

GHOLOGY
The University of Iowa Libraries
557.77 I6.1 Ser.2 v.12 1901 cop.3

IOWA

GEOLOGICAL SURVEY

VOLUME XII

ANNUAL REPORT, 1901,

WITH

1

ACCOMPANYING PAPERS.

SAMUEL CALVIN, A. M., PH. D., STATE GEOLOGIST

A. G. LEONARD, ASSISTANT STATE GEOLOGIST



DES MOINES: Published for the Iowa Geological Survey 1902. DES MOINES: BERNARD MURPHY, STATE PRINIER. 1902.

6 . · ·

1

557.77 16.1 54.12 1901 Cop, 3

GEOLOGICAL BOARD.

HIS EXCELLENCY, A. B. CUMMINS, - GOVERNOR OF IOWA HON. F. F. MERRIAM, - - AUDITOR OF STATE DR. GEO. E. MACLEAN, PRES'T STATE UNIVERSITY OF IOWA DR. WM. M. BEARDSHEAR, PRES'T IOWA AGRI'L COLLEGE PROF. H. E. SUMMERS, PRES'T IOWA ACADEMY OF SCIENCES

> The University of Iowa LIBRARIES

GEOLOGICAL CORPS

SAI	MUE	L CALVIN	St.	ATE GEOLOGIS	т
Α.	G.	LEONARD	Assistant Sta	ATE GEOLOGIS	т

J. B. WEEMS	Снемізт
S. W. Beyer	SPECIAL ASSISTANT
W. H. NORTON	SPECIAL ASSISTANT
J. A. Udden	
T. H. MACBRIDE	SPECIAL ASSISTANT
F. A. Wilder	Special Assistant
L. E. Young	
THOS. E. SAVAGE	SPECIAL ASSISTANT
IRA A. WILLIAMS	
Nellie E. Newman	SECRETARY

CONTENTS.

전 것이 이 것입니다. 것은 것이 많은 것이 같은 것이 것이 것이 있는 것이 것이 없는 것은 것을 수 있다. 그 편의 것은 것이 가지 나 다.	PAGE.
MEMBERS OF GEOLOGICAL BOARD	
GEOLOGICAL CORPS	. 4
TABLE OF CONTENTS	
LIST OF ILLUSTRATIONS	. 6
Administrative Reports	. 9
STATISTICS OF MINERAL PRODUCTION-	
By S. W. Beyer	. 36
GEOLOGY OF WEBSTER COUNTY-	
By Frank A. Wilder	. 63
GEOLOGY OF HENRY COUNTY-	
By T. E. Savage.	. 237
GEOLOGY OF CHEROKEE AND BUENA VISTA COUNTIES-	
By Thomas H. Macbride	. 303
GEOLOGY OF JEFFERSON COUNTY-	
By J. A. Udden	. 355
GEOLOGY OF WAPELLO COUNTY-	
By A G. Leonard	. 439

LIST OF ILLUSTRATIONS.

PLATES.

I. Map showing progress of detailed mapping.

II. Pit of the Waukon iron mine.

III. Waukon iron mine, close view.

IV. Structure of the gypsum.

V. Gypsum quarry face.

VI. Map of the Fort Dodge gypsum area.

VII. Upper surface of gypsum bed.

VIII. Topography of gypsum area.

IX. Map showing distribution of gypsum in the United States.

X. Mill of the Fort Dodge Plaster Company.

XI. P. W. Lyon's quarry on Turkey creek, showing the Verdi beds.

FIGURES.

1. General view of ore-washing plant, Waukon Iron Company.

2. Sketch showing Webster county drainage.

3. Sketch showing Ringgold county drainage.

4. The Des Moines valley at the mouth of the Boone river.

5. Portion of Lepidodendron found in pit of Fort Dodge Clay Works.

6. View showing line along which parallelism of deposition is interrupted.

7. Concretionary structure in Carboniferous sandstone, near mouth of Prairie creek.

8 Sandstone near mouth of Prairie creek.

9. Coalville coal basin.

10. Sandstone bluffs on the Des Moines river in central Webster county.

11. View showing mural escarpment of Carboniferous sandstone in Bone Yard Hollow.

12. Cross section east and west through the gypsum area.

13. Exposure of gypsum on Soldier creek.

14. Sketch showing order of deposition of salts from sea water.

15. Sketch showing bottom of Mediterranean sea and Strait of Gibralter.

16. Portion of clay pit of Fort Dodge Brick and Tile Company, showing the drift.

17. Old gravel in the pit of the Fort Dodge Brick and Tile Works.

18. Morainic knobs in Wisconsin drift, northern Webster county.

19. Interior of Crawford mine.

20. Mill of the Cardiff Plaster Company.

21. Mill of the Mineral City Gypsum Plaster Company.

22. Duncombe's Gypsum Plaster mill.

23. Blandon's Gypsum Plaster mill.

LIST OF ILLUSTRATIONS.

