

INDEX

A

Achey, H. P., logs from, 352
Aftonian and Nebraskan stages in Crawford county, 304; in Lucas county, 127
Age of limestones of Crawford county, 295
Air preheaters, use of, 86
Alluvial soils, character, 346; in Crawford county, 346; in Lucas county, 213
Alluvium in valleys, 118, 288
Altitude, of rock surface in Crawford county, 302; in Lucas county, 127
Altitudes, bench marks for, 368; datum for, 369; from railway profiles, 365; Gannett's Dictionary of, 365; highest and lowest, 377; in Crawford county, 268; in Iowa, James H. Lees, 363; in Lucas county, 113; sources for, 365
Anderson, C. O., work of, in coal, 180
Anhydrite, use of, 25
Annual Report, George F. Kay, 7
Arcadia, wells near, 296
Area and location of Crawford county, 243; of Lucas county, 105
Areas of drainage basins in Crawford county, 292; in Lucas county, 114
Arion, gravel and sand near, 360; Riddell pit, 331; water supply, 352
Arkansas, analyses of coal from, 78
Ash and sulphur content of Iowa coal, 92; studies of, 99
Ashley, George H., cited, 81
Aspinwall, exposures near, 313, 324
Audubon, artesian well at, 300

B

Bain, H. F., cited, 125, 246, 257, 296, 302
Barnhoff well, strata in, 354
Bassett, J. R., early settler, 244
Bates, work of, in coal 176
Bench marks, altitudes for, 368
Benches in Crawford county, 266; in Lucas county, 117
Berne, exposure near, 323
Beyer and Williams, cited, 220; and Wright, cited, 220
Big Hill mine at Lucas, 166, 180, 186, 197
Biloxi datum plane, 371, 373
Bluff formation, origin, 244
Boulders, Kansan, in Lucas county, 173
Boyer, exposures near, 306
Boyer valley, benches on, 267; character of, 260, 274; exposures in, 305; grav-

els in, 330; history of, 275; tributaries of, 285
Brick plants in Crawford county, 361; see also Clay
Briggs drift mine in Lucas county, 174
Buck creek, character, 286
Buck Grove, exposures near, 327
Buffalo creek, character, 287
Butler, K., cited, 81
Byers, H. L., work of, in coal, 176

C

Cackler mine, Lucas county, 180; section of, 237
Cairo datum plane, 373
California, well at, 301
Calvin, S., cited, 123, 127, 246, 284, 295, 329
Campbell, M. R., estimate of coal area, 74
Cap rock in Lucas county, 151
Carbonization at low temperature, 100; process for Iowa coal, 95
Carman, J. E., cited, 279, 303, 333
Carney, K. G., analyses from, 79, 80
Carr, Byron O., work of, in coal, 174
Carroll county, wells in, 294
Cedar creek drainage, 120
Cement, production in Iowa, 58; in 1925, 12; in 1926, 36
Centerville, well at, 129; coal, character of, 77
Central Iowa Fuel Co., acknowledgments, 221; analyses from, 199, 202; mines of, 178, 186; record of shaft, 153, 155
Chamberlin and Salisbury, cited, 81
Characteristics of Iowa coals, 76
Chariton, coal mining near, 177, 186; depth to St. Peter at, 206; quarries near, 219; section near, 159; water supply, 208
Chariton Conglomerate in Lucas county, 167, 218
Chariton Co-operative Coal Co., mine of, 176
Chariton river valley, age of, 107, 115; drainage basin of, 114; gradient of, 114; strata in, 115
Charter Oak water system, 351
Chemical analyses of Iowa coals, 200
Cherokee beds, character of, 143; in Lucas county, 144
Chester strata in Lucas county, 140
C., B. and Q. R.R. reservoir near Chariton, 210

