The number of cheese and butter factories, and their product, is properly represented with the products of agriculture. They are thus given by counties—see census report, 1874, page 351:

STATE AND COUNTIES.	WHOLE NUMBER.	Capital Invested.	Value of Products.*	COUNTIES.	WHOLE NUMBER.	Capital Invested.	Value of Products.*
STATE	36	\$90,900	\$328,622	Lenawee	10	\$24,000	\$162,137
Branch	1	2,000	3,862	Monroe	2	2,700	6,000
Clinton	1	3,000	2,371	Oakland	2	11,400	33,610
Eaton	3	7,300	17,600	Tuscola	1	3,000	2,000
Genesee	4	4,900	13,669	Van Buren	1	1,000	6,100
Hillsdale	2	10,100	20,653	Washtenaw	2	4,000	10,000
Ingham	2	2,200	1,875	Wayne	5	15,200	48,745

* Of course distinct from the much larger product of private dairies.

STATE AGRICULTURAL SOCIETY.

The Michigan State Agricultural Society held its twenty-seventh annual fair in September, 1875. The total disbursements of the society for the year were \$27,964.66, with a balance in the treasury of \$5,338.36.

NUMBER OF ENTRIES AND PREMIUMS AWARDED.

The following is a classified statement of the number of entries, and of the amount of premiums offered and awarded, for the year 1875:

CLASSIFICATION.	Entries.	PREMIUMS OFFERED.			PREMIUMS AWARDED.		
		Money.	Diploma.	Medal.	Money.	Diploma.	Medal.
Cattle	164	\$2,741	7	-----	\$1,795	2	-----
Horses	184	2,674	-----	-----	2,028	-----	-----
Sheep and swine	204	953	-----	-----	819	-----	-----
Poultry	106	332	6	-----	107	-----	-----
Farm products	691	850	17	1	648	12	1
Farm implements	227	725	92	11	650	24	6
Vehicles	42	185	11	-----	103	9	-----
Machinery	77	-----	39	32	-----	6	9
Manufactures	138	582	38	16	223	16	8
Musical instruments and sewing machines	10	-----	-----	-----	-----	-----	-----
Painting, needle work and art generally	752	1,052 50	71	-----	615 50	13	-----
Miscellaneous	61	122	27	5	70	8	2
Totals	2,656	\$10,216 50	308	65	\$7,058 50	90	26
Speed department	-----	5,045	-----	-----	4,785	-----	-----
		\$15,261 50			\$11,843 50		

From the
offered
That the

Show
The pro
The aw

Show

Next
reported
follow ar
It will b
forth tha
is one of
engaged
Aware of
tries of t
letters wa
for inform
that no d
timber sh
the facts a

For the
the State,
Lumberma

For the
borders, th
Among the
the pre-em
find the "N
of warmer

The whi
from Michi
of the ash
highly valu
agricultural
mental finish
the list of v

From the foregoing it will be seen that the total of ordinary premiums offered amounted to	\$10,316 50
That the amount awarded was	7,058 50
Showing an excess of premiums offered over awards	\$3,158 00
The premiums offered as speed prizes amounted to	5,045 00
The awards amounted to	4,785 00
Showing as excess of premiums over awards	\$260 00

VIII. LUMBER AND TIMBER.

Next to agriculture, the products of the forests of Michigan form the largest reported item of her resources. The statements and figures on this subject which follow are from persons and sources of information believed to be quite reliable. It will be noticed that the products of the pine forests are more specifically set forth than those of the harder woods, for the reason that the pine lumber interest is one of great magnitude, including co-operation and organic action among those engaged in it, through which statistical information is gathered and preserved. Aware of the great importance, however, of other kinds of timber, to the industries of the State, and of the difficulty of procuring information relative to them, letters were addressed to the railroad lines penetrating the timber regions, asking for information in regard to timber shipments other than pine. Replies show that no distinction is made by railway companies as to the classes of lumber or timber shipped, and hence the information asked for could not be given, so that the facts accessible on this subject are of the most general character.

TIMBER AREAS OF THE STATE.

For the following general observations on the lumber and timber interests of the State, the compiler of this work is indebted to Mr. G. W. Hotchkiss, of the Lumberman's Gazette, of Bay City:

VARIETIES OF PINE TIMBER.

For the extent and value, as well as diversity of variety of timber within her borders, the State of Michigan stands unrivalled among the sisterhood of States. Among these varieties we may name the "white pine" (*pinus strobus*) as taking the pre-eminent position, both as to extent and value, mixed among which we find the "Norway" pine, a variety approaching very nearly to the "Southern pine" of warmer latitudes (*pinus australis*).

OAK AND OTHER HARD WOODS.

The white oak resources of the State are among its most valuable, the timber from Michigan taking the highest rank in the commercial world. The members of the ash family, both white and black, are found in great profusion, and are highly valued, the former entering largely into the manufacture of wagons, and agricultural implements, the latter supplying hoop timber, and an article of ornamental finishing timber, which is rapidly reaching towards a prominent place in the list of valuable fancy woods. In years gone by black walnut and cherry have

In some sections of the State entered largely into the list of manufactures for export, but no considerable bodies of these varieties are now to be found. Both hard and soft maple are still found in great abundance, but have not as yet entered largely into the manufacture or export statistics of the State. In addition to these woods, hemlock, beech, elm, cotton wood, cedar, and tamarack, abound in nearly every section of the State.

TIMBER DISTRICTS OF THE STATE.

Geographically considered, Michigan may be divided into three sections, within the bounds of which two subdivisions may be made to distinguish her varied timber resources:

I. A line drawn from east to west, crossing the State about on the line of the Detroit and Milwaukee railroad.

II. A line drawn from Alpena, on lake Huron, crossing the State, to Grand Traverse bay, on lake Michigan.

III. The Upper Peninsula as a whole.

These, subdivided, we will consider as representing the two varieties of timber—"hard" and "soft." The territory lying south of the first named line (and a majority of that north of the second, including the Upper Peninsula), may be set down as hard wood lands, upon which the different varieties of oak, ash, maple, black walnut, cherry, hemlock, and other varieties, as distinct and separate from pine, do now, or have in the past, abounded. The southern portion of the State received the earliest attention of the pioneers who first emigrated to Michigan, and by the necessities of settlement and cultivation, the valuable timber of the section has been greatly reduced as an article of commerce. Of this, however, it may be said, that with the rapid increase in population, and consequent demands of an intelligent people, the manufacture of the thousand and one of the smaller articles of daily consumption and use, in agricultural implements, furniture, etc., is leading to the conservation of the remaining timber, which is yet to prove a source of no inconsiderable wealth to the State.

Between the first and second lines is embraced the chief wealth of Michigan, as a timber country. And in no section of the world, within an equal compass of territory, are so extensive and valuable tracts of pine timber to be found. The manufacture of pine lumber and timber, by careful computation, has been ascertained to have been in lumber, shingles, and lath, during the year 1875, no less than *three billion, two hundred and thirty-eight million, nine hundred and sixty-five thousand feet*, board measure. The amount of timber manufactured and shipped, principally beyond the bounds of the State during the year named, fell short of the product of several previous years by at least 300,000,000 feet. These figures, starting in their vastness, will give a faint idea of the immense industries and yearly wealth accruing to the State, from this source alone; but when we consider that according to competent authorities, the present rate of consumption can be maintained for from twelve to twenty years to come (authorities differing on this point), and we find that at the shorter period Michigan has still within her borders *thirty-nine billions* of feet of pine timber to be utilized in building up the cities within her own borders, and those of her sister States, some slight comprehension may be derived of the wealth of her timber resources. Embraced within the district under consideration, are the more extended and valuable of her resources in oak, hemlock, and ash, the ultimate aggregate value of which can fall but little if any short of the value of pine.

North of the second line mentioned, and extending to the straits of Mackinaw, is a country abounding in maple, beech, ash, oak, and elm, with occasional extensive admixtures of pine. Here are to be found some of the choicest ornamental

wood
"cur
with
have
On
than
erto
to be
lar ch

In
of the
G. Me
value,
The
I. 2
II.
north,
III.

Of t
the ter
none no
that day
over 300
is apper
619,867,0
The f
naw and

Mulay sa
Clenlar
Gang saw
Capital i
Capacity,
Lumber r
On hand
On dock
Logs in
Men empl
Pickets c
Lath cut
Lath on in

The qu
and in 187
naw, Bay
The oak
was first
branch of
out on the

woods indigenous to the continent, pre-eminent among which we may name the "curly" maple, shipments of which to Germany have but just been undertaken, to be without doubt continued until its recognized value among commercial woods shall have been fully established.

Our third division embraces the Upper Peninsula, more noted for its minerals than for its forests, and yet abounding with nearly every variety of timber hitherto specified. That portion of this district adjoining Wisconsin, ought properly to be classed with district number two, abounding as it does with pine of a similar character.

THE LUMBER PRODUCT.

In the absence of official statistics, the very full and comprehensive review of the lumber trade, compiled early in the present year, by C. B. Headley and J. G. McCall, and issued from the office of the East Saginaw Courier, is of great value, and from it is taken many of the facts and figures embodied herein.

The lumber trade of Eastern Michigan is grouped under three subdivisions:

- I. The Saginaw Valley proper, including Saginaw and Bay counties.
- II. The Shore, extending from Saginaw river along the east side of the State north, to and including Cheboygan.
- III. The Railroads.

THE SAGINAW VALLEY.

Of the trade in the Valley, it is said: "In 1853 there were but 61 mills in all the territory embraced within Saginaw, Bay, Shiawassee, and Genesee counties, and none north of this point. The capacity of these mills was placed by a writer of that day at 100,000,000 feet. In the territory above mentioned there are now over 300 mills, with a manufacturing capacity of over one billion feet." A table is appended, showing the increase of the cut from 133,500,000 feet in 1863, to 619,867,021 feet in 1873, the cut for the last two years being somewhat less.

The following exhibit shows comparative statistics of eighty-nine mills in Saginaw and Bay counties, mostly situated on the Saginaw river, for the years named:

	1874.	1875.
Milv saws, No.	41	38
Circular saws, No.	100	91
Gang saws, No.	67	67
Capital invested	\$4,809,000	\$5,033,000
Capacity, feet	805,500,000	845,500,000
Lumber manufactured	574,632,771	571,401,001
On hand unsold, Dec. 31	190,017,663	196,606,530
On dock sold, Dec. 31	23,135,000	25,595,578
Logs in boom	52,395,200	51,845,800
Men employed	3,825	3,583
Pickets cut	664,000	571,141
Lath cut	73,675,950	73,209,255
Lath on hand, Dec. 31	8,517,350	11,975,050

Shingles, Oak Timber, and Staves.

The quantity of shingles made on the Saginaw river in 1873 was 130,618,550, and in 1874, 130,639,500 shingles. There were 15,410,000 shingles on hand in Saginaw, Bay and Midland counties at the close of the season of 1874.

The oak timber trade has grown to be one of great importance. Attention was first turned in this direction by Canadian operators (who monopolize this branch of business), about 1869. That year 765,000 cubic feet of timber was gotten out on the streams emptying into the Saginaw. The following year new firms

commenced operations, and in 1873 over 3,000,000 cubic feet were shipped from the Saginaw river. Since then the shipments have fallen off, owing to a depression in the market and a limited demand. Last year the market was dull. The prospects the present winter are much brighter, prices having advanced fully \$100 per thousand cubic feet, or from \$320 to \$420 at Quebec, the principal market. The bulk of the timber cut here goes to Quebec, and from thence to Europe, Tonawanda, also, taking quite an amount. It is used principally for ship-building.

The stave trade of the Valley assumed its greatest importance in 1873, when nearly ten million pieces were shipped. Since then, owing to the same causes affecting the oak trade, there has been a gradual falling off.

The following table shows the production of the articles under this head for the years named:

YEARS.	Shingles.	Oak Timber, ft.	Staves.	YEARS.	Shingles.	Oak Timber, ft.	Staves.
1869..	119,843,500	765,000	3,720,000	1873..	218,394,550	3,234,920	9,568,898
1870..	178,570,000	1,105,000	5,698,000	1874..	208,489,500	2,839,700	4,623,068
1871..	187,691,000	1,382,000	3,820,000	1875..	204,346,725	1,234,000	3,113,721
1872..	159,001,750	2,560,000	8,633,200				

Logs Rafted Out.

The following table shows in feet, of board measure, the quantity of logs rafted out of the streams named during the last three years:

	1873.	1874.	1875.
Tittabawassee	269,508,740	343,814,365	309,908,517
Cass	100,458,140	48,000,268	56,003,470
Bad	37,137,384	26,000,000	41,854,894
Rifle	80,872,607	58,687,083	92,128,200
An Gres	63,281,236	38,723,688	10,948,620
Kawkawlin	33,573,254	22,000,000	19,900,000
An Sauble	96,148,000	52,000,000	55,000,000
Total	680,979,461	589,225,404	584,843,701

Aggregate of Shipments.

The amount of lumber shipped from the Saginaw river during 1875, as shown by the custom house records, was 445,149,595 feet, and of shingles, 117,832,500.

THE SHORE.

The principal lumbering points in this division are Alpena, Cheboygan, An Sauble, and Tawas. Twenty-nine mills and firms are reported as showing the following aggregates:

Mulay saws	15	On hand	48,650,000
Circular saws	45	Logs	32,400,000
Gang saws	25	Men employed	1,304
Capital invested	\$1,679,000	Lath	38,280,000
Capacity, feet	294,000,000	Shingles	59,700,000
Cut in 1875	190,233,000	Pickets	2,222,000

Un
of the
water

Flint
Jackso
Saginaw
Detroit

The
of Sag
is est
to the
of lath,

The

Genesee
Tuscola
Huron
Sault
St. Clair
Lapeer
Detroit
Grand
Manistee
Grand
Muskegon
Menom

The h
to the fo
it "is pro
It is con
correct an

LOCAL

Eastern Mic
Muskegon
White Lake
Manistee
Ludington
G. R. & Ind.

Totals...

The tot
ber and tim

The lum

* In additi
† Cut of 18

LUMBER AND TIMBER.

43

THE RAILWAYS.

Under this head is included the cut of lumber, shingles, lath, etc., on the lines of the several railways, and which finds an outlet by the railways instead of by water. The following aggregates are shown:

RAILROADS.	Lumber, ft.	Shingles.
Flint and Pere Marquette railway.....	132,014,212	164,655,000
Jackson, Lansing and Saginaw railway.....	57,350,000	*29,587,000
Saginaw Valley and St. Louis ".....	18,000,000	17,300,000
Detroit and Bay City railway.....	20,930,000	43,750,000

The above, except for the last named road, includes only mills north and west of Saginaw. The production east of Saginaw, shipping by the first named road is estimated at 300,000,000 feet of lumber, and 275,000 m. of shingles. In addition to the shipments above given by the Detroit and Bay City railway, were 12 cars of lath, 657 of staves, 361 of heading, 62 of hoops, 9 of posts, and 12 of bark.

OTHER POINTS.

The production at other points in the State in 1875 is thus stated:

LOCALITIES.	Lumber, ft.	Shingles.
Genesee county.....		
Tuscola ".....	73,000,000	51,000,000
Huron ".....	12,000,000	8,000,000
Sauillac ".....	52,000,000	14,000,000
St. Clair ".....	116,500,000	
Lapeer ".....	138,250,000	
Detroit.....	61,480,250	28,000,000
Grand Rapids.....	37,070,535	
Manistee.....	50,821,032	19,000,000
Grand Haven, etc.,.....	160,575,855	148,500,000
Muskegon.....	96,613,662	
Menominee.....	309,200,000	28,100,000
	117,503,802	19,040,000

STATE AT LARGE.

The lumber and shingle product of the entire State, for 1875 (without adhering to the foregoing classification), is aggregated as follows, the compilers adding that it "is probably as correct and reliable as it is possible for such statements to be. It is compiled carefully, has undergone numerous revisions, and is given as a correct and reliable exhibit."

LOCALITIES.	Lumber, ft.	Shingle.	LOCALITIES.	Lumber, ft.	Shingles.
Eastern Michigan.....	1,174,654,786	571,000,000	Grand Rapids.....	51,720,000	19,000,000
Muskegon.....	351,400,000	28,100,000	Grand Haven, etc.....	96,613,662	43,122,000
White Lake.....	65,250,000	20,000,000	C. & M. L. S. R. R.....	102,215,780	101,485,000
Manistee.....	160,575,855	148,500,000	D., L. & L. M. R. R.....	77,525,000	39,148,000
Ludington.....	96,641,212	4,115,000	Menominee.....	117,506,000	25,000,000
G. R. & Ind. R. R.....	116,860,093	206,400,000	Miscellaneous.....	250,000,000	175,000,000
Totals.....				2,677,963,388	1,383,870,000

The total cut of the State in 1874 was 2,866,351,027 feet. The value of the lumber and timber trade of the State during the year 1875 will approximate \$40,000,000.

LUMBER IN THE UPPER PENINSULA.

The lumber statistics of the Upper Peninsula are meagre. In the geologi-

* In addition 9,800,000 "ch.
† Cut of 1874.

cal report of 1873, page 60, a list of seventeen saw mills is given, all but three of which were in Marquette county. These mills are reported to have produced in 1872, pine lumber to the amount of 13,500,000 feet, besides shingles, lath, and some hard wood lumber. As this was mostly used for local consumption (and presumably the product for subsequent years), the lumber product of that section probably does not get into the reports, which are usually made up from shipping channels.

SQUARE TIMBER AND STAVES.

The following schedule of the shipments of timber and staves for the past three years, is furnished by Mr. E. L. Kelsey, connected with the shipping house of Merick, Fowler & Esselstyn, of Detroit. It is intended to include the total shipments from the State, as nearly as can be ascertained, without reference to the localities from whence shipped. It should be considered in connection with figures previously given on the same subject, but as representing sums total approximating accuracy, rather than details.

SEASON OF 1873.	Destination.	Price.	Value.
2,200,000 cubic feet square white oak timber.....	Quebec	25	\$550,000 00
1,200 M. Quebec pipe staves.....	"	\$150 00	180,000 00
3,400 white oak West India staves.....	"	45 00	153,000 00
300,000 cubic feet square rock elm.....	"	15	45,000 00
800,000 cubic feet square white pine timber.....	"	15	120,000 00
Value of total shipments to Quebec.....			\$1,048,000 00
600,000 cubic feet square white oak timber.....	Tonawanda.	25	150,000 00
750,000 cubic feet square white pine timber.....	"	12½	90,000 00
8,500 M. American pipe, hhd. and barrel staves.....	Buffalo	80 00	760,000 00
Total value at place of shipment.....			\$2,048,000 00
SEASON OF 1874.			
2,400,000 cubic feet square white oak timber.....	Quebec	25	\$600,000 00
1,100 M. Quebec pipe staves.....	"	\$140 00	154,000 00
800 M. white oak West India staves.....	"	40 00	32,000 00
350,000 cubic feet rock elm timber.....	"	15	52,500 00
700,000 cubic feet square white pine timber.....	"	15	105,000 00
Value of total shipments to Quebec.....			\$943,500 00
500,000 cubic feet square white oak timber.....	Tonawanda.	25	125,000 00
800,000 cubic feet square white pine timber.....	"	12½	100,000 00
6,500 M. American pipe, hhd. and barrel staves.....	Buffalo	75 00	487,500 00
Total value at place of shipment.....			\$1,656,000 00
SEASON OF 1875.			
1,600,000 cubic feet square white oak timber.....	Quebec	20	\$320,000 00
800 M. Quebec pipe staves.....	"	\$140 00	112,000 00
600 M. white oak West India staves.....	"	35 00	21,500 00
1,000,000 cubic feet square white pine.....	"	20	200,000 00
Value of total shipments to Quebec.....			\$653,500 00
150,000 cubic feet square white oak timber.....	Tonawanda.	20	30,000 00
400,000 cubic feet square white pine.....	"	12½	50,000 00
3,500 American pipe, hhd. and barrel staves.....	Buffalo	60 00	210,000 00
Total value at place of shipment.....			\$943,500 00

LUMBER AND TIMBER.

COMPARATIVE TIMBER AREAS.

At a period when a feeling prevails that our timber and lumber forests will soon be exhausted, it is proper to state that Michigan yet possesses the largest and best area of forest land in the Union. The latest estimates, confined to the leading timber States, give the following results: Maine, ten and one-half million acres; New Hampshire, two and one-quarter million; Vermont, two and one-quarter million; Massachusetts, eleven and one-half million; New York, eight and one-quarter million; Pennsylvania, eleven and one-half million; Michigan, twelve and three-quarters million; Minnesota, nine million; Wisconsin, seven and one-quarter.

CENSUS RETURNS OF THE LUMBER PRODUCT.

The following three tables show the statistics of lumbering industry for 1873, as per census report of 1874.

SAW MILLS.

STATE AND COUNTIES.	WHOLE NUMBER.	POWER USED.			Persons Em- ployed.	Capital In- vested.	Lumber Sawn.	Value of Products.
		Operated by Steam.	Operated by Water.	Not Reported.				
		No.	No.	No.				
STATE -----	1,600	1,156	419	25	23,532	28,448,014	3,231,470,894	39,850,156
Alcona -----	5	3		2	133	82,000	13,100,000	153,600
Allegan -----	60	39	21		686	408,300	64,809,891	971,300
Alpena -----	11	10	1		405	470,000	78,500,000	1,157,000
Antrim -----	4	1	3		84	87,600	11,112,000	145,896
Barry -----	33	12	21		94	108,150	13,390,000	170,770
Bay -----	45	45			2,346	3,506,000	408,081,700	5,093,242
Benzie -----	10	6	4		74	128,700	10,315,000	113,500
Berrien -----	55	38	16	1	321	301,000	28,593,803	417,480
Branch -----	52	35	15	2	197	193,200	14,184,225	250,110
Calhoun -----	21	6	15		42	53,700	3,971,300	69,580
Cass -----	33	19	14		99	81,500	6,697,000	119,860
Charlevoix -----	2	2			40	35,000	3,500,000	38,000
Cheboygan -----	7	7			271	215,000	41,400,000	432,000
Chippewa -----	2	2			80	20,000	300,000	1,800
Clare -----	2	2			17	15,000	3,800,000	57,000
Clinton -----	21	17	3		86	62,400	8,919,000	114,300
Delta -----	4	3	1	1	133	115,000	15,000,000	121,000
Eaton -----	42	27	15		173	145,500	15,687,000	176,800
Genesee -----	34	25	9		562	711,400	90,895,000	1,024,760
Grd Traverse -----	15	8	7		172	119,000	24,060,000	192,228
Gratiot -----	17	15		2	179	120,364	25,250,000	235,250
Hillsdale -----	41	33	7	1	123	88,100	7,469,529	102,633
Houghton -----	3	3			60	90,000	6,584,464	113,000
Huron -----	21	21			478	258,600	45,695,000	647,550
Ingham -----	30	26	4		126	109,800	13,297,000	165,295
Ionia -----	27	17	7	3	336	375,300	36,125,000	438,000

STATISTICS OF MICHIGAN.

SAW MILLS.—CONTINUED.

COUNTIES.	WHOLE NUMBER.	POWER USED.			Persons Em- ployed.	Capital In- vested.	Lumber Sawed.	Value of Products.
		Operated by Steam.	Operated by Water.	Not Reported.				
		No.	No.	No.				
Iosco	14	13		1	572	660,000	95,475,000	1,006,500
Isabella	11	6	5		91	62,700	7,738,000	120,174
Jackson	14	1	13		21	17,850	1,345,000	15,975
Kalamazoo	19	10	9		46	55,700	5,838,000	79,469
Kalkaska	2	1	1		11	6,600	1,020,000	12,200
Kent	54	35	19		1,065	905,800	119,528,000	1,466,500
Keveeenaw	4	3		1	18	5,200	653,000	9,130
Lake	9	7	2		79	67,800	3,400,300	31,900
Lapeer	48	35	13		694	479,500	94,076,000	868,300
Leelanaw	6	3	3		39	33,500	3,950,000	53,500
Lenawee	67	49	18		205	158,750	18,864,000	221,365
Livingston	16	8	8		42	45,300	4,000,000	42,760
Mackinac	2	1	1		45	117,000	3,000,000	40,000
Macomb	20	10	10		121	116,400	12,811,000	214,590
Manistee	25	23	2		1,156	2,739,000	246,650,000	2,519,900
Marquette	17	7	6	4	208	180,500	14,575,000	128,600
Mason	8	8			593	434,000	78,704,000	786,416
Mecosta	16	11	4	1	237	254,000	34,955,000	415,500
Menominee	6	6			565	360,000	76,000,000	625,000
Midland	13	11	2		200	197,600	23,575,000	284,650
Missaukee	1	1			5	2,500	150,000	1,350
Monroe	42	33	8	1	206	167,700	20,887,290	438,060
Montcalm	65	56	9		942	668,300	118,996,246	1,431,100
Muskegon	68	58	10		2,292	4,742,200	438,448,111	5,540,976
Newaygo	26	14	10	2	435	276,200	30,608,000	406,950
Oakland	26	10	15	1	49	54,000	4,655,000	50,490
Oceana	28	15	13		338	495,400	31,451,500	523,675
Ontonagon	1	1			5	200	10,000	200
Osceola	19	16	3		209	148,300	12,640,000	195,000
Ottawa	42	40	2		1,000	2,342,500	153,215,000	2,004,500
Presque Isle	2	2			47	26,000	4,500,000	57,000
Saginaw	72	71	1		2,223	2,549,000	332,621,897	4,162,050
Sauillac	19	17	2		214	106,900	14,250,000	143,800
Schoolcraft	3	3			83	52,000	6,414,724	97,000
Shiawassee	16	7	9		73	71,600	11,550,000	120,500
St. Clair	26	21	5		475	365,400	50,569,000	727,850
St. Joseph	16	4	12		41	40,300	3,194,662	37,949
Tuscola	20	15	5		156	102,600	18,745,000	212,200
Van Buren	56	41	15		423	261,809	43,588,418	495,768
Washtenaw	23	12	11		58	57,100	4,293,000	77,765
Wayne	51	45	5	1	736	1,114,300	74,028,834	1,443,650
Wexford	10	7	2	1	187	90,900	19,060,000	187,740

* Other
fishment

LUMBER AND TIMBER.

47

SHINGLE MILLS.

COUNTIES.	WHOLE NUMBER.	Capital Invested.	Value of Products.	COUNTIES.	WHOLE NUMBER.	Capital Invested.	Value of Products.
Allegan	3	\$9,000	\$37,000	Mecosta	14	\$64,500	\$288,400
Alpena	6	40,000	160,000	Midland	16	53,500	207,760
Bay	6	58,000	102,000	Montcalm	40	110,170	457,600
Benzie	1	10,000	8,000	Muskegon	11	116,800	169,700
Cheboygan	1	10,000	5,000	Newaygo	7	32,500	99,000
Clare	2	6,000	11,500	Oceana	6	32,000	91,000
Eaton	2	10,500	3,100	Oseola	4	28,000	51,000
Houghton	1	34,000	60,000	Ottawa	1	5,000	3,000
Huron	7	19,700	80,300	Presque Isle	1	7,000	12,000
Ionia	3	22,000	32,800	Saginaw	15	185,160	274,537
Iosco	8	17,000	120,000	Sanilac	2	25,000	75,000
Isabella	4	16,000	33,398	Tuscola	11	31,900	61,950
Kent	21	45,000	128,300	Other counties	14	22,850	37,250
Lapeer	16	75,700	341,400				
Total for State					223	\$1,087,220	\$2,950,585

STAVE, HEADING, AND HOOP FACTORIES.*

COUNTIES.	WHOLE NUMBER.	Capital Invested.	Value of Products.	COUNTIES.	WHOLE NUMBER.	Capital Invested.	Value of Products.
Berrien	4	\$34,000	\$59,000	Macomb	9	\$128,849	\$225,684
Branch	1	8,000	20,500	Mouroc	8	88,000	174,000
Clinton	2	25,000	110,000	Montcalm	2	10,000	26,500
Eaton	2	20,000	13,800	Ottawa	4	47,000	62,000
Genesee	6	40,000	72,400	Saginaw	3	21,000	11,500
Gratiot	1	5,000	80,000	Shiawassee	3	12,800	12,500
Hillsdale	1	5,000	8,000	St. Clair	3	67,500	115,000
Ingham	10	161,500	102,008	St. Joseph	2	13,000	45,000
Ionia	3	32,000	63,000	Tuscola	1	8,000	97,500
Kent	2	13,000	40,000	Van Buren	5	40,500	83,400
Lapeer	3	12,000	44,125	Wayne	2	7,000	5,800
Lenawee	5	57,800	153,500	Other counties	6	14,800	15,020
Livingston	2	31,000	70,000				
Total, State					91	\$903,749	\$1,716,637

* Other lumbering and manufacturing industries are combined with a number of these establishments.

IX. MINERAL RESOURCES.

While many kinds of mineral deposit—coal, gypsum, salt, etc.—have been discovered and are being utilized in various parts of the State, the great mining interests of the Upper Peninsula, from their importance and value, first claim attention under this head.

MINERAL DEPOSITS IN THE UPPER PENINSULA.

Under this general head it is proper to state that the facts in regard to the discovery of the mineral deposits, the geology of the Upper Peninsula, the geographical distribution of the rock system, the forms of the copper deposits, and the stamp mills, are embodied in papers furnished by Mr. E. Ganjot, for many years familiar with Upper Peninsula interests, and at present superintendent of the mineral department, and engineer for the State Centennial Board of Managers, at Philadelphia.

DISCOVERY OF COPPER.

The first account of the occurrence of native copper on lake Superior is in the work of "Lagarde," published in Paris, in 1636, in which we find some interesting accounts concerning the richness of the country. He says: "There are mines of copper which might be made profitable, if there were inhabitants and workmen who would labor faithfully. That would be done if colonies were established. About eighty or one hundred leagues from the Hurons there is a mine of copper, from which 'Truchement Bruslé' showed me an ingot on his return from a voyage he made to the neighboring nation."

Father Claude Allouez, a Jesuit missionary, who visited the region in 1666, says: "It happens frequently that pieces of copper are found weighing from ten to twenty pounds. I have seen several such pieces in the hands of the savages; and since they are very superstitious, they esteem them as divinities, or as presents given to them to promote their happiness, by the gods who dwell beneath the water. For this reason they preserve these pieces of copper, wrapped up with their most precious articles. In some families they have been kept for more than 50 years; in others, they have descended from time immemorial—being cherished as domestic gods. For some time there was seen near the shore a large rock of copper with its top rising above the water, which gave an opportunity to those passing by to cut pieces from it. But when I passed that vicinity it had disappeared. I believe that the gales which are here frequent, like those of the sea, have covered it with sand."

Father Dablon, 1669-70, says: "After having reached the extremity of the lake there may be seen, on the south shore, by the water's edge, a mass of copper weighing 600 to 700 pounds, so hard that steel cannot cut it; but when heated it may be cut like lead." On one of the islands near Chagamegon bay, he relates that copper rocks and plates are found, and that he bought of the savages a plate of pure copper, two and a half feet square, weighing more than 100 pounds. He supposes that they have been derived from Menong (Isle Royale). He mentions

the fac
find ma

In 1
that "i
plentifi

In 1
tions w

Capt
dwelt s

formed
nagon r

a better
of his c

ment in
copper r

In 18
the nor

made of
of the M

The
than th

"Althou
metamor

that has
ton had

canoe, or
Indian tr

come to
of iron

plain tha
have det

in the ex
in quanti

his exam
region.

of 1844,
existed i

Indians h
without,

Steps I
presideny

atic scien

earliest S

region in

the result
of the wo

interest.

the fact that the Ottawa squaws, in digging holes in the sand to hide their corn, find masses weighing 20 to 30 pounds.

In 1689, Baron La Houton, in a book relating to travels in Canada, mentions that "upon lake Superior we find copper mines, the metal of which is fine and plentiful, there being not a seventh part base from the ore."

In 1721, P. de Charlevoix describes the native copper deposits, and superstitions which the Indians had in regard to them, in considerable detail.

Captain Jonathan Carver visited lake Superior in 1765, and in his account dwelt so largely on the abundance of native copper, that a copper company was formed in England in 1771, which actually began mining operations on the Ontonagon river, under the direction of Mr. Alexandre Henry, who seems to have been a better historian than miner; for he gives a detailed account of the winding up of his operations in 1772, and concludes, as the result of his unsuccessful experiment in mining, "that the country must be cultivated and peopled before the copper can be profitably mined."

In 1823 a government expedition under charge of Major Long, passed along the north shore of the lake, having come from the northwest; and mention is made of their having observed copper boulders in the region of the head waters of the Mississippi.

DISCOVERY OF IRON ORE.

The date of the iron discovery is quite uncertain, but is much more recent than that of copper. In his geological report of 1841, Dr. Houghton says: "Although hematite ore is abundantly disseminated through all the rocks of the metamorphic group, it does not appear in sufficient quantity at any one point that has been examined, to be of practical importance." At this date Dr. Houghton had traversed the south shore of Lake Superior five times, in a small boat or canoe, on geological investigations. It is, therefore, probable that up to 1841 no Indian traditions worthy of credence, in regard to large deposits of iron ore, had come to his knowledge. As there are, so far as known, no considerable outcrops of iron ore which come nearer than seven miles of the shore of the lake, it is plain that investigations, based on observations taken along the shore only, could have determined no more than its probable existence, which is plainly indicated in the extracts given. Dr. Houghton was not aware of the existence of iron ore in quantity, until the return of Mr. Burt's party of surveyors to Detroit in 1844, his examinations in the interior of the country having been confined to the copper region. * * * It thus appears that the United States surveyors, in the fall of 1844, officially established the fact that iron ore in considerable quantities existed in the Upper Peninsula of Michigan. It is also undoubtedly true that Indians had previously observed the ore and were acquainted with locations of it, without, however, being able to identify it.

GEOLOGICAL SURVEY.

Steps had been taken with a view to an exploration of this region during the presidency of John Adams, but nothing was ever effected. The work of systematic scientific exploration was first undertaken by Dr. Douglass Houghton, the earliest State Geologist. Dr. Houghton had commenced his examination of this region in 1834, and in his first annual report to the Legislature in 1841, presented the results of his labors up to that period in so able a manner, that the attention of the world became directed to the Northern Peninsula with greatly increased interest.

In 1840, Dr. Houghton wrote to the Hon. A. S. Porter, under date December 26, regarding the mineral wealth of the south shore of lake Superior: "Ores of zinc, iron, and manganese occur in the vicinity of the shore, but I doubt whether either of these, unless it be zinc and iron, is in sufficient abundance to prove of much importance. Ores of copper are much more abundant than either of those before mentioned, and a sufficient examination of them has been made to satisfy me that they may be made to yield an abundant supply of the metal."

In the spring of 1847, pursuant to an act of Congress, entitled "An act to establish a new land district, and to provide for the sale of mineral lands in the State of Michigan," the Secretary of the Treasury appointed Dr. Chas. J. Jackson to execute a geological survey. After having spent two seasons in the prosecution of this work, he resigned.

After the resignation of Dr. Jackson, Messrs. J. W. Foster and J. D. Whitney, who had been assistants to Dr. Jackson, were appointed, and the completion of the survey was confided to them. They made two reports—1850-51. These reports contain a vast fund of valuable information, and to-day, 26 years afterwards, we find that very few facts have escaped their notice.

The phenomenon of drift and alluvial deposits of this region have been ably investigated by Mr. Desor, and the results of his observations will be found embodied by him in that portion of the reports which relates to the superficial and transported materials.

A report of much value, made by the joint committee of the two houses of the Legislature, in 1869, on the subject of a geological survey of the State, gives a connected resume of the history of mineral exploration and discovery in the lake Superior region, and in urging the necessity of a geological survey of the Upper Peninsula by the State, says: "In the meanwhile, those hardy pioneers have labored and waited, until now, with a population of near 35,000, a capital invested in 112 companies, for developing copper, of \$16,250,500, upon which has been paid dividends of \$5,880,000, and an iron interest which, in the twelfth year of its commercial life, produced over one-fifth of all the iron mined in the United States; they have rights, and the State has duties—long neglected duties—toward them, which it were wise to no longer neglect."

Animated by the sentiments expressed in this report, the Legislature to which it was made passed an act appropriating \$8,000 per year for four years, for the purpose of a geological survey, one-half of which was to be applied in the Upper Peninsula. As a result of this action (in part only, for private enterprise was called upon to aid), the report of the geological survey of the Upper Peninsula, embracing the period 1869 to 1873, was published during the last named year. The iron district was in charge of Major T. B. Brooks, and the copper district in charge of Prof. R. Pumpelly, while some progress was made by Dr. C. Rominger in an examination of the Palæozoic rocks. This work is referred to here, as introducing its reference in other places.

GEOLOGY OF THE UPPER PENINSULA.

The Laurentian System.—The oldest system so far observed on the Upper Peninsula, extends southeast to Lake Ontario, and along the north side of the St. Lawrence to the sea, and is designated by American geologists as the Laurentian.

This system embraces a great many rocks having a metamorphic character, such as gneiss, mica shists, amphibolite shists, feldspathic rocks, porphyroides, composed of labrador, andesine or anorthite, with hypersthene and titanite iron,

saccharo
conglom
have bee
morphle
granites,
contorted
ore: Olig
altered sl

The cr
time, mic
copper or

Huron
eastern c
stratificat

This is
the tissur
rior overl
dykes and

The roc
alluvial d
stones; th

Sandston

separate l
extends fr
second lies
third is ov
range. E
rather sma
white, grey
drab color.

The first
That porti
is well kno
vertical roc
forms. Th
From the t
of 200 feet,
drifts runni
however, di
formations.

The seco
the shore of
The layers o

The dislo
seem to be s
itself upon
that the gra
fracture bein

Toward th
different lev
level with l
is on high p

saccharoid limestones, in thin layers, separated by layers of quartzite or dolomitic conglomerates, pyroxenic rocks, associated to the limestones, and which seem to have been produced by the metamorphism of the silicious limestones, the metamorphic action having been so strong as to render the limestones nearly fluid, granites, syenites, and diorites, in large masses, which seem to have crossed and contorted the preceding rocks. This formation contains immense deposits of iron ore: Oligistic iron ore (specular) and magnetites, which are nearly always in the altered shists, and in the vicinity or in contact with the granite.

The crystalline limestones contain a great variety of minerals: Phosphate of lime, mica, titanite iron, graphite, calc-spar, sulphate of baryta, galena, hornblende, copper ores, nickel, and cobalt.

Huronian System.—Next comes the Huronian or Cambrian system, forming the eastern coast of lake Huron, also found on lake Superior, overlying in undulated stratifications the shists of the Laurentian system.

This is composed of bluish shists, with layers of hornstone, calcareous banks, the fissures of which are filled with anthracites. These rocks are on Lake Superior overlaid with traps, sandstones, and conglomerates, and crossed by diorite dykes and trap dykes.

The rocks on the Upper Peninsula of Lake Superior, so far observed under the alluvial drift, are the following: The whitish grey, variegated, and red sandstones; the conglomerates; the traps; the metamorphic rocks; and the granite.

Sandstones.—The sandstones appear on the south shore of the lake in three separate belts running from east to west, or northeast to southwest. The first extends from the Sault de St. Marie westward into the State of Wisconsin. The second lies between the granitic mass and the traps of Keweenaw point. The third is overlying the conglomerates, and forms the shore north of the trappean range. Everywhere the sandstones have the same characteristics, and are in rather small strata or beds; at the upper part of the formation they are nearly white, grey and variegated in the middle part, and red, with more or less of a drab color, at the lower part.