FIGURES.

- 24. Lower mill of the Iowa Plaster Company.
- 25. Plants of the Fort Dodge Brick and Tile Company and of the Fort Dodge Clay Works.
- 26. The Fort Dodge Pottery.
- 27. Sketch of the ravine and terraces of Bone Yard Hollow.
- 28. Gypsum boards.
- 29. Gypsum boards fastened together with cement or gypsum rods.
- 30. Gypsum boards nailed or screwed directly to wooden uprights.
- 31. A wall of gypsum boards in which no uprights are used.
- 32. Gypsum boards fastened to narrow wooden strips in iron uprights.
- 33. Sketch of machine for making gypsum boards.
- 34. Mill and one of the quarries of the Krolpa Gypsum Industry.
- 35. Vertical mills as installed by the Rhenish Gypsum Industry.
- 36. German calcining kettle, showing agitator.
- 37. Sketch showing connections between calcining kettle, cooling room and dust chamber.
- 38. Interior of Rhenish Gypsum Industry mill.
- 39. Cross section of kiln for calcining porcelain gypsum.
- 40. Section of continuous kiln for calcining the finer gypsum plasters.
- 41. Cross section of continuous kiln.
- 42. Sketch of kiln for burning estrick gypsum.
- 43. Adhesion test briquette.
- 44. Exposure of Keokuk limestone on Mud creek.
- 45. Geodes along the bed of Mud creek, near Lowell.
- 46 Irregular beds of the Verdi division of the Saint Louis, near Oakland Mills.
- 47. Exposure of middle portion of Saint Louis, at Winter's quarry.
- 48. Exposure of limestone in Parkins' quarry, showing the even layers of Pella division.
- 49. Slightly folded layers of the upper beds of the Saint Louis.
- 50. Exposure of Saint Louis limestone near Winfield.
- 51. Exposure of coal in section 5 of Salem township.
- 52. Saint Louis limestone, Rock creek.
- 53 Sandstone of the Coal Measures abutting against a ledge of Saint Louis limestone.
- 54. Illinoian moraine showing the low, rounded character of the hills. East of New London.
- 55. Deposit of loess overlying Kansan drift, near Rome.
- 56. View at mouth of Brooke's creek, looking east toward the valley of the Little Sioux river.
- 57. Pilot rock, a Sioux quartzite bowlder, four miles south of Cherokee.
- 58. Map showing approximately the location of the Altamont moraine in northwestern Iowa.
- 59. Where the prairie meets the forest.
- 60. Quartz showing a peculiar brecciated structure.
- 61. Exposure of Coal Measure strata on Cedar creek.
- 62. Kansan drift overlain by loess, one-mile west of Fairfield.
- 63. Rainy Brothers' brick and tile factory, Fairfield.
- 64 The broad valley of the Des Moines river, two and one-half miles below Cliffland station.

LIST OF ILLUSTRATIONS.

F'GURES.

65. Monoclinal fold in the Saint Louis limestone, near Dudley.

- 66. Contact between the Saint Louis limestone and Coal Measure shales, near Dudley.
- 67. Unconformity between the Saint Louis limestone and Coal Measure shales.
- 68. Contact between the limestone of the Saint Louis and the shales of the Coal Measures.
- 69. Bluff of Coal Measure sandstone at Cliffland station.
- 70. Escarpment of Coal Measure sandstone along the Des Moines river, above Eldon.
- 71. Cross-bedding in Coal Measure sandstone, one-half mile below Cliffland.
- 72. Cross-bedding in sandstone of the Coal Measures, near Cliffland station.
- 73. Clay pit of the Ottumwa Paving Brick and Construction Company.
- 74. Sketch showing the unconformity between the Saint Louis and Coal Measures.
- 75. Unconformity between the Saint Louis and Coal Measures.
- 76. Quarry of Andrew Lames at Dudley.
- 77. Quarry in bed of the Des Moines river at Ottumwa.
- 78. Plant of the Ottumwa Paving Brick and Construction Company.

MAPS.

Geological map of Webster county. Geological map of Henry county. Map of the Superficial Deposits of Cherokee county. Map of the Superficial Deposits of Buena Vista county. Geological map of Jefferson county.

Geological map of Wapello county.

8