- C., R. I. and P. Ry., elevations by, 370; reservoir in Lucas county, 210
- C. and N. W. Ry. Co., water stations, 348
- Clays in Crawford county, 361; in Lucas county, 216; operators in 1926, 17; wares in Iowa, 60; prices of, 39; production in 1925, 13; in 1926, 37
- Cleveland mine, analyses from, 201; see also Old Cleveland, New Cleveland
- Clinton silt loam, 214
- Coal, age of, and character, 66; analyses and tests, 78, 79, 97-91, 199-202; burning of, 77; in domestic furnaces, 94; cover of, and character, 66; dry cleaning of, 94; gasoline from, 97; geological conditions of formation, 67; haulage of, 19; Iowa, areas and characteristics of, 65, 82, 92; burning, 82; classification of, 99; coke from, 96; steam production, 82; oils from, 96; researches on, 91, 94; storage of, 98; use of, 93; at University, 97; laminae in, 77; lump, analyses of, 78; methods of mining, 19; in Lucas county, 187; powdered, use of, 99; production of, 75, in 1925, 18, in 1926, 41; in Lucas county, 174, 180, 182; prospecting for, 184; situation and nature of, 183; steam, analyses of, 79; test at Moline, 87; value of, 56; washing of, 94
- Coal beds, extent of, 74; formation in geosyncline, 132; in Crawford county, 361; in Lucas county, 173; Measures, surface in Lucas county, 130, 138; water from, 203; mines in Lucas county, 192; mining, history of, in Lucas county, 173; operators, 22; swamps, character of, 70; materials in, 71
- Coal Age, article in, 19
- Coke from Iowa coal, 96
- Coking properties of coal, 96
- Colorado stage, character of, 73
- Consequent drainage, 272
- Consolidated Indiana Co., in Lucas county, 187
- Consolidation Coal Co., in Lucas county, 187
- Corydon, well at, 129
- Country wells in Crawford county, 353
- Cox well, section of, 295
- Crawford, Wm. H., county named for, 243
- Crawford county, Aftonian beds in, 304; age of limestones in, 295; age of sandstones in, 296; altitudes in, 268; areas of drainage basins, 292; artesian well in, 297; benches in, 266; brick plants in, 361; coal in, 361; Cretaceous beds in, 296; deposits of uncertain age, 319; Des Moines beds in, 295; drainage of, 272; eastern province of, 259; gravels in, 328; height of land in, 247; history of, 243; Kansan and Yarmouth stages in, 321; location and area of, 243; loess in, 338; Missouri beds in, 295; Nebraskan and Aftonian stages in, 304; peat in, 316; Pleistocene in, 302; profile across, 271; rainfall in, 357; sand and gravel in, 359; soils of, 344; springs in, 357; stratigraphy of, 292; streams, water from, 357; topographic provinces in, 255; topography of, 247; underlying formations, 293; water supply of, 346; wells in, 294, 346; western province of, 264; Wisconsin gravels in, 338; Yarmouth in, 321
- Cretaceous beds in Crawford county, 296; coals, 66; system, extent and character of, 73
- Crop yield in Lucas county, 214
- Cutting power of streams, increase in, 288

D

- Dakota stage, character of, 73
- Daniels, Evan, mine of, 180, 197; section of, 232
- Datum for altitudes, 369
- Davidson, G. M., analyses by, 349
- Davie, W. A., wells by, 356
- Dearborn Drug and Chemical Works, analyses by, 350
- Deloit, exposures near, 319
- Denison, J. W., town named for, 243
- Denison, clay pit at, 342, 361; exposures near, 320; Mill pit near, 329; sand at, 360; water supply, 347; well at, 297
- Denison Brick Co., section, 342
- Deposits of uncertain age, Crawford county, 319
- Des Moines, well at, 29
- Des Moines City Ry., plant of, 84; tests by, 88
- Des Moines Dept. Streets, altitudes from, 368
- Des Moines river, elevations on, 370
- Des Moines series, base of, 131; extent of, 72; in Crawford county, 295; in Lucas county, 143; surface of, in Lucas county, 137; thickness of, in Lucas county, 138
- Devonian surface, character, 131
- Dobson, B., early settler, 244
- Dobson, T., early settler, 244
- Dow, S. E., early settler, 244
- Dow City, exposures near, 337
- Drain tile in Iowa, 14
- Drainage basins, areas of, in Crawford county, 292; in Lucas county, 114
- Drainage of Crawford county, 272; of Lucas county, 113
- Drift mines in Lucas county, 198
- Drift soils in Lucas county, 213
- Drill sections in Lucas county, 222
- Dunham, C., early settler, 244

