

INDEX

A

Acrothele ? *richmondensis*, 383, 384, 392
Alexandrian series, 411; relation to
Maquoketa, 318, 349, 354
Allamakee county, exposures in, 334,
336; fossils from, 403, 420; Galena-
Maquoketa contact in, 382; structure
of Maquoketa in, 360
Amphilichas bicornis, 395
Anaphragma mirabile, 369, 392
Anolotichia crassa, 391
Anticosti, connection with Mississippi
valley, 325; Maquoketa fossils from,
409
Aparchites fimbriatus, 395
Appalachian region, Clinton ore of, 356
Archimacella rotunda, 394
Arctic regions, Maquoketa fossils from,
327, 409; seas from, 326
Arkansas, Cason shale in, 311, 407; De-
pauperate fauna in, 311; Maquoketa
beds in, 407
Armenoceras, 409; *clermontense*, 394
Arnheim beds of Ohio valley, 310; rela-
tions, 368-370
Arthropora shafferi, 384, 392
Astylospongia, 391
Atactoporella, 391
Auburn, limestone at, 350, 352

B

Bain, H. F., cited, 341, 342, 346, 374,
383, 412
Bassler, R. S., acknowledgments, 313;
cited, 368, 412, 416
Barren middle beds of Maquoketa, 343
Barrier, near Mississippi valley, 311,
410
Basal conglomerate of Alexandrian,
411; of Devonian, 358, 411; of Niag-
aran, 354
Batostoma, 392; *rugosum*, 392
Bellerophon, 383; *lirata*, 383, 384, 394;
patersoni, 366, 383, 384
Bellevue, exposures near, 339, 341, 350,
379; graptolites at, 386
Beloitoceras discrepans, 394; *whitneyi*,
384, 394
Beyer, S. W., cited, 412
Beyrichia parallela, 370, 395
Big Bay de Noquette, strata on, 322,
362

Big Horn dolomite, position, 326
Bill's creek, Michigan, strata on, 324,
362, 367
Bill's Creek beds, Michigan, age, 364,
367
Black River strata in Michigan, 364,
365; of Minnesota, 374
Blanchester formation of Ohio, 327
Blue Limestone and Marls of Ohio, age,
320
"Blue Shale", position, 321
Boscobel, Wis., Dubuque beds near, 345
Bradley, Frank H., cited, 412; study of
Maquoketa shale, 323
Bradley, John H., Jr., cited, 381, 412
Brainard, exposures near, 329, 337
Brainard shales, 309; character, 329,
332; exposures, 337, 359; fossils from,
391; relations, 368, 369; selenite
crystals from, 337; illustr., 436
Branson, E. B., cited, 412
Brassfield formation of Ohio, 350
Bumastus, 386
Burchard, E. F., cited, 342, 383, 413
Burroughs dolomite, age, 351
Byssonchia, 394; *tenuistriata*, 394
Bythocypris, 384, 395
Bythopora delicatula, 392; *meeki*, 392;
striata, 392

C

Calloporella ? *lens*, 392
Calvin, Samuel, cited, 312, 341, 342, 346,
351, 374, 383, 387, 412; study of Ma-
quoketa shale, 321, 329, 332
Calymene, 385; *fayettensis*, 395; *graci-
lis*, 395; *mammillata*, 384, 395
Canada, studies of Maquoketa in, 312
Cape Frazier, fossils from, 310, 397
Carabocrinus, 327; *slocomi*, 391; *slocomi
costatus*, 391
Carman, J. E., cited, 412
Cascade Gulch, exposure in, 335-337
Cason shale of Arkansas, 311, 407
Cephalopods in Vogdesia beds, 387
Ceramoporella irregularis, 391
Ceraurus elginensis, 395
Chamberlin, T. C., cited, 356, 412
Charactoceras, 409; *baeri*, 394; *cler-
montense*, 394; *laddi*, 340, 394
Chasmatopora, 392
Chicago Great Western R. R., cuts by,
at Graf, 341

