

- Abies balsamea*, 154, 161, 165.  
*Abutilon abutilon*, 160, 194.  
     *avicennae*, 194.  
*Acalypha*, 160.  
*Acer dasycarpum*, 193, 551.  
     *negundo*, 153, 193, 552.  
     *saccharinum*, 153, 193, 551.  
     *saccharum*, 154, 193.  
*Acervularia davidsoni*, 116, 421.  
     *profunda*, 355, 392, 420,  
     421, 422.  
     beds, 355, 420.  
*Achillea millefolium*, 210.  
 Ackley, elevation of, 466.  
     well section, 476.  
 Acknowledgments, 146, 306, 405, 452,  
     507, 548, 648.  
*Acorus calamus*, 162, 171.  
*Acroanthes unifolia*, 174.  
*Actaea alba*, 182.  
     *rubra*, 182.  
     *spicata*, 182.  
 Adder's tongue, 172, 174.  
*Adiantum pedatum*, 157, 164.  
*Adicea pumila*, 178.  
 Administrative reports, 1, 13.  
*Adopogon virginicum*, 205.  
*Adoxa moschatellina*, 204.  
 Aftonian gravels, 362.  
*Agastache nepetoides*, 201.  
     *scrophulariaefolius*, 201.  
*Agrimonia eupatoria*, 187.  
     *hirsuta*, 187.  
*Agropyron caninum*, 168.  
     *occidentale*, 159, 168.  
     *repens*, 168.  
     *tenerum*, 159, 168.  
*Agropyrum*, 168.  
*Agrostemma githago*, 181.  
*Agrostis alba*, 159, 166.  
 Alder, hoary, 154.  
 Alexander, elevation of, 466.  
*Alisma plantago-aquatica* 170.  
*Allionia nyctaginea*, 180.  
*Allium cernuum*, 158, 171.  
     *stellatum*, 172.  
     *triccoccum*, 171.  
 Alluvial areas, 579.  
 Alluvium, 130, 289, 445, 495, 541, 638.  
*Alnus incana*, 154, 176.  
*Alopecurus geniculatus*, 166.  
*Alsine longifolia*, 181.  
     *media*, 159, 181.  
 Altitudes in Black Hawk county, 417.  
     Bremer county, 326.  
     Franklin county, 466.  
     Jackson county, 583.  
     Winneshiek county, 57.  
 Alum-root, 186.  
*Alveolites minima*, 355.  
     *undosus*, 614.  
*Alyssum*, hoary, 185.  
*Amaranthus blitoides*, 159, 180.  
     *retroflexus*, 159, 180.  
*Ambonychia*, 254.  
*Amlrosia artemisiaefolia*, 206.  
     *trifida*, 206.  
     *trifida integrifolia*, 206.  
*Amelanchier alnifolia*, 154, 188.  
     *botryapium*, 153, 188.  
     *canadensis*, 154, 188.  
     *rotundifolia*, 153, 188.  
*Amorpha canescens*, 154, 190.  
     *fruticosa*, 153, 190, 553.  
*Ampelopsis quinquefolia*, 193, 552.  
*Amphicarpaea monoica*, 191.  
     *pitcheri*, 191.  
*Amphicoelia leidyi*, 616.  
*Amplexus yandelli*, 422.  
 Analysis Cedar Valley limestone, 355,  
     358.  
     Galena limestone, 259.  
     Glass sand, 297.  
     Maquoketa shale, 294, 295.  
     well, 648.  
     McGregor wells, 302, 303.  
     Niagara limestone, 343.  
     Sabula well, 648.  
     St. Peter sandstone, 244, 297.  
     Spring at Lake View, 518.  
     Wapsipinicon limestone, 351.  
*Anastrophia hemiplicata*, 254.  
 Andrew, elevation of, 583.  
 Andrews quarry, 487, 499.  
*Andropogon furcatus*, 165.  
     *nutans*, 159, 165.  
     *provincialis*, 159, 165.  
*Anemone*, 182.  
*Anemone canadensis*, 182.  
     *cylindrica*, 182.  
     *nemorosa*, 182.  
     *patens*, 183.  
     *pennsylvanica*, 182.  
     *quinquefolia*, 182.  
     *virginiana*, 182.  
*Anemonella patens*, 183.  
     *thalictroides*, 182.  
 Annotated list of plants, 162.  
*Antennaria plantaginifolia*, 209.  
*Anthemis cotula*, 159, 210.  
*Apios apios*, 191.  
     *tuberosa*, 191.  
*Aplectrum hyemale*, 174.  
*Apocynum androsaemifolium*, 198.  
     *cannabinum*, 162, 198.  
*Aquilegia canadensis*, 158, 182.  
*Arabis dracycarpa*, 185.  
     *canadensis*, 185.  
     *confinis*, 185.  
     *dentata*, 185.  
     *laevigata*, 185.  
     *lyrata*, 185.

- Aralia nudicaulis*, 195.  
*quinquefolia*, 196.  
*racemosa*, 195.  
 Arbor-vitæ, 155.  
 Archibald quarry, 619.  
*Arctium lappa*, 159, 211.  
     *minus*, 211.  
 Area, Black Hawk county, 410.  
     Bremer county, 323.  
     Clayton county, 217.  
     Franklin county, 457.  
     Jackson county, 567.  
     Winneshiek county, 43.  
*Arenaria lateriflora*, 181.  
 Arey, M. F., acknowledgments, 146.  
     Geology of Black Hawk  
     county, 407.  
     Work of, 5.  
 Arey, R. M., 452.  
*Arisaema dracontium*, 171.  
     *triphillum*, 170.  
*Aristida basiramea*, 166.  
*Aronia nigra*, 188.  
 Arrowhead, 170.  
 Arrow wood, 154, 203, 204.  
*Artemisia artemisaefolia*, 160.  
     *biennis*, 210.  
     *caudata*, 210.  
     *dracunculoides*, 210.  
     *gnaphalodes*, 211.  
     *ludoviciana*, 211.  
     *serrata*, 210.  
     *trifida*, 160.  
 Arthur, J. C., cited, 148.  
*Asaphus (Isotelus) iowensis*, 98.  
*Asarum acuminatum*, 178.  
     *canadense*, 178.  
     *reflexum*, 178.  