Dunlap, well at, 301

E

East Boyer river, character of, 260, 283
Eaton well, Lucas county, 187; section of, 166

Eikenberry, Daniel, mine of, 175

Elevation of Nebraskan gumbotil plain, 316

Elevations, list of, in Iowa, 377; see also Altitudes

English or Wild Cat creek, 119; coal in valley of, 152

Eocene coals, 66

Erosion and deposition, effects of, 264; processes of, 257

F

Fertilizers in Iowa, 64

Fix, Louis R., work of, in coal, 174

Fleming, B. P., Possible Researches in Iowa Coal, 91

Forest denudation, result of, 216

Fort Dodge, Des Moines & Southern Ry., plant of, 84

Fort Scott beds in Lucas county, 163

Fossils in Lucas county, 139, 163

Franklin well, strata in, 354

Friends creek, character of, 286

Fuel, pulverized, use of, 85, 99

Furnaces and grates, designs of, 82

Furnaces for Iowa coals, domestic, 95

G

Gannett's Dictionary of Altitudes, 365
Gas, natural, production in 1925, 34; see Oil

Gas and oil possibilities, 63

Gasoline from coal, 97

Geology of Crawford county, James H. Lees, 239; Lucas county, A. L. Lugin, 101

Geosyncline, coal formation in, 132; in Mississippi valley, 132

Gilbert, G. K., cited, 122, 259

Glacial drift soils in Lucas county, 213

Glaciers in Crawford county, 303

Goben Coal Co., mine of, 180

Grates and furnaces, designs of, 82

Gravels, character, 328; in Boyer valley, 330; in Crawford county, 328; in Lucas county, 217; in Nishnabotna valley, 331; origin and age of, 332; see also Sand

Green, A. C., data on coal from, 361

Green and Son, brick plant of, 361

Green and Ward clay pit, section, 341, 342

Greene and Hinds, cited, 125, 126

Ground water in Lucas county, 203

Grundy clay loam, 214

Grundy silt loam, 214

Grundy silty clay loam, 214

Gumbotil, as soil in Lucas county, 213;

character of, 169, 303; concentrate, 323; in Crawford county, 303 ff; in Lucas county, 169; near Wall Lake, 305

Gumbotils, two on one slope, 327

Gypsum, production of, 59; in 1925, 24; in 1926, 44

H

Haven, William, work of, in coal, 174, 177

Heating value of Iowa coal, 92

Height of land in Crawford county, 247

Henrietta formation, character, 143; in Lucas county, 162; near Chariton, 157

Herring well, strata in, 355

Highest and lowest points in Iowa, 377

Hinds, Henry, cited, 81, 186

Hinds and Greene, cited, 125, 126

Hinman, Jack J., Jr., analysis by, 347

History of Crawford county, 243

Hixson, A. W., cited, 81

Hoffard, Frank, cited, 294

Hollingsworth, E. A., work of, in coal, 180

"Holmes" coal field, Lucas county, 187

Holstein, well at, 301

Howell, J. V., cited, 220

I

Illinois, analysis of coal from, 79

Illinois Agr. Exp. Station, cited, 211

Illinois Power and Light Corp., tests by, 89

Indian creek, Sac county, history of, 275

Inland Fuel Co., analyses from, 199; work of, 177

Iowa, altitudes in, 363; drain tile in, 14; highest and lowest points in, 377; list of elevations in, 377; topographic map of, 376