- "Cincinnati Group", position, 322, 323;
 in Illinois, 323, 324
 Cincinnati faunas, 407
 Clarke, John M., cited, 412
Clathrospira, 384
 Clayton county, Depauperate zone in,
 376, 377; exposures in, 333, 343; struc-
 ture of beds in, 360
 Clement, Mo., exposure at, 344
 Clermont, exposures near, 329, 387, 388;
 shale pit at, 322, 336, 337
 Clermont shales, 309; character, 329,
 333, 371; deposition of, 410; expo-
 sures, 336; fauna, 388, 391
Clidophorus, 363; *faberi*, 369; *fabula*,
 369; *neglectus*, 384, 393; *planulatus*,
 373
 "Cliff limestone" in Maquoketa area,
 320
Climacograptus (Mesograptus) putillus,
 391; *ulrichi*, 391
 Clinton county, exposures in, 344; in-
 linter in, 318, 328
 Clinton ore of Appalachian region, 356
Coleolus, 366; *iowensis*, 343, 347, 369,
 383, 384, 394
 Colorado, Fremont limestone in, 326;
 Richmond fossils in, 409
 "Cone-in-cone" structure, 381
Conocardium, 384, 394
Conotreta obliqua, 347, 384, 392
Constellaria polystomella, 392; *punc-*
tata, 392; *robusta*, 392
Conularia, 394; *pumila*, 384, 394; *putil-*
la, 384, 394
 "Coralline beds of Dr. Owen", posi-
 tion, 321
Cornulites, 369; *sterlingensis*, 338, 388,
 391
 Cornulites zone, age, 310, 368; ex-
 posures, 338, 340, 344, 359, 388; fos-
 sils from, 310, 369, 387, 389, 391, 402,
 420; illustr., 432, 434; relations, 355,
 370, 371
 Correlation of Maquoketa shale, 319 ff,
 362
 Corryville beds, relations, 369
Corynotrypa curta, 391; *delicatula*, 391
 Couler valley, 317
 Cox, G. H., cited, 412
 Crane, G. W., cited, 412
Crania, 392
Crepipora peculiaris, 391
Ctenodonta, 369, 374; *calvini*, 393;
fecunda, 347, 366, 383, 384, 393; *fill-*
morensis, 393; *obliqua*, 383, 384, 393;
recurva, 393; *simulatrix*, 393
 Cumings, E. R., cited, 412
Cybeloides iowensis, 395
Cyclodoceras, 409; *atkinsonense*, 385,
 394; *clermontense*, 394
Cyclonema, 394; *jacksonense*, 394
Cyclora, 384, 394; *depressa*, 369; *hoff-*
manni, 369; *minuta*, 369; *parvula*, 369
 Cyclora limestones, relations, 369
Cyrtoceras, 346
Cyrtodonta grandis luculenta, 393
Cyrtolites, 385; *conradi*, 383, 384, 394;
disjunctus, 394
- D**
- Dalmanella**, 345, 347, 352, 366, 369, 384,
 393; *corpulenta*, 393; *macrior*, 393;
porrecta, 393; *testudinaria*, 351, 383
 Daniels, Edward, cited, 373, 412; study
 of Maquoketa shale, 321
 Davis, Arthur Kyle, Jr., acknowledg-
 ments, 313
 Decorah, exposure near, 375
 Deformation of Maquoketa shale, 361
 Delaware county, structure of beds in,
 360
Dendrocrinus kayi, 391
 Depauperate fauna, character, 349, 371;
 distribution, 310; map, 440; fossils,
 383, 391; living conditions, 407; rela-
 tions, 368; in Arkansas, 311; in Mich-
 igan, 310, 407
 Depauperate zone, age, 310; character,
 371, 373; exposures, 334, 340, 375;
 fauna of, 310, 407; illustr., 422; phos-
 phate in, 348, 376 ff; position, 375;
 sections, 375; in Arkansas, 311; in
 Clayton county, 376; in Dubuque
 county, 378; in Fayette county, 376,
 377; in Illinois, 380, 381; in Jackson
 county, 379; in Michigan, 366; in
 Missouri, 381; in Winneshiek county,
 375
 Des Moines sandstone, contact with
 Maquoketa, 319, 359, 361, 411
 Devonian, basal conglomerate of, 358,
 411; contact with Maquoketa, 318,
 358
 Diastrophism, basis of stratigraphy, 357
Dicranopora emacerata, 338, 392; *fra-*
gilis, 369, 392
Dinorthis proavita, 393; *subquadrata*,
 327, 402; (*Plaesiomys*) *subquadrata*
occidentalis, 393; descr., 402; distr.,
 403; illustr., 420
Diploclema varians, 369, 391
 "Diplograptus beds" of Sardeson, 374,
 386
Diplograptus peosta, 340, 341, 343, 347,
 378, 383, 384, 386, 391
Diplotrypa obscura, 384, 392
 Dips in Maquoketa shale, 360
 Dover Mills section of Maquoketa, 332,
 334, 385
 Drainage of Maquoketa area, 317
Drepanodus acinaciformis, 347, 366, 384,
 394
 Driftless area, topography, 313