*Asclepias cornuta*, 198.  
     *exaltata*, 198.  
     *incarnata*, 198.  
     *phytolaccoides*, 198.  
     *syriaca*, 160, 198.  
     *tuberosa*, 162, 198.  
     *verticillata*, 198.  
 Ash, prickly, 191, 551.  
 Ashes, 153, 154, 156, 197, 198, 556.  
 Asparagus, 172.  
*Asparagus officinalis*, 172.  
 Aspen, 154, 174, 559.  
*Aspidum goldianum*, 164.  
     *thelypteris*, 164.  
*Asplenium filix-foemina*, 164.  
*Asprella hystrix*, 168.  
 Asters, 157, 158, 207, 208, 209.  
*Aster azureus*, 207.  
     *cordifolius*, 158.  
     *diffusus*, 208.  
     *drummondii*, 207.  
     *exiguus*, 157, 208.  
     *laevis*, 157, 208.  
     *lateriflorus*, 208.  
     *lucidulus*, 208.  
     *multiflorus*, 208.  
     *novae-angliae*, 157, 208.  
     *paniculatus*, 208.  
     *prenanthoides*, 208.  
     *ptarmicoides*, 208.  
     *puniceus*, 208.  
     *sagittifolius*, 207.  
     *salicifolius*, 208.  
     *sericeus*, 208.  
     *shortii*, 157, 207.  
     *tradescanti*, 208.  
     *umbellatus*, 209.  
*Astragalus canadensis*, 190.  
     *carolinianus*, 190.  
*Athyris proutii*, 487.  
     *vittata*, 358.  
*Athyrium filix-foemina*, 157, 164.  
*Atragene americana*, 153, 155, 183.  
*Atrypa aspera*, 420.  
     *aspera occidentalis*, 345, 355.  
     *reticularis*, 116, 352, 355.  
         358, 360, 420, 421, 422, 423,  
         425, 436, 480, 617.  
*Aulacophyllum sulcatinum*, 422.  
 Avens, rough, 187.  
 Awn-grass, tufted triple, 166.  
 Bailey creek, section on, 483.  
 Bain, H. F., cited, 61, 65, 81, 235, 248,  
     265, 592, 593, 601.  
 Balch, E. S., cited, 47, 145.  
 Baldwin, elevation of, 583.  
 Balm of Gilead, 154, 155, 174.  
 Balsam, 154, 161, 165, 209.  
     white, 204.  
 Balsam apple, 204.  
 Baneberry, 182.  
*Baptisia bracteata*, 189.  
     *leucantha*, 189.  
     *leucophaea*, 189.  
 Bartlet quarry, section, 425.  
 Bartsch, Paul, cited, 149.  
 Basswood, 154, 155, 194, 551.  
*Batrachium trichophyllum*, 156, 183.  
 Bauman well, 340.  
 Beach, H., 301, 304.  
 Beamer brick yard, 646.  
 Bear creek, 57, 588.  
 Beard-tongue, foxglove, 154.  
 Beatty quarry, 431.  
 Beaver creek, 471.  
 Becker brick yard, 647.  
 Bedstraw, 203.  
 Beebe quarry, 353.  
 Beech, blue, 154, 176.  
 Beggar's lice, 100, 109.  
 Beggar-ticks, 211.

- Bellerophon, 254, 595.  
 Bellevue, elevation of, 583.  
 Bellflower, 205.  
 Bellwort, 157, 171.  
 Bennett well, 351.  
 Benson quarry, 486, 499.  
 Bergamot, wild, 201.  
*Berteroa incana*, 185.  
 Bessey, Chas. E., cited, 5.  
 Betula, oil of, 161.  
*Betula lenta*, 154, 162.  
     *nigra*, 153.  
     *papyrifera*, 154, 176.  
 Beyer, S. W., cited, 461, 465, 476, 482, 507.  
     Mineral statistics, 17.  
     work of, 5.  
*Bicuculla bicucullaria*, 184.  
     *canadensis*, 158, 184.  
*Bidens*, 160.  
     *cernua*, 210.  
     *connata*, 210.  
     *frondosa*, 210.  
 Bindweed, 159, 199.  
 Birch, 153, 154, 155, 176.  
 Bishop's cap, 158, 186.  
 Bittersweet, 153, 155, 176, 192.  
 blackberry, 154, 187.  
 Black-eyed Susan, 209.  
 Black Hawk county, Geology of, 407.  
     alluvium and terraces, 445.  
     altitudes in, 417.  
     area, 410.  
     Buchanan gravels, 441.  
     building stone, 448.  
     Cedar Valley limestone, 421.  
     clay, 449.  
     Cretaceous materials in drift, 446.  
     deformations, 447.  
     Devonian system, 420.  
     drainage, 418.  
     economic products, 448.  
     geological formations, 420.  
     Iowan drift, 445.  
     Kansan drift, 439.  
     lime, 449.  
     loess, 445.  
     physiography, 412.  
     Pleistocene system, 439.  
     road materials, 450.  
     soils, 393.  
     stratigraphy, 419.  
     topography, 412.  
     unconformities, 448.  
     Wapsipinicon stage, 420.  
     water power, 452.  
     supply, 450.  
 Bladder nut, 154, 155, 192.  
 Bladderwort, 203.  
 Blazing-star, 157, 206.  
*Blephariglottis leucophaea*, 157, 173.  
*Blephilia hirsuta*, 201.  
 Blood-root, 158, 184.  
 Blue bell, 156, 200.  
     flag, 173.  
     grass, 159, 160, 167.  
     joint, 166.  
     stem, 165, 168.  
 Bonair, altitude of, 57.  
 Boneset, 206.  
*Botrychium virginianum*, 157, 163.  
*Bouteloua curtipendula*, 167.  
     *racemosa*, 167.  
 Boulder wall, 518.  
 Boulders, 129, 373, 444, 489.  
 Box-elder, 153, 155, 156, 193, 552.  
 Boyer quarry, 256, 291.  
 Boyer river, 522.  
 Brainard shale, 97.  
     character, 108.  
     relation to Devonian, 109.  
 Brake, 164.  
 Brandon, elevation of, 583.  
*Brassica alba*, 184.  
     *arvensis*, 159, 184.  
     *nigra*, 159, 161, 184.  
     *sinapistrum*, 184.  