Iowa Coal, Areas and Characteristics of, James H. Lees, 65; fields, age of, 66; for Steam Production, T. A. Marsh, 82

Iowa Experiment Station, cited, 345

Iowa Geol. Survey, altitudes from, 368; mapping by, 373

Iowa Nebraska mine, 179, 186

Iowa Power & Light Co., Des Moines plant of, 84

Iowa Railway and Light Co., plant of, 84

Iowa Soil Survey, cited, 211

Iowa State College, altitudes from, 367; analyses by, 201, 347

Iowa Weather and Crop Service, cited, 214, 357

J

Jackson, H. L., work of, in coal, 180

Jeffery, E. C., cited, 65

Jones, Wesley, work of, in coal, 174

K

- Kansan and Yarmouth stages in Crawford county, 321; bowlders in Lucas county, 173; drift, character, 170, 321; in Crawford county, 321; in Lucas county, 169; near Manilla, 325; gumbotil, age of, 127, 304; character, 321
 Kay, F. H., cited, 81
 Kay, George F., cited, 126, 127, 171, 173, 246, 304, 309, 311, 312, 316, 321, 323, 326, 331, 333, 338; Annual Report of, 7; Rock Resources of Iowa, 51; work in Lucas county, 106
 Kentucky, analyses of coal from, 78, 80
 King well, strata in, 354
 Kiron, exposure near, 322

L

- Ladow shaft, Lucas county, 176
 La Turno, J. L., brick plant of, 361
 Laub, H. C., early settler, 244
 Lees, James H., acknowledgments, 221; Altitudes in Iowa, 363; cited, 81, 174, 301, 338; Geology of Crawford county, 239; Iowa Coal Areas and Characteristics of Iowa Coal, 65; Mineral Production in Iowa in 1925 and 1926, 9, 35
 Lime, see Limestone
 Limestone, age of, in Crawford county, 295; and sandstone in Lucas county, 218; production in 1925, 26; in 1926, 45; value of, 63; operators, 28
 Lindley silt loam, 214
 Location and area of Crawford county, 243; of Lucas county, 105
 Loess, age of, 127, 339; character of, 341; effect on topography, 264; in Crawford county, 338; in Lucas county, 127, 169; origin, 339; relations of, 342; soils, character, 213, 345; in Crawford county, 345; in Lucas county, 213
 Logan, limestones at, 295
 Lord, N. W., analyses by, 201
 Lorensen well, strata in, 353
 Lower coal, character of, 183; elevation of, 133; in Lucas county, 144
 Lowest and highest points in Iowa, 377
 Lucas, mines at, 166, 179, 186; analyses from, 201; sections near, 160, 232
 Lucas county, Aftonian topography of, 108; alluvial soils in, 213; altitudes in, 113; basins of Lower coal in, 186; bowlders in, 173; Chariton conglomerate in, 167, 218; Cherokee formation in, 144; Chester strata in, 140; clay in, 216; coal, analyses and tests, 199; beds in, 145 ff, 173; mines, 192; mining methods, 187; present holdings of, 186; production in, 174, 180, 182; columnar section of, 142; crop yield in, 214; depth to St. Peter sandstone, 206; Des Moines beds in, 143;