- Dubuque, type exposure of Maquoketa near, 323
- Dubuque county, Ctenodonta bed in, 374; Depauperate zone in, 378; exposures in, 330, 343, 344, 352; Graf section in, 341; iron ore in, 356; structure of beds in, 360
- Dubuque dolomite, age, area, character, named, 318, 345; relation to Maquoketa, 318, 406; section of, 346; see also Galena
- Dubuque-Maquoketa contact, character, 345
- Dwarf faunas, character, 372
- E**
- Eagle Point anticline, 360
- Ectenocrinus raymondi, 391
- Eden beds, 347
- Edgewood limestone of Missouri, 350; distribution, 352; relations to Maquoketa, 318
- Eldorado, exposures near, 337
- Elgin, exposures near, 329, 330, 387
- Elgin fauna, northern derivation of, 410
- Elgin shaly limestones, 309; character, 329, 333; deposition, 409; fossils from, 385, 391, 397, 403, 405, 406, 418, 420; illustr., 430; same as Wykoff, 368
- Elkader, section at, 346
- Elkhorn beds of Ohio valley, 310; relations, 368-370
- Ellesmereland, fossil from, 418
- Encrinurus cristatus, 395
- Endoceras, 373; kayi, 394
- Ensign, Mich., exposure near, 367
- Ephippiorhynchus, 409; laddi, 384, 394
- Eridotrypa brainardensis, 392; simulatrix, 392
- Erosion of Maquoketa shale, 314
- F**
- Fauna, dwarf, of Tully pyrite, 407
- Fauna of Elgin member, 409
- Faunal lists of Maquoketa fossils, 390; zones of the Maquoketa, 370
- Faunas, dwarf, character, 372; normal, character, 372
- Fayette county, Cornulites fauna in, 390; Depauperate zone in, 376; exposures in, 329, 332, 334-339; Kankakee beds in, 353; structure of beds in, 360
- Fenestella granulosa, 392
- Fernvale limestone, age, 368; fossils in, 410; relations, 368, 369, 406
- Fenton, C. L., cited, 412
- Fenton, M. A., cited, 412
- Fillmore county, Minn., exposure in, 334
- Fish Haven dolomite, position, 326
- Florenceville, exposure at, 358
- Floerke, Aug. F., acknowledgments, 313; cited, 409, 410, 412, 415; study of cephalopods, 311, 390; study of Maquoketa, 325-327, 364
- Fort Atkinson, exposures at, 336, 389; fossils from, 397
- Fort Atkinson fauna, character, 410
- Fort Atkinson limestone, 309; character, 329, 333; exposures, 329, 336; fauna, 371, 389, 391, 397, 399, 418; position, 325
- Fossils of Maquoketa shales, 391
- Foster, J. W., cited, 413; study of Maquoketa shale, 320
- Frankfort shales of New York, position, 322
- Fremont limestone, position, 326
- Fusispira bed, 346
- G**
- Galena Junction, Ill., exposure near, 349
- Galena limestone, character, 345; exposures of, 339, 375, 376, 379; in Maquoketa area, 320; in northeastern Iowa, 314; relations, 406; topography on, 315; see also Dubuque dolomite
- Galena-Maquoketa contact in Allamakee county, 382; in Dubuque county, 378
- Geisonoceras ? clermontense, 394
- Girardeau limestone of Missouri, 354
- Glossograptus, 366; micronatus, 391
- Glyptorthis, see Hebertella
- Goldman, M. I., cited, 348, 413
- Goocher quarry, exposure in, 334
- Goose Lake channel, 317, 328
- Gordon, C. H., cited, 413
- Graf, graptolites at, 386; section of Maquoketa shale, 341
- Granger, Minn., exposure at, 334
- Grant, U. S., cited, 342, 383, 413
- Graptolite zone in the Maquoketa, 371; exposures of, 340; fossils from, 310
- Graptolites in Isotelus zone, 385
- "Gray Limestone", position, 321
- "Green and Blue shales and limestone", position, 322
- Green Bay, "Blue Shale" on, 321; Maquoketa beds on, 362
- Greenland, Maquoketa fossils from, 409
- Grout, Frank F., cited, 413
- H**
- Hall, C. W., cited, 413
- Hall, James, cited, 320-322, 362, 383; study of Maquoketa shale, 320-322, 362
- Hallopora, 392; fayettensis, 392; persimilis, 392; subnodosa, 392
- Hanover, Ill., Depauperate zone at, 380
- Hebertella bellarugosa, 401; insculpta, 327, 400; (Glyptorthis) insculpta maquoketensis, 393; descr., 399; distr.,