 Bremer, elevation of, 327.  
 Bremer county, Geology of, 319.  
     altitudes, table of, 324.  
     Buchanan gravels, 370.  
     building stone, 391.  
     Cedar Valley stage, 351.  
     clay, 392.  
     crushed stone, 391.  
     Devonian system, 420.  
     drainage, 326.  
     economic products, 391.  
     geest, 360.  
     general relations of strata, 335.  
     Iowan drift, 371.  
     Kansan drift, 363.  
     lime, 392.

- loess, 371.  
 paha, 377.  
 physiography, 324.  
 Pleistocene system,  
 361.  
 pre-glacial topography,  
 386.  
 section Sumner well,  
 402.  
 section Waverly well,  
 398.  
 Silurian system, 342.  
 soils, 393.  
 stratigraphy, 335.  
 water power, 394.  
 water supply, 395.
- Bremer river, 387.
- Brick, price of, 27.  
 production of, 27, 28, 30.
- Brickyard, Beamer, 646.  
 Becker, 647.  
 Burr, 295.  
 Cretzmeier, 393.  
 Decorah, 138.  
 Fox, 478, 502.  
 Hicks, 543.  
 Jenkins, 295.  
 Kobler, 296.  
 Maquoketa Brick Co., 646  
 Mellon, 294.  
 Monona, 295.  
 - reston, 646.  
 Stead Bros. and Guenther,  
 449.  
 Waterloo & Cedar Falls  
 Brick Co., 449.  
 Wilson Bros., 501.  
 Waverly Brick Co., 393.
- Bridgeport, elevation of, 583.
- Britton, N. L., cited, 148.  
 and Brown, cited, 148.  
 Hollick and, cited, 148.
- Brome grass, 167.
- Bromus asper*, 168.  
*ciliatus*, 159, 167.  
*kalmii*, 159, 167.  
*purgans*, 167.  
*racemosus commutatus*, 160,  
 168.  
*secalinus*, 160, 168.
- Brown, Britton and, cited, 148.
- Brunella vulgaris*, 201.
- Brush creek, 589.
- Bucania chicagoensis*, 617.
- Buchan quarry, 433.
- Buchanan gravels, 122, 284, 370, 441,  
 489, 533.  
 origin of, 122.  
 phases of, 122.
- Buckeye, 155, 156.
- Buckwheat, 179.
- Buena Vista, lead mines at, 298.
- Bugle-weed, purple, 201.
- Buhr well, 340.
- Building stone, 133, 290, 391, 448, 499,  
 545, 542.
- Bulletins, educational, publication of  
 by Survey, 6.
- Bull-rush, 169.
- Burdette, elevation of, 466.
- Burdock, 159, 211.
- Burning bush, 192.
- Bur-marigold, nodding, 210.  
 reed, 170.  
 seed, 199.  
 weed, 205.
- Burr brickyard, 295.
- Bursa bursa-pastoris*, 159, 184.
- Bush-clover, 190.
- Butler township, elevation of, 583.
- Butter-and-eggs, 202.
- Buttercup, 157, 183.
- Butternut, 153, 155, 175.
- Button-bush, 153.
- Byssomychia radiata*, 603, 608.
- Cabbage, skunk, 171.
- Cacalia atriplicifolia*, 211.  
*reniformis*, 211.  
*suaveolens*, 211.  
*tuberosa*, 211.
- Calamagrostis canadensis*, 159, 166.
- Calamus, 162, 171.
- Calmar, altitude of, 57.
- Caltha palustris*, 157, 182.
- Calvin, S., cited, 45, 237, 239, 241, 243,  
 248, 265, 274, 284, 347, 411, 423, 433,  
 441, 452, 461, 478, 480, 481, 483, 507,  
 548, 593, 596, 597, 601, 607, 613, 631,  
 648.
- Geology of Winne-  
 shiek county, 39.
- Calymene mammitata*, 601.  
*senaria*, 608.
- Cambrian system, 62, 237.
- Camelina sativa*, 160, 185.
- Cameroceras proteiforme*, 84.
- Camerotoechia, 344.
- Campanula americana*, 205.  
*aparinoides*, 205.  
*perfoliata*, 205.  
*rotundifolia*, 204.
- Camp quarry, 435.
- Campion, 157, 181.
- Camptosorus rhizophyllus*, 164.
- Canada balsam, 161.
- Canadian series, 64.
- Candy grass, 167.

- Cannabis sativa*, 160, 178.  
 Canoe creek, 57.  
 Canton, elevation of, 583.  
*Capnoides micranthum*, 157, 184.  
*Capsella bursa-pastoris*, 185.  
 Carboniferous system, 481, 625.  
*Cardamine bulbosa*, 184.  
     *hirsuta*, 184.  
     *rhomboidea*, 184.  
*Carduus allissimus*, 211.  
     *arvensis*, 159, 211.  
     *discolor*, 211.  
     *hilli*, 211.  
     *iowensis*, 211.  
     *lanceolatus*, 159, 211.  
     *muticus*, 211.  
*Carex albursina*, 169.  
     *amphibola*, 169.  
     *cephalophora*, 169.  
     *cristatella*, 170.  
     *festucacea*, 170.  
     *gravida*, 169.  
     *grisea*, 169.  
     *hystericina*, 169.  
     *laxiflora*, 169.  
     *longirostris*, 169.  
     *lupulina*, 169.  
     *pennsylvanica*, 169.  
     *rosea*, 169.  
     *sparganoides*, 169.  
     *stipata*, 169.  
     *straminea*, 170.  
     *stricta*, 169.  
     *tenera*, 170.  
     *tribuloides*, 169.  
     *vulpinoidea*, 169.  
 Carpenter quarry, section of, 427.  
 Carpet-weed, 180.  
*Carpinus caroliniana*, 154, 176.  
 Carrion-flower, 172.  
 Carter, Mrs. M. C., 148.  
*Carya alba*, 176, 558.  
     *amara*, 176.  
*Caryocrinus ornatus*, 616, 645.  
*Cassia chamaecrista*, 160, 189.  
 Castalia, altitude of, 57.  
*Castalia*, 156.  
     *odorata*, 182.  
*Castilleja coccinea*, 203.  
 Catalpa, 155, 156.  
 Catchfly, sleepy, 181.  