The first belt of sandstone contains no rock or mineral of any practical value. That portion between Sault de St. Marie and Marquette running along the coast is well known. At Grand Island and Pictured Rocks, the sandstone appears in vertical rock walls, which for many miles face the lake in a variety of picturesque forms. The walls of the Pictured Rocks rarely exceed 70 to 80 feet in height. From the top of these, and in a gradually sloping ascent, the hills rise to a height of 200 feet, but not all the rock is sandstone. The hill tops are covered with drifts running westward, where they lean or rest against the granites; the strata, however, dip southward and disappear, or bury themselves under more recent formations.

The second belt of sandstone extends in a direction north to southwest from the shore of Keweenaw point, to Black river, some distance west of lake Gogebie. The layers or strata are nearly horizontal, and highly undulated.

The dislocations of the sandstones in contact with the granites near the shore seem to be sufficient to demonstrate that the sandstone did not peaceably deposit itself upon the granites, and corroborates the opinion advanced by Prof. Rivot, that the granitic mass broke through the sandstone, the general direction of the fracture being from northeast to southwest.

Toward the north, the sandstones, coming in contact with the traps, present different dispositions. The line of demarcation of the two rocks east, is on a level with Lac la Belle, whereas west, at Portage lake and Ontonagon, this line is on high plateaus.

Near Lac la Belle and other places where the sandstones appear a little above the lake, the beds dip south at rather a sharp angle, and only to a short distance from the traps, and showing strong dislocations, which indicates that the action pushing the trappean mass through the sandstones must have been very violent. On the contrary, where the sandstones appear on the top of the plateaus, the dip toward the south extends to a great distance, and they are much less disturbed. Westward the terminus of the sandstone is at the meeting of the metamorphic mass with the traps.

The third belt of sandstone extends from the lake shore, near Eagle river, to the head of the lake near Fond du Lac (outlet of the Montreal river west of La Pointe). This belt is mostly covered with drift, and the stratified disposition can only be observed at a few places. The sandstones are dark red and drab color near the conglomerates, with which they present some alternations. At a distance from the conglomerates they are variegated, the same as at Grand Island and Pictured Rocks, and at the upper part of the formation the sandstones are nearly white. This seems to identify the sandstones of this zone with those observed farther south. It is very important that this supposed identity should be noted, and scientifically established if it be a fact.

Traps and Conglomerates.—The traps and conglomerates form a continuous belt varying in width, and extending, without interruption, from the eastern end of Keweenaw point westward into the State of Wisconsin. They are found again, having the same characteristics, if not identical, on Isle Royale, on the western coast of Canada, and as far as Greenland. On Keweenaw point they appear in strong beds, with a well defined stratification, and running in a direction nearly parallel with the shore, the greatest divergency being near the eastern end of Keweenaw point, and is about 15°. This is explained by a great many transversal dykes.*

GEOGRAPHICAL DISTRIBUTION OF THE ROCK SYSTEM.†

I. Lower Silurian.—The lower Silurian system, the youngest or lowest division of the Palaeozoic rocks, represented on the Upper Peninsula, is made up of various sandstones and limestones, which is fully described in Dr. Rominger's report, part III. The entire Peninsula east of the meridian of Marquette, is underlain by Silurian rocks, and the "copper range" is flanked by a Silurian flat on the south side, which separates it from the iron range, until the two, together with the south copper range, come together west of lake Gogebic. About two-thirds of the area of the Upper Peninsula, or 9,982 square miles, is underlain by this system.

II. Copper-bearing Rocks.—These rocks, corresponding with the upper copper-bearing rocks of the Canadian geologists, occupy a narrow belt on the northwestern edge of the Upper Peninsula. These rocks have less superficial extent than either of the other formations, underlying only about 1,186 square miles, or, say 7 per cent. of the whole surface.

III. Iron-bearing Rocks.—These rocks, corresponding, it is assumed, with the Huronian system of Canada, consist of a series of extensively folded beds of diorite, quartzite, chloritic schists, clay and mica schists, and graphitic shales, among which are intercalated extensive beds of several varieties of iron ore. The Huronian area equals about 1,992 square miles, or nearly one-eighth of the whole area of the Upper Peninsula.

* For the lithologic paragenesis of copper and its associates, see Geological Survey of Michigan, 1889-73.

† Geological Survey, Vol. I.

IV. Gra
which are
as underly

Lower Sil
Copper-be
Huronian
Laurentia
Unknown.

Total

Copper
sluce.* P
the form o
which was
logical pro
its reality.

The dis
was princ
in adherin
seminated
miners as
rior is dis

Veins.—
native cop

1. The
rocks, and
downward
to 8°, 10°, a
of Keween
A different
There they
of Keween

2. The s
nation of
under the

Most pr
Phoenix, th
they all ca
mine of the
veins have
weight.

The Mi
first system
ing 540 ton

* "The Co

IV. Granites.—These rocks, which have so far produced no useful minerals, and which are believed to be equivalents of the Laurentian of Canada, are represented as underlying about 1,839 square miles—equal to 12 per cent. of the total area.

RECAPITULATION.

	Area. Sqr. Miles.
Lower Silurian.....	9,982
Copper-bearing.....	1,186
Huronian or Iron-bearing.....	1,991
Laurentian.....	1,839
Unknown.....	668

Total area of Upper Peninsula, exclusive of islands, about..... 15,667

COPPER AND COPPER MINING.

Copper mining on lake Superior commenced in 1845, about twenty-eight years since.* Prior to this date, copper had been obtained throughout the world in the form of sulphuret. The discoveries of lake Superior were of native copper, which was a novelty in copper mining, and so improbable, according to all geological precedents, that much doubt was expressed by scientific men in regard to its reality. The facts were, however, abundantly proven.

FORMS OF THE COPPER DEPOSITS.

The distribution of this native copper, which seemed such a geological wonder, was principally in masses of various weight, "barrel work," which is strung together in adhering rock, like roots of a tree in the soil, and "stamp stuff," which is disseminated through the copper-bearing rock in small particles, known among miners as "shot copper." In these three forms the native copper of lake Superior is distributed.

Veins.—In this district we have two systems of well defined veins carrying native copper:

1. The true fissure or fracture veins running across the strata of the stratified rocks, and at nearly right angles to the formation, or axis of upheaval. In their downward course they deviate more or less from the perpendicular, amounting to 8°, 10°, and 12°. They also expand and contract at short intervals. The veins of Keweenaw county belong to this system. Their course is about north 21½° west. A different class of veins belonging to the first system prevails in Ontonagon county. There they run with the formation, instead of cutting it at right angles, like those of Keweenaw point.

2. The second system of veins, or deposits, also running parallel with the formation of the trap range, and lying between it and the sandstones, are known under the name of belts. They are of the amygdaloid and conglomerate series.

Most prominent among the first system in Keweenaw county are the Cliff, the Phenix, the Central, and Copper Falls veins. They are called mass veins, yet they all carry more or less stamp rock. The Cliff has been the first productive mine of the country, and stands to-day among the best. All the above named veins have produced a great number of masses, ranging from 400 to 500 tons weight.

The Minnesota vein, in Ontonagon county, belongs to the second class of the first system. This vein has also produced a great number of masses, one weighing 540 tons.

* "The Copper Mines of Lake Superior," by O. D. Ashley—pamphlet, 1872.

Belts.—The amygdaloid belts, most known in Houghton county, are the Pewabic, on which the Quincy, the Pewabic, and the Franklin mines are worked; the South Pewabic, with the Atlantic mine; and the Isle Royale and Concord mines on the Isle Royale belt. They are all amygdaloids, but of a different composition. Prof. Pimpelly says: "The amygdaloids are the most highly altered form of melaphyr, and present themselves under a variety of character in different beds, and in different parts of the same bed." In Keweenaw county we have eight belts so far as known:

1. The first one is farthest north, on the British American property, in section 11, town 58 north, range 30 west. This lies north of the Ash-bed. This belt has been opened on the British American property for about half a mile, by a number of pits, and shows a very uniform and fine character, and producing for an outcrop a good deal of copper.

2. The next noticeable belt going to the south is the Ash-bed. This is so well known that it is not necessary to refer to it at length. Suffice it to say that it has been worked for a number of years at the Copper Falls and at the Petherick mines.

3. The next is the Clark mine belt, laying about 800 feet north of the Greenstone. This has been falsely called the "Pewabic belt." It has been too little explored to decide upon its value.

4. The next one to be noticed is the Delaware mine belt, which is now opened to a considerable extent in that mine; also in the old Stoutenberg mine, and to a limited extent in the Connecticut and Amygdaloid mines. The generally accepted opinion formed some time ago is, that this belt is only workable within a few feet of the walls of the fracture veins. The results at the Delaware disproves this theory, as the cross cuts have proved a distance of more than one hundred feet from the vein, and show no change for the worse in that distance.

5. The next belt in succession is the Medora, though this may prove to be the same as the last mentioned. Some rock taken from this mine, with but little selection, yielded at the Cliff stamp mill $2\frac{1}{2}$ per cent of dressed copper.

6. The next one to be mentioned is the Star belt, about 800 feet south of the Greenstone.

7. Still farther south, a belt was opened upon the Montreal tract, and, judging from the limited openings which have been made upon it, it is second to none of those already mentioned.

8. To the above list might be added a belt opened upon the Mendota property, in section 21, town 58, range 29, which gives considerable promise.

Conglomerates.—Last, but not least, are the Conglomerates. Beginning north, in Houghton county, we have:

1. The Hancock conglomerates;
2. West Pewabic;
3. Albany and Boston;
4. Mesnard;
5. Calumet and Hecla;
6. Kearsarge.

In former days conglomerates have been looked upon with mistrust by the miner, yet facts have upset the old theory, and we see to-day standing most prominent among all the copper mines of the world, the Calumet and Hecla mines on the conglomerate of that name, with a production of over 1,100 tons of 92 per cent. copper. On the same conglomerate are the Schoolcraft and Osceola mines.

In Keweenaw county we have the Allouez conglomerate, on which is the Allouez mine. Some have assumed to have identified this belt as the Mesnard, and

others a
either.

The
consider
other co
work ha
been op
amygdal
good de

Ores
the bed
on the s
ersed by
tion; bu
sulphur
of chlor
age post
The gam
has been

In th
domeyki
J. D. W
very lit
the amy

The
and rich
allel wit
on the s
The cop
yet but
ductive
tively n

In th

I. The
the Poi

II. P
acres;

III. I
five mil
eight m
The isla
Canada

A wr
which c
country
it is in
which f

others as the Albany and Boston; yet it has not been satisfactorily proven to be either.

The Kearsarge conglomerate has also been opened in Keweenaw county, showing considerable copper; yet very little exploring has been done on this belt. Several other conglomerates have been traced through Keweenaw county, but very little work has been done on any of them. On Isle Royale a belt of conglomerate has been opened, and is being now worked. All the belts, both conglomerates and amygdaloids, belong to the stamp lodes. The amygdaloids, however, produce a good deal of barrel work and shot copper.

Ores of Copper.—The Bohemian or south range, forms the line of upheaval of the bedded trap and conglomerate on the north, and conglomerate and sandstone on the south. This range running parallel with the northern one, is also traversed by veins for the most part at right angles to the direction of the formation; but unlike the veins of the northern range, they yield the grey and black sulphurets and copper pyrites, instead of native copper. The rocks here consist of chlorite and feldspar of a highly crystalline texture, and appear to be of an age posterior to the bedded trap in which the native copper veins are situated. The gangue of the ore veins consists of calc-spar, chlorite, and quartz. This range has been very little explored.

In the Portage Lake district, two fissure-veins are known, carrying boenite, domeykite, chalcocite, and whitneyite, this last mineral having been discovered by J. D. Whitney (geological survey of Michigan, 1850-51). These veins have been very little explored, and only superficially examined. It is very remarkable that the amygdaloids, traversed by these fissures, contain only native copper.

EXTENT OF THE COPPER TERRITORY.

The trappean rocks, which contain the deposits of native copper, the largest and richest in the known world, extend a distance of about 120 miles nearly parallel with the shore of the lake, at the east end of the district, being immediately on the shore, and the greatest distance in Ontonagon county being 12 to 15 miles. The copper-bearing formation has an average width of about three miles. As yet but a small portion of the extensive copper field has been occupied with productive mines—a few miles in each county, separated by many miles of comparatively unexplored lands.

In the report of Foster and Whitney, made in 1847, the copper region is divided into three districts, each with an estimated area as follows:

I. The Keweenaw Point district, embracing the country from the eastern end of the Point to Portage Lake, 61,620 acres;

II. Portage Lake to the Montreal river, including the Ontonagon district, 18,270 acres;

III. Isle Royale, 77,380 acres. This latter is a narrow rocky island, about forty-five miles in length, lying northeast by southwest, varying in width from three to eight miles, and some of its hills have an altitude of three to four hundred feet. The island, although within the State of Michigan, lies much nearer the north or Canada shore, than it does to the American shore.

QUALITY AND RELATIVE VALUE OF LAKE SUPERIOR COPPER.

A writer elsewhere quoted—Mr. John R. St. John—says: "If there is one fact which characterizes the bounty of nature to ours over the mineral of all other countries, it is that fact and peculiarity of our Lake Superior native copper, that it is in no instance contaminated with alloys of other metals. The assertion of which fact, when made by Dr. Houghton, was treated as a burlesque by scientific

men, at home and abroad, who called it 'backwoods mineralogy.' His representations as to the great abundance of copper indicated by 'surface appearances,' were treated as 'new country stories,' and Dr. Houghton, smarting under this ridicule, pursued his researches for ten successive years before his reports elicited any public attention."

Mr. Ashley says: "In this connection it is worthy of note that lake Superior copper, from its better quality and adaptability for special purposes, commands a price from three to four cents per pound higher than that imported."

CHEMICAL CONSTITUENTS.

Specimens of lake Superior copper ore analyzed by Dr. McClintock, assayer of the United States mint at Philadelphia, in 1845, showed: silicic acid, 7; metallic copper, 70; oxygen, 17.50; carbonic acid, etc., 5.50. Dr. McClintock adds: "The mass of the ore is a *peroxide* of copper, producing a rich blue with aqua ammonia, which the *peroxide* fails to do. The *blue carbonate* of copper constitutes but a small portion of the specimen. The carbonates always contain a small portion of water, and you will, therefore, find the *latter* estimated with the carbonic acid, etc., 5.50 being the *absent parts*; and no trace of sulphur having been discovered, they are assumed to have been the carbonic acid of the blue carbonate, and the water necessarily associated with it. The absence of iron, sulphur, etc., adds greatly to the value of the ore, by rendering the smelting much easier, and insuring a better article when smelted."

NUMBER OF COPPER MINING COMPANIES, AND ASSESSMENTS AND DIVIDENDS.

Copper, like most other kinds of mining, has yielded its profits and entailed its losses. The Portage Lake Mining Gazette, a newspaper published at Houghton, gave, in 1873, a list of one hundred and seventeen copper mining companies, whose aggregate assessments, since the commencement of operations in 1845, amounted to \$17,296,500. The dividends declared for the same time were stated on the same authority at \$11,910,000. A large proportion of the companies never raised any ore, especially in paying quantities, and many of them are practically out of existence. The dividend-paying mines do not exceed eight or ten in number.

PROFITABLE MINING.

As the counterpart of many unprofitable ventures, the following further quotation is given from Mr. Ashley's pamphlet, page 13:

"To encourage energetic efforts and a liberal expenditure of capital in prosecuting copper mining on lake Superior, we have the astonishing success of the Calumet and Hecla, the richest mine, as established by its annual product, of any in the world, whether of gold, silver, or copper. In 1873 it produced 9,718 tons of mineral, or at ninety per cent. 8,747 tons, or 17,494,000 pounds of ingot copper. At an average of 30 cents per pound this would yield \$5,248,200. Calculating its cost at 12 cents per pound, the cost of this would be \$2,099,280, or a net profit of \$3,148,920. This calculation is based upon unofficial statements, but that it cannot be far from actual results is proved by the fact that the mine paid \$2,800,000 in cash dividends to its stockholders during the year."

The foregoing extract is reproduced, not for the purpose of advertising the mining company mentioned, nor does the compiler of this work assume any responsibility for its correctness. It is given simply as an apparently candid statement of facts.

The
of the
and
eral
figures
The
1863 (P
prox
extrem
per for
of ingo

1845 to
1858...
1859...
1860...
1861...
1862...
1863...
1864...
1865...
1866...
1867...
1868...
1869...
1870...
1871...
1872...
1873...
1874...
1875...

The
tons, fo

Portage
Koween
Ontonag

Tot

Larg
mentio
remarka

THE COPPER PRODUCT.

The following figures are compiled from reports made to the Auditor General of the State, from statistics found in the reports of the Detroit Board of Trade, and from data furnished by the Hon. J. R. Devereux, of Houghton. As the several sources of information that have been consulted agree substantially, the figures are probably as nearly accurate as it is possible to get them.

The annexed tabular exhibit shows: A, the gross product of copper ore, in tons (presumed to be net tons of 2,000 pounds), from 1845 to 1875, inclusive; B, approximate product of ingot copper, in pounds, for the same period; C, D, extreme variations (highest and lowest) in the price of lake Superior ingot copper for the years shown; E, total value of lake Superior copper; F, total product of ingot copper in the United States, including lake Superior, for a series of years:

YEARS.	A.	B.	C.	D.	E.	F.
1845 to 1853.....	18,954	27,910,000	.....	.....	\$9,000,500	.....
1858.....	4,100	7,000,000	.....	.....	1,886,000	.....
1859.....	4,200	7,000,000	.....	.....	1,890,000	.....
1860.....	6,000	9,600,000	.....	.....	2,610,000	.....
1861.....	7,500	12,000,000	.....	.....	3,337,500	.....
1862.....	9,962	16,000,000	.....	.....	3,402,000	.....
1863.....	8,548	13,000,000	39c	28½c	4,420,000	14,500,000
1864.....	2,472	13,000,000	55	39	6,110,000	16,600,000
1865.....	10,791	14,000,000	50½	28	5,145,000	15,257,000
1866.....	10,376	14,000,000	41½	26½	4,760,000	15,632,000
1867.....	11,735	16,400,000	29	21½	4,140,000	17,413,000
1868.....	13,049	19,970,000	24½	21½	4,592,000	21,206,000
1869.....	15,288	24,400,000	26¼	21½	5,368,000	26,563,000
1870.....	16,183	25,892,000	22	19	5,696,240	28,335,000
1871.....	16,071	25,714,000	27	21	6,171,360	28,104,000
1872.....	15,166	24,264,000	45	27	7,774,720	26,764,000
1873.....	18,514	28,882,600	35	20	8,200,600	34,882,180
1874.....	22,225	34,654,433	25½	19	7,770,519	39,304,433
1875.....	22,658	35,250,000	23½	21	7,843,150	40,000,000

COPPER PRODUCT BY DISTRICTS, FOR FOUR YEARS.

The following is a statement of the yield of Michigan copper mines, in round tons, for four years, taken from the Detroit Board of Trade report for 1875:

DISTRICTS.	1875.	1874.	1873.	1872.
Portage lake.....	14,625	17,067	15,229	12,612
Keweenaw.....	2,400	4,146	2,860	1,836
Ontonagon.....	600	680	547	725
Totals.....	17,625	21,893	18,636	14,173

LARGE SPECIMENS OF MASS COPPER.

Large mass copper is so normal a feature in the lake Superior mines that special mention of specimens seems unnecessary, although a few are noted. The first remarkable sample, weighing over 3,000 pounds, was discovered in the rapids of the

Ontonagon river, in 1830. It was removed to Detroit, but was claimed by the United States, and from thence taken to Washington, where it still remains.

The largest mass of pure copper was found in the Minnesota mine, in Ontonagon county, its weight being 446 tons. In dividing it into pieces, weighing two and a half to ten tons each, the labor of twenty men, during a period of twenty-three months, was required. The thickest part of this mass was a little over seven feet. Over 12 tons of copper chips were taken from it during the dividing process.

The Cliff mine developed one mass weighing a little over 250 tons. Masses of 50 to 100 tons were of somewhat frequent occurrence, both in the Cliff and Minnesota, in their earlier working.

The Phoenix has turned out a number of large masses, the largest weighing over 200 tons.

The Central has also produced a large amount of mass copper, the largest of which weighed over 200 tons. A mass was found at the surface of this mine, partly mined by a primitive race, that weighed 53 tons.

Masses of 80 to 100 tons have been found in the Copper Falls and National. Masses of from one to 15 tons have been found in all the mines that have been worked to any extent, except the Calumet-Hecla, the Schoolcraft, and Osceola. The largest piece found in the Calumet-Hecla weighed less than a ton.

Mass copper is being found in the Minong mine, on Isle Royale. The largest piece found so far as known at the time of writing, weighed about three tons.

ANCIENT MINE WORK.

The evidences of ancient mine work by a primitive and unknown race are a notable feature of the lake Superior mines. The discovery of this old work was the discovery of the mines.

In speaking of the ancient mines, Prof. J. W. Foster, in his late work on the Pre-Historic Races of America, says: "The high antiquity of this mining is inferred from these facts: That the trenches and pits were filled even with the surrounding surface, so that their existence was not suspected until many years after the region had been thrown open to active exploration; that upon the piles of rubbish were found growing trees which differed in no degree, as to size and character, from those in the adjacent forest, and that the nature of the materials with which the pits were filled, such as a fine washed clay enveloping half decayed leaves, and the bones of such quadrupeds as the bear, deer, and caribon, indicated the slow accumulation of years, rather than a deposit resulting from a torrent of water."

At a deep inlet, known as McCargoe's Cove, on the north side of the island, excavations extend in almost a continuous line for more than two miles, in most instances the pits being so close together as barely to permit their convenient working. The stone hammers, weighing from ten to even thirty pounds, the chief tool with which the labor was performed, have been found in cart loads. They are either perfect, or are broken from use, and the fragments of large numbers of them are found intermingled with the *debris* on the edge of the pits, or at their bottom. The sample of mass copper noted as taken from the Minong mine is more remarkable for these stone-hammer marks upon its surface, than for its weight.

Though it is probable that not one-tenth of these ancient excavations have so far been revealed, some idea of their extent may be arrived at, from the statement of a gentleman familiar with the mines, who has calculated that, at one point alone on three sections of land toward the north side of Isle Royale, the

amount
oldest
been d
noticed
fifty y

Even
ing up
cesses
have b
geniose

In th
and pro
machin
ing the
rather
its cha
tres of

Corn
control
pestles,

Thes
porting
to iron
pattern

In its
with ke
by a sl
bed pla
The ser
iron, an

Ball
1855-6,
made th
the Nas
continu
tion of

The
which k
time us

Atmo
which r
namely,
two yea
name, is
attached

Throu
an ordi
diameter
bored to
is pierc
behind t
increasi
to all su

The e
driven e
frame of
advisabl

The c
* From
Enginee

amount of labor performed by those ancient men far exceeds that of one of our oldest copper mines on the south shore of lake Superior, a mine which has now been constantly worked with a large force for over twenty years. Or, stated in another form, that it would have required a force of one hundred thousand men fifty years (with their means of working) to do an equivalent amount of work.

STAMP MILLS OF LAKE SUPERIOR.*

Every new mining district has had its own peculiar experiences in inventing and experimenting upon new methods for the various operations of mining, and more particularly in the processes of crushing and dressing ores. As a matter of course, during this period many old things have been reinvented, patented, and cast aside, there to remain until at a future day other genuluses shall bring them forth again as new.

In this respect the copper region of lake Superior has not been behind other mining centers, and probably in no other part of the country has more money been expended in devising new machines and improvements upon old ones for the crushing of rock. The appliances for washing the sand have not been so varied, simply for the reason that, having but one mineral, or rather metal, of high specific gravity, to separate from rock material which varies but little in its character in any one mine, it requires much less care than is necessary in most mining centres of the world.

Cornish Stamps.--At the beginning of operations in that district most of the work was in the control of Cornish miners, who introduced the simplest of Cornish mills, namely, wooden stem pestles, with wooden shafts and cams.

These were well suited for the small mines, and particularly to the limited means of transporting more expensive machinery. As these facilities improved, they were enabled to change to iron, and to vary their patterns of rods, shafts, cams, and mortars. The most approved pattern, finally obtained, is the square or round stem, with collar adjustable by means of keys. In its present form, it is a bar of cold rolled shafting, an eye in the top, an adjustable collar with key plate and keys, the head, and a shoe of chilled iron. The stem is fitted into the head by a slight taper. The battery has heretofore been of wood, lined with chilled cast plates, and bed plate of the same; but within the last two years the California pattern has been introduced. The screens are of sheet steel, drilled with sixteen holes to the inch, the cam shafts of round iron, and the cams of cast iron.

Ball Steam Stamps.--During this period of gradual improvement in pestle stamps, in the years 1855-6, the Ball steam stamps were introduced, and after years of labor and expense, have been made the most efficient and powerful machines ever yet used for the purpose. It is ostensibly the Nasmyth steam hammer, and yet the many devices for the motion of the slide-valves, the continuous and uniform running, the turning of the stems, the mortar, the grates, and regulation of feed, make it a very different machine from the ordinary steam hammer.

The movement of the valves and revolving of the stamp is taken from a separate engine, which is usually run by the escape steam from the stamp cylinder. This engine is at the same time used to drive the washing machines, and also the lathes and other tools in the repair shop.

Atmospheric Stamps.--Within the last few years, still another machine has been introduced, which may be said to occupy an intermediate position between the pestle and steam stamps, namely, the so called "atmospheric stamp." This was brought into effective operation some two years ago. The peculiar feature of this machine, and the one from which it derives its name, is the air cylinder, which takes the place of the stamp head, and to which the shoe is attached.

Through the upper cylinder-head passes the piston rod, which receives motion by means of an ordinary connecting rod from the main crank axle. The piston, four and one-half inches in diameter, is fitted with double reverse cup-leather packings. The upper end of the cylinder is bored to receive the piston to a depth of fourteen inches. The working barrel of the cylinder is pierced with two sets of holes, for the ingress and egress of the air, discharging the air behind the piston after it has once been used as an elastic cushion. This elastic cushion, besides increasing the force of the blow, removes the jar from the machine, prevents the noise incident to all such implements, and, by hastening the descent of the head, allows an increased speed.

The crank axle runs in plummet blocks carried upon the top of the side frames, and can be driven either by a hand-wheel, or by an upright steam engine, fastened directly upon the side frame of the battery. When more than one battery is used in a mill, this latter method is not advisable.

The cylinder stamp head passes through a deep guide-plate, which forms part of the battery

* From a paper by John F. Handy, M. E.; read before the American Institute of Mining Engineers.

frame. Water is introduced upon the upper side of this guide-plate, and allowed to run down around the cylinder, thus affording a lubricator, and preventing the sand splashed up from the mortars from cutting the cushions of the guides.

The removal of the shock, and the peculiar construction of the cylinder, enable a high speed to be obtained, and further, it may be remarked, no damage can be done by reversing the engine, a frequent source of accident with the pestle stamp mills. It is claimed they can run as high as 200 blows per minute, per head, and so far experience has shown that they should not be run more than about 130 blows per minute.

So far the best work has been to pulverize about 40 tons per battery in twenty-four hours, or six and two-thirds tons per head, of rock taken from a No. 9 Blake's breaker. It has been rather expensive in repairs, but the weak points, none of great importance, are being discovered, and no doubt upon the construction of new mills, these can be easily remedied. In general, the mill at the Phoenix mine, the only one which has, to my knowledge, been erected in this country, is giving good satisfaction. The size of a battery is 62 inches between side frames, and 110 inches from crank axle to floor. Total weight $8\frac{1}{2}$ tons.

Another Style.—Still another style of mill has been introduced at the Petherick mine. This is only peculiar in its arrangements. The plan has been called forth by the scarcity of water at the location.

The rock from the Blake breakers (two sizes) is screened, the coarse stuff passing thence through rollers. The fine stuff from both breakers and rollers is discharged on to a jig. All the coarse from the jig passes into the hopper of a stamp battery. In this way a very small amount of rock reaches the stamps, and a moderate amount of water can be made to handle a proportionately large quantity of rock, and may prove very economical.

It is but proper to state that there are those who still contend for the pestle stamps, on the ground of first cost, less extraordinary repairs, and further, that small mines cannot afford to erect mills of a minimum capacity of 100 to 120 tons of rock per day—the power of one head of steam stamps. This the patentee has endeavored to remedy, by the construction of a smaller pattern, namely, one of 110 pounds weight, with a duty of 40 tons per day. Such a mill has not been tried, and it therefore remains to be proven whether they can run at so small a cost on a reduced scale. It is further claimed that the steam stamps require a higher order of mechanics to run them, together with a well-appointed machine shop.

These arguments are well taken, and therefore the character of the mine needs to be carefully considered before deciding upon the kind to be adopted. If the mine is however of great capacity, the question can be quickly decided in favor of the steam stamps.

IRON AND IRON MINING.

The practical working of the iron mines, commencing about 1845, is the period from which dates the chief interest in the subject. The first company was a Michigan one, organized at Jackson, which gave the name to the oldest working iron mine on Lake Superior, the Jackson location and mine. Mr. P. M. Everett, then of Jackson, who formed one of the company, and was its treasurer and agent, writing November 19, 1845, from that point, speaks thus of his previous summer's explorations: "I left here on the 23d of July last, and was gone until the 24th of October. I had considerable difficulty in getting any one to join me in the enterprise, but I at last succeeded in forming a company of thirteen. I took four men with me from Jackson, and hired a guide at the Sault, where I bought a boat and coasted up the lake to Copper Harbor, which is over 300 miles from Sault Ste Marie. We made several locations, one of which we called Iron at the time. It is a mountain of solid iron ore, 150 feet high. The ore looks as bright as a bar of iron just broken."* It is not designed to give any detailed account of explorations in the iron district, but the foregoing, being the first practical effort in that direction, seems properly to introduce the subject of the iron mines.

GROUPING THE IRON DEPOSITS.

In the report of the geological survey it is remarked that in grouping the iron deposits it has been found convenient to disregard such political divisions as coun-

* Geological Survey, 1873, page 14.

ties at
the U.
trial g
region
sidere
Region
of whi
Marqu
This,
and (4
by a s
atite
Michig
and R
Escan
Range
is divi
in tow
Montr
wheth
betwe
of the

The
tions;
are no
could
it may
underg
at a p
mining
which
the Ir
acter t

The
tant l
underg
Huron
overl
mation
(magn
often
Usual
direct
lentifo
laid d
folded
presen
This s
dip, fr

* Geol

ties and towns in designating localities, and to employ instead either the method of the U. S. linear surveys, or by the use of what may be termed the mineral or industrial geography of the Upper Peninsula, by which it is conveniently divided into regions, districts, groups, etc., which, although not sharply defined, may be considered at present to have the following boundaries: The "Marquette Iron Region" embraces all the developed iron mines of the Upper Peninsula, the oars of which now find their outlet by way of Marquette, L'Anse and Escanaba, by the Marquette, Houghton and Ontonagon, and Chicago and Northwestern railroads. This, again, is subdivided into (1) the Negaunee, (2) Michigamme, (3) Escanaba, and (4) L'Anse districts. These divisions may be conveniently carried still further by a subdivision of the Negaunee district into the Cascade Range, Negaunee Hematite Mines, Ishpeming Group, New England and Saginaw Range; and of the Michigamme District into the Washington, Champion, Spurr and Magnetic ranges, and Republic Mountain Basin. The S. C. Smith is the only worked mine in the Escanaba District, and no ore has yet been shipped from the L'Anse District or Range. The "Menominee Iron Region," which as yet has sent no ore to market, is divided into (1) the North Belt in south part of town 42, (2) the South Belt, in towns 39 and 40, and (3) the Paint River District. The "Lake Gogebie and Montreal River Region" (or Range) is so little known that it may be questionable whether it should have a place in this economic grouping; it embraces the country between lake Gogebie and the west boundary of Michigan, and is 100 miles west of the Marquette region.

ORE DEPOSITS AND METHOD OF MINING.*

The iron ores of the Marquette region are mostly extracted in open excavations; hence the process is more nearly allied to quarrying. A number of mines are noted as having tried underground work, "but only temporarily; if such stopes could not be opened out to daylight, they have usually been abandoned. In brief, it may be said that no considerable amount of ore has as yet (1870) been mined underground in this region, and of that so mined very little has been taken out at a profit, and I may add that it seems to be the belief of the most experienced mining men that this state of things will hold for some time to come, for reasons which will appear. Nearly the same remarks may be applied to the mines of the Iron Mountain region, Missonri, the ores of which are very similar in character to those of Marquette."

The geological structure of the iron deposits is recognized as having an important bearing upon the method of mining, some doubt being expressed whether underground mining can ever be profitably prosecuted. The iron-bearing or Huronian series of rocks are stratified beds, the principal ore formation being overlaid by a quartzite and underlaid by a diorite or greenstone. This ore formation is made up, first, of pure ore; second, greenish shistose or slaty rock (magnesian), which occurs in lens-shaped beds which alternate with ore, thus often dividing the formation into two or more beds of ore, separated by rock. Usually the beds of both ore and rock thin out as they are followed in the direction of a strike from a center of maximum thickness, producing irregular lentiform masses. Since their original deposition, if we may assume they were laid down under water, the whole series, including the iron beds, have been bent, folded and corrugated into irregular troughs, basins and domes, which often present at the surface thin upturned edges of pure ore standing nearly vertical. This structure, involving sudden changes in the amount and direction of the dip, from horizontal to vertical, would evidently necessitate, in the case of under-

* Geological Survey, p. 244.

ground work, constant changes in the plan of attacking the ore, as well as in the mode of supporting the roof. * * * These facts make open workings a practical necessity at the start, and the great economy of breaking ore from high stopes with heavy charges of powder induces a continuation of the method, even when the rock covering has attained a thickness of many yards, and underground work would seem to be advisable. It is, indeed, hard to say what thickness of solid rock a Marquette mine-superintendent would hesitate to remove if it covered a large deposit of ore. * * *

It would be difficult to convince our people that having a large deposit of pure ore before them of unknown form and size, covered often by but little earth, and backed by perhaps but a small amount of money in the company's treasury, it is best to incur the delay and cost incident to sinking and drifting, to open ground already opened by nature, and ready to win. Wrought as open quarries, several of our mines have paid their way from the start, while, had they been opened on a regular system of mining, they would have required an investment of \$50,000 in plant and improvements before shipments could have begun, and at least one year's time.

The transition from the present system of quarrying to the future method of underground mining, which will have to be made in the Marquette region, will be a critical period, and will possess great interest, as affording a solution of a mining problem such as may not yet have been presented anywhere. Attempts at its solution have already been made, but, as has been remarked, very little ore has as yet been extracted at a profit by candle-light.

PRODUCTION AND QUALITY OF IRON.

Major T. B. Brooks, elsewhere noticed as connected with the geological survey of the Upper Peninsula, in a paper written in 1870, and read before the American Society of Civil Engineers, says: "The product of the Marquette mines has nearly doubled during the last four years, and is now about 825,000 gross tons of ore, which will yield on the average sixty-two and a half per cent. of pig iron in the furnace; hence, during the last two years, fully one-fourth of all the pig produced in this country has been from the Superior ores. About 66 per cent. of the shipments are specular hematite, yielding 65 per cent. of iron; 17 per cent. are magnetic ores, yielding 65 per cent. of iron; 13 per cent. are soft hematites, yielding 50 to 55 per cent. of iron; 4 per cent. second class specular ores, yielding say 57 per cent. of iron. One hundred and twenty-five furnace stacks use lake Superior ores wholly or in part; of these, 89 employ coke or bituminous coal, as fuel, 10 anthracite coal, and 26 charcoal. Eighty of the bituminous and coke stacks are in Ohio and Pennsylvania, all the anthracite stacks are in Pennsylvania and New York, and over one-half of the charcoal furnaces are located in Michigan. The iron produced is soft and strong, answering equally well for mill or foundry use. It inclines to red-shortness, without being decidedly red-short. It is too soft for rail-heads, but is unequalled for the base of the rail and for merchant bar, and is now being successfully used for 'Bessemer steel.'" The same writer, however (geological survey, page 96), thinks that the flag ores may prove harder, and be adapted for rail-heads.

CHEMICAL COMPOSITION OF ORES.

Chapter X. of the geological survey, page 283, contains the results of over one hundred and fifty analyses, more or less complete, of iron ores from the Upper Peninsula, mostly from the Marquette region, together with five analyses of pig iron produced from those ores, and several analyses of ores from other parts of the United States, which are largely used with lake Superior ores as mixtures. In order to bring out the variations in quality of the ores, and to obtain reliable

practical
analyzed
samples
more fr
against
with th
in extro
but the
chemist
contain
composi

I. Re
Republi
II. B
Washing
III. S
New En
IV. A

Protoxi
Sesqui,
Oxide of
Alumin
Lime
Magnesi
Sulphur
Phospho
Silica a
Water,
Water,
Volatile

Metallic
Phospho
Sulphur
Metallic
Specific

This
per cent
Iron and
mangan
in the a
constant
sufficient
centage
from 100
Regar
will at

practical averages, seldom less than two, and in one instance eight samples, were analyzed from the same mine. The report refers to the care taken in selecting samples for analysis, not to choose samples that would be likely to produce the more favorable results, and defending chemists against the charge often laid against them, of dishonesty or incompetency, the trouble, as is claimed, being with the samplers themselves. With the greatest care in sampling, results varied; in extreme cases from ten per cent. below to five per cent. above the true average, but the common variation was not more than three per cent. The names of the chemists, with an aggregate of 183 analyses, are given. A table is subjoined containing an approximate general summary of the results, exhibiting the average composition of the four classes of ore produced by the following mines:

I. Red Specular Ores.—Barum, Cleveland, Jackson, Lake Superior, New York, Republic, and Kloman.

II. Black Magnetic and Slate Ores.—Champion, Edwards, Michigan, Spur, and Washington.

III. Soft Hematites.—Foster, Lake Superior, Lake Angeline, Taylor, Macomber, New England, Shenango, Smith, and Winthrop.

IV. Flag Ore.—Cascade.

Table of Analyses.

CHEMICAL PROPERTIES.	I.	II.	III.	IV.
Protoxide iron.....		19.639		
Sesqui, or peroxide iron.....	90.52	67.761	75.75	70.98
Oxide of manganese.....	Trace.	0.13	0.80	Trace.
Alumina.....	1.39	2.13	1.536	2.01
Lime.....	0.70	0.68	0.36	0.45
Magnesia.....	0.42	0.69	0.294	0.20
Sulphur.....	0.05	0.132	0.110	0.03
Phosphoric acid.....	0.258	0.199	0.185	0.13
Silica acid, silica, or insoluble silicious matter.....	5.892	7.828	14.055	25.12
Water, combined.....			3.94	
Water, uncombined.....			1.18	
Water, total.....	0.77	0.811		1.03
Volatile matter.....			1.81	
	100.000	100.000	100.000	100.000
Metallie iron.....	62.915	62.930	52.649	49.332
Phosphorus.....	0.111	0.085	0.078	0.053
Sulphur.....	0.05	0.132	0.110	0.03
Metallie manganese.....	Trace.	0.091	0.56	Trace.
Specific gravity.....	4.74	4.59	3.88	4.09

This table shows that, except the soft hematite III., which contains about five per cent. of water, all the ores are essentially or chiefly composed of oxide of iron and silica or insoluble silicious matter. The other elements, namely, oxide of manganese, alumina, lime, magnesia, sulphur, phosphoric acid, and water, amount in the aggregate to only about five per cent. in the I., II., and IV. classes. So constant is this ratio that a valuable determination of iron in a hard ore, and one sufficiently accurate for practical purposes, can be made by ascertaining the percentage of insoluble silicious matter, adding five to it, and subtracting the sum from 100.