- 401; illustr., 418, 420; *occidentalis*, 402; *sinuata prestonensis*, 337, 393; descr., 401; distr., 402; illustr., 420; *subjugata*, 402
- Helopora elegans*, 369, 392; *thomasi*, 392
- Hemiphragma nodosa*, 392
- Heterotrypa*, 392
- Hindia parva*, 347, 383, 384, 391
- History, geological, of Maquoketa shale, 406
- Holtedahlna atkinsonensis*, 393
- Homotrypa nodulosa*, 391; *wortheni*, 391
- Homotrypella rustica*, 391
- Hopkinton dolomite, deposition, 411; exposures, 338, 339, 359; relations, 318, 354, 355; topography on, 315; in northeastern Iowa, 314
- Hormotoma*, 342, 366, 384, 394; *gracilis multivolvris*, 394
- Houser, G. L., cited, 408
- Howard county, exposures in, 334, 359
- Howell, Jesse V., cited, 356, 413
- Hudson Bay, Paleozoic rocks near, 326
- "Hudson-river Group" in New York, 320; position, 324
- Hussey, R. C., cited, 364, 413; study of Maquoketa shale, 320, 327
- Hyalithes dubius*, 369; *parviusculus*, 343, 369, 383, 384, 394; *versaillesensis*, 369
- I
- Illinois, basal conglomerate in, 354; Cincinnati group in, 323, 324; Depauperate zone in, 380, 381; Edgewood limestone in, 353; Kankakee limestone in, 351; Maquoketa exposures in, 344, 349, 350; studies of Maquoketa in, 312; unconformity under Maquoketa, 349
- Indiana, strata in, 370; studies of Maquoketa in, 312
- Inlier of Maquoketa, 318, 328, 361, 411
- Iowa Geological Survey, reports on Maquoketa, 312
- Iowacystis sagittaria*, 391
- Iowan drift area, topography on, 316
- Iowan glacier, work of, 316
- Iron ore in Dubuque county, 356
- Ischadites*, 346
- Isotelus*, 363; *iowensis*, 333, 334, 366, 385, 387, 394; *maximus*, 385; *rejuvenis*, 385, 395
- Isotelus maximus* zone, character, 333
- Isotelus* zone, 371; exposures, 333; fossils in, 385; illustr., 424, 426
- J
- Jackson county, Cornulites zone in, 390; Depauperate zone in, 379; exposures in, 339, 343, 344, 353, 359; fossils from, 402, 420; Maquoketa inlier in, 318, 328; structure of beds in, 360; Winston limestone in, 350
- James, J. F., cited, 341, 346, 383, 413; study of Maquoketa shales, 319, 324
- James Bay, Paleozoic rocks near, 326
- Jones, O. T., cited, 357, 413
- K
- Kankakee limestone in Fayette county, 353; in Illinois, 350; relations to Maquoketa, 318
- Kansan drift in northeastern Iowa, 316
- Kansan glacier, work of, 316
- Kentucky, strata in, 369
- Keyes, C. R., cited, 413
- Kimmswick limestone, unconformity above, 349
- Kionoceras postvillense*, 394; *tenuitectum*, 384, 394; *thomasi*, 384, 394
- Kirk, Edwin, cited, 397, 398, 413
- L
- Ladd, Harry Stephen, Maquoketa shale of Iowa, 305; cited, 414
- Lake Winnepeg, strata near, 326
- "Lamellibranch zone", 374
- Lane, A. C., cited, 414
- Larrabee, William, exposure on land of, 355
- Lasiograptus*, 391
- Leonard, A. G., cited, 312, 414
- Lepidocoleus*, 384, 391
- Leptaena*, in "Blue Shale", 321; *raymondi*, 393; *unicostata*, 393
- Leptobolus occidentalis*, 343, 347, 374, 382-384, 392
- Liberty beds, relations of, 368
- Lichenocrinus minutus*, 391
- Limonite in Maquoketa shale, 349, 376
- ff
- Lindströmia solearis*, 310, 337, 371, 389, 391; descr., 397; distr., 399; illustr., 418
- Lingula*, 343, 347, 352, 373, 380, 383; *beltrami*, 371, 392; *changii*, 364, 366, 384, 392; *iowensis*, 345; *quadrata*, 354
- Lingulasma schucherti*, 392
- Lingulops whitfieldi*, 392
- Lioclemella annulifera*, 392; *fusiformis*, 392; *solidissima*, 392
- Liospira micula*, 347, 366, 383, 384, 394
- Little Bay de Noquette, strata on, 320, 362
- Little Maquoketa river, drainage by, 317; exposures on, 330
- Locke, John, cited, 414; study of Maquoketa shale, 319
- Loess-Kansan area, topography on, 316
- Loomis, F. B., cited, 372, 407
- Lophospira*, 366, 383, 384, 394; *quadrisculata*, 394
- Lore Hill, iron ore at, 356