 Cat-brier, 561.  
 Catnip, 201.  
 Cat-tail, 157, 170.  
*Caulophyllum thalictroides*, 162, 183.  
 Caves, Winneshiek county, 141.  
*Ceanothus americana*, 154, 193.  
     *ovatus pubescens*, 154, 193.  
 Cedar Falls, altitude of, 417.  
     water supply of, 451.  
 Cedar river, 330, 415, 418, 467.  
 Cedar River Stone Co., 391.  
 Cedar Valley limestone, (see also Devonian).  
     analysis of, 355, 358.  
     in Black Hawk Co., 421.  
     Bremer Co., 351.  
     Winneshiek Co., 113.  
     sections, 352, 359, 421, 438.  
 Cedars, 153, 154, 155, 156, 165, 562.  
*Celastrus scandens*, 153, 192, 553.  
*Celtis crassifolia*, 153, 178.  
     *occidentalis*, 178, 558.  
 Cement, Portland, plants erected in Iowa, 36.  
*Cenchrus tribuloides*, 160, 166.  
*Cephalanthus*, 153.  
*Cerastium arvense*, 181.  
     *arvense oblongifolium*, 181.  
     *longipedunculatum*, 181.  
     *nutans*, 181.  
 Ceratodus, 357.  
*Cerionites dactyloides*, 616.  
 Chalk, 530.  
*Chamaenerion angustifolium*, 157, 195.  
 Chamberlin, T. C., cited, 64, 219.  
 Chapin, elevation of, 466.  
 Chase well, 351.  
*Cheilanthis feci*, 164.  
     *lanuginosa*, 164.  
*Cheilone glabra*, 202.  
*Chenopodium album*, 160, 180.  
     *glaucum*, 180.  
     *hybridum*, 180.  
 Cherry, 153, 154, 155, 189, 555.  
     ground, 160.  
 Chickweed, 159, 181.  
 Chicory, 160, 205.  
*Chimaphila umbellata*, 161, 197.  
 Choke-berry, 188.  
     cherry, 154, 156, 555.  
*Chrysanthemum leucanthemum*, 210.  
*Chrysopogon nutans*, 165.  
*Chrysosplenium alternifolium*, 186.  
     *iowensis*, 186.  
*Cichorium intybus*, 160, 205.  
*Cicuta maculata*, 196.  
 Cincinnati shales, 94.  
*Cinna arundinacea*, 159, 166.  
 Cinquefoil, 153, 187.  
*Circaea alpina*, 195.  
     *lutetiana*, 195.  
*Cladopora magna*, 421.  
     *palmata*, 44.  
     *prolifera*, 453.  
 Clammy-weed, 185.  
 Clams, 305.  
 Clark, John M., cited, 84.  
 Clausing well, 339.  
 Clay. (See also brickyards), 138, 293, 322, 449, 501, 543, 646.

- Clay production by counties, 28.  
 by years, 19, 30.  
 classified, 27, 30.  
 rank of Iowa in, 29.
- Clayton county, Geology of, 213.  
 alluvium, 289.  
 area, 217.  
 Buchanan gravels, 284.  
 building stone, 290.  
 Cambrian system, 237.  
 clams, 305.  
 clay, 293.  
 comparative table of geological formations, 239.  
 deformations, 289.  
 drainage, 231.  
 driftless area, 220.  
 economic geology, 290.  
 Galena limestone, 247.  
 glass sand, 297.  
 Iowan drift, 285.  
     plain, 229.  
 Kansan drift, 281.  
 lead, 298.  
 lime, 296.  
 loess, 286.  
 Lower Magnesian limestone, 239.  
 Maquoketa, 266.  
 Niagara limestone, 275.  
 Oneota limestone, 233.  
 Ordovician system, 239.  
 physiography, 219.  
 Pleistocene system, 281.  
 residual materials, 281.  
 road materials, 297.  
 Saint Croix sandstone, 237.  
 soils, 290.  
 stratigraphy, 233.  
 synoptical table, 234.  
 terraces, 287.  
 topography, 219.  
 Trenton limestone, 247.  
 unconformities, 289.  
 water power, 305.  
 water resources, 300.
- Claytonia virginica*, 157, 180.  
 Cleavers, 203.  
*Clematis verticillaris*, 183.  
     *virginiana*, 157, 183.  
 Clermont shales, 98.  
     exposures, 105.  
*Clionychia lamellosa* (*ambonychia*), 254.
- Clover, 157, 159, 160, 189, 190.  
 Club-moss, 164.  
*Cnicus altissimus*, 211.  
     *arvensis*, 211.  
     *lanceolatus*, 211.  
     *muticus*, 211.  
 Coal in Sac and Ida counties, 546.  
 Coal production by counties, 24.  
     by years, 19, 26.  
     rank of Iowa in, 25.
- Cocklebur, 160, 206.  
 Cock-spur thorn, 556.  
*Coeloglossum bracteatum*, 173.  
 Cohosh, blue, 183.  
 Cold spring, 139.  
 Colorado stage, 529.  
 Columbine, 156, 158, 182.  
*Comandra umbellata*, 178.  
 Compass-plant, 209.  
 Cone-flowers, 160, 209.  
 Conglomerate deposits, 125, 626.  
*Conium maculatum*, 196.  
*Conularia trentonensis*, 100.  
*Convolvulus arvensis*, 199.  
     *sepium*, 199.
- Coon river, 523.  
*Corallorhiza multiflora*, 174.  
 Coral-root, 174.  
*Coreopsis palmata*, 210.  
*Cornus alternifolium*, 153, 197.  
     *amomum*, 153.  
     *asperifolia*, 153.  
     *candidissima*, 154, 196.  
     *circinata*, 153, 196.  
     *paniculata*, 196.  
     *stolonifera*, 153, 196.  
*Corydalis micrantha*, 157, 184.  
*Corylus americana*, 153, 176, 559.  
     *rostrata*, 176.
- Cotton well, 351.  
 Cottonville, elevation of, 583.  
 Cottonwood, 153, 155, 156, 174, 560.  
 Couch-grass, 168.  
 Coulter, elevation of, 466.  
 Crab-apple, 153, 155, 188, 555.  
 Crab-grass, smooth, 165.  
 Crabb Hill, elevation of, 583.  