Regarding the percentage of metallic iron, consumers of lake Superior ores will at once note that their furnace books often show a higher yield than 62.9

per cent., which is given in the table as the average percentage for first-class ores. This discrepancy is easily accounted for: The chemist's result is in *pure metallic iron*; the furnace man's is in *pig iron*, which contains several per cent. of carbon and siliceous, and other substances. Therefore, the chemist should always find *less* iron than is shown by the furnace accounts, if he has an average sample of the ore. Just what this difference is, depends on the grade of iron made, on the waste in the slag, and other things; good authorities have placed it at $2\frac{1}{2}$ per cent.

The analyses of ores from other parts of the country cannot be conveniently reproduced here.

PHOSPHORUS IN LAKE SUPERIOR ORES.

Pig iron, intended for the use of steel makers, must be remarkably free from phosphorus, one-tenth of one per cent., according to some authorities, being the maximum amount allowable for many purposes. As it has been found impossible, up to this time, to eliminate this element from the metal either in the blast furnace or in any of the various processes for making steel, it is indispensable, in steel manufacture, that we start with an ore comparatively free from it; and for the best bar iron, only a small amount of phosphorus is admissible, its effect being to produce cold-shortness. The distribution of phosphorus among the lake Superior ores, it is stated, so far as facts go, follows no obvious law; it seems to have little, if any, relation to the kind of ore. Some of the hematite ores are among the lowest, and others among the richest in this element, and so of the specular and magnetic ores. A rule, but to which there are exceptions, seems to be, that the ores poor in iron and rich in silica contain least phosphorus. But while a rich ore may contain more phosphorus than a lean one, it may yet produce a pig iron containing less phosphorus, because less of the rich ore is required to make a ton of iron. The interest in the subject, in connection with the Bessemer steel manufacture, leads to the introduction of a tabular statement, in which the mines are arranged in order of the quantity of phosphorus, beginning with the lowest. No mine is included from which less than two samples have been analyzed.

MINE.	Kind of Ore.	Phosphorus.	Iron.
Lake Angeline	Jaspersy Specular	0.031	53.83
Wintthrop	Soft Hematite	0.037	54.63
Silas C. Smith	Hematite	0.047	49.70
Cascade	Flag	0.053	49.332
Edwards	2d class Magnetic	0.055	49.190
Macomber	Hematite	0.058	54.92
Cascade	Flag and Specular	0.061	51.253
Jackson	Specular	0.066	63.715
Edwards	Magnetic	0.067	61.60
Shenango	Hematite	0.070	56.315
Champion	Magnetic and Slate	0.072	63.55
Lake Angeline	Hematite	0.079	50.70
Foster	Hematite	0.094	52.27
Lake Superior	Specular	0.104	62.11
Jackson	Hematite and Jaspersy	0.124	57.155
Cleveland	Specular	0.126	61.092
Barnum	Specular	0.134	61.69
Washington	Magnetic	0.141	61.305
New York	Specular	0.224	61.74

By
by the
ores, w
is give
phosph
given a

CHIEF

Magnes
Siliceo
Silicon
Graphit
Combin
Metalli
Phosph
Sulphur
Metalli

I. w
near fu
Superio
Applet
pany, a
in the r

The
Lake Su
the rest
tensity
experim

Iron fro
" "
" "
" "
" "

A ge
summar
1845 of
duced an
from ove
reductio
circumst
shipped
amount
pig iron

ANALYSIS OF PIG IRON.

By way of verifying the results as to the percentage of phosphorus, as shown by the last table, the results of five analyses of pig iron, made from the same ores, with charcoal, and a flux containing no appreciable amount of phosphorus, is given. The analyses are deemed to indicate very accurately the amount of phosphorus in the ores, which, as will be seen, averages about the maximum given as admissible in steel.

CHEMICAL PROPERTIES.	I.	II.	III.	IV.	V.	Average.
Magnesia			0.47			
Silicic acid or silica		1.16	1.83	3.21	2.91	2.28
Silicon	2.245					
Graphitic carbon	2.88	3.72	3.35		3.61	3.39
Combined carbon	0.80	0.30	0.00		0.05	0.38
Metallic iron	93.201		93.49			93.34
Phosphorus	0.138	0.104	0.082	0.126	0.092	0.108
Sulphur	0.011	0.045	Trace.		0.04	0.030
Metallic manganese	0.174					0.174

I. was chipped from many pigs of No. 1 gray foundry iron, made at the Pioneer furnace, Negaunee, of Jackson ore. II. is a pig iron made from assorted lake Superior ores, at the Appleton furnace, Wisconsin. III. is also a specimen of Appleton iron. IV. is No. 1 gray foundry iron made by the Jackson Iron Company, at Fayette, Michigan, of Jackson ore, with charcoal, and is extensively used in the manufacture of Bessemer steel.

COMPARATIVE STRENGTH OF DIFFERENT KINDS OF IRON.

The "New York Engineer," of August 1, 1857, in an article on the subject of Lake Superior iron, says: "To show the comparative quality of this iron, we give the result of the various experiments of Professor Walter R. Johnson, on the tensile of bar iron, from localities both at home and abroad." The result of the experiments is shown as follows:

	Strength per lb. Square inch.
Iron from Salisbury, Ct., by means of 40 trials.....	58,009
" " Sweden, by means of 4 trials.....	58,184
" " Center Co., Pa., by means of 15 trials.....	59,400
" " Essex Co., N. Y., by means of 4 trials.....	59,962
" " Lancaster, Pa., by means of 5 trials.....	58,561
" " Russia, by means of 5 trials.....	76,069
" " Carp River, lake Superior, by means of 1 trial.....	59,582

SUMMARY OF THE IRON PRODUCT.

A gentleman familiar with the history and progress of the iron mines, thus summarises their products: Beginning with a product from the Jackson mine in 1845 of about 5,000 tons—the only work done in the entire district—there was produced and shipped from the lake Superior iron mines in 1873, over 1,100,000 tons, from over seventy mines then working. The financial panic of that year, and the reduction of price, has since curtailed operations, although under these unfavorable circumstances, and in the third year of financial depression in 1875, there was shipped over 800,000 tons from thirty mines. These figures are additional to the amount used in blast furnaces in the district, and which is included in product of pig iron, as follows: First product, one furnace, 1,627 tons in 1858, representing

3,200 tons of ore; last reported, 1874, seventeen furnaces turned out 90,500 tons of pig iron, the product of 180,000 tons of ore. The total manufacture of pig iron in that district, from 1858 to 1875 inclusive, was 600,000 tons, representing 1,200,000 tons of ore. The total amount of ore shipped to same date being 8,500,000 tons, makes the yield of the district in ore, up to December 1, 1875, as near as may be, *nine and a quarter millions of tons*, the value of which, at place of shipment, has been near *seventy million dollars*.

PRODUCT OF THE DIFFERENT MINES.

The three tables following, show the number of tons of ore shipped from the several mines for the years given. The first two are taken from chart XII, accompanying the geological survey, to and including 1872. The figures since then are furnished by Mr. H. B. Tuttle, of Cleveland, Ohio, and are taken from statements published from time to time in the Marquette Journal. From the same source the facts of the third table are derived, showing the products in gross tons, of mines not reported in 1872:

TABLE I.

YEAR.	Jackson.	Cleveland.	Lake Superior.	New York.	Lake Angeline.	Marquette.	Foster.	Washington.	Iron Mountain.	New England.	Edwards.
1854*.....	25,000	3,000	.....	.....	.....	60,850	.....	.....	.....	.....	.....
1855.....	447	1,449	.....	.....	.....	.....	.....	.....	.....	.....	.....
1856.....	447	6,343	.....	.....	.....	.....	.....	.....	.....	.....	.....
1857.....	12,422	13,204	.....	.....	.....	.....	.....	.....	.....	.....	.....
1858.....	10,309	7,909	4,655	.....	.....	.....	.....	.....	.....	.....	.....
1859.....	28,377	15,787	24,668	.....	.....	.....	.....	.....	.....	.....	.....
1860.....	41,295	40,091	33,015	.....	.....	.....	.....	.....	.....	.....	.....
1861.....	12,919	11,795	25,195	.....	.....	.....	.....	.....	.....	.....	.....
1862.....	40,635	40,364	37,709	.....	.....	.....	.....	.....	.....	.....	.....
1863.....	77,237	46,842	78,976	.....	.....	.....	.....	.....	.....	.....	.....
1864.....	83,905	44,959	88,773	8,000	19,500	.....	.....	.....	.....	.....	.....
1865.....	65,505	33,355	50,201	12,214	20,151	.....	.....	4,782	898	.....	.....
1866.....	92,287	42,680	68,002	33,761	24,073	.....	.....	15,150	68,060	3,150	2,843
1867.....	127,491	75,864	119,935	43,302	46,607	.....	.....	25,440	5,000	9,075	4,928
1868.....	130,524	102,112	105,745	45,665	26,651	7,977	† 6,000	35,757	3,833	8,257	17,300
1869.....	125,908	106,133	125,560	71,456	39,694	2,497	14,540	63,229	.....	14,148	21,450
1870.....	127,642	132,884	109,582	94,809	53,467	3,702	23,458	79,762	.....	24,871	24,232
1871.....	132,297	142,658	158,047	76,381	33,645	.....	13,532	48,725	.....	33,359	26,437
1872.....	118,842	151,724	188,070	68,950	35,221	11,974	18,684	38,841	.....	17,465	29,026
1873.....	113,892	132,082	166,665	70,882	43,533	2,148	27,372	38,014	112	181	31,730
1874.....	105,660	108,580	114,074	77,010	31,526	.....	3,318	28,390	.....	.....	2,849
1875.....	90,568	133,875	129,330	70,745	26,370	3,088	667	9,941	1,635	.....	12,800
Total.....	1,568,365	1,393,690	1,680,215	673,275	400,838	93,236	107,571	387,731	18,341	110,566	170,655

* And prior. † Previous to 1860.

TABLE II.

YEAR.	Champion.	Barnum.	Winthrop.	Meccumber.	Grand Central.	Negaunee.	Cascade.	Saginaw.	Silas C. Smith.	Republic.	Miscellaneous.
1868.....	6,255	14,383	.....	.....	.....	.....	.....	.....	.....	.....	.....
1869.....	7,414	37,503	.....	.....	.....	.....	.....	.....	.....	.....	.....
1870.....	73,101	44,793	3,460	4,866	1,869	.....	.....	.....	.....	.....	1,806
1871.....	67,588	45,939	7,319	15,942	2,921	4,787	3,719	.....	.....	.....	83
1872.....	70,588	39,137	14,239	25,030	9,225	9,154	39,495	19,160	13,445	11,025	6,949
1873.....	72,782	43,076	33,549	38,909	6,629	.....	20,507	37,139	9,328	105,452	3,704
1874.....	46,769	41,403	8,242	2,641	.....	.....	16,931	45,486	.....	126,956	2,184
1875.....	57,979	43,209	7,502	10,407	987	.....	4,071	55,318	187	119,763	282
Total.....	412,536	295,443	74,317	97,855	22,271	13,941	84,723	157,003	22,960	363,201	13,170

NAME

Rollin
Allen.
Hartm
Kloma
Pittsb
Lak
Spurr
Michi
Keyst
Himro

Th
each
the la
same
repro
betwe
by ha
ment

Jack
New
Cleve
Lake
Cham
Washi
Repub
Kloma
Casc
Barn
Foste
Salisb
Lake
Edwar
Spurr
Michi
Keyst
McCo
Winth
Sagin
Good
Rollin
Exec
Marqu
Grand
Iron M
Smith

* No

MINERAL RESOURCES.

67

TABLE III.

NAME OF MINE.	1872.	1873.	1874.	1875.	NAME OF MINE.	1873.	1874.	1875.
Rolling Mill.....	6,772	11,319	16,643	37,806	Shenango.....	8,658	7,549	.....
Allen.....	8,707	510	130	.....	Carr.....	1,853	948	.....
Hartman.....	7,633	.....	.....	.....	Bagaley.....	12,770	541	.....
Kloman.....	.....	21,065	35,088	8,059	Howell Hoppeck.....	1,239	965	.....
Pittsburgh and Lake Superior.....	.....	21,498	1,362	.....	Emma.....	7,137	736	.....
Spurr.....	31,933	42,068	23,064	.....	Gribben.....	4,517	.....	.....
Michiganme.....	28,966	45,294	44,763	.....	Goodrich.....	3,258	3,100	1,780
Michigan.....	3,212	.....	.....	.....	Home.....	1,090	2,139	.....
Keystone.....	10,426	5,227	3,346	.....	Teal Lake.....	.....	2,610	.....
Hinrod.....	2,074	.....	.....	.....	Salisbury.....	.....	7,480	4,330
.....	.....	.....	.....	.....	Excelsior.....	.....	1,065	2,860

AGGREGATE SHIPMENTS OF EACH MINE.

The following table purports to give the shipments of ore, in gross tons, from each mine, from 1856 to 1875, inclusive. It comes through the same channel as the later facts given in the last preceding tables. It covers by aggregates the same ground, substantially, that is covered in detail by those tables, but it is reproduced here for two reasons: First, because there are some discrepancies between the several aggregates, which those interested may be able to reconcile by having their attention called to them; and second, because the one table below mentions some mines and their products that the other tables do not.

MINES.	Gross Tons.	MINES.	Gross Tons.
Jackson.....	1,507,285	Pittsburgh and Lake Superior.....	24,020
New York.....	669,426	Shenango.....	16,404
Cleveland.....	1,399,798	Albion.....	2,228
Lake Superior.....	1,690,320	Carr.....	2,621
Champion.....	412,397	Bagaley.....	6,243
Washington.....	384,964	Howell Hoppeck.....	2,205
Republic.....	363,261	Emma.....	7,863
Kloman.....	64,212	Home.....	3,229
Cascade*.....	80,749	Teal Lake.....	2,610
Barnum.....	269,665	Williams.....	1,040
Foster.....	105,138	Rowland.....	2,278
Salisbury.....	11,810	Hinrod.....	2,074
Lake Angeline.....	397,576	Green Bay.....	8,582
Edwards.....	168,456	Gribben.....	4,517
Spurr.....	97,095	New England.....	108,990
Michiganmi.....	119,164	Allen.....	9,347
Keystone.....	18,999	Magnetic.....	78
McComber.....	96,170	Hungerford.....	145
Winthrop.....	72,317	Parsous.....	1,896
Saginaw.....	157,103	Negaanee.....	11,687
Goodrich.....	8,138	Matner.....	2,228
Rolling Mill.....	72,540	Franklin.....	2,007
Excelsior.....	4,681	Michigan.....	4,439
Marquette.....	59,234	Quartz.....	3,108
Grand Central.....	22,371	Stewart.....	305
Iron Mountain.....	18,341	Other small mines.....	39,499
Smith.....	22,960	.....	.....
Total iron ore, all grades.....		8,555,156	

* Now called Palmer.

SHIPMENTS OF PIG IRON.

The following were the total shipments of pig iron from the lake Superior district to the close of navigation, 1875:

FURNACES.	Gross Tons.	FURNACES.	Gross Tons.
Pioneer	101,381	Bay	38,367
Northern	16,068	Mumising	22,625
Collins	43,949	Ishpening	1,150
Michigan	41,351	Menominee	10,852
Greenwood	40,202	Cliff	6,830
Baneroff	52,316	Escanaba	8,580
Morgan	54,665	Carp River	1,445
Champion	31,096	Grace	11,346
Deer Lake	25,139	Marquette and Pacific	20,790
Fayette	71,335		
Total shipments			*599,537

* Of which were shipped in 1875, 81,753 tons.

But six of the above furnaces are now running, one after another having stopped in 1875.

MINES AND FURNACES.

All the producing mines are named incidentally in the foregoing tables. The first of the following tables shows the name and the location by town, range, and section, of the mines in Marquette county producing 5,000 tons and over of ore, in 1875. The other table shows the ownership, location, capacity, etc., of furnaces, at the beginning of the present year.

PRINCIPAL PRODUCING MINES.

MINES.	Kind of Ore.	Town.	Range.	Section.
Jackson	Red Specular	47	27	1
Lake Superior	" " and Soft Hematite	47	27	9, 10, 16
Cleveland	" "	47	27	10, 11
New York	" "	47	27	3
Barnum	" "	47	27	9
Saginaw	" "	47	27	19
Lake Angeline	" "	47	27	15
Republic	Specular and some Magnetic	46	29	7
Champion	Magnetic chiefly, some Specular	48	29	31
*Washington	" " " "	47	29	1, 12
Edwards	" " " "	47	29	2
*Kloman	Specular and Magnetic	46	29	6
Spurr	Magnetic	48	31	24
Michiganum	"	48	30	19, 20
McComber	Soft Hematite	47	27	6, 7
Rolling Mill	" "	47	27	7
Winthrop	" "	47	27	21

* Suspended work in 1875, because of unremunerative prices.

IRON SMELTING FURNACES.

	OWNERS.	TOWN AND COUNTY.	Number of Stacks.	SIZE IN FEET.		FUEL.	POWER.
				Height.	Diameter of Bosh.		
UPPER PENINSULA.	Iron Cliff Co.....	Negaunee, Marquette Co.....	2	40	9%	Charcoal.....	Steam.
	Bancroft Iron Co.....	Marquette, " ".....	1	40	9	"	Water.
	Northern Iron Co.....	Chocolay, " ".....	1	45	9	"	Steam.
	Morgan Iron Co.....	Morgan, " ".....	1	41	9	"	"
	Michigan Iron Co.....	Ely, " ".....	1	41	9	"	"
	" ".....	" ".....	"	"	"	"	"
	Jackson Iron Co.....	Fayette, Delta Co.....	2	42 1/2	9 1/2	"	"
	D. L. Iron and Lumber Co.....	Ishpeming, Marquette Co.....	1	38	8	"	Water.
	Munising Iron Co.....	Munising, Schoolcraft Co.....	1	43	9	"	Steam.
	Bay Furnace Co.....	Onota, " ".....	1	41	9	"	"
	Escanaba Iron Co.....	Escanaba, Delta Co.....	1	56	12	"	"
	M. & P. Rolling Mill Co.....	Marquette, Marquette Co.....	1	62	15	Bituminous Coal	"
Lake Superior Iron Co.....	" ".....	1	60	17	Anthracite	"	
Carp River Iron Co.....	Ishpeming, " ".....	1	"	"	Peat and Charcoal	"	
Menominee Iron Co.....	Menominee " ".....	1	"	"	Charcoal.	"	
LOWER PENINSULA.	Peninsular Iron Co.....	Detroit.....	1	"	"	"	"
	Union Iron Co.....	" ".....	1	"	"	"	"
	Det. & L. Sup. Iron Mfg. Co.....	" ".....	1	"	"	"	"
	Wyandotte R. M. Co.....	" ".....	1	"	"	"	"
	Enreka Iron Co.....	" ".....	1	"	"	"	"
	Pigeon River Iron & Salt Co.....	Saginaw Bay.....	1	"	"	"	"
	Mich. Central Iron Co.....	Lawton, Van Buren Co.....	1	"	"	"	"
	Bangor Furnace Co.....	Bangor, Van Buren Co.....	1	"	"	"	"
	Frankfort Iron Co.....	Frankfort, Benzle Co.....	1	"	"	"	"
	Leelanaw Iron Co.....	Leelanaw, Leelanaw Co.....	1	"	"	"	"
Elk Rapids Iron Co.....	Elk Rapids, Antrim Co.....	1	"	"	"	"	

TRANSPORTATION.

Facts in regard to transportation, as related to mining interests, are embraced under the title "Transportation."

SALINE INTERESTS.

The first satisfactory evidence of the existence of saline water within the limits of Michigan, of a strength sufficient to make the manufacture of salt profitable, was obtained by Dr. Douglas Houghton, the first State geologist, previous to 1840.

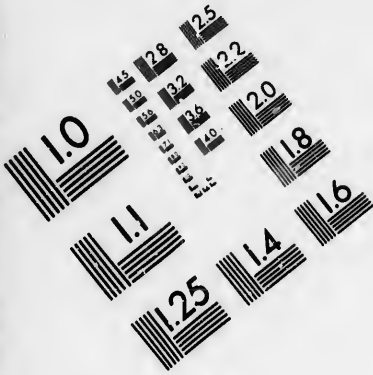
FIRST MANUFACTURE AND SUBSEQUENT DISCOVERIES.

The first successful experiments in salt manufacture were in the Saginaw Valley, in 1859, under the auspices of the East Saginaw Salt Manufacturing Company. Subsequent discoveries have been made at Saginaw City, Buena Vista, Carrollton, and Zilwaukie, in Saginaw County; at Bay City and Bangor, in Bay County; at Caseville, Port Austin, and White Rock, in Huron County; at East Tawas and Baldwin, in Iosco County; and at Mount Clemens, in Macomb County. The amount of production at the various points will appear in the statistical tables.

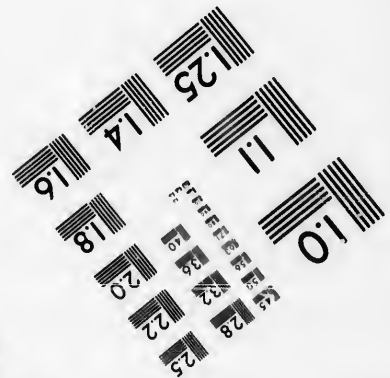
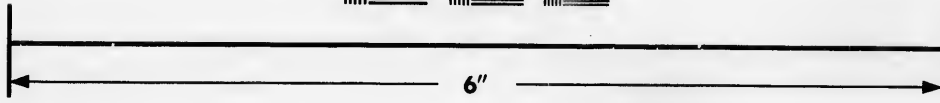
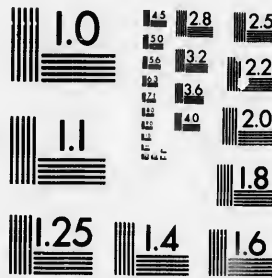
COMPARATIVE PROGRESS IN SALT MANUFACTURE.

The fact is authoritatively stated, that greater progress was made in the manufacture of salt in Michigan in four years, than in the Kanawha Valley in fifty years, and greater progress in the former in five, than at the Onondaga Salt Springs in forty-two years succeeding 1797. Much of this progress was doubtless due to





**IMAGE EVALUATION
TEST TARGET (MT-3)**



**Photographic
Sciences
Corporation**

23 WEST MAIN STREET
WEBSTER, N.Y. 14580
(716) 872-4503

24
28
32
36
40
18
20
22
25

10
11

the wise policy of the Legislature in encouraging the manufacture by a small bounty, during the earlier years of the enterprise.

SALT BRINE DEPOSITORIES.

The Michigan Salt Group, and the contiguous sandstones above and below, particularly the Napoleon Sandstone, have thus far proved to be the principal sources or depositories of the brines discovered. These have proved extremely rich, even more so than the most sanguine anticipated.

Encouraged by the information furnished by the geological surveys, boring in several localities has been extended to another group of rocks, much older and lower than the preceding, namely, the Onondaga Salt Group—the representative in this State of the group so called in New York—and though their productiveness is not yet perhaps satisfactorily established, sufficient encouragement has been received to afford reasonable hopes that these rocks may yet yield a supply of salt sufficient to render them a source of profit, thus adding immensely to the saline wealth of the State. In regard to those portions of the State which shall prove productive in rich brines, much remains for future exploration to develop.

SALT INSPECTION.

The salt manufacture of the State is under a system of inspection established by law, at the head of which is the State Inspector, with deputies at such points as may be required.

GRADES AND QUALITY OF MICHIGAN SALT.

The salt product has been defined by the Inspector according to the following grades:

Fine.—In barrels 280 lbs. suitable for general use for all family purposes.

Packers.—In barrels 280 lbs. suitable for packing and bulking meat and fish. One of the best and purest grades of salt, and branded when coarse, "C Packers C."

Solar.—In barrels 280 lbs., when screened, branded "C Solar C," for Coarse, and "F Solar F," for finer grades. The solar salt is equal in all respects to Onondaga solar salt.

Second Quality.—All salt intended for No. 1, of any of the above grades, when for any cause it is condemned by the Inspector, is branded, "Second Quality," and sold as such. This salt is good for salting stock, hay, hides, etc.

As to the quality of Michigan salt, the Inspector, in his report for 1872, says: "From all points reached by Michigan salt, we are having the most favorable reports of its quality, and it is rapidly taking the precedence in all the markets of the west."

ANALYSES OF BRINES AND SALT.

The following analyses of Michigan brines from various localities, will show their constituents:

<i>Saginaw City.</i>		<i>East Saginaw.</i>	
Depth of well 830 ft.—Salometer 86°.		Depth of well 806 ft.—Salometer 80°.	
Lime Sulphate.....	0.098	Lime Sulphate.....	0.1516
Calcium Chloride.....	2.643	Calcium Chloride.....	2.2665
Magnesium Chloride.....	1.069	Magnesium Chloride.....	0.9629
Sodium Chloride.....	17.510	Sodium Chloride.....	16.8639
Water.....	78.680	Water.....	79.7554
Total.....	100.000	Total.....	100.0000

<i>Bangor Salt Company, Bangs, Bay Co.</i>		<i>White Rock, Huron Co.</i>	
Depth of well 774 ft.—Salometer 95°.		Depth of well 575 ft.—Salometer 82°.	
Lime Sulphate.....	0.0722	Lime Sulphate.....	0.2922
Calcium Chloride.....	2.9611	Calcium Chloride.....	0.5873
Magnesium Chloride.....	1.2612	Magnesium Chloride.....	0.4106
Sodium Chloride.....	19.8545	Sodium Chloride.....	18.9134
Water.....	75.8460	Water.....	79.9764
Total.....	100.0000	Total.....	100.0000
<i>East Tawas, Isco Co.</i>		<i>Analysis of Michigan Fine Salt.</i>	
Lime Sulphate.....	0.0350	Chloride Sodium.....	97.268
Calcium Chloride.....	3.4843	“ Calcium.....	0.329
Magnesium Chloride.....	1.2433	“ Magnesium.....	0.340
Sodium Chloride.....	15.6141	Sulphate Lime.....	0.697
Water.....	79.6233	Moisture.....	1.300
Total.....	100.0000	Insoluble matter.....	0.046
		Total.....	100.000

The last table shows the chemical constituents of Michigan fine salt, as distinct from the analyses of brines. The analyses of brines was made by Prof. C. A. Goesmann, Ph. D., of Amherst, Massachusetts, with the view of ascertaining their commercial value. The analysis discloses traces of iron and bromine, and compounds of potassium.

SALT PRODUCT FOR A SERIES OF YEARS.

The annual salt product of the State from 1860 to 1875, both inclusive, was, in barrels, as follows: 1860, 4,000; 1861, 125,000; 1862, 243,000; 1863, 466,356; 1864, 529,073; 1865, 477,200; 1866, 407,077; 1867, 474,721; 1868, 555,690; 1869, 569,688; 1870, 628,979; 1871, 732,437; 1872, 724,481; 1873, 823,346; 1874, 1,026,979; 1875, 1,081,865.

MECHANICAL AND CHEMICAL VALUE OF SALT REFUSE.

Bromine can be separated from the magnesia, with which it is combined, and is now very extensively used in the arts and in pharmacy, as a basis for a large number of bromine salts, such as bromide of ammonium, bromide of cadmium, bromide of iron and bromide of silver, much used in photography. Bromide of calcium and bromide of potassa, have become very valuable medicinal remedies. Over 130,000 lbs bromine are produced in the United States, from the preparation of the above salts. Bromine itself is a very valuable disinfectant, and is largely used in the army hospitals in the treatment of gangrene, etc.

Chloride of Magnesium, found in the bitter water, can be used for the preparation of hydrate of magnesia, carbonate of magnesia, and other magnesian salts, the magnesia being precipitated by adding a solution of caustic lime.

Chloride of Calcium has a value in its use for the manufacture of artificial stone. The chloride of calcium and magnesium are contained in the bitter waters, and are generally deposited as a double salt. It is well known that a mixture of sand, magnesia and this bitter water, will form a strong mortar, which soon hardens, and when moulded in blocks makes a good artificial stone. The manufacture of artificial stone of the best quality, could be started with the most flattering results, from the bitter waters of our salt works.

Soda and Soda Salts.—Bicarbonate of soda, carbonate of soda (washing soda), caustic soda, are all made from salt. Recent improvements in the manufacture of soda by the decomposition of salt brine, have been made.

STATISTICS OF MICHIGAN.

CENSUS STATISTICS OF SALT PRODUCTION.

The census report for 1874 shows the following statistics of salt manufacture for the preceding year:

STATE AND COUNTIES.	Whole Number.	No. Persons Employed.	Capital Invested.	Value of Products.
STATE	55	869	\$1,347,500	\$1,119,255
Bay	17	278	472,000	431,500
Huron	3	65	65,000	65,000
Iosco	1	8	20,000	25,000
Saginaw	34	518	790,500	597,755

The salt works are mostly operated by steam, the offal from lumber mills furnishing cheap and abundant fuel.

SLATE.

Among the other natural resources of the Upper Peninsula, the slate quarries are assuming importance. The Huron Bay Slate and Iron Company, whose field of work is on Huron bay, twelve miles from L'Anse, commenced operations in 1874, and have invested about \$100,000 in opening the quarry and getting in working order. The slate produced is rapidly making its way into market in Detroit, Chicago, Milwaukee, and other cities of the Northwest. Black, purple, green, and all varieties of slate, are produced. Chicago architects regard it as the finest roofing slate on the continent. A railway connects the slate quarries with the dock and harbor on the bay. Machinery for cutting and trimming the slate, and mechanically adapting it to all purposes for which slate is used, is to be put in the present year.

OTHER MINERAL PRODUCTS.

Coal, plaster, and building stone, are prominent among the partially developed mineral resources of the State. The State census report shows the following statistics (quite incomplete) of these commodities:

COAL MINES.

STATE AND COUNTIES.	No. of Mines.	Men Employed.	Capital Invested.	Amount of Product.	Value of Product.
STATE	4	85	\$216,999	*25,732,000	\$60,250
Eaton				400,000	600
Ingham	1	30	43,000	9,000,000	18,000
Jackson	1	14	5,450	2,200,000	2,650
Shiawassee	2	41	168,549	14,132,000	39,000

PLASTER MINES.

STATE	4	198	\$300,000	†128,000	\$179,000
Iosco	1	75	50,000	30,000	60,000
Kent	3	123	250,000	98,000	119,000

* Pounds. † Tons.

BUILDING STONE QUARRIES.

STATE AND COUNTIES.	No. of Mines.	Men Employed.	Capital Invested.	Amount of Product.	Value of Product.
STATE.....	20	107	\$145,600	*398,776	\$43,882
Calhoun.....				3,000	600
Eaton.....				5,000	2,000
Huron.....	3	10	3,000	192,000	650
Ingham.....	4	4	200	79,800	
Ionia.....	1			4,000	1,400
Jackson.....	2	9	6,000	12,000	4,200
Marquette.....	1	10	15,000	74,000	33,000
Monroe.....	2	65	120,000	28,976	2,032
.....	7	9	1,400		

* Cubic feet.

MISCELLANEOUS MINERAL RESOURCES.

Under the head of "Economical Geology," Prof. Winchell (see Walling's Atlas) enumerates fourteen different classes of geological or mineral productions found in the State that connect themselves with the economic uses of life. Under the head of "Metals and their Ores," he enumerates iron, copper, silver, lead, gold, and manganese. In salt, the value of its residuary properties are mentioned, as in the article on that subject, preceding. For chemical uses, iron pyrites, suitable for alum-making, are noticed in the Huron group. Limestone suitable for fluxing, is said to exist in the Trenton and Huronian rocks of the Upper Peninsula, and in the limestones of the Lower Peninsula. For agricultural uses, gypsum, marl, and peat, exist. For minerals used as pigments, iron and manganese ochres, in the bogs and marshes. In combustibles, are coal, bituminous shale, petroleum, and peat. Refractory materials are represented by sandstone, fire-clay, moulding and white sand; the latter in the township of Raisinville, Monroe county, and in the Woodville sandstone, in Jackson county. From the point first named it is shipped extensively, and used by iron manufactories for "fire sand," and in Pittsburg, Detroit, and other points, for the manufacture of flint glass, the shipments for these purposes averaging from 2,000 to 4,000 tons per annum. Materials for bricks, etc., exist in the form of clay, capable of producing, in different localities, common, buffish, and white bricks; also, pottery, tile, etc. For cements and mortars, hydraulic limestone, stone for quick lime, and plaster. In grinding and polishing materials, are gritstones, honestones, and polishing powders. For building materials, the granite, syanite, dlorite, gneiss, etc., of the Upper Peninsula, are pronounced equal to any in the world; of sandstones, the brown, reddish, and mottled, bluish and gray, buffish, and whitish freestones, are enumerated; also, limestones, sand and gravel, and boulders. For ornamental purposes are marbles, statuary, mottled, and coralline; alabaster, white and clouded; precious stones, as agates, jasper, chalcedony, chrysocalla, chlorastralites, etc. The mineral waters, found both in spontaneous springs and by artesian borings in different parts of the State, are classified as saline, carbonated, and sulphur waters. For miscellaneous uses, lithographic stones, stationers' sand, and paving stones, are named.

X. FISHERIES.

The insular position of Michigan, and its large number of interior lakes, suggest the fishing interest as one of its prominent features. Fish culture, so far as the hatching and deposition of the young fishes is concerned, has its place among the recognized modern arts. To what extent the fishes thus deposited may reach maturity, so as to be of value, is perhaps yet in the realm of experiment, but it is an experiment which the State of Michigan is giving a thorough trial through her fish commission. Her inland lakes, the most of them, are equal to the great lakes on her borders for depth and clearness, and with the practical value of fish culture proven, the water area of the State will be not less productive of life-sustaining food than an equal extent of land area. The stock of native fishes in the inland waters still exists in liberal supply as a source of local pleasure and use, and the commercial fisheries within the larger waters form a most important branch of industry.

EXTENT OF MICHIGAN FISHERIES.

Mr. Milner, in his report on the lake fisheries, page 3 of appendix to report of United States Commission of Fish and Fisheries, 1872-74, says: "The fisheries of the lakes are an industrial interest of large extent and considerable commercial value, of which little is known except among those directly interested. * * * Though the risks and uncertainties of this vocation make the yearly income very variable, the investments of fishermen in their stocks are quite respectable sums, and compare favorably with the farming communities, being all the way from \$300 to \$20,000, their sales reaching in some instances as high as \$7,000 from their own nets. This refers to those men only who actually superintend their own fisheries. A few dealers who furnish the nets on shares sell five or six times as much in a year."

CAPITAL INVESTED AND MEN EMPLOYED.

Mr. Milner gives the following schedule of investments in fishing stocks on lake Michigan in 1877:

281 pound-nets, average value \$500	\$140,500
102 gill-nets, "heavy rigs," average value \$725	73,950
348 gill-nets, "light rigs," average value \$225	78,300
98 boats, average value \$500	49,000
348 Mackinaw boats, average value \$100	34,800
143 pound-net boats, average value \$50	7,150
100 anchor boats, average value \$25	2,500
4 steam fishing boats, average value \$1,800	7,200
1 schooner	3,000
500 shanties, average value \$50	25,000
100 ice houses, average value \$100	10,000
Total of fishing investment	\$431,400

The number of men employed is stated in round numbers at 2,000, and the working capital at \$150,000.

The foregoing is for lake Michigan alone, and gentlemen in the trade estimate that fully two-thirds of the fishing interest on that lake centres in the State of Michigan.

AMOUNT AND KINDS OF FISH TAKEN.

Mr. Milner gives a tabular exhibit of the amount of fish handled at different points on the lakes, classified as follows:

*Hard fish, pounds	13,640,927
†Soft fish, "	2,387,808
‡Mixed fish, "	1,153,205
Lake herring, pounds	4,122,621
Sturgeon, "	745,647
Salt fish, pounds	10,199,800

As no Canadian or lower lake ports are named, this exhibit is presumed to comprise only American waters, and upper lake ports. What proportion belongs to Michigan there is no means of determining, unless the extent of her coast line may afford an approximation. Mr. Milner estimates that the totals as given are fully 25 per cent. below the actual production, for reasons which he gives.

FISHING AT GRAND HAVEN.

Hon. J. A. Leggat, mayor of the city of Grand Haven, furnishes the following memoranda of the fishing industry centering at that point.

There are employed five steam fishing boats, valued, with outfit, nets, etc., at \$7,500 each, and eight sail boats, \$2,000 each, aggregating \$53,500. The steamers employ eight, and the sail boats six men, each. Two men additional are required for each boat in cleaning, packing, and handling, making a total of 114 men. Averaging families at four and a half persons each, gives a total of 484 persons engaged directly and indirectly in the business. The steamers work coastwise sixty to seventy miles each way, and as far as thirty miles from shore. The steamers average 270 days per season, and the sail boats 220.

The fish taken are chiefly whitefish and trout, averaging about as follows:

5 steamers, 125,000 lbs. each	625,000
8 sail boats, 70,000 lbs. each	560,000
Total	1,185,000

The average price received for the fish delivered on cars and boats is four cents per pound, net. There are also about 300 barrels of oil made from the offal and poor fish. Aggregate values stated:

1,185,000 lbs. fish, 4c	\$47,400 00
10,000 gallons oil, at say 55c	5,500 00
Total per season	\$52,900 00

The fish are mostly sold fresh at Chicago, Milwaukee, St. Louis, and other accessible markets.

* Includes wall-eyed pike, or pickerel, black bass, lake pike, salmon trout, white fish, and such of the skinned catfish as sell for the highest prices in the market.
 † Includes the sanger, white bass, suckers, and carp.
 ‡ Includes all kinds enumerated above.

SAGINAW AND VICINITY.

The catch of the fisheries of the Saginaw river, bay and shore last year is estimated at 22,000 barrels. The most extensive fisheries are at Au Sauble.*

CENSUS REPORT OF FISHERIES.

The State census report for 1874 states the amount of capital invested in fisheries at \$334,091, and the catch for the previous year at 167,710 barrels. This is distributed among thirty-seven counties—or, speaking in general terms, the entire of the shore counties of the State.

CURING AND MARKETING OF FISH.

Fish are marketed fresh, salted, and "frozen." The freezing process is a lately invented one, by which the fish are packed as if in barrels, and frozen. One firm in Detroit packed 1,500 barrels during the fishing season of 1875 for the succeeding winter's trade. The same firm, during the season of navigation, handles weekly about fifteen tons of fresh whitefish and trout. These fish are dressed, so far as having the entrails removed, and are packed and transported for long distances in portable ice boxes. In Detroit river a large business is done in the whitefish trade by means of pens or "pounds," being simply enclosures made by driving stakes into the bed of the river sufficiently close to prevent the escape of fish, but with openings into which the fish run or are driven during their passage in the fall of the year. By this means they are secured and sold fresh, as there may be a demand for them during the winter. A low average estimate of the fish thus annually secured, places the number at 180,000. The fish find a ready market in cities east, west, and south.

FISH CULTURE AND PROTECTION.

This sketch of the fisheries of Michigan may very properly be closed with some notice of the steps taken by the State to increase the product of the fisheries and protect them from needless waste.

THE STATE FISH COMMISSION.

At the legislative session of 1873, an act was passed creating a Board of Commissioners "to increase the product of the fisheries." The act appropriated \$7,500 for each of the years 1873 and 1874. At the session of 1875 the appropriation was made \$7,000 per year for that and the following year, and the constitution of the Board somewhat changed. The Board as first organized consisted of the Governor, Hon. John J. Bagley, Mr. George Clark, of Ecorse, in Wayne county, and Mr. George H. Jerome, of Niles. As at present organized, the Board consists of Hon. Eli R. Miller, of Richland, Kalamazoo county, President, Mr. Clark, of Ecorse, and Mr. Andrew J. Kellogg, of Detroit, with Mr. Jerome as Secretary and Superintendent. The expenditures were: In 1873-4, \$7,360 81; in 1874-5, \$6,319 67; and in 1875-6, for the greater part of the year, which ends June 30, \$6,000.