- Des Moines surface in, 137; drainage, age of, 121; drainage history of, 113; drift mines, 198; drill sections in, 222; Economic geology of, 173; Fort Scott beds in, 163; fossils in, 163; geological terms used, 125; Geology of, A. L. Lugn, 101; glacial drift soils in, 213; ground water in, 203; gumbotil in, 108, 169; Henrietta formation in, 162; history of coal mining in, 173; Kansan drift in, 169; Kansan gumbotil in, 169; Kansan plain, remnants in, 108; location and area, 105; loess soils in, 213; Mississippian surface in, 134; Mississippian system in, 139, 150; Nebraskan drift in, 170; Nebraskan gumbotil in, 171; Nebraskan gumbotil plain in, 107; oil in, 220; Paleozoic history and structure, 127; Peorian loess in, 108; Pleasanton formation in, 167; Pleistocene beds in, 169; Pliocene surface, 107; precipitation in, table of, 204; preglacial surface, 107; rainfall in, 203; reservoirs in, 208; road material in, 220; sand and gravel in, 217; sandstone and limestone in, 218; septaria in, 163; soil, waste in, 215; soils and soil conservation in, 210; soils in "Southern Iowa loess", 213; springs in, 206; stratigraphy, 123; St. Louis strata in, 140; Ste. Genevieve formation in, 139; streams, 203; streams, water in, 121; table of temperatures in, 205; thickness of strata in, 129; topographic analysis of, 112; topographic maps of, 113; topography of, 106; typical wells in, 207; unconformities in, 134; Warsaw strata in, 140; water supply of, 203
 Lugn, Alvin Leonard, Geology of Lucas County, 101
 Lysaght, J. A., analyses by, 80

M

- McAhren, G., pit, Deloit, 330
 McCaffery Brothers well, strata in, 353
 McHenry, M., early settler, 244
 Macbride, T. H., cited, 246, 248, 278
 Mallory, S. H., work of, in coal, 175
 Malone, W. M., work of, in coal, 180
 Maloney, J. H., coal prospect of, 361
 Manilla, brick plant at, 361; Kansan drift near, 325; water supply, 352
 Manning, exposures near, 310
 Maple Block Coal Co. in Lucas county, 187
 Mapping by U. S. Geological Survey, 373
 Maps, see Topographic Maps
 Marsh, T. A., cited, 79, 81; Use of Iowa Coal for Steam Production, 82
 Mason, J., early settler, 244
 Melcher, mine at, 180