*Cracca virginiana*, 190.  
 Cranberry, bush, 154, 203.  
 Crane's-bill, 157, 191.  
*Crataegus*, 153.  
     *coccinea*, 188.  
     *crus-galli*, 188, 556.  
     *macracantha*, 189.  
     *punctata*, 188, 556.  
     *tomentosa*, 189, 556.
- Cratty, R. I., cited, 148.  
 Cresco, elevation of, 57.  
 Cresco-Calmar ridge, 45, 56.  
     effect on drainage, 57.

- Cress, 184.  
 Cretaceous material in drift of Black Hawk Co., 446.  
 Cretaceous strata, section in, 501.  
 Cretaceous system, 526.  
 Crowfoot, 183.  
 Crushed stone, 391.  
*Cryptogramma stelleri*, 164.  
*Cryptotaenia canadensis*, 196.  
 Cryptozoon, 243.  
 Ctenodonta, 594.  
 Culver's root, 202.  
 Cup-plant, 209.  
 Currants, 153, 155, 186, 554.  
*Cuscuta cephalanthi*, 160, 199.  
     *glomerata*, 199.  
     *gronovii*, 160, 199.  
     *paradoxa*, 160, 199.  
 Cut-grass, rice, 166.  
 Cynthia, 205.  
 Cyperus, 168.  
*Cyperus diandrus*, 168.  
     *esculentus*, 168.  
     *filiculmis*, 168.  
     *schweinitzii*, 168.  
 Cypress, 168.  
*Cypripedium*, 157.  
     *candidum*, 173.  
     *hirsutum*, 162, 173.  
     *parviflorum*, 162, 173.  
     *pubescens*, 173.  
     *reginae*, 173.  
     *spectabile*, 173.  
*Cyrtina hamiltonensis*, 115, 116, 345, 420, 422.  
*Cyrtoceras luthei*, 243.  
 Cyrtodonta, 608.  
*Cyrtodonta grandis*, 254.  
*Cyrtolites ornatus*, 605.  
*Cystiphyllum americanum*, 422.  
*Cystopteris bulbifera*, 158, 163.  
     *fragilis*, 157, 163.  
  
*Dactylis glomerata*, 159, 160, 167.  
 Daisy, 208, 210.  
 Dakota sandstone, 526.  
 Dandelion, 159, 205.  
*Dasiphora fruticosa*, 153, 187.  
*Datura*, 159.  
 Davis, Floyd, 648.  
 Davis, Wm. M., cited, 6.  
 Dayton township, 388.  
 Jean quarry, 354.  
 Decorah, altitude of, 57.  
     brickyard, 138.  
     ice cave, 46, 142.  
 Decorah shale, character, 84.  
     distribution, 84.  
     exposures, 86.  
     fossils, 85.  
     use of term, 61.  
  
 Deep creek, 589.  
 Deformations, 289, 447, 640.  
 Dehn quarry, 259, 292.  
 Delaware, term abandoned, 234.  
*Delphinium azureum*, 182.  
     *carolinianum*, 182.  
*Dentaria laciniata*, 184.  
 Denver Junction, elevation of, 327.  
 Denver loess—Kansan area, 367.  
*Deringa canadensis*, 196.  
*Desmodium acuminatum*, 190.  
     *parviflorum*, 190.  
 Des Moines sandstone, quarries in, 641.  
     stage, 625.  
 Devonian fishes, 356.  
     limestone, character, 115.  
     occurrence, 114.  
     relation to Maquoketa, 114.  
 Devonian system, 45, 113, 345, 420, 477, 621.  
 Dewar, elevation of, 417.  
 Dewberry, 154, 187.  
*Dicentra canadensis*, 184.  
     *cucullaria*, 184.  
*Dielasma iowensis*, 116.  
*Dicrvillea*, 154.  
*Dinichthys pustulosus*, 356.  
*Dioscorea villosa*, 173.  
*Diplograptus peosta*, 100.  
 Dipnoan tooth, 356.  
*Dirca palustris*, 153, 195.  
*Discoceras conoideus*, 617.  
 Ditchmoss, 170.  
 Dock, curly, 159, 160, 179.  
 Dodders, 160, 199.  
*Dodecatheon meadia*, 156, 157, 197.  
*Doellingeria humilis*, 209.  
     *umbellata*, 209.  
 Dogbane, 198.  
 Dog-fennel, 159, 210.  
 Dogwood, 153, 154, 155, 196.  
 Dolomite quarry, 276.  
 Doorweed, 179.  
 Douglas township, 389.  
 Dows, brickyard, 500.  
     elevation of, 466.  
*Draba caroliniana*, 185.  
 Dragon-head, 201.  
     root, 171.  
 Drainage of Black Hawk county, 4.S.  
     Bremer county, 327.  
     Clayton county, 231.  
     Franklin county, 467.  
     Jackson county, 584.  
     Sac and Ida counties, 521.  
     Winneshiek county, 57.  
 Driftless area, 43, 47, 220.  
     topography, 121, 228.  
 Dropseed, 166.  
*Dryocallis arguta*, 187.

- Duckweed, 171.  
 Duggan, elevation of, 583.  
 Dunes, 580.  
 Dunkerton, altitude of, 417.  
 Dutchman's breeches, 184.
- Eads quarry, 620.  
 East Waterloo, elevation of, 417.  
 Eastman, C. R., cited, 356, 405.  
*Eatonia pennsylvanica*, 167.  
*Eccylopterus*, 254.  
*Echinocystis lobata*, 204.  
 Economic products, 133, 290, 391, 448, 498, 542, 642.  
 Eel-grass, 170.  
 Elder, 153, 154, 155, 203, 205, 557.  
 Elecampane, 209.  
 Elevation of strata at Sumner, 401.  
     at Waverly, 401.  
 Elgin shaly limestone, 98.  
     character, 102.  
     exposures, 103.
- Elkader, water supply, 300.  
*Ellisia nyctelea*, 199.  
 Elm, 153, 154, 155, 156, 178, 557.  
*Etocharis ovata*, 168.  
     *palustris*, 168.  
*Elodea canadensis*, 170.  
*Elymus canadensis*, 168.  
     *hystrix*, 168.  
     *robustus*, 168.  
     *striatus*, 168.
- Emeline, elevation of, 583.  