PROPAGATION AND DISTRIBUTION OF FISH.

Mr. Jerome, who has been Secretary of the Board of Fish Commissioners from the first, supplies the essential facts of the operations of the Board. Fish arti-

* Saginaw Courier review of the business of the Valley, 1876.

pecially propagated have been distributed through the lakes and rivers of the State during the three years' work of the Board, in numbers as follows:

	1873-4.	1874-5.	1875-6.
Atlantic salmon			
California salmon.....	220,000		
Land-locked salmon.....	80,000	750,000	800,000
Shad.....		3,000	18,000
Whitefish.....	210,000	205,000	
	*1,750,000	2,700,000	8,500,000
Totals	2,260,000	3,658,000	9,318,000

* Approximately.

Or a grand total of 15,236,000. The Board have two "hatcheries," one at Pokagon, in Cass county, and the other in the city of Detroit, and from these hatcheries or fish nurseries, for such they are, have been obtained most of the supplies that go to make up the foregoing numbers, although some have been purchased from outside. The distribution has included some five hundred of the inland lakes, and the connecting and outflowing streams and coast-line waters in those parts of the State where exhaustion of the native stock of fishes is likely first to occur.

PROTECTION AND PRESERVATION OF FISH.

The importance of the fishing interests of the State has led to the enactment of general laws for fish protection and preservation, for the enforcement of which certain special powers are conferred upon the Board of Fish Commissioners.

XI. WATER POWER.

To the absence of water within given limits of great extent, is due the great deserts that occupy a considerable part of the earth's surface. A region of country that is not watered at all, is a desert. A region that is insufficiently watered is subject to droughts that impair its productive capacity. The proximity of large bodies of water serves to equalize climatic conditions and to ensure productiveness. The permeation by water-courses and smaller bodies of water, is to a country what the arterial system is to the animal economy. In its hydrographic features, Michigan is at opposites with the regions of desert. Her position with reference to the great lakes is elsewhere noticed. So also her inland waters, with reference to beauty of scenery and transportation.

WATER AS A MOTOR.

The design under this head is to call attention to a single feature, namely, the material advantages arising from the numerous rivers and water-courses that traverse the State. The amount of labor that they are capable of performing, and are made to perform, is incalculable. This power is being made available as fast as there is a demand for it, although but a comparatively small part of it has as yet been put to use. This with more especial reference to the Lower Peninsula. In the Upper Peninsula very little use has as yet been made of water power, except in a few instances in connection with mining operations.

THE WATER SHEDS.

First, as to the summit levels, which are essential in showing the descent of the streams toward the great lakes on either side of the peninsula. In general terms, it may be said that in the lower peninsula, the waters flow eastward to lakes Erie and Huron, and westward to lake Michigan. A depression, however, extends from Saginaw bay southwestwardly to Grand Haven, forming the valleys of the Saginaw and Grand Rivers, and drawing to it from the northward and southward the confluents of those rivers. Along this depression the land elevation ranges from one hundred to two hundred feet above the level of the waters of lakes Michigan and Huron, while north and south of it the elevations are much higher, marking as high as eleven hundred feet on the line between Otsego and Antrim counties, and over six hundred feet at two or three points in Hillsdale county. These are extreme elevations, but they indicate a sufficient mean elevation* forming a water divide north and south through the peninsula to afford ample head or fall for mill purposes.

DISTRIBUTION OF WATER POWER.

It would be impossible, without very great labor, to enumerate all of the rivers of Michigan that furnish hydraulic power. Those given below are taken from the map by following the coast line. Many strictly interior rivers and creeks, that are the confluents of those named, are, from their size and capacity, equally entitled to mention. Nor is entire accuracy claimed as to points touched upon.

THE EASTERN AND NORTHERN SLOPE.

Starting from the southeast corner of the State, we have the river Raisin, emptying into lake Erie at Monroe; the Huron, seeking the same outlet on the line between Wayne and Monroe counties; the Rouge, emptying into Detroit river a short distance below Detroit; the Clinton, seeking lake St. Clair by way of Mount Clemens; the Black river, reaching lake Huron at or near Port Huron; the Willow and Partridge rivers, reaching the same outlet near the northern extremity of Huron county, and the Pine river, reaching Saginaw bay near Point au Sauble. Directing the eye on the map to Saginaw county, we find the Cass, Flint, Shiawassee, Bad and Tittabawassee rivers converging to form the Saginaw, and draining the Saginaw Valley as by a circle drawn from northeast to northwest, with the city of Saginaw for its approximate center, the Saginaw river debouching into Saginaw bay. Passing up the bay, we find the Potato, Sagamin, Pine, Rifle, and

* Estimated by Higgins to be 160 feet above the lake level.

An Gros rivers, the latter, with numerous branches, emptying their waters into the bay. Up the lake coast are the An Sauble, Black and Devil rivers, and the Thunder Bay river, with its outlet at Alpena. At Duncan, near the extreme northern point of the Peninsula, the Cheboygan river flows into lake Huron, forming an outlet to Cheboygan, Mullett, and Burt's lakes, with the numerous streams flowing into them.

THE WESTERN AND NORTHERN SLOPE.

In the south-west corner of the State, the St. Joseph river finds an outlet into lake Michigan at the village of St. Joseph, and the Paw Paw river at or near the same place. Up the lake shore are three streams called Black river, the first, with three important branches, emptying at South Haven, the second at Amsterdam, and the third at Orinca. Coming back to Saugatuck, is the mouth of the Kalamazoo river; at Port Sheldon, the Pigeon river; at Grand Haven, the Grand River; at Sevastopol, the Muskegon; at Perryville, the White river; at Pentwater, the river of that name; at Ludington, the Pere Marquette; at Grand Sauble, the Grand and Little Sauble rivers; at Manistee, the Grand and Little Manistee rivers; at Traverse City, the Boardman river; while numerous small streams flow into Grand and Little Traverse bays, and into the lake northward to the straits of Mackinac.

EXTENT TO WHICH THE POWER IS UTILIZED.

The compiler has no means of judging of the capacity of the several streams for furnishing power for manufacturing purposes, beyond a limited personal knowledge, and the data furnished by the census report of 1874. This last (p. 367) gives a total of manufacturing establishments in the State operated by water power, of 1,601, although additional establishments in which water is used in connection with steam would increase the number to about 1,950, while for 462 establishments, the kind of power used is not reported. This number it is presumed includes flouring and saw mills, of which there were 1,000 the former and 419 of the latter. In Washtenaw county 44 establishments are reported as using water, with five others operated by water in part, giving a total of 49. Of this number about 30 are situated on the Huron river, a considerable number of which are within a distance of about as many miles, although the course of the stream would give a much greater distance. Before entering Washtenaw, the Huron does service in Oakland county, where it takes its rise, and in Livingston, and in Wayne county after leaving Washtenaw. In Oakland county, 55 establishments use water power, which is furnished chiefly by the Clinton and Huron rivers. Kent county has 74 water power manufactories reported, of which 26 are in the city of Grand Rapids, and 19 in one ward, while a considerable number of establishments in which the kind of power is not reported would add probably not less than twenty per cent. to the number. Allegan county is reported as having 52 water power establishments, of which 36 are on the Kalamazoo river within a distance of about as many miles. Calhoun county reports 44 water power establishments, of which over 30 are on, or driven by, the Kalamazoo river. In the twenty-eight counties constituting the four southern tiers, the number of water power establishments reported is 812, or nearly four-fifths of the entire for the State. These figures are not exhibited for the purpose of giving prominence to particular localities, but to show the driving power in those parts of the State where it has been but partially improved, as an indication of what it may be in

the whole State when it comes to be improved, as its distribution throughout the State is shown previously.

THE POWER PERPETUAL.

Doubtless as the country becomes improved, and the marshes, which serve as sponges to retain the water and equalize the supply, become drained, the capacity of many of the smaller streams will be diminished, but the great number of interior lakes, with which many of the rivers are connected, will always serve as reservoirs to keep up the supply during intervals of rain. At present steam is largely used in many places in consequence of the abundance of fuel, but as this becomes exhausted, the water-courses of Michigan will afford an unfailing source of power for manufacturing purposes, and a source of wealth which can neither be destroyed nor removed.

XII. MANUFACTURES.

The statistics of manufactures, which follow, are taken from the State census report for 1874. An examination of the returns of manufactories from a number of localities with which the writer is familiar, leads to the belief that the manufacturing industries of the State, as to their number and aggregate products, are but poorly represented by the census returns. These returns, however, have a value as showing the diversity and distribution of manufacturing industries, and they are largely copied for that reason. The compiler of the census, in his comments under the head of "products of industry," points out many discrepancies, and adds: "Suffice it to say here that of the thousands of mistakes in the census returns probably three-fourths were in items under this heading. A protracted correspondence has corrected many of these mistakes, but the compiler well knows that many and serious ones remain." In most of the tables, the number of manufactories, the amount of capital invested, and the value of products (for the year 1873) are given by counties. Generally, however, where the aggregate capital invested in any one county in any single branch of manufacture was less than \$5,000, the name of the county is omitted, and the figures aggregated under the head of "other counties."

Many industries that are properly manufactures, are included under other heads, and omitted from this: As, under "Mineral Resources" is included the smelting of iron and copper ores, the manufacture of salt, etc.; under "Lumber and Timber" is included lumber, lath, and shingle manufacture; under "Agriculture" is included dairy products, cider, wine, etc.

MANUFACTURES.

FLOURING MILLS; AND FLOUR MANUFACTURE.

STATE AND COUNTIES.	Whole Number.	POWER USED.			Persons Employed.	Capital Invested.	Runs of Stone.	Flour Made. (Barrels, 1873.)	Value of Product.
		Operated by Steam.	Operated by Water.	Not Reported.					
STATE.....	550	158	394	7	1,704	\$7,037,592	1,480	2,612,070	\$20,170,067
Alcona.....	1				4	5,000	1		6,000
Allegan.....	19	3	16		58	197,000	47	96,810	682,990
Alpena.....	1	1			5	2,500	1	225	2,250
Antrim.....	2		2		4	38,000	5	5,450	35,200
Barry.....	14	2	12		34	89,000	35	55,960	407,800
Bay.....	3	2	1		13	56,000	7	18,100	170,800
Benzie.....	2		2		2	6,000	3	300	3,600
Berrien.....	22	3	19		63	197,000	65	134,954	884,354
Branch.....	11	6	5		33	113,200	30	32,215	237,305
Calhoun.....	20	3	17		60	387,000	72	120,733	1,063,731
Cass.....	14		14		40	100,000	39	48,900	431,500
Charlevoix.....	1		1		1	3,900	1	250	2,400
Cheboygan.....	1		1		1	8,000	2	650	4,000
Clinton.....	11	5	6		26	70,000	25	28,480	220,034
Elton.....	12	3	9		28	120,000	31	26,940	236,540
Genesee.....	15	6	9		53	175,500	41	2,200	500,010
Gr. Traverse.....	3		2		7	24,000	5	8,000	71,000
Gratlot.....	3		2	1	7	24,000	5	8,000	71,000
Hillsdale.....	21	7	14		55	17,000	10	13,200	80,400
Huron.....	5	4			12	155,700	55	76,126	567,292
Ingham.....	11	6		1	36	24,000	8	3,800	22,900
Ionia.....	19	3	14	2	57	163,400	30	50,271	388,765
Iosco.....	1	1			4	204,500	50	62,800	431,300
Isabella.....	3		3		8	2,000	2		15,000
Jackson.....	22	7	15		31	19,000	6	8,160	68,250
Kalamazoo.....	15	2	13		68	319,400	71	173,700	1,577,660
Kent.....	27	3	24		88	203,000	45	138,600	891,250
Lapeer.....	16	9	7		85	418,800	69	159,250	1,339,025
Leelanaw.....	4		4		52	107,200	39	60,550	427,775
Lenawee.....	22	6	16		6	9,700	5	2,700	20,000
Livingston.....	16	4	12		59	278,500	68	91,032	655,800
Macomb.....	12	5	7		37	143,500	38	32,200	217,300
Manistee.....	4	3	1		38	106,000	32	56,750	435,000
Mason.....	1		1		12	21,000	5	1,900	20,500
Mecosta.....	5		5		1	5,000	2		
Monroe.....	13	4	8	1	12	48,000	10	8,400	69,000
Montcalm.....	8	1	7		38	102,500	36	54,675	323,590
Muskegon.....	5	2	3		29	115,500	21	38,610	317,580
Newaygo.....	4		3	1	16	80,000	10	54,100	498,000
Oakland.....	33	5	28		99	17,000	8	19,220	54,800
Oceana.....	5		5		8	291,500	93	146,100	967,400
Oseola.....	1		1		8	29,020	10	14,200	108,600
Ottawa.....	6	4	2		1	6,000	2	1,548	9,600
Saginaw.....	9	6	3		24	65,000	14	17,000	147,500
Sanilac.....	7	5	2		34	194,000	21	56,400	485,750
Shiawassee.....	8	2	6		58	41,100	14	8,359	65,442
St. Clair.....	14	8	6		26	184,500	22	42,450	284,800
St. Joseph.....	18		18		35	59,500	31	18,800	135,500
Tuscola.....	8	4	4		58	261,000	58	103,381	675,054
Van Buren.....	15	3	12		21	59,500	18	17,512	151,100
Washtenaw.....	22	4	18		39	136,000	42	43,675	326,000
Wayne.....	23	15	8		61	257,000	65	137,800	1,072,900
Wexford.....	2	1	1		129	1,305,000	67	248,234	2,514,420
					4	6,500	2	200	3,000

STATISTICS OF MICHIGAN.

MANUFACTURES BY COUNTIES.

FOUNDRIES AND MACHINE SHOPS.*

COUNTIES.	Whole No.	Capital Invested.	Value of Product.	COUNTIES.	Whole No.	Capital Invested.	Value of Product.
Allegan.....	2	\$28,000	\$5,000	Lenawee.....	5	\$68,000	\$82,000
Alpena.....	12	11,000	20,000	Livingston.....	2	23,000	41,000
Bay.....	7	83,789	158,273	Manistee.....	4	21,000	61,500
Berrien.....	4	29,000	14,500	Marquette.....	2	60,000	105,000
Calhoun.....	6	636,500	718,800	Mecosta.....	1	10,000	10,000
Cheboygan.....	2	10,000	5,000	Monroe.....	1	20,000	16,000
Clinton.....	2	7,500	6,000	Oakland.....	8	28,500	24,500
Eaton.....	5	23,000	52,000	Oceana.....	1	8,000	10,000
Genesee.....	7	89,500	177,200	Ottawa.....	3	41,000	50,500
Gratiot.....	2	11,000	13,500	Saginaw.....	6	245,000	342,000
Hillsdale.....	1	10,000	20,000	Sanilac.....	1	10,000	11,000
Houghton.....	2	100,000	135,000	Shiawassee.....	4	25,700	47,000
Ingham.....	5	54,000	29,000	St. Clair.....	8	545,900	74,500
Ionia.....	8	79,000	110,000	St. Joseph.....	5	104,000	122,764
Jackson.....	2	118,000	158,000	Tuscola.....	3	12,200	12,000
Kalamazoo.....	4	10,500	8,200	Washtenaw.....	5	22,400	36,000
Kent.....	9	212,700	309,000	Wayne.....	28	1,674,000	2,686,000
Lapeer.....	3	21,000	50,000	Other counties.....	7	15,700	21,700
Total, State.....	170	\$4,649,899	\$5,924,937				

* Includes steam engine and boiler works. †

WAGON, CARRIAGE, AND SLEIGH FACTORIES.

Allegan.....	2	\$14,000	\$20,155	Keweenaw.....	1	\$5,000	\$4,600
Alpena.....	2	8,000	14,000	Lapeer.....	3	12,000	21,500
Berrien.....	4	108,600	110,370	Lenawee.....	9	61,000	87,000
Branch.....	6	22,200	42,400	Macomb.....	11	48,900	84,300
Calhoun.....	5	83,800	87,500	Marquette.....	1	10,000	50,000
Cheboygan.....	4	18,000	26,980	Muskegon.....	4	16,300	20,500
Clinton.....	3	8,500	20,000	Oakland.....	5	5,300	16,000
Eaton.....	5	39,500	69,500	Shiawassee.....	2	5,000	13,900
Genesee.....	4	32,000	33,614	St. Joseph.....	8	28,000	54,000
Hillsdale.....	4	19,650	19,400	Van Buren.....	5	17,900	27,000
Ingham.....	2	6,000	15,000	Washtenaw.....	5	53,800	107,400
Ionia.....	8	556,350	241,700	Wayne.....	10	5,500	310,500
Jackson.....	6	46,900	68,500	Other counties.....	16	15,900	26,100
Kalamazoo.....	10	228,000	191,506				
Total, State.....	143	\$1,569,700	\$1,777,525				

AGRICULTURAL IMPLEMENT WORKS.

Allegan.....	3	\$7,850	\$5,700	Kent.....	5	\$162,000	\$223,000
Barry.....	1	45,000	115,000	Lapeer.....	1	15,000	20,000
Berrien.....	2	5,000	7,000	Lenawee.....	3	46,000	44,000
Branch.....	2	29,000	26,500	Livingston.....	4	9,000	10,500
Calhoun.....	4	119,000	145,000	Manistee.....	5	14,250	12,600
Cass.....	4	24,000	48,500	Montcalm.....	1	15,000	16,000
Clinton.....	2	11,000	11,800	Oakland.....	5	28,800	23,700
Eaton.....	4	29,500	26,000	Ottawa.....	2	33,000	25,000
Genesee.....	2	8,300	11,000	St. Joseph.....	3	30,000	35,000
Hillsdale.....	3	35,000	63,000	Washtenaw.....	1	50,000	60,000
Ingham.....	3	29,500	19,700	Wayne.....	2	14,000	26,000
Jackson.....	3	63,500	231,000	Other counties.....	1	1,000	400
Kalamazoo.....	2	110,000	225,000				
Total, State.....	70	\$662,700	\$1,460,400				

MANUFACTURES.

83

PLANING AND TURNING MILLS, AND SASH, DOOR, AND BLIND FACTORIES.

Value of Product.	COUNTIES.	Whole No.	Capital Invested.	Value of Product.	COUNTIES.	Whole No.	Capital Invested.	Value of Product.
	Allegan.....	6	\$44,600	\$48,881	Macomb.....	5	\$21,500	\$36,000
\$82,000	Alpena.....	2	5,000	18,000	Manistee.....	3	23,500	13,800
41,000	Barry.....	4	22,200	36,000	Mason.....	1	8,000	.....
61,500	Bay.....	6	173,000	723,000	Mecosta.....	3	35,000	74,000
10,000	Benzel.....	1	5,000	4,000	Monroe.....	4	31,000	123,000
10,000	Berrien.....	7	69,000	201,275	Montcalm.....	4	93,500	110,100
24,500	Branch.....	6	35,500	46,400	Muskegon.....	4	56,000	101,000
10,000	Calhoun.....	6	48,500	37,000	Newaygo.....	1	6,000	10,000
342,000	Cass.....	3	14,000	59,500	Oakland.....	2	12,500	11,000
11,000	Cheboygan.....	2	12,000	4,000	Oceola.....	2	6,400	5,500
47,000	Delta.....	1	10,000	25,000	Ontonagon.....	1	8,000	15,000
74,500	Eaton.....	12	111,500	340,600	Ottawa.....	6	38,000	36,500
122,764	Genesee.....	10	396,400	254,000	Saginaw.....	7	92,000	186,000
12,000	Hillsdale.....	3	25,500	11,600	Shiawassee.....	6	33,200	44,000
36,000	Ingham.....	3	90,300	68,500	St. Clair.....	8	34,000	57,300
2,686,000	Ionia.....	6	43,000	10,000	St. Joseph.....	4	55,000	48,000
21,700	Iosco.....	2	7,000	10,000	Tuscola.....	7	18,900	34,175
	Jackson.....	7	39,500	92,000	Van Buren.....	7	38,000	45,000
	Kalamazoo.....	5	112,200	145,000	Washtenaw.....	6	61,000	139,000
	Kent.....	5	30,500	66,800	Wayne.....	16	450,000	894,900
	Lapeer.....	17	436,000	560,000	Other counties.....	11	24,100	37,600
	Lenawee.....	5	30,500	66,800				
\$5,924,937		11	127,500	183,600				
	Total, State.....					237	\$2,975,700	\$5,174,621

FURNITURE AND CHAIR FACTORIES.

\$4,600	Allegan.....	4	\$50,000	\$48,000	Lapeer.....	1	\$5,000	\$8,000
21,500	Barry.....	3	9,500	3,800	Lenawee.....	2	44,000	60,000
87,000	Berrien.....	6	146,000	121,500	Mecosta.....	1	10,000	12,000
84,300	Branch.....	4	25,000	30,000	Monroe.....	2	10,000	20,000
50,000	Calhoun.....	2	39,200	62,500	Muskegon.....	2	10,500	20,000
20,500	Cass.....	2	10,000	12,500	Oakland.....	2	10,000	16,000
16,000	Clinton.....	2	75,200	50,461	Shiawassee.....	4	51,200	121,000
13,000	Genesee.....	2	8,000	4,000	St. Clair.....	2	9,500	16,500
54,000	Gratiot.....	1	7,500	7,000	St. Joseph.....	5	26,300	33,000
27,000	Hillsdale.....	3	91,500	144,500	Tuscola.....	4	17,000	23,200
107,400	Houghton.....	1	5,000	8,000	Washtenaw.....	4	27,500	82,000
310,500	Ingham.....	4	60,500	22,000	Wayne.....	7	474,000	375,000
26,100	Ionia.....	3	25,400	125,400	Other counties.....	10	18,400	25,450
	Jackson.....	10	918,500	1,180,000				
	Kalamazoo.....							
	Kent.....							
	Lapeer.....							
	Lenawee.....							
	Mecosta.....							
	Monroe.....							
	Muskegon.....							
	Oakland.....							
	Shiawassee.....							
	St. Clair.....							
	St. Joseph.....							
	Tuscola.....							
	Van Buren.....							
	Washtenaw.....							
	Wayne.....							
	Other counties.....							
\$1,777,525	Total, State.....					93	\$2,184,700	\$2,630,611

BARREL, KEG, PAIL, TUB, AND RIM-WORK FACTORIES.

\$220,000	Berrien.....	2	\$29,000	\$52,000	Kent.....	4	\$181,800	\$180,938
20,000	Branch.....	8	6,250	16,700	Lenawee.....	6	16,500	41,800
44,000	Calhoun.....	5	11,050	37,300	Livingston.....	1	8,000	15,000
10,500	Eaton.....	1	35,000	120,000	Saginaw.....	1	125,000	60,000
12,600	Genesee.....	4	10,100	24,300	St. Joseph.....	2	6,500	0,000
15,000	Hillsdale.....	2	7,000	11,800	Washtenaw.....	2	5,000	22,000
25,700	Ingham.....	1	5,500	4,000	Wayne.....	3	459,000	250,000
25,000	Ionia.....	1	10,900	20,000	Other counties.....	14	13,900	36,400
35,000	Iosco.....	3	15,140	50,000				
60,000	Jackson.....							
26,000								
400								
\$1,400,460	Total, State.....					60	\$944,740	\$960,635

STATISTICS OF MICHIGAN.

BREWERIES.

COUNTIES.	Whole No.	Capital Invested.	Value of Product.	COUNTIES.	Whole No.	Capital Invested.	Value of Product.
Allegan	4	\$5,700		Keweenaw	2	\$6,000	\$13,250
Bay	7	53,500	\$57,000	Lenawee	3	30,000	24,000
Branch	1	5,000	7,500	Macomb	4	8,700	15,880
Calhoun	2	7,000		Marquette	4	61,000	128,270
Clinton	3	7,000	11,618	Mason	1	20,000	10,000
Eaton	1	5,000	15,000	Menominee	2	9,000	25,000
Genesee	6	32,000	26,950	Monroe	3	44,500	27,000
Hillsdale	1	7,000	7,500	Ottawa	3	8,500	9,900
Houghton	6	108,000	106,500	Saginaw	14	101,300	138,465
Ingham	4	18,500	14,200	Shiawassee	2	13,000	16,000
Ionia	1	12,000	13,500	St. Clair	6	31,000	55,500
Jackson	5	48,600	49,413	Washtenaw	8	84,800	90,500
Kalamazoo	4	23,600	32,000	Wayne	24	883,700	840,118
Kent	4	156,500	139,050	Other counties	24	43,000	64,440
Total, State				148 \$1,802,900 \$1,931,992			

WOOLEN AND COTTON FACTORIES.

Allegan	1	\$20,000	\$10,000	Macomb	2	\$12,000	\$10,000
Cass	3	23,000	23,500	Montcalm	1	8,000	10,000
Eaton	3	5,000	4,000	Oakland	4	61,000	70,621
Genesee	3	119,000	153,000	St. Clair	3	20,000	14,068
Gratiot	1	8,000	6,000	St. Joseph	2	32,000	8,000
Hillsdale	3	209,020	139,003	Tuscola	1	15,000	25,000
Ingham	1	30,000	25,000	Van Buren	1	6,000	5,286
Ionia	3	45,000	60,000	Washtenaw	3	31,000	19,500
Lenawee	2	108,000	107,610	Other counties	4	8,200	9,200
Total, State				39 \$760,920 \$690,738			

WOOD FAUCET, CLOTHES-PIN, AND WOODEN-WARE FACTORIES.

Allegan	2	\$5,700	\$5,000	Ionia	2	\$3,500	\$10,500
Bay	2	62,000	84,000	Kalamazoo	1	40,000	3,500
Berrien	5	57,000	109,000	Kent	5	73,500	92,000
Cass	1	4,000	50,000	Lenawee	2	11,500	30,000
Clinton	2	7,000	7,947	Wayne	1	5,000	4,000
Eaton	1	25,000	23,000	Other counties	5	17,000	45,009
Hillsdale	2	8,000	9,400			8,500	18,000
Total, State				33 \$332,700 \$491,347			

BRICK AND TILE MANUFACTORIES.

Ingham	3	\$45,000	\$81,000	Saginaw	7	\$41,000	\$69,000
Jackson	2	30,000	28,000	St. Clair	5	40,540	48,500
Kent	2	105,000	92,000	St. Joseph	3	6,300	8,400
Lenawee	1	6,000	4,500	Van Buren	2	14,500	19,000
Milland	1	5,000	3,500	Wayne	9	173,500	215,800
Ottawa	2	20,000	24,000	Other counties	10	18,600	32,500
Total, State				47 \$600,440 \$636,200			

MANUFACTURES.

85

TANNERIES.

COUNTIES.	Whole No.	Capital Invested.	Value of Product.	COUNTIES.	Whole No.	Capital Invested.	Value of Product.
Allegan	5	\$95,500	\$50,500	Monroe	2	\$35,000	\$16,000
Branch	2	15,000	35,000	Montcalm	1	5,000	5,000
Calhoun	2	44,500	38,000	Muskegon	1	30,000	50,000
Genesee	1	5,000	5,000	Ottawa	5	78,000	217,500
Huron	1	12,000	10,000	Saginaw	2	35,000	40,000
Ingham	2	5,000	9,500	Shilawassee	1	20,000	50,000
Kalamazoo	1	38,000	28,000	St. Clair	4	33,500	65,800
Kent	1	16,000	32,000	Tuscola	1	9,000	10,000
Leawee	2	6,800	12,500	Van Buren	5	31,750	46,050
Macomb	2	10,000	12,500	Washtenaw	5	54,000	104,750
Marquette	1	20,000	10,000	Wayne	7	342,000	690,000
Mecosta	1	25,000	25,000	Other counties	7	16,300	22,000
Total, State.....				63 \$1,009,350 \$1,597,600			

PAPER MILLS.

Allegan	1	\$15,000	\$43,000	Leawee	2	\$77,000	\$47,349
Berrien	2	53,200	35,000	Monroe	2	28,000	32,000
Calhoun	1	20,000	50,000	Oakland	-1	20,000	25,000
Genesee	1	1,500	7,000	Shilawassee	1	20,000	14,130
Kalamazoo	1	70,000	60,000	St. Joseph	1	75,000	100,000
Kent	1	35,000	10,000	Washtenaw	5	275,000	478,000
Total, State.....				19 \$687,700 \$949,497			

TOBACCO AND CIGAR FACTORIES.

Branch	1	\$30,000	\$90,000	Monroe	1	\$150,000	\$300,000
Calhoun	2	50,500	88,800	Muskegon	2	9,000	21,000
Jackson	1	120,000	170,000	Saginaw	2	16,000	25,000
Kent	2	11,000	55,000	Wayne*	23	1,256,500	3,615,500
Leawee	6	26,100	50,600	Other counties	7	9,200	25,300
Macomb	2	7,000	30,000				
Total, State.....				49 \$1,686,300 \$4,411,200			

* The Detroit Board of Trade report for 1876 gives eight tobacco manufacturing establishments in the city, turning out 4,246,208 pounds of manufactured tobacco, and paying thereon a government tax of \$974,474 01; and 171 cigar manufacturing establishments, turning out 23,397,600 cigars, and paying a government tax of \$170,631 90.

AGGREGATES OF SUNDRY MANUFACTURES.

The following table shows the aggregate, for the State, of the several kinds of manufactures named, but which are not elsewhere tabulated:

	Whole No.	Capital Invested.	Value of Product.
Broom factories.....	10	\$14,230	\$80,550
Canning and drying fruit, etc.....	6	43,000	175,380
Bakery and confectionary establishments.....	8	314,800	859,760
Soap and candle factories.....	12	78,000	283,700
Pot and pearlsh factories.....	8	6,200	18,010
Vinegar and cider establishments.....	34	54,300	81,634
Gas factories (?).....	6	300,000	132,000
Artificial and cut stone works.....	21	79,100	128,000
Plaster mills.....	12	232,000	207,925
Lime kilns.....	15	167,400	181,750
Oil factories.....	7	4,300	11,680
Gun smith shops.....	4	1,950	2,450
Saleratus and baking powder, and coffee and splee.....	3	100,000	290,000
Hemloek bark extract.....	3	53,000	16,150
Chemicals.....	4	385,500	241,000
Wine.....	5	47,500	39,500
Malt.....	3	62,000	90,000
Show cases.....	3	29,800	57,000
Files.....	2	4,600	10,000
Copper smelting.....	2	1,000,000	2,600,000
Fuse.....	2	22,949	18,120
Wood working machines.....	2	41,000	38,000
Saws.....	2	29,000	30,000
Bending.....	3	43,000	86,090
School-room furniture.....	2	45,000	60,000
Distilleries.....	2	81,600	380,900
Books and blank books.....	3	27,000	42,700
Stone ware.....	3	28,600	34,400
Glue.....	2	35,000	70,000
Gas, steam and water pipe.....	2	127,000	229,000
Pieture frames.....	3	41,000	91,000
Windmills.....	4	17,500	38,400
Whip sockets.....	2	14,900	32,500
Varnish.....	2	102,000	302,000
Building mortar.....	1	16,000	10,000
Zinc collar pads.....	1	30,000	75,000
Wheelbarrows, hand sleighs, etc.....	1	14,000	25,000
Window shades.....	1	3,000	15,000
Ink and bluing.....	1	3,000	20,000
Rolling copper.....	1	138,025	75,000
Grind stones and scythe stones.....	4	25,500	35,000
Hoop skirts.....	1	25,000	100,000
Piano and billiard table legs.....	1	20,000	40,000
Novolty factory.....	1	4,000	5,000
Burial cases.....	2	30,000	56,000
Spring beds.....	2	17,900	33,000
Jobbing, wood, and eroquet.....	1	16,000	35,000
Telegraph pins and brackets.....	1	6,000	19,000
Peat fuel.....	1	50,000	20,000
Square oak timber.....	1	15,000	15,000
Rope.....	1	5,000	10,000
Glass sand.....	1	20,000	150,000
Patent spinning wheels.....	1	10,000	40,000
Curtain fixtures and sewing machine erates.....	1	10,000	20,000
Charcoal.....	1	10,000	25,000

AGGREGATES OF SUNDRY MANUFACTURES.—CONTINUED.

ral kinds of

Value of Product.	Whole No.	Capital Invested.	Value of Product.
	1	\$3,000	\$20,000
	1	60,000	
	2	3,500	6,000
\$80,550	1	5,000	15,000
175,380	1	7,000	25,000
859,760	1	5,000	10,000
283,700	2	130,000	415,000
18,010	2	175,000	190,000
81,634	1	75,000	200,000
132,000	1	60,000	150,000
128,000	1	75,000	175,000
207,925	1	15,000	40,000
181,750	1	200,000	550,000
11,680	1	25,000	50,000
2,450	1	200,000	160,000
290,000	1	300,000	1,000,000
16,150	3	150,000	825,000
241,000	1	50,000	200,000
39,500	1	50,000	3,500
90,000	1	100,000	433,689
57,000	29	385,950	567,760
10,000	9	1,677,000	6,029,911
2,600,000	4	44,000	85,500
18,120	12	170,000	176,716
38,000	23	168,200	218,850
30,000	4	88,000	223,060
86,000	12	532,000	1,204,000
60,000	55	165,200	419,850
380,900	69	471,400	1,748,650
42,700	19	244,450	575,850
34,400			
70,000			
229,000			
91,000			
38,400			
32,500			
302,000			
10,000			
75,000			
25,000			
15,000			
20,000			
75,000			
35,000			
100,000			
40,000			
5,000			
56,000			
33,000			
35,000			
19,000			
20,000			
15,000			
10,000			
150,000			
40,000			
20,000			
25,000			

* Wayne county was not reported at all under this head. There are in Detroit five leading clothing establishments, the aggregate value of whose home manufactured goods reaches \$1,500,000. This is exclusive of a large number of custom shops.

GENERAL SUMMARY FOR THE STATE.

The following table, as per page 367 of census report, shows aggregates for the State and for the counties. Many of the items are subject to explanation and qualification, as shown by the notes accompanying the census compilation, but these are omitted as not important for the purposes of this publication.

STATE AND COUNTIES.	Whole No.	POWER USED.				Persons Employed.	Capital Invested.	Value of Product.
		Steam.	Water.	Without Steam or Water.	Not Reported.			
STATE	4,292	2,471	1,004	355	462	59,346	\$73,893,428	\$122,901,262
Alcona	6	3			3	137	87,000	159,600
Allegan	116	53	52	3	8	1,054	925,650	1,960,242
Alpena	29	19	2		8	583	549,500	1,381,500
Antrim	9	2	5		2	291	352,000	468,396
Barry	71	24	36	8	3	239	294,530	764,920
Bay	107	90	1	2	14	3,204	4,678,089	7,098,215
Benzie	15	9	6			165	349,700	269,100
Berrien	136	79	40	3	14	1,384	1,177,750	2,363,359
Branch	102	60	20	14	8	496	502,650	851,277
Calhoun	100	27	44	23	6	1,038	1,612,250	2,744,831

GENERAL SUMMARY FOR THE STATE.—CONTINUED.

STATE AND COUNTIES.	Whole No.	POWER USED.				Persons Employed.	Capital Invested.	Value of Product.
		Steam.	Water.	Without Steam or Water.	Not Re- ported.			
Cass	78	28	34	16		287	\$277,500	\$759,460
Charlevoix	3	2	1			41	38,000	40,400
Cheboygan	14	12	1	1		325	255,500	452,000
Chippewa	2	2				80	20,000	1,800
Clare	5	5				39	24,000	73,500
Clinton	60	34	9	13	4	323	315,700	599,700
Delta	8	7	1			255	425,000	386,000
Eaton	98	56	33	1	8	492	574,300	1,097,040
Genesee	112	62	19	13	18	1,112	1,636,700	2,394,889
Gr. Traverse	29	9	10	9	1	212	158,600	296,728
Grant	33	18	3		12	283	177,264	438,250
Hillsdale	97	57	23	2	15	688	787,320	1,201,305
Houghton	19	15	1	2	1	326	778,974	529,770
Huron	49	42		4	3	753	419,100	806,350
Ingham	88	65	11	9	3	806	798,400	1,011,943
Ionia	85	43	26	1	15	716	870,300	1,312,225
Iosco	28	27			1	714	746,000	1,238,500
Isabella	19	11	8			146	115,700	227,822
Jackson	84	36	28	5	15	1,367	1,880,540	3,084,848
Kalamazoo	91	28	26	32	5	766	853,650	1,748,369
Kalkaska	2	1	1			11	6,600	12,200
Kent	215	99	74	6	36	4,230	4,561,800	7,149,319
Keweenaw	8	3	1		4	37	31,200	35,980
Lake	9	7	2			79	67,800	31,900
Lapeer	104	74	22	3	5	1,097	763,700	1,863,300
Leelanaw	16	4	11	1		137	172,400	320,500
Lenawee	181	116	35	23	7	1,739	1,783,550	3,472,101
Livingston	43	20	20	3		181	264,300	406,660
Mackinac	2	1	1			45	117,000	40,000
Macomb	91	39	20	16	16	655	502,949	1,121,604
Manistee	37	32	3	2		1,228	2,816,500	2,619,700
Marquette	39	25	8		6	1,438	2,829,500	1,976,470
Mason	12	11	1			618	469,000	801,416
Mecosta	42	23	15	1	3	444	448,500	926,240
Menominee	9	9				595	372,000	646,200
Midland	41	30	2	9		423	280,100	531,960
Missaukee	1	1				5	2,500	1,350
Monroe	98	64	19	8	7	783	821,600	1,838,500
Montcalm	129	106	22	1		1,514	1,030,770	2,383,880
Muskegon	125	78	17	2	28	2,837	5,366,300	6,721,676
Newaygo	40	20	16		4	553	332,800	571,450
Oakland	104	35	52	10	7	388	549,200	1,292,196
Oceana	44	25	18	1		491	482,802	746,775
Ontonagon	2	1			1	7	3,200	3,800
Osceola	26	22	4			286	195,300	276,000
Ottawa	88	68	4	13	3	1,483	2,745,600	2,852,400
Presque Isle	4	3			1	57	35,300	69,700
Saginaw	178	146	8	15	9	3,675	4,463,850	6,410,147
Sanilac	35	30	4	1		349	198,000	318,242
Schoolcraft	6	2	3		1	313	352,000	482,000
Shiawassee	58	24	21	3	10	364	464,500	785,430
St. Clair	90	59	12	9	10	1,452	1,351,990	1,840,218
St. Joseph	82	23	39	16	4	574	844,750	1,320,367
Tuscola	73	40	13	4	16	395	296,500	661,275
Van Buren	110	61	35	4	10	939	799,850	1,341,704
Washtenaw	125	45	44	3	33	687	1,061,900	2,470,795
Wayne	318	191	14	40	73	10,724	15,228,150	32,515,819
Wexford	12	8	3		1	191	97,400	191,340

Value
of
Product.

\$759,460
 40,400
 452,000
 1,800
 73,500
 599,709
 386,000
 1,097,040
 2,394,889
 299,728
 438,250
 1,201,305
 529,770
 896,350
 1,011,943
 1,312,225
 1,238,500
 227,822
 3,084,848
 1,748,369
 12,200
 7,149,319
 35,980
 31,900
 1,863,900
 320,500
 3,472,101
 400,660
 40,000
 1,121,604
 2,619,700
 1,976,470
 801,416
 926,240
 646,200
 531,960
 1,350
 1,838,500
 2,383,880
 6,721,676
 571,450
 1,292,196
 746,775
 3,800
 276,000
 2,852,400
 69,700
 3,410,147
 318,242
 482,000
 785,430
 840,218
 1,320,367
 661,275
 341,704
 2,470,795
 5,515,819
 191,340

XIII. RAILROADS.

EARLY RAILWAY ENTERPRISES.