- Memphis datum plane, 370, 373
 Methods of coal mining in Lucas county, 187
 Metric system, conversion of, 372
 Meyers, F. W., cited, 243
 Mill pit near Denison, 329, 360; fossils in, 329, 337
 Miller, B. L., cited, 126
 Miller, W. J., cited, 294, 296
 Miller well, strata in, 354
 Milwaukee Electric Railway Light & Power Co., tests by, 85
 Mine dump waste as road metal, 220
 Mineral production in Iowa in 1925 and 1926, 9, 55, 56; in 1926, 35
 Mines, coal, in Lucas county, 192
 Mining, possible depth of, 75
 Mississippi Valley, geosyncline in, 132
 Mississippian surface in Lucas county, 130, 134; system in Lucas county, 139, 150
 Mississippi River Com., altitudes from, 366; bench marks of, 369
 Missouri-Mississippi watershed, 247
 Missouri River Com., altitudes from, 366; bench marks of, 370
 Missouri series, character of, 73, 295; in Crawford county, 295
 Missouri Valley, strata near, 295
 Moberly sandstone, origin, 126
 Moisture content of Iowa coal, 92
 Moline, coal tests at, 87
 Monroe county, No. 10 well in, 129
 Moody, work of, in coal, 176
 Mormon Trace road, 108
 Mystic vein, character of, 93
- N**
- Naeve well, strata in, 355
 Nebraskan and Aftonian stages in Crawford county, 304; drift, in Lucas county, 127, 170; thickness of, 318; gumbotil, age of, 127; in Crawford county, 304 ff; in Lucas county, 171; near Boyer, 307; gumbotil plain, elevations of, 316
 New Cleveland, coal mining near, 177
 Nicholson Produce Co., water supply, 350
 Nishnabotna valley, gravels in, 331
 Nodaway coal, extent of, 73; mining of, 76
 Norton, W. H., cited, 128, 251, 297, 301
 Norwood, Josh, work of, 178
 Norwood, mine near, 180
- O**
- Old Cleveland mine, 186; section of, 165
 Oil and gas, 63; possibilities, 63
 Oil in Lucas county, 220
 Oils from Iowa coal, 96
 Olin, H. L., analyses by, 202; cited, 81; studies on Iowa coal, 99; tests by, 80
 Onawa, well at, 295
 Osgood, C. F., work of, 187
 Osgood, J. C., work of, in coal, 174, 177
- Oskaloosa, well at, 129
 Otter creek, Crawford county, character, 289
 Otter creek, Lucas county, drainage area, 116
- P**
- Paleozoic deposition in Lucas county, 132
 Panora coal in Lucas county, 144
 Paradise creek, character, 287
 Parr, S. W., cited, 81
 Pearce, J. N., cited, 304
 Peasley, J. C., work of, 176
 Peat in Crawford county, 316
 Pella, well at, 129
 Pennsylvanian system, base of, 131; coal in, 66; water in, 203; time, climate of, 69; conditions in, 68; geosyncline in, 133; plants of, 69
 Peorian loess, 127, 339; see also Loess
 Petroleum, see Oil
 Pirsson and Schuchert, cited, 81
 Pleasanton formation in Lucas county, 167; deposition in, 133
 Pleistocene deposits in Crawford county, 302; in Lucas county, 139, 169
 Porter creek valley, exposures along, 306; gravels in, 331
 Possible Researches in Iowa Coal, B. P. Fleming, 91
 Potter, J. T., work of, in coal, 174
 Precipitation in Crawford county, table of, 358; in Lucas county, table of, 204
 Preheaters, air, use of, 86
 Prentice, F., early settler, 244
 Profiles across Boyer valley, 274; across Crawford county, 271; in Lucas county, 109 ff; railway, altitudes from, 365
 Providence Western Land Co., settled Crawford county, 243
 Pulverized coals, Iowa, 95; tests of, 88
- R**
- Raccoon river, history of, 276
 Railroad elevations, data for, 373; officials, altitudes from, 365; profiles, altitudes from, 365
 Rainfall in Crawford county, 357; in Lucas county, 203
 Ramsey, George, work of, in coal, 176
 Red Rock sandstone, origin, 126
 Reservoirs in Lucas county, 208
 Rickert, Henry, wells by, 355
 Ricketts water system, 351
 Riddell sand pit, Arion, 331
 Road material in Lucas county, 220; mine dump waste as, 220; see Sand and Gravel
 Rock Island Mfg. Co., tests by, 87
 Rock Resources of Iowa, George F. Kay, 51
 Rock surface, altitude of, 302
 Rocks, character of, 51; economic importance of, 54