- Lorraine shales of New York, position, 322
- Lower Brainard shales, character, 338
- Lyckholm beds of Russia, 345
- M**
- McCune limestone in Missouri, 381
- McGee, W J, cited, 414; study of Maquoketa shale, 325
- Maquoketa area, drainage, 317; physiography, 313; relief, 313
- Maquoketa fauna, origin in north, 326; resemblance to Utica fauna, 325
- Maquoketa fossils, lists of, 390; from Arctic regions, 397, 409
- Maquoketa river, drainage by, 317
- Maquoketa shale of Iowa, 305; age, 309, 323, 357; area, 309, 311, 323; character, 323, 329; columnar section, 331; conglomerate in, 355; correlation, 324, 362; dips in, 360; distribution in Iowa, map, 439; distribution, general, map, 438; divisions, 329; erosion, 411; extent, 326; faunal zones in, 370, 391; fossils in, 311, 383, 384, 390; general section, 332; geological history, 406; Graf section, 341; graptolite zone in, 386; inlier of, 318, 328, 361, 411; interpretations, 311; members, 309; named by White, 322, 329; of Richmond age, 357; outcrops, distribution, 328; overlying rocks, 309; pebbles from, illustr., 437; phosphate in, 348, 376 ff; previous study, 312; relation to Silurian formations, 318; relation to underlying rocks, 346; resistance to erosion, 314; soil under, 349; stratigraphy, 318; structure, 360; studies in Canada, Illinois, Indiana, Michigan, Missouri, Ohio, Ontario, 312; topography on, 315; typical localities, 323, 331; underlying rocks, 309
- Maquoketa shale, northwest area, 309, 332; faunal zones in, 370 ff, 386; members in, 329, 332; southeast area, 309, 339; exposures in, 330, 339; faunal zones in, 370 ff
- Maquoketa-Alexandrian contact, 349
- Maquoketa-Des Moines contact, 359
- Maquoketa-Devonian contact, 358
- Maquoketa-Niagara contact, 354
- Mastigograptus gracillimus, 391
- Maysville beds, 347
- Mead, D. W., cited, 414
- Meek, F. B., cited, 396, 414; study of Maquoketa shale, 322
- Meekospira subconica, 394
- Mesotrypa, 392; maquoketensis, 391; patella delicatula, 392
- Michigan, Black River beds in, 365; Depauperate fauna in, 310, 366; "Hudson-river Group" in, 320; Maquoketa beds in, 407; relation of Richmond in, to Maquoketa, 362; Richmond in, 310, 327; studies of Maquoketa in, 312, 364-367; Upper Peninsula, map, 363
- Microceras inornatum**, 369; **patersoni**, 394
- Miller, Hugh, cited, 374
- Minnesota, fossils from, 406, 420
- Mississippi river, drainage by, 317; exposures along, 339
- Mississippi valley, barrier near, 311, 410
- Missouri, Depauperate zone in, 381; Edgewood limestone in, 351; Maquoketa exposures in, 344; Orchard Creek and Girardeau beds in, 354; studies of Maquoketa in, 312; unconformity under Maquoketa, 349
- Modiolopsis**, 373; **excellens**, 394
- Mohawkian beds, relations, 369
- Mount Auburn beds, relations, 369
- Mount Hope beds, relations, 369
- N**
- "Neda Iron Ore" in Iowa, 356
- Niagaran series, basal conglomerate in, 354; contact with Maquoketa, 354; relation to Maquoketa, 318; topography on, 315
- Nileus vigilans** zone, character, 333
- Northwest area of Maquoketa shale, 309, 332; deposition in, 409; faunas in, 310; graptolite zone in, 386; members, 329, 332
- Norton, W. H., cited, 414
- Nucula**, 363; **poststriata**, 373
- "Nucula shale", fossils in, 373; position, 321
- Nuculaformis**, 373
- O**
- Ohio, Blanchester formation in, 327; studies of Maquoketa in, 312
- Ohio valley, Richmond beds in, 310, 357, 368
- Oklahoma, Sylvan shale in, 407; Depauperate zone in, 311
- Oneota river in northeastern Iowa, 317
- Ontario, studies of Maquoketa in, 312
- Orbiculoidea, 384, 392
- Orchard Creek shale of Missouri, 354
- Ordovician-Silurian boundary, study of, 327, 356
- Orthis testudinaria**, 363
- Orthoceras**, 383; **sociale**, 342, 347, 366, 375, 378, 383, 384, 387, 394, 409
- "Orthoceras beds", 342, 343, 409; of Graf, 375
- Ossian, exposure near, 336; fossils from, 399