*Encrinurus nereus*, 344.  
*Endoceras proteiforme*, 84.  
*Enothera biennis*, 195.  
     *serrulata*, 195.
- Eolian deposits, 638.  
*Epilobium adenocaulon*, 195.  
     *angustifolium*, 195.  
     *coloratum*, 195.
- Equisetum arvense*, 163.  
     *hyemale*, 163.  
     *laevigatum*, 163.  
     *robustum*, 163.
- Eragrostis frankii*, 167.  
     *major*, 167.  
     *purshii*, 167.
- Erechtites hieracifolia*, 160, 211.  
 Erigeron, oil of, 161.  
*Erigeron annuus*, 208.  
     *bellidifolius*, 208.  
     *canadensis*, 208.  
     *philadelphicus*, 208.  
     *pulchellus*, 208.  
     *ramosus*, 208.  
     *strigosus*, 208.
- Eriophorum cyperinum*, 169.  
*Eryngium aquaticum*, 196.  
     *yuccaeifolium*, 196.
- Erysimum cheiranthoides*, 185.  
*Erythronium albidum*, 157, 172.  
     *americanum*, 172.  
*Euomphalus bicarinatus*, 618.  
     *tricarinatus*, 618.
- Euonymus atropurpureus*, 153, 162, 192  
*Eupatorium ageratoides*, 158, 206.  
     *altissimum*, 206.  
     *maculatum*, 206.  
     *perfoliatum*, 161.  
     *purpureum*, 206.  
     *rydbergii*, 206.
- Euphorbia*, 160.  
     *commutata*, 192.  
     *corollata*, 192.  
     *cyparissias*, 192.  
     *maculata*, 192.  
     *nutans*, 192.  
     *preslii*, 192.
- Euthamia caroliniana*, 207.  
     *graminifolia*, 157, 207.
- Everlasting, plantain-leaf, 209.
- Fagopyrum esculentum*, 179.  
     *fagopyrum*, 179.
- Falcata comosa*, 191.  
     *pitcheri*, 191.
- Falcher well, 362.  
 Farmers creek, 588.  
     township, elevation, 583
- Farrington well, 362.  
 Faulkner, elevation of, 466.  
*Favosites favosus*, 343, 613, 614.  
     *hisingeri*, 343, 614.  
     *niagarensis*, 614.  
     *polymorpha*, 422.
- Ferns, 157, 163, 164.  
 Ferretto zone, 534.  
 Fescue, nodding, 167.  
*Festuca nutans*, 167.  
     *octoflora*, 167.  
     *tenella*, 167.
- Fever-few, American, 209.  
 Figwort, Maryland, 202.  
 Fir, balsam, 155, 156, 165.  
 Fire-weed, 160, 211.  
 Fish remains at Waverly, 356.  
 Fitzpatrick, T. J., cited, 149.  
 Five-finger, 187.  
 Flax, 160, 185, 191.  
 Flea-bane, 160, 208.  
 Flenniken, J. C., 307.  
 Flora, importance of, 149.  
 Flora of Winneshiek county, character of, 147.  
 Flowering plants of Winneshiek county, 164.  
 Forage plants, 159.  
 Foraminifera from Cretaceous chalk, 526.



- Forest problem of Winneshiek county, 150.  
 Forestry notes, Sac and Ida counties, 549.  
 Fort Atkinson limestone, 98.  
     character, 106.  
     exposures, 106.  
     quarries, 137.  
 Fort Benton shale, 529.  
 Four o'clock, 180.  
 Fox-tail, 166.  
*Fragaria americanum*, 187.  
     *virginiana*, 187.  
 Franklin county, Geology, 449.  
     altitudes, 466.  
     area, 457.  
     Buchanan gravels, 489.  
     Carboniferous system, 481.  
     clays, 501.  
     Devonian system, 477.  
     drainage, 467.  
     economic products, 498.  
     general relations of strata, 472.  
     geological formations, table of, 473.  
     Hackberry shale, 477.  
     Iowan drift, 489.  
         area, 459.  
     Kansan drift, 488.  
     Kinderhook limestone, 481.  
     Kinderhook limestone, sections, 483.  
     Lime creek shales, 477.  
     moraines, 463.  
     Owen beds, 479.  
     physiography, 468.  
     Pleistocene system, 488.  
     post-glacial deposits, 494.  
     sand and gravel, 503.  
     soils, 495.  
     stratigraphy, 472.  
     streams, 468.  
     topography, 468.  
     water power, 507.  
     water supply, 505.  
     Wisconsin drift, 492.  
         area, 463.  
         gravel trains and terraces, 493.  
 Franklin township, 388.  
*Frazinus americana*, 153, 197, 556.  
     *lancoolata*, 153, 197, 556.  
     *nigra*, 153, 198.  
     *pennsylvanica*, 154.  
     *sambucifolia*, 198.  
     *viridis*, 197.  
 Frederika township, 389.  
 Frostweed, hoary, 194.  
 Fulton, elevation of, 583.  
*Fusispira angusta*, 254.  
     *elongata*, 93, 94, 254.  
     *inflata*, 94, 254.  
 Galena limestone, character, 88, 258, 276, 593.  
     distribution, 87, 263, 279, 593.  
     dolomitization, 264.  
     effect on topography, 51, 228, 576.  
     599.  
     fossils, 90, 261, 594.  
     quarries in, 135, 291, 642.  
     suitability for lime, 138.  
     thickness, 87, 264.  
 Galena-Platteville limestone, 80, 247, 259, 592.  
*Galeopsis tetrahit*, 201.  
*Galeorchis spectabilis*, 173.  
*Galium aparine*, 203.  
     *asprellum*, 203.  
     *boreale*, 203.  
     *concinnum*, 203.  
 Garry Owen, elevation of, 583.  
 Gas, 546.  
*Gaura parviflora*, 195.  
 Geest, 59, 117, 281, 360, 439, 497, 632.  
 Geneva, elevation of, 466.  
 Gentian, 157, 198.  
*Gentiana alba*, 198.  
     *andrewsii*, 158, 198.  
     *crinita*, 198.  
     *flavida*, 158, 198.  
     *puberula*, 157, 198.  
     *quinqueflora*, 198.  
     *quinquefolia occidentalis*, 198.  