The first attempt at railroad building in Michigan was the incorporation, by the Legislative Council, in 1832, of the Detroit and St. Joseph railroad company, for the construction of a railroad from Detroit to the mouth of the St. Joseph river, on lake Michigan. The charter provided that the road might be purchased by the State, and this was done after the admission of the State into the Union and the inauguration of the internal improvement policy, the route becoming thereafter the Michigan Central. The next historical effort was by the Detroit and Pontiac railroad company, chartered in 1834. This work was never in the hands of the State. The road was built by slow stages, but as rapidly, perhaps, as could be expected, in view of the newness of the country, and the equal lack of capital and practical skill in railroadng. It was completed to Pontiac in 1844. In 1855 it was consolidated with the Oakland and Ottawa railroad company, the latter having been chartered in 1848 from Pontiac westward, the consolidation forming the line of the present Detroit and Milwaukee railroad. In the earlier history of the State, numerous other charters for building railways, chiefly short lines, were granted. Considerable expenditures were made on some of these lines, but generally involving only disaster to those engaged in them. In addition to the Central, the State also undertook the construction of the Southern, from Monroe westward. The former had been completed to Kalamazoo, and the latter to a point near Adrian, at the time of their sale by the State in 1846, and its practical abandonment of the internal improvement system. The Southern became known after the sale as the Michigan Southern and Northern Indiana, and now forms a part of the trunk line of the Lake Shore and Michigan Southern.

These lines, traversing the State from east to west, were gigantic schemes in the earlier days; and at the time of their completion, taken in connection with the means of water transportation, gave to the improved portions of Michigan facilities of communication unequalled at that time by any part of the west. In this connection may properly be mentioned the project for a road from Port Huron westward to lake Michigan, undertaken in 1836. Some work in the way of grubbing and grading was done on this route, but the speculative impulse under which it was projected having subsided, and the necessary means being wanting, the work was dropped. A portion of the line however now forms a part of the Chicago and Lake Huron railway, which, with the completion of the section between Flint and Lansing, will form a continuous route southwestwardly from Port Huron by way of Lapeer, Flint, Lansing and Battle Creek, to Chicago, thus opening another through line.

RAPID INCREASE OF RAILWAYS.

Three principal causes contributed to the rapid building of railroads in Michigan during the decade stated generally between 1864 and 1874: The abundance of ready money which the war period made available; the demand which existed for

additional outlets for the natural productions of the State, especially lumber, timber, salt, and plaster; and the efforts of the trunk lines, which were competitors in the extension of lateral and connecting lines; to which may be added the provision of the constitution adopted in 1850, forbidding special charters, and subsequent legislation providing for the formation of companies by general law, thus removing everything in the form of legal monopoly in railway construction.

LOCAL AID TO RAILWAYS.

A strong feeling in favor of extending local aid to railway enterprises sprung up prior to 1869, in which year the general railroad aid law was passed, (a number of special acts for the same purpose having been previously passed) but this policy was early arrested by an adverse decision of the Supreme Court. The rapid railway construction of the three or four years following, demonstrated the absence of any necessity for relying upon municipal aid, while reflection, reinforced by the financial depression and commercial disaster of the past two or three years, has produced a general conviction of the impolicy of thus pledging local credits.

COMMISSIONER OF RAILROADS.

In the winter of 1873, the office of Commissioner of Railroads was established by the Legislature, and the value of that office in systematising railway management, as an agent between the corporations and the people, and in the collection of facts and statistics, is shown by the work of the department.

PROGRESS OF RAILWAY BUILDING.

The progress of railway construction in Michigan is practically shown by the following figures, taken mainly from statistics published in 1873. The figures are approximations only, except for the past three years, which are official through the office of the Commissioner of Railroads, and are designed to show the number of miles in operation at the beginning of each year given, namely: 1841, 138 miles; 1850, 342; 1855, 474; 1860, 779; 1865, 941; 1866, 1,039; 1867, 1,163; 1868, 1,199; 1869, 1,325; 1870, 1,638; 1871, 2,116; 1872, 2,214; 1873, 2,975; 1874, 3,253; 1875, 3,315.

A natural reaction upon ten years or more of great activity, the commercial and financial characteristics of the time, and a feeling of insecurity arising from organized efforts throughout the country that were looked upon as inimical to railway interests, have combined to check construction, showing the marked contrast between a total of nearly nine hundred miles built in the State in 1872, and sixty-one miles in 1874.

RAILWAY MILEAGE AND CONSTRUCTION.

The Commissioner of Railroads, in his report for 1874, gives the miles of road owned by the thirty-four corporations doing business and reporting to his department, at 5,278.36, of which 3,314.98 miles lie within this State. Of the above there are 4,484.71 miles of main line, and 831.55 of branches. There are 304.55 miles of double track, and 898.89 miles of sidings, exclusive of the Chicago and Northwestern, which does not report this item. Only one road, the Mineral Range, 12½ miles in length, is of the narrow, or three feet gauge. The net increase of mileage for the year 1874 was 61.60.

The average number of miles of railroad constructed per year in this State for the last thirty-four years, from 1841 to 1875, is 97½; but if the average be taken for the ten years from 1865 to 1875, the period which marked the greatest activity

in railroad construction, it has been 330 miles; the greatest number of miles built in any one year being 901, in 1872.

COMPARATIVE MILEAGE IN MICHIGAN AND OTHER STATES.

This rapid construction of railroads has gone on, says the Commissioner, until we find that in the four southern tiers of counties of the State, embracing 17,894 square miles of territory, and a population, according to the census of 1874, of 997,701, we have 2,333 miles of railroad. This is equal to one mile of road to every 427 inhabitants; while in Massachusetts there is only one mile of road to every 879 inhabitants; and in Connecticut there is but one mile of road to every 620 inhabitants; so that we have within the limits of the territory mentioned, in proportion to the population, more than two miles of road to one in Massachusetts, and one and two-fifths miles of road to one for Connecticut.

COST, INDEBTEDNESS AND EQUIPMENT OF RAILROADS.

The following gross figures showing the cost, value, indebtedness, etc., of railroads doing business and situated in the State, will be of interest:

Paid in capital stock	\$63,529,917 86
Average per mile, paid in	26,529 76
Funded debt	95,074,237 07
Debt per mile of road	30,128 56
Aggregate of paid in stock and debt	169,214,154 93
“ “ “ “ per mile of road	56,862 77
Cost per mile of roads and equipments	54,453 91
“ “ “ “ exclusive of equipments	46,715 13
“ “ “ “ equipments	6,768 06

The foregoing figures bear no special relation to each other; and the two last items, which it may be supposed should equal the one immediately preceding, come somewhat short of it, for the reason that the computations are made from different bases.

The equipment reported for the various roads consists of 1,358 locomotives of all sizes, and a total of 31,254 cars; of which there were 604 passenger cars, 262 express and baggage cars, 14,667 box freight cars, 7,298 platform cars, and 8,476 ore and other cars. There are 125 locomotives equipped with the air brake. There are 482 passenger cars thus equipped. Six roads still use the common hand brake, their general business being done mostly by means of mixed trains.

NUMBER OF STATIONS AND PERSONS EMPLOYED.

The total number of stations for all the roads is 1,252, of which 759 are in this State. This gives an average of one station for each $4\frac{1}{4}$ miles of road. The thirty-four corporations reporting to the Commissioner of Railroads employ, in the various branches of superintendence and work, 22,575 persons, of which 15,608 are employed in this State; being an average of four men to each mile of road.

STATE LAND GRANTS FOR RAILROAD PURPOSES.

At the present time, direct communication between the two peninsulas is practically cut off during the close of lake navigation. The communication is by way of Chicago and the State of Wisconsin. The Legislature, at its session of 1873, passed an act appropriating not to exceed ten sections of State swamp lands per mile for the construction of a railroad from Mackinac to Marquette, and the Legislature of 1875 increased the appropriation to sixteen sections per mile, the road

to be completed at farthest before the thirty-first of December, 1878. A grant of five sections per mile of swamp lands was made at the same session to aid the construction of a railroad from L'Anse to Houghton, and a further grant of seven sections per mile for a road from Escanaba, westerly and northwesterly through the Menominee iron range. No definite steps have yet been taken for the construction of either of these roads.

RAILWAY ROUTES.

The map accompanying this work, prepared by the Commissioner of Railroads, shows very clearly the railway routes in the State. The following schedule, however, showing the length, termini, and intermediate points of the various railways, will be found convenient. It was prepared under the direction of the Commissioner:

CHICAGO AND CANADA SOUTHERN, AND TOLEDO, CANADA SOUTHERN AND DETROIT RAILWAYS.

These roads, though separate corporations, are in the same interest. The Chicago and Canada Southern is an extension of the Canada Southern, westward from Trenton, on the Detroit river to Fayette, Indiana, a distance of 67 miles, 62½ miles of which are in Michigan.

The Toledo, Canada Southern and Detroit runs from Toledo, Ohio, to Detroit, 54½ miles, 47½ miles being in Michigan. It connects at Trenton with the Canada Southern, east, and the Chicago and Canada Southern, west.

CHICAGO AND LAKE HERON RAILROAD.

Completed from Port Huron to Flint, and from Lansing to Valparaiso, Indiana, where it connects with the Pittsburg and Fort Wayne Road. The length of road completed is 232 miles, of which 174 miles are in Michigan. It passes through Lapeer, Flint, Charlotte, Battle Creek, Cassopolis, and other important towns.

CHICAGO AND MICHIGAN LAKE SHORE.

Runs from New Buffalo, by way of St. Joseph, to Pentwater, with branches from Holland to Grand Rapids, and from Muskegon to Big Rapids, giving a total length of road of 246 miles.

CHICAGO AND NORTHWESTERN.

This is an Upper Peninsula road in its Michigan section, running from Menominee to Lake Angeline mine, 170 miles, with numerous branches leading to several different iron mines. It passes through Escanaba, and connects with the Marquette, Houghton and Ontonagon road at Negaunee.

CHICAGO, DETROIT AND CANADA GRAND TRUNK JUNCTION.

This road forms the connection between the Grand Trunk Railway of Canada, at Port Huron, and the Michigan Central near Detroit, a distance of 59 miles. It connects with the Michigan Midland and Canada, and the St. Clair and Chicago Air Line at Ridgeway.

DETROIT AND BAY CITY.

Runs from Detroit to Bay City, a distance of 108 miles, with a branch from Lapeer to Fish Lake, six miles. It connects with a branch of the Flint and Pere Marquette at Otter Lake. Rochester, Lapeer, and Vassar are important towns on this line.

DETROIT, HILLSDALE AND SOUTHWESTERN.

Runs from Ypsilanti, where it connects with the Michigan Central; through Manchester, where it crosses the Jackson branch of the Lake Shore and Michigan Southern; and through Hillsdale, crossing the Lake Shore and Michigan Southern (main line) to Bancker's, connecting there with the Fort Wayne, Jackson and Saginaw road. Length, 65 miles.

DETROIT AND MILWAUKEE.

Extends from Detroit to Grand Haven, a distance of 189 miles, connecting by steamboats with Milwaukee. It connects with the Flint and Pere Marquette at Holly, the Jackson, Lansing and Saginaw at Owosso, the Detroit, Lansing and Lake Michigan at Ionia, the Grand Rapids, Newaygo

and Lake Shore and the Grand Rapids and Indiana at Grand Rapids, with the Chicago and Michigan Lake Shore at Nunica, and the Michigan Lake Shore at Ferrysburgh. On the line of this road are 34 stations, the most important of which, in addition to those mentioned above, are Pontiac, Fenton, Corunna, St. Johns, and Lewell.

DETROIT, LANSING AND LAKE MICHIGAN.

Runs from Detroit to Howard City, on the Grand Rapids and Indiana railroad, a distance of 160 miles, with a branch from Tonja to Stanton of 20 miles. It connects with the Flint and Pere Marquette at Plymouth, the Jackson, Lansing and Saginaw, the Chicago and Lake Huron, and a branch of the Lake Shore and Michigan Southern at Lansing, and the Detroit and Milwaukee at Ionia. Howell and Greenville are important towns on this line.

FLINT AND PERE MARQUETTE.

Runs from Monroe, on Lake Erie, to Ludington, on Lake Michigan, a distance of 253 miles. It crosses the Chicago and Canada Southern at Carleton, the Michigan Central at Wayne, the Detroit, Lansing and Lake Michigan at Plymouth, the Detroit and Milwaukee at Holly, the Detroit and Bay City at Bay City and Otter Lake, and the Grand Rapids and Indiana at Reed City. It has branches from East Saginaw to Bay City, and from Flint to Otter Lake. There are 50 stations on this line, the most important of which have been mentioned above.

FORT WAYNE, JACKSON AND SAGINAW.

Runs from Jackson to Fort Wayne, Indiana, a distance of 100 miles, 46 of which are in Michigan. It connects with the Michigan Central, Grand River Valley, Jackson, Lansing and Saginaw, and the Jackson branch of the Lake Shore and Michigan Southern, at Jackson, the Lake Shore and Michigan Southern (main line) at Jonesville, the Detroit, Hillsdale and Southwestern at Bancker's, the Baltimore and Ohio at Auburn, Indiana, and the Grand Rapids and Indiana at Fort Wayne.

GRAND RAPIDS AND INDIANA.

Runs from Fort Wayne, Indiana, to Petoskey, Michigan, a distance of 335 miles, of which 281 are in Michigan. Its connections in this State are with the Lake Shore and Michigan Southern at Sturgis, Plainwell, Kalamazoo, and Grand Rapids, with the Michigan Central (main line and branches) at Mendon, Kalamazoo, and Grand Rapids, the Chicago and Lake Huron at Vicksburg, the Grand Rapids, Newaygo and Lake Shore at Mill Creek, the Flint and Pere Marquette at Reed City, the Mansfield, Coldwater and Lake Michigan at Monticith, the Detroit and Milwaukee at Grand Rapids, the Detroit, Lansing and Lake Michigan at Howard City, and the Chicago and Michigan Lake Shore at Grand Rapids and Big Rapids. There are 85 stations on this line.

GRAND RAPIDS, NEWAYGO AND LAKE SHORE.

Runs from Grand Rapids to Morgan, where it connects with the Big Rapids branch of the Chicago and Michigan Lake Shore. This line is 45 miles long. Its most important station is Newaygo.

LAKE SHORE AND MICHIGAN SOUTHERN.

Has in Michigan 403 miles of road, of which 116 miles belong to its main line and 287 miles are branches. Entering the State at its southeastern corner, it passes through the southern tier of counties toward Chicago. The prominent towns on the main line are Adrian, Hudson, Hillsdale, Jonesville, Coldwater, Sturgis, and White Pigeon. The branches of this line in Michigan are to the Detroit, Monroe and Toledo, from Detroit to Toledo, 65 miles; the Jackson branch from Adrian to Jackson, 41 miles; the Northern Central Michigan, from Jonesville to Lansing, and the Kalamazoo and White Pigeon, and Kalamazoo, Allegan and Grand Rapids, which together make a line from White Pigeon to Grand Rapids. On all the lines operated by this company in this State, there are 82 stations.

MARQUETTE, HOUGHTON AND ONTONAGON.

This is exclusively an Upper Peninsula road, and runs from Marquette to L'Anse, 63 miles. It has seven branches to mines, aggregating 25 miles. It connects with the Chicago and Northwestern at Negaunee. There are 18 stations on this line.

MICHIGAN CENTRAL.

Runs from Detroit to Chicago, a distance of 284 miles. Of this distance 221 miles are in Michigan. The more prominent stations on the main line are Ypsilanti, Ann Arbor, Jackson, Albion, Marshall, Battle Creek, Kalamazoo, and Niles. This company operate under lease, the Grand

River Valley, from Jackson to Grand Rapids, 84 miles, the Jackson, Lansing and Saginaw, from Jackson to Gaylord, 226 miles, the Kalamazoo & South Haven, from Kalamazoo to South Haven, 30 miles, and the Michigan Air Line, from Jackson to South Bend, 114 miles. On all the lines operated by this company there are 115 stations. Of these, the most prominent on the Grand River Valley, are Eaton Rapids, Charlotte, and Hastings; on the Jackson, Lansing & Saginaw, Lansing, Owosso, the Saginaws, and Bay City; on the Michigan Air Line, Homer, Tekonsha, Centerville, Three Rivers, Cassopolis, and Niles.

MICHIGAN LAKE SHORE.

Runs from Allegan to Muskegon, 57½ miles, and connects with the Chicago and Michigan Lake Shore at Holland, and the Detroit and Milwaukee at Grand Haven.

OTHER RAILWAY LINES.

The Michigan, Midland and Canada runs from St. Clair, on the St. Clair river, to Ridgeway, 15 miles, where it connects with the Grand Trunk, and the St. Clair and Chicago Air Line.

The St. Clair and Chicago Air Line runs from Ridgeway, on the Grand Trunk, and a terminus of the Michigan, Midland and Canada, to Romeo, 20 miles.

The Traverse City railroad is a line 26 miles in length, from Traverse City, at the head of Grand Traverse bay, to Walton Junction, on the Grand Rapids and Indiana road.

The Mansfield, Coldwater and Lake Michigan road has eleven and a half miles completed, from Allegan to Monteth.

The Paw Paw road runs from Lawton, on the Michigan Central, to Paw Paw, the county seat of Van Buren county, four miles.

The Saginaw Valley and St. Louis runs from Saginaw to St. Louis, in Gratiot county, 34 miles.

The Hecla and Torch Lake, an ore transfer 4½ miles in length, from the Calumet and Hecla mines, in Houghton county, to the stamp mills on Torch lake.

The Mineral Range is a narrow gauge road, running from Franc ek, in Houghton county, to Calumet, 12½ miles.

XIV. TRANSPORTATION.

Appropriately following the railway statistics, is the subject of transportation. The shore-line of the State is elsewhere given at 1,620 miles, and reference is made to the numerous bays and rivers available for purposes of navigation and floatage. In the earlier days of the State, the St. Joseph, Kalamazoo, and Grand rivers formed the outlet and inlet for the shipment of produce and the receipt of merchandise, for the cultivated sections in the western and southwestern parts of the State. Later, the lumber regions have found, and still find, outlets through the Saginaw, the Au Sauble, the Muskegon, the Manistee, and other rivers. These are all in the Lower Peninsula. The Upper Peninsula is not less favored with the means of water transportation for its distinctive products.

RAILWAY TRANSPORTATION.

For rapid, cheap, and abundant transportation, the railways are indispensable, not only as competing with themselves, but with water carriage.

TRANSPORTATION.

95

RATES ON MICHIGAN RAILROADS.

The following table, taken from the report of the Commissioner of Railroads for 1874, shows the average passenger and freight rates on the leading railways of the State:

RAILROADS.	FOR EACH PASSENGER, PER MILE.			FREIGHT—RATE PER TON, PER MILE.		
	Through.	Local.	Through and Local.	Through.	Local.	Through and Local.
Chicago & Canada Southern.....			\$0.03			\$0.0376
Chicago & Lake Huron.....			.0313			.0273
Chicago & Mich. Lake Shore.....	\$0.03	\$0.03	.03			.03
Chicago & Northwestern.....	0.034	.04	.037			.0235
Detroit & Bay City.....			.0276			
Detroit & Milwaukee.....	.02333			\$0.00736	\$0.02861	.01783
Detroit, Lansing & Lake Mich.....		.03	.03			.02733
Flint & Pere Marquette.....		.0297			.02219	
Ft. Wayne, Jackson & Saginaw.....				.0125	.02	
Grand Rapids & Indiana.....						.027
G. Rap., Newaygo, & L. Shore.....		.03	.03			
Lake Shore & Mich. Southern.....	.0211	.0255	.0245	.00273	.01264	.01180
Marq., Houghton & Ontonagon.....	.0475	.0475	.0475	.0611	.0645	.0462
Michigan Central.....	.0219	.028	.0252	.011	.0234	.013
Grand River Valley.....			.029			.0286
Jackson, Lansing, & Saginaw.....			.025			.0236
Kalamazoo & South Haven.....			.029			.047
Michigan Air Line.....			.028			.047
St. Clair & Chicago Air Line.....	.04625	.044				.044
Toledo, Can. South'n & Detroit.....			.03			.0158

COMPARATIVE FREIGHT RATES.

Careful analyses made by the Commissioner shows that the carrying rates for freight on some of our leading railroads is below the rate on the Erie canal. He says: When we consider that the class of freight usually transported by canal is that which is always carried at the lowest rate, while the business by rail is general, including all classes of freight, it will be seen that the rates by rail, upon the same class of business, have been really less than by canal.

The Auditor of the Canal Department for the State of New York, in his report for 1872, gives the average rates per ton per mile for freight on the Erie canal for the seventeen years from 1856 to 1872, inclusive, from which it is found that the average rate received by the carrier, including the State tolls, during those years, was nine and fourteen hundredths mills per ton per mile; and but one year during that time was the rate less than that received by the Detroit & Milwaukee railroad in 1874 for their through business.

For their entire business, of which their local traffic constitutes nearly nine-tenths, the Lake Shore & Michigan Southern received but eleven and eight tenths mills per ton per mile, as against nine and fourteen hundredths mills, the average canal rate.

The average cost of transportation by the Erie canal for the years 1871 and 1872, as shown by the report of the Canal Auditor of New York, for the year last named, was ten and two-tenths mills per ton per mile, which is the same rate received by the Lake Shore and Michigan Southern during the first half of 1876 for its entire freight business done on both main line and branches.

The same ratio of reduction may be noted in the rates of the Michigan Central, and indeed, of all the roads in the State.

In the Commissioner's report for 1873, page 11, the following occurs:

The last annual report of the Lake Shore & Michigan Southern Railway Company to its stockholders, contains these words: "It is a fact worthy of note, that rates have, of late years, tended downward so steadily and so rapidly that the average rate per ton per mile in 1872 is but little more than half the rate of 1868,"—said rates being 1.37 cents and 2.43 cents respectively. The annual report of the Michigan Central Company comments upon the same fact, and in referring to a table showing the earnings per ton per mile since 1864, says: "It will be noticed how gradually but certainly rates have been sinking from 3.06 per ton per mile in 1865, to 1.56 in 1872, with slight increase—(1-100th of a cent)—in 1873." The favorable comparison which the rates of our own roads bear to those of leading and representative roads elsewhere in the country is shown by cents and fractions of a cent in the following comparative statement:

Average rates received per ton per mile for 1872.

RAILROADS.	Local.	Through.	Average of Local and Through.
Michigan Central.....	2.76	1.19	1.57
Lake Shore & Michigan Southern (Eastward bound).....	2.04	1.13	1.37
Lake Shore & Michigan Southern (Westward bound).....	2.01	1.44	.....
Jackson, Lansing & Saginaw.....	.....	.....	3.02
Grand River Valley.....	.....	.....	2.82
Michigan Air Line.....	.....	.....	3.38
Kalamazoo & South Haven.....	.....	.....	3.38
Detroit & Milwaukee.....	.....	.....	.....
Boston & Lowell.....	3.40	1.10	.....
Boston & Providence.....	3.09	2.76	.....
Boston & Albany.....	4.80	3.06	.....
New York Central & Hudson River.....	2.37	1.54	2.02
New York & Harlem.....	.....	.....	1.59
Rensselaer & Saratoga.....	.....	.....	6.14
Chicago, Burlington & Quincy.....	.....	.....	3.27
Chicago & Northwestern.....	3.18	1.42	.....
Average of all railroads reporting to the Board of R. R. Commissioners of the State of Connecticut.....	.....	.....	2.35
			4.50

TRANSPORTATION IN THE UPPER PENINSULA.

The proximity of the mineral districts to the lake affords the most ample facilities for the cheap transportation of products to all the harbors of the five great lakes, thus making the expense of delivering the products of the mines to the eastern cities by rail from the ports of lake Erie, very low. Regular lines of steamers of the largest class employed on the lakes run from the ports of the mineral districts to Chicago, Detroit, Cleveland, Erie and Buffalo, making the round trip in nine to ten days. In the same manner the coals from the fields of Ohio and Pennsylvania are delivered at a small cost within a few miles of the mines.

The Chicago and Northwestern railroad, leading from Chicago and Milwaukee, and connecting with all points south and west, has 170 miles of its line in Michigan, from Menominee, on the west side of Green Bay, to lake Angelina mine, with branches leading to several different iron mines, and connecting with the Marquette, Houghton, and Ontonagon railroad, at Negaunee. The present route

of the last named road is from Marquette to L'Anse, 63 miles, with branches running to various iron mines, aggregating about 25 miles. The Hecla and Torch Lake railroad is an ore transfer road, four and a half miles in length, connecting the Calumet and Hecla mines, in Houghton county, with the stamp mills on Torch Lake. The Mineral Range railway is a narrow gauge road, 12½ miles in length, running, at present, from Hancock, in Houghton county, to Calumet.

WATER TRANSPORTATION.

LAKE AND OCEAN NAVIGATION.

The extended coast line of Michigan, with ample harborage and depth of water, gives unlimited natural facilities for water transportation. The means for transportation therefore will be measured only by the demand for it. Lake and ocean navigation have for some years been practically one, as there is a considerable direct trade with Europe from all the leading lake ports, through the Welland canal and the river St. Lawrence.

SAULT STE MARIE SHIP CANAL.

The only serious natural obstruction to water navigation between the lower lakes and lake Superior, is the rapids or falls of St. Mary, on the river St. Mary. This is overcome by the St. Mary's Falls Ship Canal, a work constructed by means of a grant of land from the general government, but under the charge of the State, and by recent improvements made capable of passing vessels of the largest class navigating the lakes.

STATISTICS OF LAKE MARINE.

Further statistics of the lake marine and lake commerce will be found under the miscellaneous head at the end of this work.

XV. EDUCATION.

EARLY GOVERNMENTAL PROVISION FOR EDUCATION.

The ordination of the system of public instruction which, in its later development, is so interwoven with the social life of Michigan, antedates the political life of the State.

ENCOURAGEMENT OF EDUCATION BY THE FEDERAL GOVERNMENT.

The ordinance of 1787, for the government of the northwestern territory, declared that "schools and the means of education, shall ever be encouraged." The act of 1804, providing for the sale of lands in the then Indiana territory, of which the present State of Michigan formed a part, expressly reserved from sale section sixteen in every township, "for the support of schools." The act of 1805, organizing the territory of Michigan, reaffirmed these provisions, and the territorial authority, as early as 1827, enacted laws for the establishment of schools in

accordance with their intent. In 1828, Congress placed the school lands under the supervision of the Governor and Council, to protect and lease, so as to make them productive. The act of Congress of 23d June, 1836, making certain propositions to Michigan as conditions of her admission into the Union, declared: "That section numbered sixteen in every township of the public lands, and where such section has been sold or otherwise disposed of, other lands equivalent thereto, and as contiguous as may be, shall be granted to the State for the use of schools."

PROVISIONS OF THE STATE CONSTITUTION.

The Constitution of the State declares: "The proceeds from the sales of all lands that have been or hereafter may be granted by the United States to the State, for educational purposes, and the proceeds of all lands or other property given by individuals, or appropriated by the State for like purposes, shall be and remain a perpetual fund, the interest and income of which, together with the rents of all such lands as may remain unsold, shall be inviolably appropriated and annually applied to the specific objects of the original gift, grant, or appropriation." So far then as regards the fund arising from these grants, which has become a munificent one, it is dedicated to the purposes of education, beyond any probability of diversion.

THE PRIMARY AND GRADED SCHOOLS.

The Constitution of the State also provides that "A school shall be maintained in each school district [without charge for tuition] at least three months in each year. Any school district neglecting to maintain such school, shall be deprived for the ensuing year of its proportion of the income of the primary school fund, and of all funds arising from taxes for the support of schools."

SCHOOL LAW OF THE STATE.

The present school law requires a school to be kept not less than nine months in each year in districts having over eight hundred children of school age (between five and twenty), not less than five months in districts having over thirty and less than eight hundred children, and not less than three months in all other districts.

SCHOOL DISTRICTS AND THEIR GOVERNMENT.

The government of school districts is in the hands of three officers denominated the moderator, director, and assessor, who together constitute the school district board. Any district containing more than one hundred children of school age may, however, elect a board of six trustees, who shall constitute the district board, with power to choose its own officers. The boundaries of districts are determined by a township board of school inspectors.

REPORTS REQUIRED TO BE MADE BY CERTAIN OFFICERS.

District boards are required to make reports to township boards of inspectors, these to the county clerk, and the county clerk to the State Superintendent of Public Instruction, who is the official head of the educational structure of the State. A system of county superintendency was established in 1867, but the Legislature of 1875 supplanted it by a township superintendency.

UNION AND GRADED SCHOOLS.

The system of union or graded schools, culminating in high schools in many cases, and which has been so generally adopted throughout the State, had its first active growth about twenty years ago. The earlier schools of this class were organized under special acts, and it was to obviate the necessity of these special acts

in the growing tendency to the establishment of schools of this class, that the act authorizing the government of districts by trustees was passed in 1859. The powers of districts organized under this law for graded and high schools are enlarged and differ from those conferred upon other districts, in that they are authorized to elect a board of six members instead of three, to whom may be delegated the power to establish a high school and collect a tuition fee of resident pupils attending the same. School districts may contract loans for buildings and sites, proportioned to the number of pupils, but not to exceed thirty thousand dollars in any district.

SCHOOL LIBRARIES.

School libraries are required to be maintained in each township, although school district libraries may be substituted instead. An annual tax of two mills on the dollar of the taxable property of the State is levied each year for school purposes, and so much of this tax as the electors of each township may determine, together with fines, penalties, forfeited recognizances, etc., goes to the town libraries.

SECTARIAN TEACHING FORBIDDEN.

School boards are forbidden to apply any of the moneys received from the primary school fund, or from any or all other sources, for the support or maintenance of any school of a sectarian character, whether the same be under the control of any religious society or made sectarian by the school district board.

COMPULSORY ATTENDANCE AT SCHOOL.

All children between the ages of eight and fourteen years, not instructed in the common branches of education, or attending other schools, are required by law to attend the public schools at least twelve weeks in each year, unless some good reason exists which prevents such attendance.

THE SUPPORT OF SCHOOLS.

The public schools, which term, according to the later law and practice, includes as well the graded and high schools as the primary, are supported by the interest from the primary school fund derived from the sales of the school lands, by the two mill tax, and by taxes voted by the districts.

THE PRIMARY SCHOOL FUND.

The income from the primary school fund in 1873, was \$213,040 12, in 1874, \$216,657 15, and in 1875, \$217,499 06. The apportionment per capita upon the children of school age for the past two years has been fifty cents, the highest reached at any time, showing that the increase of the fund more than keeps pace with the increase of population. There is, of course, a limit to the increase of the school fund from the sales of land. The maximum to which the fund may reach from sales of the primary school lands, is estimated by the Superintendent of Public Instruction at \$4,000,000 to \$5,000,000. One-half of the receipts from the sales of swamp lands also go to the school fund, and the least favorable estimates place the aggregate fund from the two sources at not less than \$5,000,000. It is entirely safe to place the annual income from this fund at \$350,000, or seven per cent. on the gross sum. Although the portion of the fund derived from sales of swamp lands draws but five per cent, the entire fund will, without doubt, exceed the estimate sufficiently to compensate for the slight difference. Prospectively also, upon the extinguishment of the State debt, the school fund will receive an income from specific taxes on corporations, which in 1874 amounted to \$525,628 46.

COMPARATIVE SCHOOL STATISTICS FOR TEN YEARS.

The facts embodied in the four following tables will be found of interest:

TABLE I.

Showing: A, the number of townships in the State; B, number of school districts in the State; C, number of volumes in town libraries; D, number of volumes in district libraries; E, whole number of teachers employed in the schools; F, G, average wages per month of male and female teachers, respectively; H, total wages of teachers for the year; I, total value of school houses and lots.

YEAR.	A.	B.	C.	D.	E.	F.	G.	H.	I.
1865	713	4,474	58,633	95,577	8,792	\$41 77	\$17 51	\$720,251 55	\$2,355,982
1866	725	4,625	64,042	79,504	9,182	43 53	18 44	811,939 37	2,854,990
1867	774	4,744	52,883	87,606	9,384	41 03	19 48	917,539 01	3,361,567
1868	790	4,855	46,819	27,287	9,030	47 78	21 92	1,041,965 38	4,303,472
1869	828	5,052	40,254	96,580	10,219	47 71	21 55	1,177,847 86	5,331,774
1870	854	5,108	53,725	97,101	11,011	48 01	24 73	1,393,228 59	6,234,797
1871	893	5,299	48,479	101,760	11,274	49 92	27 21	1,529,111 58	6,755,995
1872	901	5,375	49,741	108,281	11,639	49 11	26 72	1,660,226 11	7,476,339
1873	911	5,521	49,231	115,311	11,950	51 04	27 13	1,765,069 59	8,105,391
1874	955	5,571	49,872	120,677	12,276	53 31	27 01	1,917,011 16	8,613,845
1875	987	5,706	51,605	132,335	12,478	51 29	28 19	1,952,674 19	9,115,350

TABLE II.

Showing: A, whole number of school houses in the State; B, number built of stone; C, number built of brick; D, number of frame school houses; E, number of log school houses; F, whole number of seatings for pupils; G, number of children in the State between five and twenty years of age; H, whole number attending school; I, per cent. of attendance to the whole number; J, average number of months of school.

YEAR.	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.
1865							298,607	228,629	76.5	6.2
1866	4,495	67	329	3,376	723		321,186	216,957	76.5	6.2
1867	4,622	73	375	3,569	663		338,244	219,161	72.	6.3
1868	4,715	72	416	3,669	618		354,753	250,996	70.7	6.2
1869	4,921	74	459	3,767	621		374,774	269,587	72.	6.3
1870	5,110	78	538	3,867	627		384,554	278,686	72.5	6.9
1871	5,300	77	570	4,024	629	371,760	393,275	292,466	76.5	7.
1872	5,318	79	595	4,153	691	382,107	404,235	316,006	78.	7.5
1873	5,572	80	641	4,215	665	399,067	421,322	324,615	79.	7.
1874	5,702	81	682	4,390	549	407,672	436,694	327,506	75.	7.
1875	5,787	79	719	4,476	513	414,060	449,181	343,931	79.	6.9

TABLE III.

Showing: A, amount of moneys on hand at the commencement of the year; B, amount of two-mill tax; C, amount of primary school fund; D, district taxes to pay teachers and incidental expenses; E, other district taxes; F, receipts from all other sources.*

YEAR.	A.	B.	C.	D.	E.	F.
1865	\$112,938 52	\$281,770 74	\$137,351 92	\$178,439 24	\$295,769 49	\$201,541 24
1866	183,981 96	288,820 06	143,913 31	234,769 21	369,319 10	317,521 44
1867	192,602 02	289,967 63	142,913 25	332,812 13	541,462 65	485,623 70
1868	289,877 87	309,219 38	151,066 50	414,913 00	625,043 53	548,651 25
1869	325,146 22	323,246 12	165,060 51	571,564 11	737,054 67	634,325 31
1870	360,477 81	408,111 61	177,313 79	1,034,788 77	707,790 10	523,381 67
1871	437,939 23	469,511 20	182,922 25	1,157,549 43	591,858 46	551,162 21
1872	530,260 28	421,971 29	182,005 97	1,384,079 62	593,680 90	537,971 29
1873	530,680 27	463,912 81	194,179 88	1,366,649 68	728,570 49	443,453 68
1874	576,056 03	466,080 05	205,480 14	2,393,604 73	455,639 39	443,539 39
1875	675,892 40	508,551 87	218,036 29	2,341,923 71	480,205 61	380,205 61

* The column "total resources for the year" is omitted from this table for the sake of convenience. It corresponds substantially, year by year, with column E in table IV.

EDUCATION.

101

TABLE IV.

Showing: A, amount paid for building and repairs; B, paid on bonded indebtedness; C, paid for all other purposes; D, amount of money on hand at the close of the year; E, total expenditures for the year, including amount on hand; F, total indebtedness of the districts.

YEAR.	A.	B.	C.	D.	E.	F.
1865.....						
1866.....	\$175,471 32		\$170,000 56	\$195,007 45	\$1,242,824 78	\$221,703 45
1867.....	339,080 71		274,810 26	215,431 35	1,587,104 12	235,786 26
1868.....	805,705 88		287,701 66	303,156 00	2,011,025 83	439,476 38
1869.....	776,074 00		369,158 80	313,721 11	2,487,560 32	643,591 49
1870.....	852,122 62		465,083 60	393,542 37	2,771,653 92	917,027 87
1871.....	662,806 11		545,029 55	470,280 46	3,154,232 24	861,409 94
1872.....	625,843 61		746,253 55	527,128 52	3,367,868 81	1,146,569 14
1873.....	537,006 68		788,902 96	594,417 18	3,563,479 63	1,234,686 35
1874.....	536,307 28	\$384,354 41	600,901 48	683,661 33	4,107,583 78	1,707,700 16
1875.....	550,661 64	308,105 41	619,112 98	641,700 35	4,168,063 53	1,826,160 48

MISCELLANEOUS FACTS.

The value of school houses was first obtained in 1869—sixteen years ago. In that year it was \$1,093,296. Average annual increase, \$501,044.

The amount expended by the districts for the entire support of the schools (including moneys paid on bonded indebtedness) during the year ending September 7, 1874, was \$3,410,959.68, which is \$7.81 per capita of the school population by the last census.

GRADED AND UNGRADED SCHOOLS.

The following comparative statement of leading items shows the relative position of the two classes of schools (graded and ungraded) in the State, for the year 1874, as to the items stated:

	Graded.	Ungraded.
Number of districts.....	327	5,244
Census enrollment.....	178,204	258,490
School enrollment.....	121,919	205,587
Teachers employed.....	2,278	9,998
Teachers' wages.....	\$914,253	\$1,002,758
Total resources.....	2,275,149	1,830,602
Total expenditures.....	1,888,036	1,525,685
Total indebtedness.....	1,485,241	365,522
Valuation of school property.....	5,486,761	3,425,937

STATISTICS OF CITY UNION SCHOOLS.

The Superintendent of Public Instruction has, at much labor, obtained many valuable facts and statistics regarding union and graded schools, additional to those required by the regular reports. From the forthcoming report of that officer, the following statistics of city union schools are taken, so far as reported for 1875:

TABULAR STATISTICS OF CITY UNION SCHOOLS.

Showing: A, assessed valuation of real and personal estate in the district; B, value of school property, buildings and grounds; C, number of school buildings in the district; D, cost of central or union school building; E, bonded indebtedness of the district; F, amount paid for the support of the High School during the year—estimated; G, salary of principal or superintendent; H, num.

interest:

Districts in the
libraries; E,
of male and
value of school

I.
1 55 \$2,355,082
0 37 2,854,060
0 01 3,361,667
5 38 4,303,472
7 86 5,391,774
8 59 6,234,797
1 58 6,755,995
3 11 7,470,339
9 39 8,105,391
1 10 8,613,845
4 19 9,115,350

stone; C, num-
ers; F, whole
e and twenty
e whole num.

I.	J.
29 76.5	6.2
57 76.5	6.2
91 72	6.3
96 70.7	6.2
87 72	6.3
86 72.5	6.9
36 76.5	7.
96 78	7.5
15 79	7.
96 75	7.
11 79	6.9

ount of two-
nd incidental

F.
\$201,541 24
317,521 44
455,925 79
548,651 25
634,325 31
526,381 67
551,162 23
537,971 29
443,453 68
453,529 39
386,265 61

sake of con-

ber of pupils belonging to the High School during the year; I, number of pupils graduating at the close of the year; J, number of pupils studying languages; K, number studying United States history; L, number studying civil government.