- Ostracodes, 347
 Owen, D. D., cited, 414; study of Maquoketa shale, 319, 321
- P**
- Pachydictya**, 392
 Paleontology of the Maquoketa, 370
 Paleozoic rocks near Hudson and James bays, 326
Parastrophia, 393
 Patterson's spring, exposure at, 338, 388, 390
 Pebbles from Maquoketa shales, 348; illustr., 437
 Pennsylvanian system, relation to Maquoketa, 319, 359, 361, 411
 Percival, J. G., cited, 414; study of Maquoketa shale, 321
 Perdue, N. J., cited, 413
Peritocrinus, 327
Peronopora decipiens, 391
 Phosphate in Maquoketa beds, 347, 348, 376-381
 Phosphate zones, origin, 348
 Physiography of Maquoketa area, 313
Plaesiomys, see **Dinorthis**
Platyceras, 396
Platystrophia, 393; *elginensis*, 393
Plectambonites, 338, 340, 344; *precosis*, 393; *recedens*, 393; *saxeus*, 393
Plectorthis (Austinella) whitfieldi, 392
Plethospira semele, 394
Pleurocystites, 326; *beckeri*, 391; *clermontensis*, 391
Pleurotomaria, 373; (*Lophospira*) *depauperata*, 347, 366, 382-384, 394
Porocrinus, 326; *fayettensis*, 391
 Postville, exposures near, 332, 382; fossils from, 403, 420
Prasopora elginensis, 391
 Pratt, W. H., cited, 414
 Preston, exposures near, 353; fossil from, 420; structure of beds near, 360
 Preston inlier, 318, 328, 361, 411
Primitia cincinnatiensis, 384, 395; *gibbera*, 395; *tumidula*, 395
Priscochiton, 384, 393; *elongatus*, 347, 383, 384, 393
Proboscina auloporoides, 391; *frondosa*, 391
Pterinea iowensis, 393
Pterygomtopus fredricki, 395
Ptilodictya, 392
 Pulaski shales of New York, position, 322
- Q**
- Queenston beds, age, 357
- R**
- Rafinesquina altidorsata**, 393; *kingi*, 393; *subquadrata*, 393
 Rapid river, Mich., Maquoketa shale on, 362
 Raymond, P. E., cited, 335, 414
Receptaculites zone, 346
 Relief of Maquoketa area, 313
Rhinidictya, 384, 392
Rhombotrypa quadrata, 392; *subquadrata*, 392
Rhynchotrema anticostiense, 393; *capax*, 404; *capax altirostratum*, 393; *descr.*, 403; *distr.*, 405; *illustr.*, 420; *neenah*, 393; *perlamellosum*, 404
 Richmond age of Dubuque beds, 345
 Richmond basin, connected with Mississippi valley, 325
 Richmond beds, age, 309, 357, 358; fauna, 357, 390; of Michigan, 327; age, 310; relation to Maquoketa, 362; of Mississippi valley, 406; of Ohio valley, relations, 368; of Wyoming, fossils in, 409; unconformity, 407
 Richmond fauna, origin, 327
 Richmond submergence, extent, 357; importance, 325
 River valleys, abandoned, 317
 Rockville, exposure at, 351
 Rominger, Carl, cited, 414; study of Maquoketa shale, 324, 363
 Ross, C. S., cited, 348, 356, 415
 Rowley, R. R., cited, 414
 Ruedemann, Rudolph, cited, 414
- S**
- St. Donatus, exposure at, 379
Sactoceras maquoketense, 394
Saffordia sulcodorsata, 393; *ventralis*, 393
Salpingostoma imbricatum, 394
 Sardeson, F. W., cited, 318, 324, 358, 374, 386, 413, 414; study of Maquoketa shale, 325, 345
 Savage, T. E., cited, 312, 318, 348, 349, 350, 353, 356, 360, 368, 383, 398, 415; study of Maquoketa shale, 327, 332, 334; study of rocks near Hudson Bay, 326
 Savanna, Ill., exposure at, 345, 350; structure of rocks at, 360
Sceptropora facula, 369, 392
Schizotreta minutula, 392
 Schuchert, Charles, cited, 357, 415-417; study of Maquoketa shale, 325
 Scofield, W. H., cited, 416
 Seaman, A. E., cited, 414
 Sea water, composition, effect on life, 408
 Selenite crystals from Brainard shale, 337; *illustr.*, 436
Serpulites, 384, 391
 Shammattawa limestone, position, 326
 Shaw, E. W., cited, 346, 355, 374, 380, 383, 415