 Geological formations, comparative table of, 239.

- Geology of Black Hawk county, 407.  
 Bremer county, 319.  
 Clayton county, 213.  
 Franklin county, 449.  
 Jackson county, 563.  
 Sac and Ida counties, 509.  
 Winneshiek county, 37.
- Geranium maculatum*, 157, 162, 191.  
*Gerardia*, 202, 203.  
*Gerardia aspera*, 202.  
   *purpurea*, 202.  
   *tenuifolia*, 203.  
*Geum macrophyllum*, 187.  
   *triflorum*, 187.  
   *virginianum*, 187.
- Ginseng, 196.  
 Glass sand, analysis of, 297.  
*Glecoma hederacea*, 159, 201.  
*Gleditsia*, 153.  
   *triacanthus*, 553.
- Glenwood cave, 141.  
 Glenwood shale, character and distribution, 74.  
   use of term, 61.
- Glyceria americana*, 167.  
   *grandis*, 167.  
   *nervata*, 167.
- Gnaphalium obtusifolium*, 209.  
   *polycephalum*, 209.
- Goddard, Herbert E., 1+8.  
 Gold, Winneshiek county, 140.  
 Goldenrod, 157, 158, 206, 207.  
 Golden seal, 182.  
*Goodyera pubescens*, 174.  
 Goose Lake channel, 585.  
 Gooseberry, 155, 186, 554.  
 Goosefoot, 180.  
 Gordons Ferry Station, elevation of, 583.
- Gower stage, 619.  
   quarries in, 643.
- Grant City, coal near, 546.  
 Grape, wild, 153, 193, 552.  
 Grasses, 157, 159, 160, 165, 167, 168, 173, 185.
- Gratiola virginiana*, 202.  
 Gravel, Sac and Ida counties, 544.  
 Gravel trains, Wisconsin, 493.  
 Gravels, Wisconsin, 539.  
 Gray, Asa, cited, 148.  
 Green Island, elevation of, 583.  
 Green quarry, 136.  
 Green Shales, 592.  
 Greenbrier, hispid, 154, 172, 561.  
 Gromwell, 200.  
 Ground cherry, 202.  
 Ground-nut, 191.  
 Groundsel, balsam, 211.  
 Gue, B. F., cited, 217.  
 Guttenberg, lead mines at, 299.  
*Gypidula leviuscula*, 422.
- Gypsum, production of in Iowa, 3.  
   in 1903, 19.  
   in 1904, 19.  
   in 1905, 19, 34.
- Gyrostachys gracilis*, 174.
- Habenaria bracteata*, 173.  
   *hookeri*, 173.  
   *hyperborea*, 173.  
   *leucophaea*, 173.
- Hackberry, 153, 155, 156, 178, 558.  
 Hackberry shale, 477.  
 Hall, James, cited, 46, 64, 80, 94, 218, 324, 410.  
 Halloran quarry, 134, 135.  
*Halysites catenulatus*, 278, 343, 344, 613, 614, 616.
- Hamamelis virginiana*, 161.  
 Hampton, elevation of, 466.  
   well, analysis, 506.  
   section, 471.
- Hansell, elevation of, 466.  
 Harmon quarry, 436.  
 Harebell, 204.  
 Harris & Cole quarry, 429.  
 Hartgrave creek, 468.  
 Hawkweed, 205.  
 Haws, 153, 154, 155, 188, 189, 204, 557.  
 Hazel, 153, 176, 559.  
 Heal-all, 201.
- Hedeoma hispida*, 201.  
   *pulegeoides*, 161.
- Helenium autumnale*, 210.  
*Helianthemum canadense*, 194.  
   *majus*, 194.
- Helianthus annuus*, 160, 260.  
   *decapetalus*, 210.  
   *grosse-serratus*, 160, 210  
   *occidentalis*, 210.  
   *rigidus*, 160, 210.  
   *scaberrimus*, 210.  
   *strumosus*, 210.  
   *strumosus macrophyllus*, 210.
- Heliolites interstinctus*, 614.  
   *megastemus*, 614.  
   *subtubulatus*, 343.
- Heliopsis scabra*, 209.  
 Hemlock, 155, 196.  
 Hemp, 160, 178.  
 Hemp, Indian, 198.  
 Henry, Joseph, 302.
- Hepatica acuta*, 157, 182.  
   *acutiloba*, 182.  
   *lanatum*, 196.
- Heracleum lanatum*, 196.  
 Hesper, altitude of, 57.  
*Heteracanthus politus*, 356.  
*Heuchera hispida*, 186.

- Hickory, 154, 155, 176, 558.  
Hicks, Geo., 548.  
    brickyard, 543.  
*Hicoria minima*, 154, 176.  
    *ovata*, 154, 176.  
*Hieracium canadense*, 205.  
    *scabrum*, 205.  
Hoarhound, water, 202.  
Hoary alder, 176.  
Hoen, A. B., analysis of limestone by,  
    1, 7.  
Hollick and Britton, cited, 148.  
*Holopea turgida*, 243.  
Holway, E. W. D., 148.  
Honewort, 196.  
Honeysuckle, 153, 154, 155, 204.  
Hop-hornbeam, 559.  
Hopkinton, use of term, 234.  
Hopkinton stage, 109, 609.  
    quarries in, 643.  
*Hordeum jubatum*, 160, 168.  
*Hormotoma gracilis*, 104.  
    *major*, 90, 93, 94.  
    *salteri*, 255.  
    *subangulata*, 594.  
    *trentonensis*, 93, 254.  
Horse-gentian, 204.  
Horse-radish, 184.  
Horsetail, 184.  
Horse-weed, 160, 208.  
Hudson, altitude of, 417.  
Hudson river shales, 94.  
*Humulus lupulus*, 161.  
Hurst quarry, 615.  
Hurstville, elevation of, 583.  
Hydrangea, 157.  
*Hydrastis canadensis*, 162, 182.  
*Hydrophyllum appendiculatum*, 199.  
    *virginicum*, 158, 199.  
*Hypericum ascyron*, 194.  
    *canadense*, 194.  
    *cistifolium*, 194.  
    *maculatum*, 194.  
    *perforatum*, 160.  
    *sphaerocarpon*, 194.  
*Hypopitys americana*, 197.  
*Hypoxis erecta*, 173.  