	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.†	K.	L.
Alpena *	\$1,200,000	\$25,000		\$20,000			\$1,400	18				30
Adrian	120,000	120,000	5	70,000	\$47,700	\$3,500	2,000	159	24	45	200	
Ann Arbor	1,757,818	140,000	6	60,000	29,000	6,300	2,000	380	71	281	113	65
Battle Creek	150,000	150,000	4	83,000	72,000		1,700	148	15	73	191	
Bay City *	1,782,250	120,000		54,000	41,000		1,800	40			75	
Big Rapids	1,200,000	15,600	4	35,000	24,000		1,300	29	2	25	50	
Coldwater	\$984,000	66,000	3	35,000	4,000		3,000	160	8	14	90	12
Charlotte	517,600	23,000	4	15,000	1,000		1,200	64	6	79	100	14
Detroit	27,774,630	(936,732)	26					3,225	630	74	519	2,275
East Saginaw	3,283,040	159,685	10	39,225	14,000	3,463	3,000	103	12	989	186	31
Flint	1,307,340	150,000	6	114,000	96,000	4,000	2,000	137	4	60	145	36
Grand Haven	622,069	55,000	3	40,000	28,000		2,000	46		29	96	
Grand Rapids	10,090,045	341,000	12	50,000	69,000		2,500	164	17	151	136	136
Greenville		50,000	3	30,000	26,500	1,500	1,500	57	2	16	32	
Hastings	440,086	49,000	3	38,000	35,000		1,300	53		50		20
Hillsdale	933,730	45,000	5	33,000	13,000		1,200	109	8	20	47	
Holland	436,850	65,000	2	3,000	1,100		1,000	28			79	5
Ionia		45,000	4	30,000	16,000	4,000	1,800	140	5			
Jackson		41,000	4	28,000			1,800	12		24	21	
Kalamazoo	2,500,000	100,000	6	55,000		4,500	2,000	168	3	64	103	63
Lansing	2,103,120	190,000	6	96,750	30,000	1,600	1,400	62	2	34	88	16
Lapeer	400,000	15,000	4	17,000		2,600	1,500	78	2	24	34	25
Manistee	685,812	32,000	4	20,000			1,500			6	13	13
Marshall	987,493	150,000	5	70,000	43,000	2,700	1,600	103	9	47	23	25
Monroe	938,065	30,000	3	18,000			1,200	49		19	75	
Muskegon	1,945,449	101,872	6	54,483	52,925		1,600		2		58	2
Niles	\$50,000	75,000	5	30,000	10,500	2,178	1,800	109	16	52	75	15
Owosso	258,169	51,000	5	42,000	34,000	2,600	1,400	98	14	64	84	16
Pontiac	929,855	100,000	5	66,875	40,000	3,450	1,800	132	8	75	58	11
Port Huron	1,256,600	80,800	3	50,000	25,000		1,300	102	6	65	130	40
Saginaw City	1,890,555	135,000	6	72,000	89,000	2,300	2,000	72	6	30	60	
St. Clair	\$316,000	20,000	2	10,000	7,000		1,200	24	4			
Wyandotte	*190,000	54,000	3	23,000	7,000		1,200	58	8		12	
Ypsilanti		84,000	3	70,000	4,750		1,500	53	2	29	30	6

* Taken from report for 1874.

† Latin, Greek, and German, the latter averaging about one-third of the whole.

THE STATE NORMAL SCHOOL.

The leading object of the Normal School is to instruct and qualify persons for the work of teaching in the primary schools, and as such, this notice of it properly follows in this connection.

LOCATION AND BUILDINGS.

The school is located at Ypsilanti, a city of between 5,000 and 6,000 inhabitants, thirty miles west of Detroit, on the Central railroad. The school buildings are in the northwestern part of the city, upon an elevated site, about ninety feet above the level of the Huron river, and overlooking the entire town. The grounds are about five acres in extent, and are terraced, and ornamented with abundant shrubbery. The buildings are two in number, and are very correctly represented in the cut. The principal building, which appears on the right, with cupola projecting from the center of the roof, is 102 feet long and 56 feet wide, and is three stories high, exclusive of the basement. The second building is occupied by the School of Training and Practice. It is 70 feet by 52, and is three stories high including the basement.

ORGANIZATION AND WORK OF THE SCHOOL.

The school was organized in 1853, and has instructed in its Normal department some 6,300 students, 472 of whom have completed some one of the courses of study.

is graduating at
studying United

J.†	K.	L.
	30	-----
45	200	-----
281	113	65
73	191	-----
	75	-----
2	23	-----
79	100	14
14	90	12
519	2,275	-----
989	186	31
60	145	36
20	96	-----
15.	136	186
16	32	-----
50		20
20	47	-----
	70	5

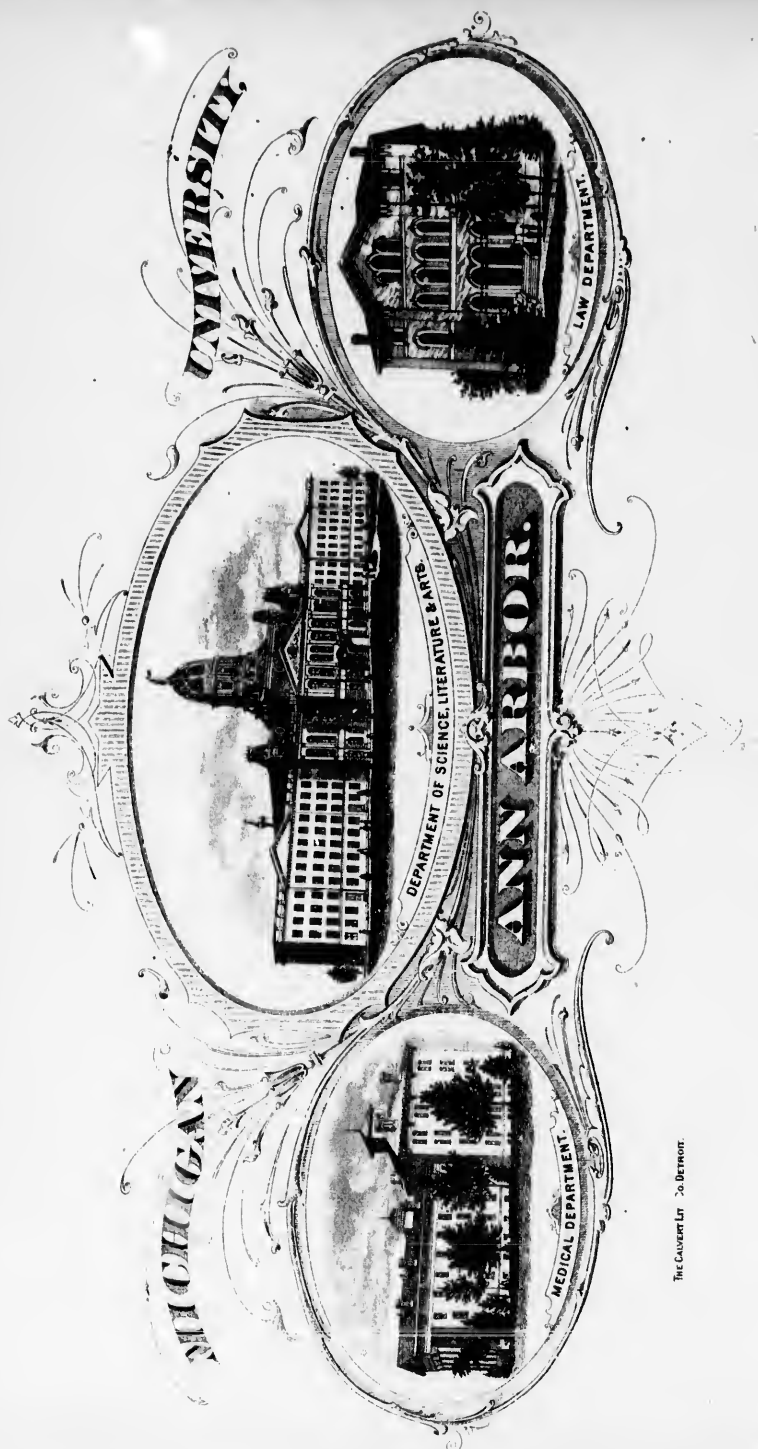
24	21	-----
64	103	63
34	88	16
24	34	25
6	33	13
47	25	25
10	75	-----
	58	2
52	75	15
64	84	16
75	58	11
65	150	40
30	60	-----

	12	6
29	30	-----

persons for
if it properly

inhabitants,
buildings are
ninety feet
The grounds
h abundant
represented
cupola pro-
and is three
plied by the
stories high

department
es of study.



The University of Michigan

and received the diploma. The total attendance in 1874 was 486, of whom 364 were in the Normal department. The graduates for that year were 51, of whom 43 were understood to have engaged in teaching. The total enrollment for the school year ending July 1, 1875, was 609. Of this number 409 belonged to the Normal department. The remaining 200 were in attendance upon the Experimental or Model School. The graduates for the year from the different courses number sixty, of whom 52 are now engaged in teaching in the public schools of the State.

COURSES OF STUDY.

The courses of study at the Normal School are: Common school course, two years; full English course, three years; course in modern languages, four years; classical course, four years; higher English course, two years; higher language courses, two years.

MODEL DEPARTMENT.

The Experimental or Model Department comprises the three grades of Primary, Intermediate, and Grammar, that distinguish the graded schools of the State. It numbers 200 pupils, children of citizens of the place, who receive instruction the same as in any graded school. The object of this department is to afford to Normal pupils means of observing the practical working of the graded school, from the youngest class in the primary to the most advanced in the grammar department.

ENDOWMENT, EXPENSES, AND TERMS OF ADMISSION.

The permanent endowment of the School is the Normal School fund, derived from the sale of lands dedicated to the purpose. The State makes an annual appropriation of about \$18,000. The annual expenses of the school average about \$25,000. Each member of the State Legislature is entitled to designate two pupils from his district to receive instruction in the School, and to these the tuition is free. Other Normal pupils pay a tuition fee of \$10 per year, and all are required to sign a declaration of their intention in good faith to engage in the profession of teaching. Both sexes have equal privileges in the School.

GOVERNMENT.

The School is under the government of a Board of Education consisting of three members, elected by the people of the State, the Superintendent of Public Instruction being ex officio a member, and secretary of the Board.

EFFECT OF DIPLOMAS—TEACHERS EMPLOYED—VALUE OF PROPERTY.

The diploma of the School is evidence of the legal qualification of the person holding it to teach. Thirteen teachers are employed in the various departments of the School. The value of grounds, buildings, furniture, library, apparatus, etc., is stated at \$72,800.

THE STATE UNIVERSITY.

LOCATION AND WHEN ESTABLISHED.

The University of Michigan is located at Ann Arbor, a city of about 7,000 inhabitants, forty miles west of Detroit, on the line of the Central railroad. The University was founded in 1837, and the first record of the appointment of a professor is in 1838, being the professorship of botany and zoölogy. The first degrees

conferred were in 1845, with seven professors, part of whom only were on active duty. The department of Medicine was organized in 1850, and the Department of Law in 1859.

EARLY ENDOWMENT.

By act of Congress of May 20, 1826, land equal to two townships, or seventy-two sections, was set apart for the use and support of a university, within the then territory of Michigan, and by act of June 23, 1836, this grant was confirmed to the State. The lands selected as "University Lands" were among the choicest in the State, and were held and sold at prices considerably in advance of the market value of other public lands, only some 200 acres now remaining unsold. The money received for these lands is held by the State as trustee, and is stated by the Superintendent of Public Instruction, in his report for 1874, p. xxi., at \$543,968.21. The interest upon this fund, amounting to about \$38,000 annually, is a permanent endowment, secured both by the terms of the grant and by the constitution of the State, to the University.

PURPOSE AND CHARACTER OF THE UNIVERSITY.

The University, as a part of the educational system of the State, may be said to offer (in its plan, at least, and in practice, so far as its age and the means at its disposal enable it to do so) every facility for the acquirement of the highest knowledge imparted by the schools.

The Rev. Henry P. Tappan, who was chosen the first regular President of the University in 1852, serving until 1863, did very much to impress upon the Institution the stamp of a university, and to impress the people with a right conception of what a university should be. The University having honored him by an invitation to attend its commencement exercises in 1876 (from his long retirement in Europe), some of his declarations on the general subject of universities seem appropriate here, as serving to define the character of the University of Michigan. In an address before the Christian Library Association of the University, June 22, 1858, he says:

"In all mere human institutions, there are none so important and mighty in their influence as universities; they embrace the means of all human culture, and they act directly upon the upspringing manhood of a nation. * * Wherever you collect the treasures of knowledge, and the men who know how to use and apply them, there, and there only, you have properly a university. * * * Let there be no jealous and tyrannical interference; let there be no religious or political tests; let there be no barbarous attempt to harness the winged Pegasus to the drag of beggarly elements. Knowledge can flourish only in the air of freedom; truth can walk in majesty and vigor only when unfettered; goodness can be pure and without hypocrisy only amid the sanctities of trust. Freedom—this is the grand characteristic of university education, as it is the essential attribute of manhood. * * The State of Michigan * * has conceived the plan and laid the foundations of a university. How simple the idea of a university! An association of eminent scholars in every department of human knowledge, together with books embodying the results of human investigation and thinking, and all the means of advancing and illustrating knowledge. How simple the law which is to govern this association! That each member, as a thinker, investigator and teacher, shall be a law unto himself, in his own department. * * I conceive of the University of Michigan as capable of becoming one of these great and distinguished institutions. * * Let the State of Michigan collect here the means of all knowledge and liberal culture. Let the curators appointed by the

people aim at one thing—to bring together, here, all the talent and erudition possible, independent of political or sectarian considerations, and no doubtfulness can overhang the result. * * * This young University is a son of the morning—the light beam of the great sun of knowledge which is rising upon the Empire of the West. * * * We have avoided one grand and fatal mistake in not misconceiving the true character of a University. There are three others to which, in all honesty, fidelity and plainness, I would call your attention. Those three mistakes would be the introduction of political partisanship and aims, local jealousies and competitions, and sectarian prejudices and demands, into the management of the University. * * * Politics can never be admitted to influence its appointments and measures, for two plain reasons. First, in its nature it has nothing to do with politics. * * * Secondly, it being essential to its success to procure the most able professors, no respect can be had to political sympathies, but purely to scientific and literary qualifications. * * * The very idea of a university is that of concentrating books and learned men in one place. All branches of human learning are cognate, and require for their successful prosecution, cordial co-operation and mutual support. * * * Local jealousies, if they have existed, must soon subside before a generous common sense. * * * Professors in every department should be men of pure and honorable characters. * * * But beyond this, in the appointment of professors, reference should be had only to scientific and literary qualifications, and aptitude to teach. * * * But egregiously do those mistake the character and ends of this institution who imagine that because it belongs to no sect or party in particular, it therefore belongs to all sects and parties conjointly, and of equal right. It not only does not belong to any sect or party in particular; it belongs to no sect or party at all. The deed of trust by which it was founded, the ordinance by which its objects are defined, makes no allusion to * * * any religious denominations; it speaks not of political parties; it refers to no particular localities; it speaks only of the State of Michigan, or of the people of the State. It is a purely literary and scientific institution; it is in no sense ecclesiastical. It is designed for a single purpose—advancing knowledge and promoting education. It is as absurd to speak of the University as belonging to religious sects conjointly, as it would be to speak of the asylum, the State prison, the Legislature, or any other body, institution, or works, as thus belonging. The State is not composed of religious sects, but of the people. And the institutions of the State do not belong to the sects into which the people may chance to be divided by their opinions and practices, but to the people considered as the body politic, irrespective of all such divisions. The people of the State, and not the religious sects, elect, by districts, ten judges and ten regents,* who are responsible to their constituents, the people of the State, and not to the religious sects. As well may the religious sects prescribe to the one as to the other. The duties of these judges and regents are fixed, not by the religious sects, but by the constitution, and organic laws enacted under it. * * * The right of prescription, interference, or of any control conceded to one religious body, would involve a concession of the same to all similar bodies. What is conceded to the Protestants, the Catholics may equally claim. What is conceded to Methodists or Presbyterians, all other Protestant sects may equally claim. Nay, what is conceded to religious sects must be conceded also to those who belong to no sect. * * * The only practical alternative is that of committing an institution of learning to one sect, or to none at all. State institutions, of course, are committed to none at all.”

* Prior to 1863 the regents were elected by single districts, but since that time by the State at large.

GOVERNMENT OF THE UNIVERSITY.

The governing power of the University is reposed in a board of eight Regents, elected by the people of the State at large.* The regents exercise legislative and general executive power over the institution, independently of the State Legislature.

SITUATION AND BUILDINGS—UNIVERSITY HALL.

The site of the University is a tract of forty acres of land, donated by citizens of Ann Arbor for the purpose, within five minutes' walk of the principal business part of the city. As originally designed, there were to be four main buildings, which were to serve as dormitories and for general college purposes. One of these buildings, in which the university work was first begun, was commenced in 1837, and another, distant from the first 147 feet, was built some years later. The abandonment of the dormitory system contributed to a change of plan, and when a legislative appropriation in 1871 permitted the work to be undertaken, what is now "University Hall" was constructed by building up the intervening space between the two buildings mentioned, which are called the wings, giving an entire frontage of 347 feet, the center portion having a depth of 140 feet, and the wings 40 feet each. From the basement to the summit of the dome is 140 feet. This commodious edifice contains the chapel, 34 by 30 feet, the principal hall for use on commencements and other public occasions, 80 by 128 feet, library, museum, recitation rooms, offices, etc.¹ The cost of the new building was \$105,000.

DEPARTMENTS AND COURSES.

The University comprises three principal departments: The Department of Literature, Science, and the Arts; the Department of Medicine and Surgery; and the Department of Law. The schedule of diplomas granted, which appears below, shows the academic and special courses comprised in the Department of Literature, Science, and the Arts. The School of Mines, established during the past year, comes within the same department. An important adjunct of this department also is the Astronomical Observatory, which is more particularly noticed elsewhere. The Homeopathic Medical College, and the Dental School, also established during 1875, naturally connect themselves with the Department of Medicine, although the former has no recognized connection with that, more than with any other department of the University. The Resident Graduate course is open to all graduates for the pursuit of the higher branches of learning.

THE ASTRONOMICAL OBSERVATORY.

The Astronomical Observatory is situated on an eminence a short distance from the University grounds. It is known as the "Detroit Observatory," on account of the liberal contributions made by citizens of Detroit towards its erection. The renown which the Observatory has acquired under the directorship of Prof. Watson, a graduate of the University, who has held the position of Director for many years, renders any description of the Observatory unnecessary. Seventeen new planets (new to astronomical knowledge) had been discovered by Prof. Watson up to 1874.

LIBRARY AND MUSEUM.

In 1872 the University library proper was reported at about 22,000 volumes; Medical, 1,500; Law, 3,000. Three or four societies also had libraries, so that the

* Vide note to last preceding page.

entire number of books was estimated at 30,000. Considerable additions have since been made, including 609 volumes in 1875. An appropriation of about \$2,000 is annually made for the improvement of the library.

The museum is richly endowed with botanical, zoölogical, geological, mineralogical, and archaeological specimens.

ADMISSION OF WOMEN.

The University was opened to young women in 1870, and its reports since show a creditable representation, both of students and graduates.

GRADUATES FROM THE HIGH SCHOOLS.

Graduates from the union schools of the higher class in the State are received into the Freshman class at the University without examination.

FEEES AND CHARGES.

The only charges made by the University to students are: To residents of the State, an admission fee of \$10, and to non-residents, \$25, and an annual fee of \$10 from all students. A person once matriculated is entitled to permanent membership in any department, the only further condition being the payment of the annual fee.

APPROPRIATIONS.

The State has extended aid to the University as follows:

1838, loan, for building purposes.....	\$100,000 00
1867, 20th-mill tax, two years *.....	30,796 60
1869, annual appropriation of \$15,000, four years, to 1873....	60,000 00
1871, \$35,500 for two years, for building hall.....	70,000 00
1873, for completing hall, \$25,000, and to meet deficit \$13,000	38,000 00
1873, 20th-mill tax for three years, including 1875 †.....	94,500 00
1875, for water supply.....	5,000 00
“ to pay outstanding indebtedness.....	13,000 00
“ for Dental School, (payable one-half each year, '75-’c).....	6,000 00
“ for school of mines, “ “ “ “.....	21,000 00
“ for hospital and supplies.....	7,500 00
“ for Homeopathic College †.....	6,000 00

RESOURCES AND EXPENSES.

The revenue of the University is derived chiefly from the following sources:

Interest fund, per year.....	\$38,500
20th-mill tax, per year.....	31,500
Homeopathic College, per year.....	6,000
Students' fees and diplomas.....	30,000
Total.....	\$106,000

The receipts from the interest fund will vary but little from year to year, although it is expected that the receipts from the 20th-mill tax will be considerably increased after the new equalization is made, which will be in June of this year. The item for students' fees and diplomas is an estimate predicated on the receipts for 1875, which were \$29,225, the amount, of course, depending upon the enrollment. The amount of disbursements for 1876 is estimated at \$111,100, of which \$88,970 is for salaries.

* By computation.

† Annual appropriation until changed by the Legislature.

VALUE OF PROPERTY.

The property of the University is valued as follows:

Personal Property:		Real Estate:	
Libraries	\$50,000	Land (40 acres)	\$30,000
Observatory apparatus	20,000	University Hall (centre)	105,000
Chemical	20,000	North and south buildings (wings)	20,000
Fine art collection	15,000	Law building	25,000
Mineralogical collection	10,000	Medical building	35,000
Anatomical collection	10,000	Astronomical Observatory	20,000
Geological collection	8,000	Chemical Laboratory	10,000
Zoological collection	5,000	Four dwellings	32,000
Botanical collection	2,000	Hospital	9,500
Miscellaneous collection	3,000	Water works	5,000
Apparatus, physics and eng	7,000		
Hospital supplies	2,500		
Total	\$148,500	Total	\$311,500
		Total personal	148,500
		Grand total	\$460,000

The foregoing, except the items for water works, hospital, and hospital supplies, which were provided for by the last Legislature, is taken from the report of the Superintendent of Public Instruction for 1873, based upon an estimate submitted at the dedication of University Hall, in November of that year.

SUMMARY OF STUDENTS.

The whole number of students attending for each of the years named (closing June 30) was: 1870, 1,126; 1871, 1,110; 1872, 1,224; 1873, 1,136; 1874, 1,112; 1875, 1,193.

The number of women attending during the same years (but included in the foregoing figures) was: 1871, 34; 1872, 64; 1873, 88; 1874, 94; 1875, 122.

Thirty-three States and territories, Ontario (Canada), Hawaiian Islands, Japan, Natal (South Africa), Siberia, and Russia, were represented in the catalogue of 1875. The proportion of students resident in Michigan during the past five years has averaged about 46 per cent. of the whole, but classified, the per cent. would be about as follows: Literary, 60; medical, 38; law, 33.

TABLE OF GRADUATIONS.

The following table shows the number of graduates from the Department of Literature, Science, and the Arts, from 1845 to 1850, both inclusive, and the number graduated each year in each department since that time:

YEARS.	Bachelors of Arts.	Bachelors of Philosophy.	Bachelors of Science.	Civil Engineers.	Pharma. Chemists.	Doctors of Medicine.	Bachelors of Law.	Total.	YEARS.	Bachelors of Arts.	Bachelors of Philosophy.	Bachelors of Science.	*Civil Engineers.	Pharma. Chemists.	Doctors of Medicine.	Bachelors of Law.	Total.
1845-50.....	92	.....	.....	.....	.....	.....	.....	92	1863.....	23	.....	6	3	.....	32	45	109
1851.....	10	.....	.....	.....	.....	6	.....	16	1864.....	22	.....	3	1	.....	50	65	141
1852.....	9	.....	.....	.....	.....	27	.....	36	1865.....	22	.....	5	6	.....	68	76	175
1853.....	11	.....	.....	.....	.....	34	.....	45	1866.....	31	.....	6	6	.....	67	103	211
1854.....	21	.....	.....	.....	.....	41	.....	62	1867.....	26	.....	10	7	.....	80	141	264
1855.....	15	.....	.....	.....	.....	33	.....	40	1868.....	34	.....	5	15	.....	79	145	278
1856.....	20	.....	.....	.....	.....	41	.....	50	1869.....	23	.....	9	12	.....	94	122	272
1857.....	27	.....	.....	.....	.....	27	.....	61	1870.....	41	.....	6	16	.....	13	116	295
1858.....	29	.....	.....	.....	.....	27	.....	75	1871.....	33	6	7	14	18	78	117	273
1859.....	26	.....	.....	.....	.....	24	.....	63	1872.....	57	7	12	11	5	89	142	323
1860.....	22	.....	.....	.....	.....	21	16	74	1873.....	40	15	12	11	9	91	123	301
1861.....	37	.....	.....	.....	.....	43	40	136	1874.....	35	12	13	14	20	71	126	291
1862.....	37	.....	.....	.....	.....	39	44	130	1875.....	42	21	18	20	18	79	136	334

* Includes 14 on whom the degree of mining engineer was conferred during the period 1867 to 1872.

The foregoing figures are taken from the general catalogue of 1871, and from other published reports since that time.

NUMBER OF INSTRUCTORS, AND SALARIES PAID.

Including the new departments provided for during 1875, there are about forty-five professors, assistant professors, and instructors employed. The President receives an annual salary of \$4,500, the professors each from \$1,300 to \$2,500, and the assistant professors and instructors from \$1,000 to \$1,300 each.

STATE AGRICULTURAL COLLEGE.

ESTABLISHMENT AND LOCATION.

The constitution of Michigan provides that "The Legislature shall, as soon as practicable, provide for the establishment of an Agricultural School." In pursuance of this provision, the Legislature, in 1855, passed an act "for the establishment of a State Agricultural School," which provided that the college should be located within ten miles of Lansing, on not less than 500 acres of land in one body. The location was made June 16, 1855, on a farm of 676 57-100 acres, three and one-half miles east from the capital. About three acres only were cleared of timber at the time of purchase. The soil is very varied, there being hard clay, clay loam, peaty soil, sand, sandy loam, alluvial flats, etc. The Red Cedar river runs through the farm.

WHEN OPENED.

The college was opened to students May 13, 1857, and has been in uninterrupted operation from that time. It opened in charge of the State Board of Education, with seven professors and instructors and sixty-one students.

GOVERNMENT.

The management of the institution was in 1861 transferred from the State Board of Education to a State Board of Agriculture. This Board is a body corporate, consisting, besides the Governor of the State and the president of the College, who are ex officio members, of six persons, who are nominated by the Governor and confirmed by the Senate.

The immediate management of the institution is committed to a Faculty consisting at the present time of a president and eleven professors, instructors, and foremen, exclusive of the Secretary, who is a member ex officio of the Faculty.

CHARACTER OF THE INSTITUTION.

The law provides that "The Agricultural College shall be a high seminary of learning, in which the graduate of the common school can commence, pursue and finish a course of study terminating in thorough theoretic and practical instruction in those sciences and arts which bear directly on Agriculture and kindred industrial pursuits," and requires that "the full course of study shall embrace not less than four years." A full course of study is laid out, requiring four years to complete it, although students are received for shorter periods, for the study of select branches. The College is authorized to confer degrees.

MANUAL LABOR.

The law provides that the institution "shall combine physical with intellectual labor," and it requires that students shall, with some exceptions, labor three hours each day. This labor is required on each afternoon of the week excepting Sat-

\$30,000
105,000
20,000
25,000
35,000
20,000
10,000
32,000
9,500
5,000

\$311,500
148,500

\$160,000

cal sup-
report
ate sub-

closing
2; 1875,

in the

Japan,
agne of
e years
won't

ment of
e num-

	Total.
45	109
5	141
76	175
33	213
11	244
35	278
22	272
19	295
7	273
2	323
33	301
6	291
6	334

not 1867

urdays and Sundays, and is paid for according to its value at a maximum rate of ten cents an hour.

BOARD AND TUITION.

The institution is conducted on the plan of making the expense to students as small as possible. Most of the students board in the college, and the law provides that "in assessing the price of board it shall be so estimated that no profit shall be saved to the institution." Tuition is free.

ENDOWMENT, APPROPRIATIONS, AND VALUE OF PROPERTY.

The College has a permanent endowment fund, derived from lands donated by the act of Congress in 1862, which gave to each state public lands to the amount of 30,000 acres for each of its senators and representatives in Congress, according to the census of 1860, for the "endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts."

The income from lands already sold is something over \$16,000 per annum. The annual expenses of the institution are about \$25,000, the balance being made up by appropriations by the State. The endowment it is supposed will be ample for the support of the College when the lands are sold.

The total amount of State appropriations up to December 30, 1875, has been \$440,213.50. The value of the property belonging to the State at the College, September 30, 1874, is \$209,038.

IMPROVEMENTS AND APPARATUS.

The farm has now six fields of about twenty-four acres each in cultivation under a system of rotation of crops, barns, shops, and various kinds of cattle, sheep, and swine. The Horticultural Department has various orchards of large and small fruits, a vegetable garden, greenhouse and borders. There is an excellent chemical laboratory for students to work in, an apiary, museums, and libraries.

BUILDINGS.

There are on the grounds twenty-two buildings of all sorts. The three College buildings proper comprise college hall, 50 by 100 feet, boarding hall, 116 by 116 feet in its largest dimensions, and dormitory, 50 by 84 feet, all three stories in height, the first two with basement. The laboratory is 51 by 100 feet, one story and basement. The greenhouse, as designed and partly built, is 25 by 113 feet, with gardener's rooms and potting room 26 feet square. Including the President's house there are nine dwellings for professors and herdsman, and the farm house. The other buildings comprise apiary, shops, barns, piggery, sheds, etc.

TERMS, ATTENDANCE, AND COURSE OF STUDY.

There are three terms in each year, so arranged that nearly all the vacation time is in winter.

There has been a steady growth in the number of students. There were in 1875: Resident graduates, 5; seniors, 16; juniors, 21; sophomores, 21; freshmen, 82; specials, 11. Total 156.

The College has graduated one hundred and twenty-three students, about 40 per cent. of whom are engaged in agriculture.

No other courses than one of general and agricultural education have as yet been established.

DENOMINATIONAL AND PRIVATE COLLEGES AND SCHOOLS.

ALBION COLLEGE.

This college is under the control of the Methodist Episcopal Church, and is located at the village of Albion, in the central part of the State, on the line of the Central railroad. The grounds comprise about fifteen acres. There are three college buildings, each three stories in height, having severally the dimensions of 46 by 80, 40 by 100, and 47 by 80 feet. The institution does not aim to be a university, but makes its collegiate courses full and thorough. It comprises both male and female departments. The attendance for the collegiate year ending June, 1875, was: Juniors, 6; sophomores, 13; freshmen, 25; preparatory, 105; conservatory of music, 64; department of fine arts, 12; book-keeping and penmanship, 44. The tuition in the preparatory and collegiate studies, is free. There are some incidental fees and charges for music, painting, and other special studies. The average annual expenses to each student, including board in the institution, but not including music and painting, are from \$175 to \$250. The faculty consists of nine members. Value of property, about \$85,000; liabilities, \$18,000. Income during the year, \$16,608; paid teachers, etc., \$9,228. A sinking fund is provided, which it is thought will liquidate the indebtedness in ten years. Rev. Geo. B. Jocelyn is president.

ADRIAN COLLEGE.

This institution is located at Adrian, a city of 10,000 inhabitants, the capital of Lenawee county, in the southeastern part of the State, on the line of the Lake Shore and Michigan Southern railroad. It was founded in 1859 by the Wesleyan Methodists, and is now under control of the denomination or connection known as the Methodist Church. The grounds contain about twenty acres. Five buildings are contemplated, four of which have been built. The institution is for the education of both sexes, and retains the dormitory and boarding feature (the halls for the sexes being separate), and will accommodate at present about 225 students. The aggregate attendance during the last college year was 179; number of graduates, 13. Total graduates for previous years, 121. Ten professors and teachers are employed. Exclusive of the endowment fund, the assets of the institution, including grounds, buildings, furniture, apparatus, musical instruments, outlying lands, etc., amount to more than \$137,000. The endowment fund upon which interest is paid promptly amounts to about \$80,000. The income from other sources is about \$2,500 per annum. There is a tuition fee of \$5 per term, with incidental expenses and charges for special courses. Room rent, \$2 50 to \$5 per term; board, \$3 per week. Rev. G. B. McElroy is president.

HOPE COLLEGE.

This institution, under the patronage and auspices of the Dutch Reformed Church, is located in the city of Holland, Ottawa county, and is an outgrowth of the settlement of the Dutch (or Hollanders) in that section. Its incipient establishment was in 1851. It has three departments: Preparatory, Academic or Collegiate, and Theological. The aggregate number of its graduates has been: From the preparatory department, beginning in 1863, 95; from the academic, beginning in 1866, 53; and from the theological, beginning in 1869, 24. The present number of instructors employed is nine, who are sometimes aided in the preparatory department by some of the older students. The value of real estate occupied by the college is about \$25,000, and of other property over and above incumbrance, about

\$10,000. The amount of endowment paid in is about \$55,000. The income from this and other sources is about \$9,000 per annum. Rev. Philip Phelps, Jr., is president.

KALAMAZOO COLLEGE.

This institution is located at the village of Kalamazoo, the capital of Kalamazoo county, being on the second tier of counties north of the Ohio line and the second east of lake Michigan. The College is under the auspices of the Baptist denomination. The college site of about five acres, with building, is valued at \$35,000. Investments, \$88,000. The income from all sources during the year 1875 was \$7,351. Eleven instructors are employed. Three courses of instruction, of four years each, are announced: Classical, Latin and Scientific, and Scientific. The charge for tuition is \$6 per term, with an incidental fee of \$2.50 per term, and a matriculation fee of \$5, payable on admission to a college class. Kendall Brooks, president.

HILLSDALE COLLEGE.

This is an institution of considerable importance, located at Hillsdale, in the county of that name, on the southern boundary of the State, and on the line of the Lake Shore and Michigan Southern railroad. It is the educational center for a considerable portion of the northern and northwestern States, of the Free Will Baptist denomination. No report has been received from it.

OLIVET COLLEGE.

Located at the village of Olivet, Eaton county, in the central portion of the Lower Peninsula, near the line of the Chicago and Lake Huron railroad. It is under the joint auspices of the Presbyterian and Congregational denomination. The value of buildings and grounds is stated at \$83,200; library, cabinet and instruments, \$10,250. The productive assets aside from buildings and grounds are stated at \$107,426.26, and of unproductive assets, \$37,767. Fourteen professors and teachers are employed. There are five departments, namely: The Collegiate Department, embracing the classical, scientific and ladies' courses; the Preparatory Department; the Normal Department; the Department of Music, conducted under the title of the "Michigan Conservatory of Music;" and the Art Department. The number of students attending during 1875 was 217,—155 gentlemen and 162 ladies; number graduated, 13—five gentlemen and eight ladies.

BATTLE CREEK COLLEGE.

The city of Battle Creek, nearly midway between Detroit and Chicago, on the Michigan Central railroad, is the headquarters of the sect known as Seventh Day Adventists. They have here an extensive publishing house, and in their diet and habits verge somewhat closely on what is known as Grahamite or vegetarian, having an establishment or health institute conducted on this plan. Battle Creek College is under the auspices of this sect or denomination, although like most other denominational colleges, it disclaims any special sectism in its teaching. The College campus contains 12 acres. The only building at present is a three story brick, built since March, 1874, when the enterprise was first formally undertaken. The institution comprises four departments: Primary, Intermediate, Grammar, and Collegiate, and reports eleven professors and teachers, and an aggregate attendance the first year of 289 pupils, of both sexes. The charges for tuition are \$4 to \$6 per term of twelve weeks. Elder James White is president.

FEMALE SEMINARIES.

Although women are admitted to all of the public educational institutions of the State, and to most, if not all, of the private colleges, a number of exclusively female schools are maintained. The Michigan Female Seminary, at Kalamazoo, is the only one of these that reports to the Superintendent of Public Instruction. This is a boarding school, modeled after Mount Holyoke Seminary, in Massachusetts, and is under Presbyterian auspices. Ten teachers are employed. Value of real estate, \$70,000. Yearly income from \$10,000 to \$15,000. Jeannette Fisher, principal.

OTHER PRIVATE SCHOOLS.

The report of the Superintendent of Public Instruction for 1874, page lxxxii., gives statistics obtained through the school superintendency, of private and denominational schools in the State. These reports are not full, but yet they have a value, and are entitled to a place in this work. The colleges and schools noted above are not included in these figures. The aggregates for the State are as follows:

Whole number of schools	121
Number of teachers employed	197
Number of pupils	6,450
Amount expended for support of schools	\$26,388

XVI. STATE INSTITUTIONS.

CHARITABLE, REFORMATORY, AND PENAL.

No State would cite as a recommendation to favor, the fact that she was under the necessity of maintaining institutions of a charitable, reformatory and penal character. But as there is no known civilized state where such necessity does not exist, an outline of the structural formation of the social life that did not recognize such necessity, would be incomplete. And the State itself would be incomplete in so far as it failed to make the best possible provision to meet such necessity.

BOARD OF STATE COMMISSIONERS.

In conformity to an advanced public sentiment, which within the past few years has manifested itself in the United States and Europe, the Legislature of Michigan, in 1871, passed an act "to provide for the appointment of a Board of Commissioners for the General Supervision of Penal, Pauper, and Reformatory Institutions, and defining their duties and powers." The object of the act was the betterment of the condition of these institutions and of their inmates, through a reformed and more systematized management. The law gives to the Board of Commissioners supervision not only of State institutions, but of local poor houses,

asylms and jails. These latter cannot of course be specifically noticed in this connection, and reference is made to the law establishing the commission only for the purpose of showing the tendency to better methods in the management of this class of institutions.

ARRANGEMENT AND CLASSIFICATION.

In compiling this work, the title under this head is varied a little from that which the title of the law would suggest, for convenience of arrangement. The State Public School and the Asylms seem to come properly under the head of "charitable" institutions, the Reform School under that of "reformatory," and the prisons under the head of "penal." It is true that the State Public School and the Reform School are properly "schools," and their reports have been embodied in the report of the Superintendent of Public Instruction. And so also, the Institution for the Deaf and Dumb, and the Blind, is a school. But the educational character of these institutions is exceptional, and this classification is adopted in this work as distinguishing them from the general school system of the State.

THE STATE PUBLIC SCHOOL.

This institution is located about a mile north of the city Coldwater, the county seat of Branch county, near the southern boundary of the State, and nearly central between lake Erie and lake Michigan.

ESTABLISHMENT AND OBJECT OF THE SCHOOL.

In the year 1870, a commission appointed by the Governor for the purpose, visited many of the poor-houses in the State, and found a large number of children in them, under sixteen years of age, indiscriminately associated with idiots, maniacs, prostitutes, and vagrants. Their report recommended the classification of paupers, and especially, that children in the county houses, under sixteen years, should be placed in a State school. The act establishing the school was passed in 1871, in conformity with the recommendation. As amended in 1873, it provides, in substance, that there shall be received as pupils in such school all neglected and dependent children that are over four and under sixteen years of age, and that are in suitable condition of body or mind to receive instruction, especially those maintained in the county poor-houses, those who have been deserted by their parents, or are orphans, or whose parents have been convicted of crime. It is declared to be the object of the act to provide for such children temporary homes only, until homes can be procured for them in families. The plan comprehends the ultimate care of all children of the class described, and it is made unlawful to retain such children in poor-houses, when there is room for them in the State public school. Dependent orphans, or half orphans of deceased soldiers and sailors, have the preference of admission should there be more applications than room. Provision is made for preserving a record of the parentage and history of each child.