- Shaw, James, cited, 415; study of Maquoketa shale, 324
- Shideler, W. H., acknowledgments, 313; cited, 368, 370, 390; study of bryozoa, 311, 390
- Shipton, T. D., fossils from, 380
- Silurian system, relation to Maquoketa, 318
- Sinuities, 346; concinna, 394
- Slocum, A. W., cited, 415; study of Maquoketa shale, 326, 333
- Sny Magill anticline, 360
- Soil, residual, under Maquoketa shale, 349
- Soper, E. K., cited, 413
- Southeast area of Maquoketa shale, 309, 339; deposition in, 409; exposures in, 330, 339; faunal zones in, 370 ff
- Sphaerocoryphe maquoketensis*, 395
- Spatiopora iowensis*, 342, 384, 391
- Spirifer lynx*, 363
- Springer, Frank, cited, 416
- Spring Valley, Minn., fossils from, 406, 420
- Spyroceras calvini*, 394; *clermontense*, 394; cf. *perroti*, 394
- State University of Iowa, fossils at, 397 ff
- Stigmatella incerta*, 392
- Stockton, Ill., exposures at, 344
- Stomatopora arachnoidea*, 391
- Stony Mountain limestone, position, 326
- Strata, uplift of, 411
- Stratigraphy of Maquoketa shale, 318
- Streptelasma*, 391; *angulatum*, 397; *haysii*, 310, 391, 409; *deser.*, 396; *distr.*, 397; *illustr.*, 418; *latusculum* var. *trilobatum*, 397; *trilobatum*, 397
- Strong, Moses, cited, 415
- Strophomena*, 393; *abscissa*, 393; *acuta*, 393; *fluctuosa occidentalis*, 393; *plano-dorsata*, 393
- Structure of Maquoketa shale, 360
- Sygcaulocrinus typus*, 391
- Sylvan fauna, resemblance to Utica fauna, 325
- Sylvan shale of Oklahoma, 311, 325, 407
- T**
- Tennessee, strata in, 369
- Tetradella quadrilirata*, 370, 395; *simplex*, 370, 395
- Tetradium ontario*, 384, 391
- Thomas, A. O., acknowledgments, 313; cited, 341, 389, 415; fossils from, 398; photo by, 314, 385, 388
- Thwaites, F. T., cited, 415
- Topography of Driftless area, 313; of Galena area, 315; of Iowan drift area, 316; of Loess-Kansan area, 316; of Maquoketa area, 315; of Niagaran area, 315
- “Transition beds” above Maquoketa shales, 351
- Trematis*, 392
- Trematopora granulata*, 392
- Trenton faunas, 407
- “Trenton Group” in New York, 320
- Triplecia* bed, 345
- Triplecia (California) ulrichi*, 393
- Trochonema (Eunema) minnesotensis*, 394
- Trowbridge, A. C., cited, 346, 355, 374, 380, 383, 415
- Tully pyrite, dwarf fauna of, 407
- Turgite in Maquoketa beds, 377, 378
- Turkey river, drainage by, 317
- Tysor, Homer J., acknowledgments, 313; fossils from, 398
- U**
- Udden, J. A., cited, 312, 415
- Ulrich, E. O., acknowledgments, 313; cited, 345, 346, 351, 357, 358, 368, 370, 374, 375, 383, 405-407, 415, 417; study of Maquoketa shale, 319, 321, 324, 325, 327
- Ulrichia bivertex*, 384, 395
- Unconformities, evidence of, 345
- Unconformity below Maquoketa, 346, 349
- U. S. National Museum, specimens in, 396 ff
- Uplift of strata, 411
- Upper Elgin beds in the Maquoketa, 371; exposures, 335; fossils from, 387, 401, 420
- Upper Iowa river in northeastern Iowa, 317
- Utah, Fish Haven dolomite in, 326
- Utica fauna, in Mississippi valley, 407; resemblance to Maquoketa, 325
- Utica shales of New York, position, 322
- V**
- Valleys, abandoned, 317
- Van Tuyl, F. M., cited, 415; study of rocks near Hudson Bay, 326
- Vanuxemia bristolensis*, 393
- Vogdesia* beds in the Maquoketa, 371; exposures, 335; fossils from, 387; *illustr.*, 428; origin, 387
- Vogdesia vigilans*, 335, 387, 394
- W**
- Wachsmuth, Charles, cited, 416
- Walcott, C. D., cited, 416
- Walter, Otto, cited, 416; study of Maquoketa shale, 327
- Wapsipinicon formation, relation to Maquoketa, 318
- Wapsipinicon river, drainage by, 317
- Waucoma, limestone at, 350, 352