- Rogers, H. O., article by, 19
Room and pillar method of mining, 76, 187
- S**
- St. John, Orestes H., cited, 144, 147, 152, 157, 174, 244; work in Crawford county, 244; in Lucas county, 106
St. Louis strata in Lucas county, 140
St. Peter sandstone, depth of, at Chariton, 206; at Denison, 299; in Lucas county, 206; surface, character, 131
Ste. Genevieve formation in Lucas county, 139
Sag valley near Wall Lake, 275
Salisbury and Chamberlin, cited, 81
Sand and gravel in Crawford county, 359; in Lucas county, 217; producers, 32; production, 61; in 1925, 29; in 1926, 47
Sandstones in Crawford county, age of, 296; and limestone in Lucas county, 218
Savage, T. E., cited, 77, 81
Schleswig water system, 351
Schuchert and Pirsson, cited, 81
Science, article in, 65
Sea level, mean, 369
Septaria in Lucas county, 163
Shelby loam, 214
Shimek, B., cited, 126, 246, 268, 295, 302
Shortwall mining methods, 74, 187
Shuler, work of, in coal, 176
Shurkey well, strata in, 356
Sioux City Gas & Electric Light Co., plant of, 85; tests by, 88
Skidmore Brothers, mine of, 178
Smith, John E., work of, on fertilizers, 64
Smith quarry, Lucas county, 219
Soil, characteristics of, 211; formation, 210; waste in Lucas county, 215
Soils, types of, 212; and soil conservation, in Crawford county, 344; in Lucas county, 210
Soldier rivers, character, 289
"Southern Iowa Loess" soils in Lucas county, 213
Spirifer pellaensis in Lucas county, 139
Spirit Leveling in Iowa, altitudes from, 366
Springs in Crawford county, 357; in Lucas county, 206
Spry, W. R., analyses from, 80
Steam walls, radiant, 86
Stokers, types of, 83
Stone, production in 1925, 26; in 1926, 45
Story, D. Q., work of, in coal, 176
Stratigraphy of Crawford county, 292; of Lucas county, 123
Stream gradients in Lucas county, 114 ff; in western Iowa, 252
Stream valleys, difference in walls, 122, 284
Streams in Crawford county, 272; in Lucas county, 203
Streams, water from, in Crawford county, 357; in Lucas county, 203
Sulphur content of Iowa coal, 76, 92, 99
Swede Hollow, quarries in, 219; strata in, 155, 162
- T**
- Table of precipitation in Crawford county, 358; in Lucas county, 204; temperatures in Lucas county, 205
Talcott well, strata in, 356
Temperatures in Lucas county, 205
Thompson, D. M., work of, in coal, 176
Tilton, J. L., cited, 81, 125, 131, 206, 211, 295, 317
Todd, J. E., cited, 279
Topographic map of Iowa, 376
Topographic maps, list of, 374; making, by U. S. Geol. Survey, 373
Topographic provinces in Crawford county, 255
Topography, agents forming, 264; of Crawford county, 247; of Lucas county, 106
Troeltzsch, J. R., tests by, 80; cited, 81
Trost, F. W., acknowledgments, 221; work of, in coal, 180
Two Layer limestone in Lucas county, 144, 147 ff
- U**
- Unconformities in Lucas county, 134
Union Coal and Mining Co., mine of, 176
Union silt loam, 214
United Light & Power Co., plant of, 85
U. S. Bureau of Soils, cited, 212
U. S. Coast and Geodetic Survey, altitudes from, 366
U. S. Corps of Engineers, altitudes from, 366
U. S. Geological Survey, altitudes from, 366; bench marks of, 368; coal analyses by, 199; mapping by, 373
Upper coal beds, Lucas county, 183
- V**
- Vail, water supply of, 351
Valley walls, north and south, difference in, 284
Victor Fuel Co., Lucas county, 187
- W**
- Wabash clay loam, 214
Wabash silt loam, 214
Wall lake, history of, 276
Wall Lake, gumbotil near, 305; sag valley near, 275
Walling, K. L., reports from, 350
Ward, brick plant of, 361

- Warrensburg sandstone, origin, 126
Warsaw strata in Lucas county, 140
Water from Coal Measures (Pennsylvanian strata), 203
Water supply of Crawford county, 346; of Lucas county, 203
Water walls, radiant, 86
Wells in Crawford county, 294, 346; typical, in Lucas county, 207
West Nishnabotna river, character, 289
West Side water supply, 350
West Virginia, analyses of coal from, 78
Wheeler coal in Lucas county, 147 ff
Wheeler's mill, Lucas county, 174
White, Charles A., cited, 106, 243, 244
White, S. W., work of, in coal, 126
White Breast coal in Lucas county, 144, 147
White Breast Fuel Co., work of, 173, 186
White Breast valley, age of, 119; coal in, 141 ff; strata in, 118; system, 116; terraces in, 117
Wild Cat creek, character, 119
Williams, I. A., cited, 126
Williamson, mine near, 179
Willow creeks, character, 291
Wisconsin gravels in Crawford county, 338
Woodbine, limestones at, 295
Woolston, Frank, samples from, 297
- Y**
- Yarmouth and Kansan stages in Crawford county, 321
- Z**
- Zero, mine at, 186