SUPERVISION AND METHODS.

The general supervision of the school is delegated to a Board of Control, consisting of three members, who are appointed by the Governor, with the advice and consent of the Senate. The Board are to appoint the superintendent, matron, teachers, and cottage managers. As an adjunct to aid in carrying out the design of the school, which is to provide permanent homes in good families for

iced in this
sion only for
management of

e from that
ment. The
the head of
ry," and the
School and
en embodied
o, the Insti-
educational
s adopted in
he State.

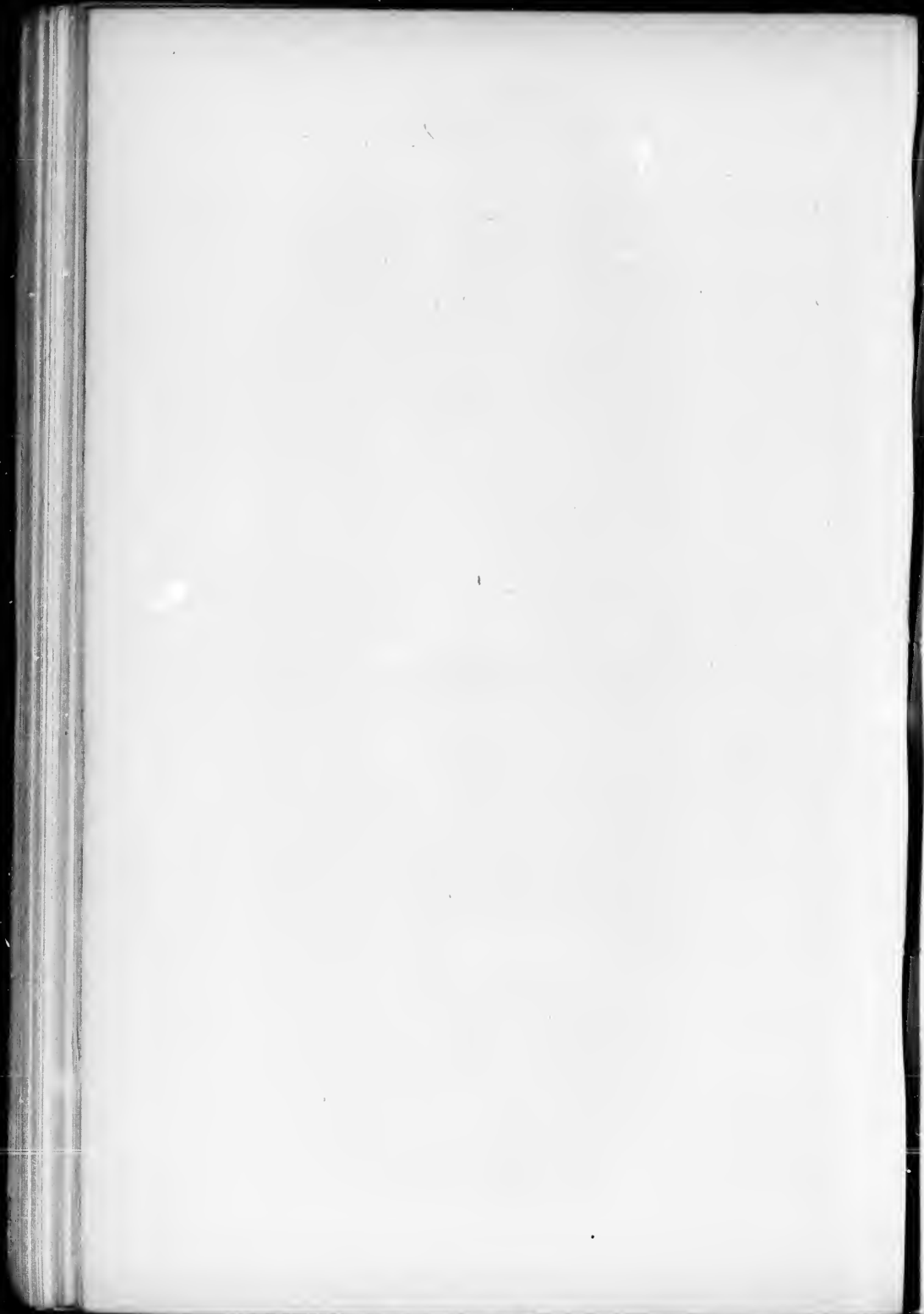
dwater, the
, and nearly

he purpose,
ber of chil-
with idiots,
classification
xteen years,
as passed in
it provides,
ll neglected
of age, and
n, especially
deserted by
f crime. It
temporary
lan compre-
it is made
for them in
sed soldiers
applications
centage and

ontrol, con-
the advice
ndent, mat-
ng out the
amilies for

INDIC 'RENNACVOC
COEDWATER, MICH.
'FOODS DESELE EEVES





each child, the Board is empowered to appoint an agent, whose duty it is to see to finding homes for these children, to apprentice them, and keep a general oversight of them by visitation or correspondence. As a further adjunct, the Governor is empowered to appoint an agent for each county, who is to be known as the Agent of the Board of State Commissioners for the general supervision of charitable, penal, pauper, and reformatory institutions, who shall assist the general agent in all his work.

INTERNAL GOVERNMENT.

The system upon which the institution was organized is that of the "family" and "congregate" combined. The children eat, work, and attend school together, but in all other respects live as families do, except that they are somewhat larger, being divided into families of thirty members, each family being under the care of a "cottage manager" whom the children call "auntie," who is supposed to care for them as a mother would. She looks after their clothing, sees that they are regularly bathed, attends to the disciplining of them in all minor cases, gives them moral and religious instruction, conducts family worship with them, settles their little quarrels, and sympathises with them in their sorrows. The relationship, in time, becomes very much like that between mother and child, and brother and brother.

OCCUPATION AND INSTRUCTION.

Each child of sufficient years, is expected to work three hours every day. Some work on the farm, some in the dining room and kitchen, while others make shoes, braid straw hats, make their own clothing, work in the bakery, engine room, laundry, etc. The value of their labor is deemed of less importance than the formation of industrious habits, which will in time make them self supporting.

The children are required to attend school from three to five hours per day, according to their ages, and the school hours are divided into sessions to accommodate the work. The best books and teachers that can be procured are furnished them, and their progress in study is quite satisfactory. A Sunday school is maintained, mostly by the assistance of ladies and gentlemen from Coldwater. The School has a small library of 460 volumes, with provision for its annual increase.

BUILDINGS, GROUNDS, AND APPROPRIATIONS.

The buildings, ten in number, comprise a main building, eight cottages, and hospital, all of brick. The buildings are steam-heated, lighted with gas, and have good bathing facilities. The cost of land (41 acres), buildings, furniture, etc., will be about \$150,000, furnishing accommodations for 240 children. The appropriations for construction and maintenance have been: 1873, \$36,550; 1874, \$51,450; 1875, \$70,465; 1876, \$80,000.

RESULTS.

The School was opened in May, 1874. Up to the close of the year 1875, 265 children had been received, of whom 82 had been indentured to good families.

INSTITUTION FOR EDUCATING THE DEAF AND DUMB, AND THE BLIND.

LOCATION, ESTABLISHMENT, AND CHARACTER.

This State institution is located at Flint, in the county of Genesee, sixty miles north bearing west, from Detroit. The act establishing the institution was

passed in 1848, and the school was first opened in 1854, in a leased building. It is a school in common for deaf mutes and for the blind, rather from motives of economy than from any relation which the two classes, or the methods for their care and instruction, bear to each other.

CONDITIONS OF ADMISSION AND ATTENDANCE.

Tuition and board are free to all residents of the State, and the trustees are authorized to assist indigent persons in the way of clothing, etc., to the amount of forty dollars per annum. Persons from without the State may be admitted upon payment of such amount as will cover their care and keeping. The county poor authorities are required to place all deaf and dumb, and blind persons, under their charge, who are between the ages of ten and twenty years, and of sound mind, in the institution. Official steps are taken each year for ascertaining the residence of deaf mutes and blind persons, and notifying their friends of their right to the benefits of the institution.

NUMBER OF INMATES.

The number of inmates at the close of each school year for the years named, was: 1865, 94; 1866, 109; 1867, 116; 1868, 119; 1869, 135; 1870, 130; 1871, 148; 1872, 159; 1873, 164; 1874, 191; 1875, 225.

BUILDINGS AND GROUNDS.

The actual work of constructing buildings for the institution was begun in 1853. The principal buildings of the institution now are: Front building 43 by 72 feet, with east and west wings, each 28 by 60 feet; center building, 40 by 60, and east and west wings, each 50 by 70 feet; main school building, 52 by 54, with two wings, each 25 by 60 feet. All of these buildings are four stories in height, except the center of the front building, which is five stories, including basement. The other buildings are: Boiler and engine house, wash house, dry house, ironing house, cabinet shop, barn, pump house, well house, and other necessary outhouses. The total value of buildings is \$358,045, and of land (about 88 acres), \$17,570.

TEACHERS AND ATTENDANTS.

Including the Principal, there are ten teachers employed in the Deaf and Dumb department, and four in the Blind department, besides the matron and her assistants, who are not enumerated as teachers.

OCCUPATIONS.

The deaf mutes (boys) are taught cabinet making, shoe making, and printing, and the girls, sewing, knitting, printing, and kitchen and laundry work. The blind boys are taught basket making, and some of the girls are taught sewing, knitting, and bead work.

CARE AND TREATMENT OF THE INSANE.

MICHIGAN ASYLUM FOR THE INSANE.

The first step taken by the State towards making provision for the insane, was in 1848, when the Legislature passed an act establishing an asylum, and hence has grown the Michigan Asylum for the Insane, at Kalamazoo. The Asylum as now completed, consists of two distinct buildings, each complete in itself, which are designated as Male and Female Departments respectively. The capacity of the former is 250, and of the latter 300 patients.

building. It
in motives of
ods for their

trustees are
to the amount
be admitted
The county
persons, under
and of sound
ertaining the
nds of their

years named,
1871, 148; 1872,

egun in 1853.
3 by 72 feet,
60, and east
54, with two
eight, except
ement. The
use, ironing
y outhouses.
\$17,570.

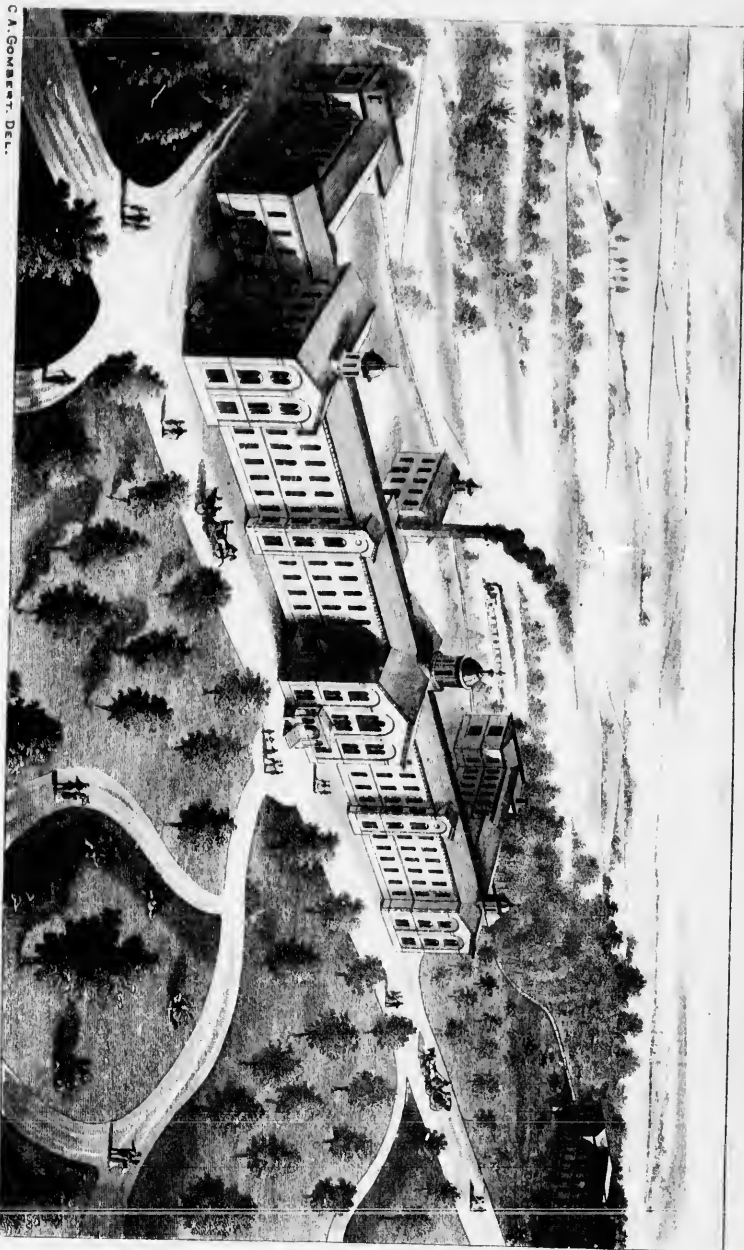
af and Dumb
and her assis-

and printing.
work. The
ight sewing.

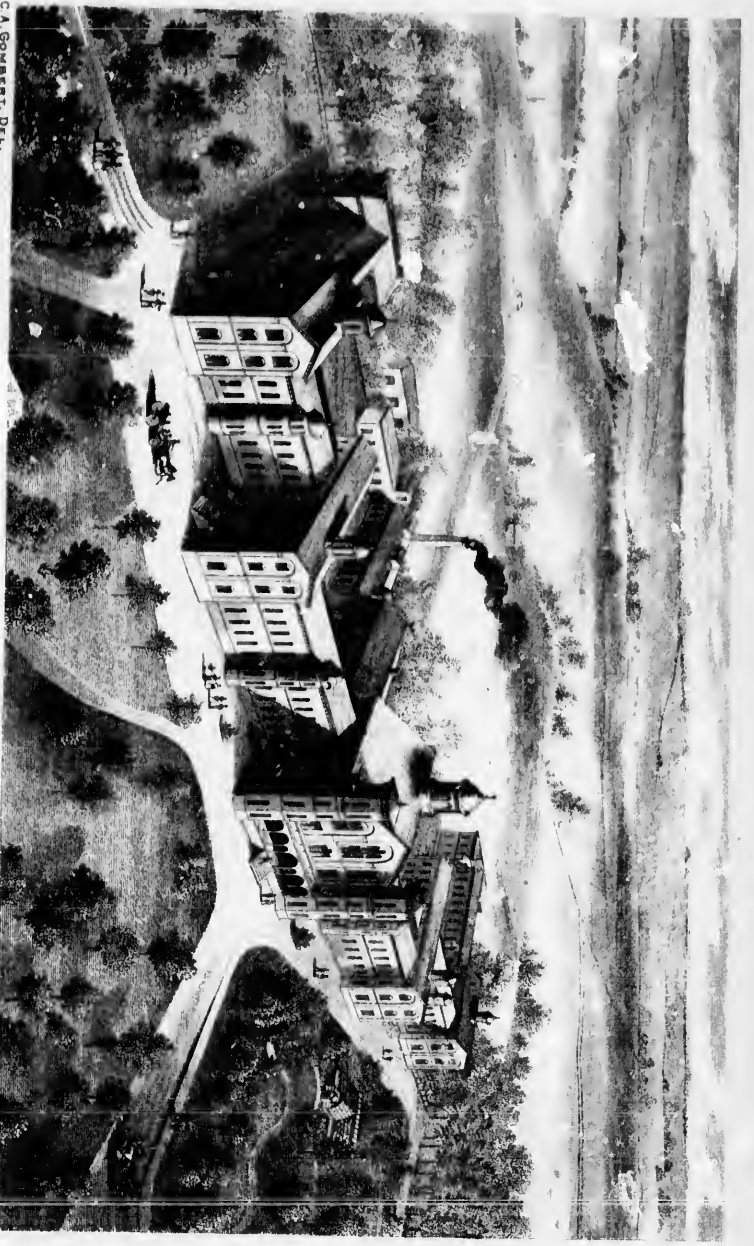
the insane,
n, and hence
e Asylum as
itself, which
capacity of

**RECEIVED ASSETS FOR THE INSANE,
KANSAS ASYLUM,
MALE DEPARTMENT.**

C. A. GOMBERT, DEL.



CAVENDISH LITH. CO. DETROIT



C. A. GOVERN, DEL.

LAURENCE LITH CO, DETROIT

**MICHIGAN STATE FOR THE ISSUES,
KALAMAZOO.**

PENALTY DEPARTMENT

In
the
insan
Ame
brick

T
kitch
ing 1
173.90
large
ciable
Si
and m
1, 187

Inc
the co
the av
receiv
week.
with r
tution

A r
acres,
substan
The m
Accom
mated
ated fo

No r
comple
In all p
treatme
the nat
which o
course h

This
in 1855
of the fe

PLAN AND CONSTRUCTION.

In their general construction both buildings are arranged in accordance with the propositions relative to the construction and arrangement of hospitals for the insane unanimously adopted by the Association of Medical Superintendents of American Institutions for the Insane. The material used in their construction is brick, with stone trimmings, and the structures are substantial.

COST OF BUILDINGS, GROUNDS, AND MAINTENANCE.

The entire cost of both buildings, with adjacent structures, such as chapel, kitchen, bakery, laundry, engine and boiler rooms, shops, engineer's house, pumping house, etc., all furnished and complete, and 195 acres of land, is about \$727,173.90, fully twenty-five per cent. of which is to be ascribed to the fact that the larger portion was built during the war or immediately after, before any appreciable decline had taken place in the cost of labor or material.

Since the opening of the Asylum in 1859 there has been expended for the care and maintenance of patients, exclusive of the cost of construction, up to October 1, 1875, the sum of \$994,711.32.

CONDITIONS OF ADMISSION AND TREATMENT.

Indigent patients are received and treated at the Asylum at the expense of the counties to which they belong, on the certification of the county authorities, the average cost of maintenance being about \$4.12½ per week. Pay patients are received when there is room for them, the minimum price of board being \$5 per week. Patients so far recovered as to be discharged, are, if indigent, supplied with necessary clothing, and money not exceeding twenty dollars, by the institution.

EASTERN ASYLUM FOR THE INSANE.

A new Asylum has been located at Pontiac, upon a farm of upwards of 300 acres, and the erection of the necessary buildings has begun. They are to be substantially similar in plan and arrangement to those of the Michigan Asylum. The material used is to be brick, with stone window caps, belt-courses, etc. Accommodations will be furnished for not less than 300 patients, and the estimated cost of the completed institution is \$400,000, \$100,000 having been appropriated for each of the years 1873, 1874, 1875, and 1876.

TREATMENT OF THE CHRONIC INSANE.

No mention of what Michigan has done for her unfortunate citizens would be complete without an allusion to her enlightened policy towards the chronic insane. In all provisions, the effort has been to provide for all who could be benefited by treatment, whether curable or incurable. The design has been to cure, whenever the nature of the mental malady would permit, but failing this, to cease no effort which could minister to the comfort and welfare of the incurable. No other course has been deemed consistent with the dictates of humanity and right.

STATE REFORM SCHOOL.

LOCATION AND CHARACTER.

This institution, located at Lansing, the capital of the State, was established in 1855 as the "House of Correction for Juvenile Offenders," having about it many of the features of a prison. In 1859 the name was changed to the "State Reform

School." The institution has undergone gradual modification in its government and discipline, until all the prison features have been removed except those that remain in the walls of the original structure, and which remain simply as mementoes, without practical use. No bolts, bars, or gwards are employed. The inmates are necessarily kept under surveillance of the officers, of which however there is little need, as the attempts at escape are much fewer than when a more rigid discipline prevailed. The Reform School is for the detention, education and reformation of boys between the ages of eight and sixteen years who are convicted of light offenses.

THE BUILDINGS AND THEIR USES.

The principal building is four stories high, including basement, and has an extreme length of 246 feet, the center a depth of 48 feet, and the wings a depth of 33 feet each. There are besides two "family houses," so called, where the more tractable and less vicious boys form a kind of family, as distinguished from the congregated life of the institution proper.

OCCUPATION.

The boys are required to work half a day, and attend school half a day. A farm of 228 acres belonging to the school furnishes work for many of the boys during the working season. Some are employed in making clothing and shoes for the inmates. The only shop work carried on is cane-seating of chairs. There is no contract labor, but all the work is done by the institution itself.

NUMBER OF INMATES.

The number of boys in the school September 30, 1875, was 220, against 243 the previous year. This diminution is perhaps due in part to a law passed in 1873, providing for the appointment in each county of an agent to inquire into all complaints against boys, and to return them to their parents, or otherwise find homes for them, if circumstances seemed to call for it, instead of sending them to the Reform School.

GOVERNMENT AND MANAGEMENT.

The general administration of the school is by a Board of Control appointed by the Governor. A Superintendent and Assistant, Matron and Assistant, two overseers, and six teachers are employed.

PRISONS.

The State prison at Jackson is the only penal institution at present maintained by the State. The Detroit House of Correction, although a local institution, is used to a considerable extent as an intermediate prison, to which persons are sentenced by the courts throughout the State for minor offenses. Women convicted of felonies are also sentenced to the House of Correction. An intermediate prison is in course of construction at Ionia, which will afford better means of classifying offenders in proportion to their degree of guilt, moral condition, and promise of reformation, in accordance with the advanced sentiment of the age. The number of convicts in the prison at Jackson at the close of the prison year, 1875, was 788, including persons convicted of capital crimes, the death penalty having been abolished in Michigan many years ago.

XVII. RELIGIOUS ORGANIZATIONS.

At the time of commencing this compilation, circulars were addressed to representative persons of all the religious denominations, asking for statistical information. The responses have been so very meagre as to be of no practical value. Most of the statistics under this head therefore are taken from the United States census report of 1870.

RELIGIOUS ORGANIZATIONS BY COUNTIES.*

The following table shows the statistics, by counties, of the leading religious organizations:

COUNTIES.	Baptist.		Congrega- tional.		Episcopal.		Lutheran.		Methodist.		Presbyte- rian.		Catholic.		
Allegan	4	650	6	900	3	450			17	1,400	3	510	1	200	
Alpena	2	300	1	100	1	200				2	200			1	500
Barry	14	1,200	4	475	1	150			28	3,500	5	250			
Bay	5	500			1	500	3	525	7	3,200	3	1,000	2	1,000	
Berrien	9	1,900	4	1,060	1	325	6	1,025	50	4,450	3	1,100	2	2,300	
Branch	19	2,750	3	650	3	800	1	300	36	3,400	4	1,520	2	500	
Calhoun	14	3,050	2	670	3	1,250	3	1,000	18	4,550	6	2,800	1	700	
Cass	13	2,500	2	600					23	3,450	6	1,300			
Clinton	9	1,700	2	700	1	250	1	190	14	3,600			2	1,150	
Eaton	10	1,500	9	2,300					22	2,200	4	500	1	300	
Genesee	11	2,275	8	2,400	6	1,600			43	6,810	5	2,150	6	1,900	
Grand Traverse	1		1	250					7	250	1	150	1	200	
Grant	7	1,300	2	125					8	1,300	4	400	1	250	
Grandtrot	19	4,350	5	1,100	3	450	1	150	36	5,325	6	850	1	300	
Hillsdale	3	370	1	300	1	300	1	200	6	1,200			6	2,500	
Houghton	7	2,270	1	200	2	450			23	2,900	4	1,050	1	450	
Ingham	8	2,100	4	1,000	3	700			9	2,000	4	1,100	2	900	
Ionia	1	250							5	500	2		2	150	
Iosco	2	200			2		1	150	5	500			2	400	
Isabella	18	4,550	4	1,500	3	850	1	500	26	5,250	4	725	2	560	
Jackson	9	2,800	12	3,000	2	800	1	300	28	8,500	6	1,100	3	1,100	
Kalamazoo	11	2,800	7	2,000	6	1,700	1	350	17	3,810	2	1,200	5	2,500	
Keweenaw					1	200			7	1,450			3	600	
Lapeer	9	1,625	1	300			1	150	29	4,250	1	350	2	660	
Leelanaw	2		4	175			2		3		2	300	4	300	
Lenawee	12	4,425	6	1,950	6	725	2	800	28	7,100	8	2,850	3	2,360	
Livingston	3	850	2	650	3	400	1	200	14	1,960	4	950	4	850	
Macomb	7	1,650	6	1,700					16	3,125	2	550	5	1,750	
Manistee			1	650					1	300	6	500	2	150	
Marquette	1	200			2	550			3	930	1	400	6	3,000	
Milledge	1	400			1	300			4	500	2	300	1	300	
Monroe	5	1,000	1	300	1	400	7	1,500	13	3,350	6	1,500	6	3,000	
Montcalm	9	1,000	2	350					21	500	1		1	80	
Muskegon	6	300	2	300	2		4	1,100	8	1,200	1		2	900	
Oakland	11	5,790	6	2,250	6	900			26	5,800	15	4,700	4	1,350	
Oceana	6	400	5	300			1		13	1,300	1		3	400	
Ontonagon					1	200			2	300	1	250	3	600	
Otsego	5	750	6	415	2	350	1	300	13	900	3	850	8	775	
Saginaw	11	4,500	7	1,800	3	3,000	6	1,400	23	6,000	9	2,170	7	3,500	
Sauk	5	500	2	250	2		1	75	14	900	3	450	3	160	
Shiawassee	8	1,000	2	450	2	400	1	250	10	1,750	5	700	2	500	
St. Clair	7	1,350	3	900	4	1,100	4	1,650	20	3,550	2	400	7	2,900	
St. Joseph	8	1,900	1		3	950	9	1,200	18	4,850	6	2,500	2	575	
Tuscola	9	150					2	200	31	1,200	1	250			
Van Buren	8	1,900	3	1,225	2	150			12	3,170	3	1,050	2	200	
Washtenaw	15	3,975	5	1,900	6	1,300	9	3,800	17	7,050	9	3,450	8	4,000	
Wayne	11	3,000	4	2,150	9	4,950	9	3,500	30	7,770	13	6,150	15	11,400	
Other counties	8		7	750	1	100	4	300	47	3,120	8	650	20	378	
Totals	386	74,100	156	38,320	100	20,750	56	23,150	864	140,290	187	48,925	167	62,561	

* The first column under each head represents the number of organizations, and the second the seating capacity of edifices.

SPECIAL CLASSIFICATION OF CERTAIN DENOMINATIONS.

The foregoing table seems to include Baptists and Presbyterians of all shades, but the table by States separates them into "regular" and "other," the number of organizations and seating capacity for the State under this classification being as follows:

Baptist (regular).....	335	70,110	Presbyterian (regular).....	177	45,925
" (other).....	31	3,760	" (other).....	10	5,000

OTHER DENOMINATIONS.

The name, number of organizations, and seating capacity, in the State, of all denominations not included in the foregoing table, are given as follows:

	No. Org.	Capacity.		No. Org.	Capacity.
Christian	38	4,625	Moravian	1	100
Evangelical Association*....	15	2,350	Swedenborgian	3	670
Friends	10	2,600	Reformed church in America§	26	8,700
Jewish	5	1,300	Reformed church in U. S. ¶	19	2,800
Second Advent †.....	39	4,840	United Brethren in Christ..	69	4,225
Spiritualist ‡.....	35	1,100	Universalist	31	5,550
Unitarian	7	1,700	Unknown (union).....	1	750

* A note to the compiler from Rev. J. H. Keeler, of Jackson, states statistics of this denomination as follows: Membership, 4,258; preachers (itinerant and local), 58; church edifices, 63; value of churches, \$93,150; parsonages, 21; Sunday Schools, 82; Sunday School scholars, 3,210.

† Supposed to include the Seventh Day Adventists. A note to the compiler from the Review and Herald, of Battle Creek, gives the following statistics of this denomination: Number of churches, 71; members, 2,226; ministers, 17; licentiates, 14.

‡ The number of organizations is probably placed too high, although including places where partial and informal organizations have been made, and where occasional meetings are held, the number is probably not overstated.

§ Late Dutch Reformed.

¶ Late German Reformed.

The whole number of organizations of all denominations in the State is given at 2,239; edifices, 1,415; sittings, 456,226; value of property, \$9,133,816.

XVIII. SCENERY.

CONDITIONS FAVORABLE TO REST AND RECREATION.

Reference has been made to the attractiveness of Michigan scenery for tourists and pleasure seekers. If rest and recreation be sought side by side with what is called the comforts and luxuries of life, or if recreation with physical exercise, and the romance of "roughing it," be the desideratum, they can equally be had.

REST FOR THE WEARY—THE INLAND LAKES.

The large interior towns of Michigan afford every facility for comfort and even luxury of living, with the advantages of refined society and church and school

accommodations. There are many people, however, who, from overwork, prostration, or debility, want only rest—those who need to escape from the noise of cities, from the sound of bells and steam whistles, and from the clash and clatter of competitive business and industry. They want to exchange these for the aroma of the clover fields, the melody of birds, and the passive hours of the summer twilight, made musical by the varied symphony that flows from differing forms of insect life, as they vie with each other in the fullness and earnestness of their vesper song. The innumerable inland lakes of the State, at many of which public houses are maintained, invite persons of this class to needed rest and repose.

TOURISTS.

To the large class of summer pleasure seekers known as tourists, the field is equally inviting and extensive, comprising the whole range of the two peninsulas with their alternating scenery of hill, plain and mountain, river, lake, and bay, town and country, field and woodland.

MEANS OF REACHING MICHIGAN AND HER POINTS OF ATTRACTION.

Means of conveyance are now so plentiful and varied that the difficulty with tourists may be, which to choose. If a lake and river trip is desired, it can be had for any distance within the limit of two thousand miles by taking boat from the lower St. Lawrence, Ogdensburg, Oswego, Buffalo, or Detroit, with the western extremity of lake Superior as the objective point. Or if parties from the east do not desire so extended a water ride, the numerous railway lines through Canada or by the lake shore, converging at Detroit, will afford choice at that point of either railway or boat—by the first either to the interior of the State or to the Traverse Bay region and the straits of Mackinac, and by the last through lake St. Clair, the St. Clair river and lake Huron, to the straits, or to lake Superior. Visitors from the south will be welcomed to Michigan through the railway lines entering the State from that direction. From Chicago, communication by rail is direct to the Upper Peninsula (at present through the State of Wisconsin, or up the west coast of the Lower Peninsula (on the east shore of lake Michigan) as far as Pentwater. Or if the water route is preferred, the west coast of the Lower Peninsula, including the Fruit Belt and the Traverse Bay region, may be enjoyed during a trip of three hundred and fifty miles through the length of lake Michigan to the straits of Mackinac, and thence through the St. Mary's river, passing the rapids or Sault through the ship canal at that point, to lake Superior.

THE GRAND TRAVERSE REGION.

This is one of the most delightful and attractive places for summer resort in the northwest. A reference to the map will show the situation and configuration of Grand Traverse bay, extending southward from the eastward curve of lake Michigan near its northern extremity, Little Traverse bay lying farther up and jutting out from the lake to the east. The length of Grand Traverse bay is about thirty-five miles, and its average breadth about eleven miles. It is navigable for the largest class of lake craft, and has excellent harborage. A writer who is frequently quoted from in this work,* says:

"The Grand Traverse region is remarkably provided with navigable inland lakes. Some of these connect with each other or with the bay or lake Michigan

* Prof. Winchell, Report on Resources of the counties of Antrim, Grand Traverse, Benzie and Leelanaw, 1866.

In such a manner as to constitute extended channels of inland navigation by water. Connecting with the east arm of the bay through Elk river, is Elk lake, a body of water about ten miles long, and averaging a mile and a half in width. Passing from this we enter Round lake, about one-fifth as large, from which we proceed northward to Torch lake, the largest in the region. * * From the east side of Torch lake we pass into Clan lake, a narrow strip of water stretching eastward into Grass lake. From the latter we proceed northward through a series of small lakes called collectively Intermediate lake. * * The remarkable series of lakes just described is navigable for tugs and small vessels from the east arm of the bay to the head of Grass lake, making a total length of navigable inland water amounting to eighty miles." Carp, Glen, and Platt lakes, and Lake aux Bees Seles (or Lake "Betsie"), are also inland navigable lakes in the immediate vicinity connecting with lake Michigan. Numerous smaller lakes of less importance dot the entire region. The shore line of navigable water afforded by the lakes named is computed at one hundred and fifty-eight miles. Describing the scenery at some length, the writer last quoted, says: "The scenery of the Grand Traverse region is subdued and soft—sometimes picturesque, always beautiful, in some instances exquisitely so. Viewed from some suitable eminence, the landscape presents an undulating sea of verdure, one softly-rounded hill-top succeeding to another in the retreating view, the dimness of distance lending an ever increasing enchantment to the prospect." An Indian reservation adjacent to the bay, and an old Catholic Mission, are the chief historical features, and Traverse City, a village of about fifteen hundred inhabitants, situated at the foot of the bay, is the principal capital of the region.

MACKINAC.

Mackinac, Mackinaw, or, as anciently, Michilimackinac, describes generally the point of approach of lake Michigan and lake Huron, and will be made to comprehend a considerable region round about, or be confined in its meaning to the town and island of Mackinac, as the particular occasion of speech may indicate. It was the site of a French Jesuit mission as early as 1672, founded by father James Marquette. A writer compares the straits, in a commercial and strategical point of view, to Constantinople on the Bosphorus, the straits of Gibraltar, Singapore, on the straits of Malacca, and the isthmus of Panama. The island and vicinity are widely celebrated for their healthfulness and salubrity, and as a summer resort. A physician (Dr. Drake) who visited Mackinac in 1842 for the purpose of examining the climate and topography, says: "The three great reservoirs of clear and cold water, lakes Huron, Michigan, and Superior, with the islands of Mackinac in their hydrographical center, offer a delightful hot-weather asylum to all invalids who need an escape from crowded cities, pondal exhalations, sultry climates, and officious medication." Dr. Drake looked upon Mackinac as one of the healthiest portions of the whole north-west, and to which, in time, tens of thousands of persons, even from the farthest south, would resort to be reinvigorated in body, refreshed in mind, and delighted with the contemplation of the sublime and beautiful scenery in that region of expansive waters, rocky coasts, forest-bearing lands and clustering islands. Indian mythology makes the island of Mackinac the home of the Giant Fairies, and hence the Indians have always regarded it with a species of veneration. It is within the recollection of persons, that the Indians, in passing, have made offerings of tobacco and other articles to these Great Spirits, to propitiate their good will. Among the points of interest on the island are "Arched Rock," "Lover's Leap," "Sugar Loaf Rock," "Devil's Kitchen," "Robinson's Folly," "Pontiac's Lookout," "Skull Cave," etc., etc. These points all have

romantic or tragic traditions purporting to refer to their origin. A portion of the Island, containing about one thousand acres, has been dedicated by Congress as a national park, but what progress has been made in its improvement is not within the present knowledge of the writer. A glance at the map will show the adjacent islands, while boating and fishing will suggest themselves as appropriate pastimes. The distance from Mackinac to New York city is one thousand and fifty-six miles, and from Detroit and Chicago about three hundred and fifty miles each.

LAKE SUPERIOR.

The water route to lake Superior, from whichever direction chosen, involves the passage of the river St. Mary through its course of between forty and fifty miles, with its lakelets, bays, islands, and rapids, of which latter the "Sault" holds the imperial position. The falls or rapids of St. Mary, or, if we have the French orthography correct, the Sault de Ste Marie, vulgarly called the "Soo," has a history coeval with the early French explorations, and a celebrity which is at least national. It is a succession of rapids extending a distance of about a mile, with a fall of about eighteen feet, the passage of vessels being possible only through the canal, which has three locks, with a lift of about six feet each. The chief natural features of lake Superior as regards scenery, are the purity of its waters, its rocky bed, its rugged, uneven and rocky coasts, its hilly or mountainous elevations, its water-falls, its islands, and its clear, crisp, and bracing air. Among the leading objects of interest that the enterprise of man has developed, are its minerals, and the methods of securing and working them.

A very clever writer, Mr. John R. St. John, in a small work published in 1846, gives quite a detailed account of the lake Superior country, and of the coasting and pastimes thereabout; though it will borne in mind that at that time the Sault canal was not in existence, and there were but few vessels on the lake, and no railroads in the vicinity. The tonnage is thus summarised in the work mentioned: "A steamboat, large, staunch, commodious, and safe; a propeller with all these qualities also, and a number of very convenient schooners, as will be seen by the list of vessels on lake Superior." The writer had this, also, to say: "To the traveler for pleasure, let me say a few words. When you shall have read the round upon which I have taken the coaster, you will probably shrink from the toils of following the shore, and wish to go direct, and quick, from place to place, or tarry a time at one place and then go to another—in either case there will be ample provision next season. * * If you are in pursuit of pleasure, whether lady or gentleman, you can find it in the lake Superior region, provided you can be pleased with grand scenery, water-falls, lakes and mountains. You can ramble in search of agates and carnellans, in which, of all I have seen engaged, I have never known one to tire of the amusement. * * Or, tired of this, you can wander away with hook and line, to the bright and beautiful lakes that lie among the hills; or take your gun, for

The Pigeon and the Pheasant's there,
The wild Duck, and the timid Hare—

but no snakes! I have never heard of any in the country. Or take a bark canoe, which two or three trials will make you at home in, for they are much easier to get the 'hang' of, than most persons suppose; go to the adjacent islands, run into the caverns and grottos, which cannot be reached in any other way. You may find rare agates there after a gale, and when you return keep along the shore and

examine the bottom marked by white spar velus, discernable at thirty or forty feet deep, * * * and when you get back you will have an appetite; the tonic air of that region, and the water, will make a new being of you in a few weeks. The air is bracing, yet soft, and is pleasant in 'dog days,' without producing that fatigues and lassitude of the warm weather you have been used to; and the water—well, you will not be singular, you will then say you have never drunk any water before, and when you return whence you came, and again drink of that you once thought detestable, you will condemn it as an adulteration, or spurious. To the invalid I have a few words to say; I am not "crackling" up the country; for I shall write nothing that all who go, will not find as I represent it, or all who have been will not confirm, either on this or any other subject of their acquaintance which I treat upon. To you I say, go, then; although your health is impaired you cannot be injured, and I know one gentleman who had been south, and to Havana, without benefit, and one season on lake Superior restored him, as he said, to comparative health. I don't know why it should not relieve consumptives as well as others—all who go there declare they *feel* much better, and I know I did."

THE COMPILER'S PROTESTATION.

But this topic has far exceeded the limits designed for it. The topic itself was one that could not well be ignored, but yet it was entered upon with some hesitation lest it might seem to tinge what is designed to be the purely impartial and factative character of this work, by favorable argumentation or enthusiastic description.

XIX. MISCELLANEOUS.

SUMMARY OF MICHIGAN PRODUCTS.

In his message to the Legislature on the first of January, 1875, Gov. Bagley summarises the value of the products of the State for the preceding year as follows: "The aggregate products of the soil, mines and forests of the State, for the year, amount to \$145,000,000, distributed among the different interests as follows: Agricultural, \$84,000,000, consisting of 15,000,000 bushels of wheat, 24,000,000 bushels of corn, and 13,000,000 bushels of other grains, 14,000,000 bushels of potatoes, 1,400,000 tons of hay, 7,800,000 pounds of wool, 48,500,000 pounds of pork, 4,000,000 pounds of cheese, and 28,000,000 pounds of butter; cattle and horses estimated at \$7,000,000, and fruits estimated at \$5,000,000. Product of the mines, \$16,000,000, consisting of \$80,000 tons of iron ore, 80,000 tons of pig iron, 22,000 tons of copper, and 1,000,000 barrels of salt. Products of the forest, \$45,000,000. To this should be added the product of the mechanical and manufacturing labor of the State, the value of which can hardly be estimated."