- Waucoma limestone, character, 350
Waynesville beds, age, 368; relations, 370
Weiser, Miss Frances, acknowledgments, 313
Weller, Stuart, cited, 349, 383, 416
White, C. A., cited, 416; named Maquoketa shale, 322, 329
Whitefish river, Mich., Maquoketa on, 362
Whitella minnesotensis, 393; descr., 405; distr., 406; illustr., 420; obliquata, 405; **sterlingensis**, 393
Whitewater beds, relations, 368-370
Whitfield, R. P., cited, 416; study of Maquoketa shale, 324
Whitney, J. D., cited, 383, 413, 416; study of Maquoketa shale, 320, 321, 322
Whittlesey, Charles, cited, 417
Williams, I. A., cited, 412
Wilson, A. G., cited, 417
Winchell, N. H., cited, 358, 383, 417; study of Maquoketa shale, 319, 321, 324
Winneshiek county, Depauperate zone in, 375; exposures in, 334-338, 359; fossils from, 397, 399, 401, 405, 418
Winston, Ill., exposure at, 349
Winston limestone, character, 349, 350
Wisconsin, beds in, 319, 322; Dubuque beds in, 345
Worthen, A. H., cited, 414, 417; study of Maquoketa shale, 322
"Wykoff Beds" of Sardeson, position, 358; relations, 368
Wyoming, Big Horn dolomite in, 326; Richmond fossils in, 409
- Z**
- Zaphrentis haysii**, 396
Zygospira, 384, 393; **modesta**, 369, 383