SUMMARY OF TAXABLE LAND AND FARMS.

The following summary of the land statistics of the State, as related to taxation and improvement, taken from the censuses of 1854, 1864, 1870, and 1874, will be of interest:

	Census of 1854.	Census of 1864.	Census of 1870.	Census of 1874.
Land—acres taxable	7,921,501	12,080,661		20,530,108.85
Land—acres improved	2,113,985	3,077,945	5,088,957	5,540,830.53
Land—acres exempt from taxation				1,900,699.24
Land—exempt from taxation, value of, including improvements.				\$30,505,727
Farms—number of				113,413
Farms—number of acres in				10,213,692
Farms—average number of acres in				90.05

The taxable land of the State, as shown by the census report of 1874, increased 14,443,507 acres, or 119.40 per cent., as compared with 1864. A considerable proportion of this increase is doubtless due to the addition to the tax rolls of the railroad lands during the decade. The increase from 1854 to 1864 was 4,159,160 acres, or 52.57 per cent. Of improved land, there were 351,882 acres, or 8.87 per cent, more reported than in 1870, and 1,863,194 acres, or 50.92 per cent, more than in 1864. The increase from 1854 to 1864 was 1,563,660 acres, or 73.99 per cent.

THE PUBLIC HEALTH.

By an act passed in 1873, a State Board of Health was established, consisting of seven members, the Secretary being a member and principal executive officer of the board. It is made the duty of the Board to make sanitary investigations and inquiries respecting the causes of disease, and especially of epidemics; the causes of mortality, and the effects of localities, employments, conditions, ingesta, habits and circumstances, on the health of the people. They shall, when required, or when they deem it best, advise officers of the government, or other State boards, in regard to the location, drainage, water supply, disposal of excreta, heating, and ventilation of any public institution or building. They shall from time to time recommend standard works on the subject of hygiene for the use of the schools of the State. The Secretary is required to collect information concerning vital statistics, knowledge respecting diseases, and all useful information on the subject of hygiene, and through an annual report, and otherwise, as the Board may direct, shall disseminate such information among the people.

THE MILITARY.

The military system of the State has undergone revision within the past few years, and has been placed in a position of efficiency, should occasion arise. The active militia is composed of volunteers between the ages of eighteen and forty-five years, known as State troops. The amendatory act of 1873 provides: "The State troops shall be composed of not exceeding twelve companies of infantry prior to the first day of January, eighteen hundred and seventy-four, and the number of companies may be increased at the rate of four companies in each year thereafter, until the full number of twenty-four companies shall be reached; beyond

which, in time of peace, there shall be no increase." A State military Board has general supervision of military affairs. The State supplies each organized company with uniform and armory, and each division, brigade, regiment, or company, such tents, fixtures, arms, and equipments, camp equipage, and such other military property, as may be necessary. The State troops are paid at the rate of thirty-five cents per day when on parade and in camp, not exceeding ten days in each year, and necessary expenses. An annual tax equal to ten cents for each voter, as shown by the last preceding general election, is levied for the support of the State troops.

There are now in commission two full regiments of ten companies each, numbering 1,184 men. This is the full maximum which the law allows. There are besides two "Independent companies," numbering 143 men, who are expected to be enrolled with the State troops when the law permits the addition to the force on the first of January next.

BANKING IN MICHIGAN.

Below is given statistics of national and State banks in Michigan at the close of the year 1875, the former taken from the report of the Controller of the Currency, and the latter from reports made to the State Treasurer.

NATIONAL BANKS.

<i>Resources, 77 Banks:</i>		<i>Liabilities, 77 Banks:</i>	
Loans and discounts.....	\$14,004,027 64	Capital stock.....	\$8,392,200 00
Bonds for circulation.....	6,435,750 00	Surplus fund.....	1,863,986 61
Bonds for deposits.....	50,000 00	Other undivided profits.....	784,013 21
U. S. bonds on hand.....	9,700 00	National bank circulation.....	5,691,228 00
Other stocks and bonds.....	330,047 56	Dividends unpaid.....	131,130 00
Due from reserve agents.....	1,211,846 55	Individual deposits.....	8,206,412 80
Due from national banks.....	509,414 23	U. S. deposits.....	2,210 00
Due from State banks.....	103,607 50	Deposits U. S. officers.....	27,795 40
Real estate, etc.....	854,646 50	Due to national banks.....	123,674 20
Current expenses.....	94,883 31	Due to State banks.....	141,749 23
Premiums paid.....	285,137 71	Notes rediscounted.....	551,646 08
Cash items.....	154,798 63	Bills payable.....	11,000 00
National bank notes.....	349,848 00		
Fractional currency.....	43,601 24		
Specie.....	19,494 71		
Legal tender notes.....	1,202,419 00		
U. S. certificates of deposit.....	5,000 00		
Dep. with U. S. Treasurer.....	352,930 85		
Total.....	\$25,987,053 43	Total.....	\$25,987,053 43

STATE BANKS, OTHER THAN SAVINGS BANKS.

<i>Resources, 15 Banks:</i>		<i>Liabilities, 15 Banks:</i>	
Loans and discounts.....	\$2,711,861 44	Capital.....	\$1,347,800 78
Bonds.....	107,375 76	Surplus.....	112,961 20
Cash.....	498,803 22	Bills rediscounted.....	8,875 00
Real estate and fixtures.....	78,682 38	Due banks and depositors.....	2,296,937 47
Due from banks.....	411,346 28	Profit and loss.....	108,014 76
Expenses.....	35,333 78		
Overdrafts.....	31,296 35	Total.....	\$3,874,591 21
Total.....	\$3,874,591 21		

SAVINGS BANKS.

<i>Resources, 12 Banks:</i>		<i>Liabilities, 12 Banks:</i>	
Loans and discounts.....	\$4,082,806 19	Capital.....	\$870,720 00
Bonds.....	714,126 90	Surplus.....	167,055 05
Cash.....	658,641 33	Due banks.....	29,045 61
Real estate and fixtures.....	130,721 06	Due depositors.....	4,930,575 41
Due from banks.....	470,162 75	Profit and loss.....	49,262 14
Expenses.....	30,942 39	Interest, premium and exchange.....	23,153 70
Overdrafts.....	2,471 90		
Total.....	\$6,069,812 52	Total.....	\$6,069,812 52

POPULATION OF CITIES.

The following table shows, as per census of 1874: A, the cities of the State; B, counties in which located; C, year of incorporation; D, population in 1874:

A.	B.	C.	D.	A.	B.	C.	D.
Alpena.....	Alpena.....	1871	3,964	Jackson.....	Jackson.....	1857	13,859
Adrian.....	Lemhew.....	1853	8,803	Kalamazoo*.....	Kalamazoo.....		11,023
Ann Arbor.....	Washtenaw.....	1851	6,692	LaSling.....	Lugham.....	1859	7,445
Battle Creek.....	Calhoun.....	1859	5,423	Lapeer.....	Lapeer.....	1869	2,882
Bay City.....	Bay.....	1865	13,690	Ludington.....	Mason.....	1873	2,177
Big Rapids.....	Mecosta.....	1869	3,103	Maulslee.....	Maulslee.....	1869	4,894
Coldwater.....	Branch.....	1861	4,330	Marshall.....	Calhoun.....	1859	4,623
Charlotte.....	Eaton.....	1871	2,631	Marquette.....	Marquette.....	1871	5,242
Comma.....	Shilawassee.....	1869	1,345	Monroe.....	Monroe.....	1837	5,782
Detroit.....	Wayne.....	1815	101,255	Muskegon.....	Muskegon.....	1869	8,505
E. Saginaw.....	Saginaw.....	1859	17,084	Niles.....	Berrien.....	1859	4,592
Fliint.....	Genesee.....	1855	8,197	Negaunee.....	Marquette.....	1873	3,741
Gr. Haven.....	Ottawa.....	1867	4,363	Owosso.....	Shilawassee.....	1859	2,448
Gr. Rapids.....	Kent.....	1850	25,923	Pontiac.....	Oakland.....	1861	3,651
Greenville.....	Montcalm.....	1871	3,140	Port Huron.....	St. Clair.....	1857	8,240
Hastings.....	Barry.....	1871	2,075	Saginaw City.....	Saginaw.....	1859	10,004
Hillsdale.....	Hillsdale.....	1869	3,684	St. Clair.....	St. Clair.....	1858	2,003
Holland.....	Ottawa.....	1867	2,469	Wyandotte.....	Wayne.....	1867	3,338
Ionia.....	Ionia.....	1873	3,251	Ypsilant.....	Washtenaw.....	1858	5,211
Ishpeming.....	Marquette.....	1873	4,692				

* Not an incorporated city, but proud of the distinction of being the largest village in the state.

ST. MARY'S FALLS SHIP CANAL.

The following statistics of the business of the canal for 1875 are taken from the report of the Superintendent:

VESSELS PASSING THE CANAL, TONNAGE, AND TOLLS PAID.

NUMBER AND CLASS OF VESSELS.	Tonnage.	Tolls.
659 Steamers.....	477,666.47	\$15,557 02
803 Barges and consorts.....	591,943.72	19,331 14
493 Sailing vessels.....	186,977.82	6,164 87
30 Government vessels.....	1,459.20	No Tolls.
15 Small boats.....	1,021.44	\$5 each { 75 00
13 Rafts.....		{ 65 00
1 Wrecker.....	464.88	15 11
2,633	1,259,533.53	\$41,199 04

AMOUNT OF FREIGHT CARRIED TO AND FROM LAKE SUPERIOR.

The subjoined table shows the amount of freight carried to and from lake Superior during the season of 1875, and passing through the canal:

y Board has
gaulzed com-
pany,
her military
te of thirty-
days in each
each voter,
oport of the

s each, mun-
There are
expected to
to the force

at the close
of the Cur-

\$8,392,200 00

1,863,986 61

784,013 21

5,691,228 00

131,139 00

8,206,412 80

2,210 00

27,795 40

123,674 20

141,749 23

551,046 08

11,000 00

\$25,987,055 43

\$1,347,800 78

112,961 20

8,875 00

2,296,937 47

108,014 76

\$3,874,591 21

\$870,720 00

167,055 66

29,045 61

4,930,575 41

49,262 14

23,153 70

\$9,061,812 52

Nature and Amount of Freight Carried to Lake Superior during the Season of 1875.

ARTICLES.	ARTICLES.					Total.
	Buffalo Boats.	Chicago Boats.	Canadian Boats.	Barges and Salliers.	Total.	
Pork, blbs.	1,567	4,825	2,482	8,992	33	427
Flour, blbs.	7,245	9,074	6,861	23,260	147	2,171
Wheat, blbs.	1,142	4,129	8,431	13,702	4	665
Barley, blbs.	283,699	95,161	1,029	476,352	4	868
Lard, lbs.	61,371	38,749	17,250	117,370	11	1,559
Butter, lbs.	171,068	407,439	47,423	625,936	1,623	29,478
Cheese, lbs.	73,143	126,265	23,330	223,068	106	1,414
Tallow, lbs.	8,130	82,029	4,290	94,350	32	11
Candles, boxes	70,635	6,912	4,070	82,217	17	97
Soap, boxes	8,179	10,244	1,240	19,663	2,184	819
Sugar, blbs.	17,262	1,023	657	18,948	293,633	6,090
Starch, blbs.	2,337	4,031	686	7,054	422	1,101
Tee, chests	2,465	435	134	3,034	256	56
Coffee, bags	4,462	435	134	5,031	6,393	8,705
Salt, blbs.	30,282	581	3,523	43,880	1,701	12,114
Vinegar, blbs.	427	343	72	700	1,258	30
Tomacoe, lbs.	71,241	109,331	24,249	205,021	5	31
Dried, Kegs, lbs.	12,839	681	1,426	14,966	5,031	122
Onions, lbs.	10,353	5,070	4,870	20,293	634	225
Vegetables, bush.	19,353	1,829	1,829	23,011	1,829	500
Lime, blbs.	12,431	829	4,423	16,353	123	123
Merchandise, tons.	12,178	2,777	17,240	32,800	689	3,629
Coal, tons	5,845	12	68	101,290	60	125
Lumber, M.	43	8	707	1,018	150	150
Window glass, boxes	1,230	486	237	1,953	150	150
Iron, lbs.	869	629	118	1,616	3,069%	8,226
Cattle head.	102	323	606	1,031	3,069%	8,226
Mass copper, tons	2,060	63	12,354	15,477	37%	770
Sheet copper, tons	3,633	108	12,522	16,263	218	218
Stamp works, tons	1,000	1,572	3,683	6,255	54	54
Pig iron, tons	17,354	13,774	483,776	504,904	540	540
Silver ore, tons	500	13,748	3,428	40,348	30	30
Iron	500	240	240	980	24	24
Flax	4,849	2,201	10,003	17,053	68	68
Furs and pelts, bundles.	4,423	81	4,344	9,848	689	629%
Flour, lbs.	6,700	5,881	41,181	53,762	123	123
Fish, barrel	4,121	4,849	13,887	22,857	84	84
Shrimp, M.	37	3,241	3,473	6,951	10	10
Wheat, bush.	480,015	330,373	465,000	1,245,788	85	713
Flour, blbs.	288,349	4,000	286,731	579,080	8	798
Feed, tons	573	1,059	440	1,672	8	8
Potash, casks	758	758	758	1,516	3	3
Oil cake, tons	259	259	259	518	3	3
Passengers.	3,424%	586	4,008%	8,226	3,424%	8,019

Nature and Amount of Freight Carried from Lake Superior during the Season of 1875.

ARTICLES.	ARTICLES.					Total.
	Buffalo Boats.	Chicago Boats.	Canadian Boats.	Barges and Salliers.	Total.	
Horses and mules, head.	33	47	37	117	33	427
Sheep, head	147	1,421	665	2,233	147	2,171
Hogs, head	4	525	338	868	4	868
Brick, M.	1,029	111%	14	1,559	1,029	2,713%
Furniture, piece s	7,627	29,282	1,589	38,498	7,627	39,478
Machineery, tons	1,033	106	255	1,494	1,033	1,414
Rollers	12	32	1	45	12	11
Wagons	47	46	97	190	47	107
Liquors, blbs.	2,184	1,515	819	4,518	2,184	4,518
Malt, lbs.	293,633	291,990	6,090	585,713	293,633	883,233
Eggs, bush.	422	1,101	56	1,579	422	1,579
Salt, tons	256	190	56	502	256	2,073
Cast-iron iron, tons	6,393	231,701	12,114	240,208	6,393	240,088
Ground rock, tons.	1,701	1,701	1,701	5,103	1,701	2,073
Bar iron, tons	1,258	30	36	1,324	1,258	1,311
Powder, tons	5	5	5	15	5	31
Kerosene oil, blbs.	5,031	122	124	5,277	5,031	5,277
Lard oil, blbs.	634	225	42	901	634	926
Cement, blbs.	1,829	500	42	2,371	1,829	2,329
Barrel	123	3,629	60	3,812	123	123
Crocker, blbs.	689	3,629	125	4,443	689	3,629
Road scrapers.	150	150	150	450	150	150
Wheelbarrows.	150	150	150	450	150	150
Limestone, tons.	777	777	777	2,331	777	13,405
Passengers.	3,069%	586	4,008%	8,226	3,069%	11,696%
Merchandise, tons.	551	171%	37%	770	551	770
Fresh fish, cars.	218	218	218	654	218	218
Rags, tons	54	54	54	162	54	54
Wagon, tons	540	540	540	1,620	540	540
Horses	30	24	30	84	30	30
Wagons	60	68	20	148	60	60
Railroad iron, tons.	500	68	20	588	500	500
Building stone, tons	689	629%	10	1,328	689	689
Potatoes, blbs.	123	10	10	253	123	123
Bones, tons	84	84	84	252	84	84
Scrap iron, tons	85	713	798	1,596	85	85
Wagon, tons	8	8	8	24	8	8
Household goods, boxes.	8	8	8	24	8	8
Whisky, blbs.	1,672	1,672	1,672	5,016	1,672	1,672
Lard ore, tons	758	758	758	2,274	758	758
Passengers.	3,424%	586	4,008%	8,226	3,424%	8,019

LAKE MARINE AND CUSTOMS RECEIPTS.

There are four collection districts in Michigan: The Detroit district, at Detroit; the Huron district, at Port Huron; the Meigsan district, at Grand Haven; and the Superior district, at Marquette. In answer to inquiries, the following statistics are furnished from all except the Superior district. The first table shows the number of vessels entering and clearing, with their tonnage and crews and amount of duties collected, for three years, and the second, the number of vessels owned in each district, with their total tonnage, for five years.

VESSELS AND TONNAGE, AND DUTIES COLLECTED.

DISTRICTS.		Entered.			Cleared.			Amount of Duties Collected.
		No. of Vessels.	Tonnage.	Crews.	No. of Vessels.	Tonnage.	Crews.	
DETROIT DISTRICT.	1873.....	8,576	1,074,800	62,800	8,220	1,702,300	6,831	\$257,275 04
	1874.....	8,224	1,882,925	62,045	8,465	1,782,828	6,406	203,808 03
HURON DISTRICT.	1873.....	7,330	1,521,841	50,823	8,425	1,545,573	56,975	270,912 44
	1874.....	3,010	1,458,108	39,008	3,895	1,472,154	39,510	74,085 23
MICHIGAN DISTRICT.	1873.....	3,654	1,367,858	35,858	3,041	1,443,686	35,327	71,018 38
	1874.....	3,601	1,475,768	32,414	3,784	1,431,192	33,497	132,454 94
MICHIGAN DISTRICT.	1873.....	0,848	1,815,177	82,687	0,607	1,802,600	79,170	.....
	1874.....	8,075	1,730,301	73,681	8,045	1,804,430	76,530	.....
	1875.....	8,769	1,904,047	75,008	8,048	1,960,144	76,585	.....

NUMBER OF VESSELS OWNED IN THE DISTRICTS, AND THEIR TONNAGE.

YEARS.	Detroit District.		Huron District.		Michigan District.	
	No. of Vessels.	Total Tonnage, June 30.	No. of Vessels.	Total Tonnage, June 30.	No. of Vessels.	Total Tonnage, June 30.
1871.....	365	79,192	248	31,500	175	14,820
1872.....	348	74,396	274	39,611	184	14,820
1873.....	365	78,546	295	46,575	184	15,912
1874.....	365	83,008	314	51,245	190	17,591
1875.....	356	85,277	330	53,650	211	18,989

AREA, DEPTH, AND ELEVATION OF THE GREAT LAKES OF AMERICA.

GREAT LAKES.	Greatest Length, Miles.	Greatest Breadth, Miles.	Greatest Depth, Feet.	Height above Sea, Feet.	Area, Square Miles.
Superior.....	450	170	900	600	32,000
Meigsan.....	320	85	700	578	22,000
Huron.....	250	120	800	576	20,500
Eric.....	250	65	250	565	9,700
Ontario.....	180	85	700	232	6,300
Total area.....					90,500

INTERNAL REVENUE COLLECTIONS IN MICHIGAN.

The following statement, derived from newspaper sources, and presumed to be predicated upon official statistics, shows the collections of internal revenue for the year ending December 31, in the several collection districts of Michigan:

First District	\$1,454,981 05	Fourth District.....	\$102,150 52
Second District.....	63,197 96	Fifth District.....	36,688 68
Third District.....	226,510 90	Sixth District.....	138,334 63

INTERNAL REVENUE TAXES PAID BY DETROIT.

The following was the amount of taxes paid to the United States Internal Revenue Department by business houses of Detroit in 1875:*

Tobacco manufacture, other than cigars.....	\$974,474 01
Cigars.....	170,631 90
Spirits (one distillery).....	110,991 00
Beer (34 breweries. One concern pays nearly one-fifth of the tax).....	98,262 26
Licenses.....	46,512 91
Banks.....	35,126 45
Miscellaneous.....	18,992 44
Total.....	\$1,454,991 05

NEWSPAPERS.

There are 275 newspapers and periodical publications in Michigan, of all classes. Of these, 224 are published weekly, 17 daily and weekly, 2 daily, 7 semi-weekly, 4 semi-monthly, 19 monthly, 1 quarterly, and 1 yearly. Politically classified, 112 are Republican, 46 Democratic, 73 independent and neutral, and 15 miscellaneous; 14 are religious, or connected with religious objects, of which two are Methodist, seven Adventist (two HOLLANDSCH), and one each Episcopal, Catholic, and Baptist; 4 mining, 5 educational, 1 Masonic, 1 Odd Fellow, 1 Grange, 3 medical, and 1 agricultural. Five are printed in the German language, 6 in the Dutch or HOLLANDSCH, and one each in the Swedish and Danish.

THE FUR TRADE.

The fur trade of Michigan is of much less importance now than in the earlier days. The value of the raw furs handled in the State is estimated at about \$1,000,000 annually, only about one-half of which amount is for furs produced in Michigan. Michigan furs bear the best prices in Europe. Among the fur-bearing animals are the Beaver, Black Bear, Otter, Mink, Marten, Fisher, Lynx, Silver, Cross, Red, and Grey Fox, Raccoon, Muskrat, Polecat, Wildcat, and Opossum. The "Wolverine," which gave to Michigan its popular cognomen of the "Wolverine State," is extinct.

MARQUETTE AND MACKINAW RAILROAD.

At the time of printing the part of this work relating to railroads ("State Land Grants for Railroad purposes," p. 91-2), no contract for building the Marquette and

*Detroit Board of Trade report, 1875.

Mackinaw railroad had been let. On the eighth day of May, 1876, a contract was consummated between the Board of Control of State Swamp Lands and "the Marquette, Sant Ste Marie and Mackinaw Railroad Company," for the construction of the proposed road according to the terms of the land grant, the road to be completed by December 31, 1877, but with the right of an extension of the time for one year if satisfactory progress shall have been made within the time first named.

STATE FINANCES.

The financial condition of the State is quite fully set forth under the proper head. But the report of the Auditor General, issued since the first part of this work was printed, contains some facts which will be of interest.

PURCHASE OF UNMATURED BONDS.

The amount of State debt falling due by fiscal years is as follows: Sept. 30, 1878, \$394,000; 1879, \$46,000; 1883, \$632,000; 1890, \$358,000. Total, \$1,430,000. Of the total amount of debt falling due, \$1,384,000 is payable through the two-million-loan sinking fund, and the balance—\$46,000—is payable from the canal fund. The surplus specific taxes will be ample to discharge the portion of the debt payable through the sinking fund as fast as it matures, and tolls from the canal will meet the portion to be paid from the canal fund.

Under act No. 12, session laws of 1875, bonds to the amount of \$98,000 were purchased at a premium of \$4,003.34, a trifle over 4 per cent premium. Attached to these bonds were coupons, to cancel which, had the bonds run to maturity, would have required \$40,504.41. Deduct premium paid, \$4,003.34, it shows a saving to the State of \$36,501.07.

Had there been no bonds purchased during the period in which the interest falling due the present fiscal year was accruing, the amount would have been \$93,840; but on account of purchasing bonds during this period the interest was discharged by the payment of \$91,762.43, thus saving interest falling due during the fiscal year to the amount of \$2,077.57.

The interest falling due during the year closing Sept. 30, 1875, as shown above, is \$93,840; and the interest falling due for the year 1876 is stated at \$86,880, showing an annual saving in interest on account of bonds purchased, of \$6,960.

RECEIPTS AND DISBURSEMENTS FOR VARIOUS PURPOSES.

Act No. 148, session laws of 1873, requires all persons receiving or disbursing State funds to report to the Auditor General information in detail as to the source of all receipts, and the purposes for which all disbursements were made. The receipts and disbursements of the various institutions during the past year, as shown by the vouchers filed in the office of the Auditor General, were as follows:

	Receipts.	Disbursements.		Receipts.	Disbursements.
University.....	\$144,788 70	\$141,164 76	Deaf, dumb, and blind, at Flint.....	\$56,066 35	\$54,647 62
Normal School.....	24,284 23	21,886 86	Teachers' institutes.....	766 21	671 54
Agricultural college.....	51,112 36	50,716 37	State library.....	6,541 63	6,369 22
Public school.....	52,341 12	52,334 01	Geological survey.....	2,060 00	.....
Reform school.....	43,834 05	37,174 80	State pioneer society.....	250 00	250 00
State prison.....	141,925 64	141,335 08	Quartermaster General's department.....	22,576 83	22,268 46
Asylum for insane at Kalamazoo.....	204,064 43	199,158 29	Soldiers' aid.....	3,625 65	2,426 15
Asylum for insane at Pontiac.....	100,350 43	83,560 88	St. Mary's falls canal.....	43,348 92	40,335 15

N.
 resumed to be
 volume for the
 gan:
 \$102,150 52
 36,688 68
 138,334 63

T.
 Internal
 4,474 01
 0,631 90
 0,991 00
 8,262 26
 3,512 91
 5,126 45
 3,992 44
 9,991 05

of all classes.
 semi-weekly,
 classified, 112
 miscellaneous; 14
 Methodist, seven
 Baptist; 4 min-
 agricultural.
 sch, and one

the earlier
 ed at about
 produced in
 fur-bearing
 yrix, Silver,
 ossum. The
 "Wolverine

State Land
 Marquette and

STATE OFFICERS AND STATE BOARDS.

The following schedule of State officers and State boards is given partly as suggestive of the civil structure and working of the State government, and partly as a convenience to persons outside of the State who may wish to correspond with any of the departments:

ELECTIVE STATE OFFICERS* AND THEIR PRINCIPAL DEPUTIES.

- Governor*: JOHN J. BAGLEY. Residence, Detroit.
Private Secretary to the Governor: GEORGE H. HOPKINS. Residence, Detroit.
Lieutenant Governor: HENRY H. HOLT. Residence, Muskegon.
Secretary of State: E. G. D. HOLDEN. Residence, Grand Rapids.
Deputy Secretary of State: WM. CROSBY. Residence, Lansing.
Auditor General: RALPH ELY. Residence, Alma.
Deputy Auditor General: HUBERT R. PRATT. Residence, Lansing.
Commissioner of the State Land Office: LEVERETT A. CLAPP. Residence, Centerville.
Deputy Commissioner: OZRO A. BOWEN. Residence, Lansing.
State Treasurer: WILLIAM B. MCCREERY. Residence, Flint.
Deputy Treasurer: CHARLES H. HODSKIN. Residence, Lansing.
Attorney General: ANDREW J. SMITH. Residence, Cassopolis.
Superintendent of Public Instruction: DANIEL B. BRIGGS. Residence, Romeo.
Deputy Superintendent: CORTLAND B. STEBBINS. Residence, Lansing.
Regents of the State University: SAMUEL S. WALKER, St. Johns; term expires 1883. BYRON M. CUTCHEON, Manistee; term expires 1883. EDWARD C. WALKER, Detroit; term expires 1881. ANDREW CLIME, Leonidas; term expires 1881. CHARLES RYND, Adrian; term expires 1879. CLAUDIUS B. GRANT, Houghton; term expires 1879. JOSEPH ESTABROOK, Ypsilanti; term expires 1877. JONAS H. MCGOWAN, Coldwater; term expires 1877. The President of the University, JAMES B. ANGELL, LL. D., Ann Arbor, *ex officio*.
Members of the State Board of Education: EDGAR REXFORD, Ypsilanti; term expires December 31, 1881. WITTE[†] BAXTER, Jonesville; term expires December 31, 1876. EDWARD DORSCH, Monroe; term expires December 31, 1878. The Superintendent of Public Instruction, Hon. D. B. BRIGGS, *ex officio*.
State Board of Auditors: The Secretary of State, the State Treasurer, and the Commissioner of the State Land Office, are, by the constitution, made a Board of Auditors to adjust all claims against the State.

OFFICERS AND BOARDS CREATED BY THE LEGISLATURE.

- Commissioner of Insurance*: SAMUEL H. ROW. Residence, Lansing.
Deputy Commissioner: HENRY N. LAWRENCE. Residence, Lansing.
Commissioner of Railroads: STEPHEN S. COBB. Residence, Kalamazoo.
Clerk to the Commissioner of Railroads: SAMUEL F. COOK. Residence, Lansing.
State Librarian: MRS. HARRIET A. TENNEY. Residence, Lansing.
State Salt Inspector: SAMUEL S. GARRIGUES. Residence, East Saginaw.
State Land and Road Board: The Governor, the Secretary of State, the State Treasurer, the Auditor General, the Commissioner of the Land office, the Attorney General.
State Swamp Land Commissioner: JOSEPH P. HAVILAND. Residence, Traverse City.
Clerk to the Commissioner: L. H. BRIGGS. Residence, Lansing.

* Made elective by the constitution.

State Building Commissioners: E. O. GROSVENOR, Jonesville; JAMES SHEARER, Bay City; ALEXANDER CHAPOTON, Detroit; the Governor, *ex officio*; ALLEN L. BOURS, Secretary, Lansing.

St. Mary's Ship Canal Board: The Governor, the State Treasurer, the Auditor General.

Superintendent of the Sault Ste Marie Canal: FRANK GORTON, Sault Ste Marie.

State Board of Agriculture: HEZEKIAH G. WELLS, President, Kalamazoo; A. SMITH DYCKMAN, South Haven; FRANKLIN WELLS, Constantine; MILTON J. GARD, of Cass county; J. WEBSTER CHILDS, Ypsilanti; GEO. W. PHILLIPS, Romeo; the Governor, *ex officio*; the President of the Agricultural College, Prof. T. C. ABBOT, *ex officio*.

State Board of Health: HOMER O. HITCHCOCK, President, Kalamazoo; ROBERT C. KEDZIE, Lansing; C. H. BRIGHAM, Ann Arbor; HENRY F. LYSTER, Detroit; JOHN S. GOODMAN, East Saginaw; ARTHUR HAZELWOOD, Grand Rapids; HENRY B. BAKER, Secretary, Lansing.

Commissioners for the Supervision of Penal, Pauper, and Reformatory Institutions: CHARLES I. WALKER, Detroit; UZZIEL PUTNAM, Jr., Pokagon; HENRY W. LORD, Pontiac; Z. R. BROCKWAY, Detroit. CHARLES M. CROSWELL, Secretary, Adrian.

Board of Trustees for the Michigan Asylum for the Insane: LUTHER H. TRASK, Kalamazoo; term expires 1879. E. S. LACY, Charlotte; term expires 1881. JAMES A. BROWN, Detroit; term expires 1877. WILLIAM A. TOMLINSON, Kalamazoo; term expires 1881. JOSEPH GULMAN, Paw Paw; term expires 1877. JAMES E. PITTMAN, Detroit; term expires 1878. CHARLES T. MITCHELL; term expires 1879. Dr. E. H. VAN DEUSEN, Medical Superintendent, Kalamazoo.

Commissioners of the Eastern Asylum for the Insane: WARREN G. VINTON, Detroit; GEORGE HANNAIS, South Haven; M. E. CROFOOT and W. M. MCCONNELL, Pontiac; SAMUEL G. IVES, Unadilla.

Board of Trustees of the Institution for Educating the Deaf and Dumb, and the Blind: I. D. HANSCOMB, Romeo; term expires 1879. A. L. ALDRICH, Flint; term expires 1881. CHARLES G. JOHNSON, Monroe; term expires 1877. E. L. BANGS, Principal, Flint.

Commissioners of the State Public School: CHARLES E. MICKLEY, Adrian; JAMES BURNS, Detroit; CALEB D. RANDALL, Coldwater; the Governor, *ex officio*.

Board of Control of the State Reform School: GEO. W. LEE, Detroit; term expires 1879. E. H. DAVIS, Lansing; term expires 1881. DANIEL L. CROSSMAN, Williamston; term expires 1877. FRANK M. HOWE, Superintendent, Lansing.

State Prison Inspectors: A. A. BLISS, Jackson; WM. S. WILCOX, Adrian; LAFAYETTE W. LOVELL, Climax. WM. HUMPHREY, Warden, Jackson.

State Geological Board: The Governor, the Superintendent of Public Instruction, the President of the State Board of Education.

State Board of Control for Railroads: D. BETHUNE DUFFIELD, Detroit; BYRON M. CUTCHEON, Manistee; DARIUS MONROE, Bronson; P. DEAN WARNER, Farmington.

State Fish Commissioners: ELI R. MILLER, President, Richland; GEORGE CLARK, Ecorse; A. J. KELLOGG, Detroit; the Governor, *ex officio*; GEORGE H. JEROME, Secretary, Niles.

Military Officers of the State: The Governor, Commander-in-Chief; Brig. Gen. JOHN ROBERTSON, Adjutant General; Brig. Gen. SALMON S. MATTHEWS, Quartermaster General; Brig. Gen. LUTHER S. TROWBRIDGE, Inspector General; Maj. GEORGE H. HOPKINS, Military Secretary to the Commander-in-Chief; Maj. JOHN PULFORD, Judge Advocate.

State Military Board: CHAS. E. GRISSON, St. Johns; HENRY M. DUFFIELD, Detroit; the Inspector General, *ex officio*.

CORRECTIONS AND EMENDATIONS.

TYPOGRAPHICAL CORRECTIONS.

In the second paragraph on page 50, the middle letter in the name of Dr. Jackson should be T, instead of J.

The erroneous spelling of the word "ores," at the end of the sixth line on page 61, will be noted.

THE COPPER STATISTICS.

Some few modifications of the copper statistics have been suggested since that part of the work was in print—among them the addition on page 57 of 27 tons of ore, or 22 tons ingot shipped from Isle Royale in 1875.

There may be some apparent discrepancies between the totals shown by the two tables on page 57, but generally it is believed that the round tons given in the last table will agree with the number of pounds in the first on a multiple of 2,000. Should any real discrepancies be found to exist, the figures of the first table should be accepted, the chief value of the last one being to show the distribution of the copper product.

It is also suggested that the weight of some of the specimens of mass copper noted near the bottom of page 53 will bear some reduction.

Per contra, the largest specimen of mass copper stated at 446 tons (p. 58), taken from the Minesota mine, it is claimed should be 540 tons, agreeing with the last paragraph on page 53, and from the Phoenix mine (p. 58), stated at 200 tons, should be 500 tons.

THE IRON STATISTICS.

With the view of verifying the data on this subject as fully as possible, advance sheets were forwarded to Mr. H. B. Tuttle, of Cleveland, Ohio, with the request that he would suggest any modifications that he might think proper. The result of his examination is given in the following letter:

MR. S. B. McCracken:

CLEVELAND, May 11, 1876.

Dear Sir—In accordance with your request, I have hastily examined the matter which you sent me touching the iron district of Michigan, and would suggest its modification as follows:

Page 60.—Until 1855 the only ore mined was for use in local forges, making blooms. The first shipment from Marquette was in 1855, being 1,447 tons.

Page 61.—The comments on underground mining may have been appropriate to 1870, but not at this date. Nearly all the old mines have some underground work. The Champion and Michigan are entirely underground, their experience having proved that to be the best method for those mines.

Page 62.—In the paragraph on the quality of the iron, it may be remarked that the iron produced from the red specular ores is decidedly red-short, and that from the magnetic ores is about neutral.

Same page, relative to the per centage of yield in iron, the statements of Major Brooks are of the mines *collectively*, many of the mines grading their ore to a higher standard, and thus meeting the wants of the most exacting makers of the higher grades of iron and steel. The distinction between first and second class ores consists chiefly, but not entirely, in silica, and of this all the "flag" ores have an excess.

Page 63.—In the fifth line from the bottom, should read, *ordinary* uses, in the place of "practical" uses, such a method being only admissible in making common iron.

Pages 64 and 65.—Since 1870 improved methods have been discovered and adopted by the best chemists for determining phosphorus, but the process is such a delicate one that even good chemists now differ in reported results from the same specimen. In the list of mines (page 64), the reported per cent of phosphorus and iron, obtained by analysis of specimens, is not correct as to some of the mines, as is now well known by results obtained on a large scale in the use of the ores. The difficulty lies in obtaining specimens which shall represent an *average* of the ore as furnished for actual use, and if with great care and good judgment the average has been

included in the specimens or samples, the work of analysis is sometimes necessarily entrusted to assistants, or students, who may, or may not be as accurate as the eminent chemist in whose name the analysis goes forth, but who has had no time to verify the process.

The list of mines on page 61 has omitted the following, which are regularly productive: *

MINE.	KIND OF ORE.	Phosphorus.		Iron.
Republic.....	Chiefly specular.....			
Michigan.....	Magnetic.....	0.040		63.51
Spurr.....	".....	0.041		64.38
Saginaw.....	".....	0.104		63.81
	Specular.....	0.132		52.40

The percentage of phosphorus and of iron is quoted, like the others, from the geological report, but subject to the preceding criticism.

Respectfully yours,

H. B. TUTTLE.

CONCLUDING REMARKS.

The Latin inscription on the State coat of arms, which appears on the title page of this work, rendered into English, signifies: "If you would behold a beautiful peninsula, look around you." All travelers in Michigan in the earlier days recognized the appropriateness of this motto. In the springtime the picture was beautified by the bloom of forest trees and flowers; in the summer the plains afforded native pasturage for the deer and the elk, and for animals of domestic use so far as they had been introduced, while the foliage was a protection from the heat of the sun; in autumn the ripeness of the year was typified by the thousand brilliant tints reflected from the forest leaves, and by the sense of peace and repose inspired by the Indian summer; winter swept her breath of frost over the land, only to cleanse and purify where the productive season had left impurities.

But if the inscription was appropriate in the primitive condition, cultivation and improvement have been a failure if they have not added to its force and propriety. In the preceding pages have been traced the evolution of a political commonwealth from a primitive and savage state, with a population which, scarcely appreciable fifty years ago, may safely be stated in round numbers at this time at fifteen hundred thousand. In its financial condition, a bidder in the market for its own unmatured obligations, it is believed that no State, certainly no new State, can claim a higher standing. In its public lands, it offers variety, fertility, accessibility, and liberal terms for payment. It shows an aggregate of agricultural products, or at least a capacity of production, beyond any limit which the imagination can well conceive, both in quantity and variety. The products of its forests are a source of wealth exhaustless for many years to come. In its iron and copper, yet in the infancy of their development, challenging the world, both in the richness of the deposits and the intrinsic value of products; while salt, gypsum, coal, slate, stone, and other minerals, are held in liberal and apparently exhaustless supply. Her fisheries offer unlimited facilities, both for profit and pleasure. She has water power, abundant and indestructible. In manufactures, she shows great variety and material value. In railways, the older sections of the State rival New England in their extent of mileage, while the facilities for transportation, both by railway and water, afford a certain security against oppressive charges for carriage. The State presents an institutional

* These mines, with others, were marked with a star in the report from which the table on page 64 was compiled, and were omitted because of the memorandum that they "are new, and not sufficiently developed to enable me to say that an average sample of the ore was obtained." The subsequent history of the four mines here given entitles them to be included.—*Compiler.*

structure, both educational and benevolent, which, without boasting, it is believed will, in its scope and design, bear favorable comparison with that of the most advanced communities; while in her social, moral, and religious status, her people will rather prefer to be judged than to pass judgment upon themselves.

The effort has been, in the foregoing work, to set forth in perspective our BEAUTIFUL PENINSULA, as well in its native beauty as in the beauties and attractions that the labor of man has added unto it—for unworthy would our people be of such a heritage, did they fail to improve and enrich it. This work is designed primarily for those who may not have had the opportunity to behold our Beautiful Peninsula by looking about them, but who may not be unwilling to receive impressions of it through the operation of the reasoning and reflective powers. We dismiss the work, therefore, and commend it to the reader with the spirit of the motto of which Michigan is modestly but justly proud.

it is believed
t of the most
us, her people
lves.
erspective our
ies and attrac-
our people be
rk is designed
old our Beau-
ing to receive
ective powers.
with the spirit