    *hirsuta*, 173.  
Hyssop, 201, 202.  
Ice Cave, Decorah, 142.  
    cause, 144.  
    temperature, 144.  
    thickness of ice, 143.  
Ida county. (See Sac).  
Ida county, topography, 514.  
*Idiostroma gordiacum*, 427.  
Idiostroma beds, 428.  
Illænus, 343.  
*Ilacnus americanus*, 254.  
    *imperator*, 617, 618.  
    *insignis*, 112.  
*Impatiens aurea*, 193.  
    *biflora*, 193.  
    *fulva*, 193.  
    *pallida*, 193.  
Independence shale, 346.  
Indian pipe, 196.  
    turnip, 170.  
Indigo, 153, 155, 189, 553.  
*Inoceramus labiatus*, 530.  
Inoceramus beds, 530.  
*Inula helenium*, 209.  
*Iodanthus pinnatifidus*, 184.  
Iowa river, 471.  
Iowan bowlders, derivation of, 375.  
    drift, 128, 285, 371, 443, 453,  
        534, 634.  
        border, 54.  
        bowlders, 372, 490.  
        character, 128, 285.  
        distribution, 128.  
        sections, 443.  
        soils, 496.  
        thickness, 286.  
        topography, 128, 230, 569.  
        types, 371.  
Iowan drift area, 229, 459, 634.  
Iowan loess. (See Loess).  
    sand terraces, 129.  
*Ipomoea pandurata*, 193.  
*Iris versicolor*, 159, 162, 173.  
Iron, prospecting for, 36.  
Iron Hill, elevation of, 583.  
Iron-weed, 206.  
Iron wood, 154, 176, 559.  
*Isanthus brachiatus*, 200.  
*Ischadites iowensis*, 94, 254.  
*Isopyrum biernatum*, 157, 182.  
*Isotelus gigas*, 104, 108, 254, 608.  
    *iowensis*, 98.  
    *maximus*, 98, 99, 100, 270.  
Isotelus beds, 98, 99, 270, 274.  
*Iva xanthifolia*, 160, 205.  
Ivy, 153, 159, 192, 201.  
Jackson county, Geology of, 563.  
    alluvial areas, 579.  
    altitudes, table of, 583.  
    building stone, 643.  
    Carboniferous system  
        625.  
    clays, 646.  
    deformations, 640.  
    Devonian system, 621.  
    drainage, 584.  
    economic products,  
        642.  
    Iowan drift, 634.

- Kansan drift, 623.  
   lime, 644.  
   loess, 636.  
   Maquoketa stage, 597  
   Niagara series, 609.  
   Ordovician system,  
     592.  
   physiography, 568.  
   residual material,  
     630.  
   sand, 646.  
   soils, 639.  
   stratigraphy, 590.  
   topography, 568.  
   unconformities, 641.  
   water supplies, 647.
- Jackson township, 390.  
 Jacob's ladder, 156, 157, 199.  
 Jacob's Siding, elevation of, 417.  
 Janesville, elevation of, 327, 417.  
 Jefferson township, 390.  
 Jesup, altitude of, 417.  
 Joe-pye weed, 206.  
 Jordan sandstone, 62.  
*Juglans cinerea*, 162, 175.  
   *nigra*, 153, 175, 558.  
*Juncus nodosus*, 171.  
   *tenuis*, 160, 171.  
   *vaseyi*, 171.  
 June-berry, 154, 155, 188.  
 Juniper, 154, 165, 562.  
   oil of, 161.  
*Juniperus communis*, 161, 165.  
   *virginiana*, 154, 165, 562.
- Kansan drift, 119, 281, 363, 439, 488,  
   531, 623.  
   character, 121, 282, 363,  
     440, 531, 633.  
   distribution, 119, 282,  
     363.  
   sections, 282, 364.  
   thickness, 440, 634.  
   topography, 53, 281,  
     365, 441.
- Kasota limestone, 134.  
 Kent, Chas., 548.  
 Keyes, C. R., cited, 440.  
 Keystone Lime Co., 645.  
 Kimball, H., cited, 145.  
 Kinderhook limestone, 420, 481.  
   character, 482.  
   quarries, 498.  
   sections, 483.
- Knotweed, 179.  
 Koeberle, John, 405.  
 Koehler lime kiln, 296.  
*Koeleria cristata*, 167.  
*Koeleria flauosa*, 201.  
   *virginicus*, 201.  
 Kohler brickyard, 296.
- Kovarik, A. F., acknowledgments, 119,  
   148.  
   cited, 47.  
   work on Ice Cave, 113
- Krigia amplexicaulis*, 205.  
   *eupatorioides*, 206.  
*Kuhnia glutinosa*, 206.  
*Kuhnistera candida*, 157, 190.  
   *purpurea*, 157, 190.
- Lacinaria*, 157.  
   *cylindracea*, 206.  
   *pycnostachya*, 206.  
   *scariosa*, 206.
- Lactuca canadensis*, 205.  
   *scariola*, 159, 205.
- Ladies' slippers, 157, 173.  
 Lafayette township, 390.  
 Lainsville, elevation of, 583.  
 Lamb's quarters, 160, 180.  
 La Motte, elevation of, 583.  
 La Porte City, elevation of, 417.  
*Laportea canadensis*, 178.  
*Lappula lappula*, 199.  
   *texana*, 199.  
   *virginiana*, 160, 199.
- Larch, European, 155, 156.  
 Larkspur, prairie, 182.  
*Lathyrus achroleucus*, 191.  
   *venosus*, 191.
- Lead, 298.  
 Lead and Zinc, production of in Iowa,  
   in 1903, 19.  
   in 1904, 19.  
   in 1905, 19, 35.
- Lead plant, 154.  
 Leaf-cup, 299.  
 Leather-wood, 153, 195.  
*Lechea stricta*, 194.  
 Lee, Chas., lime kiln of, 296.  
 Leek, wild, 171.  
*Leersia oryzoides*, 159, 166.  
 Lees, J. H., acknowledgments, 146.  
   work of, 5.
- Lemna trisulca*, 171.  
 Leonard, A. G., cited, 219, 248.  
   Geology of Clayton  
   County, 213.  
   work of, 5.
- Leonurus cardiaca*, 160, 201.  
*Lepachys pinnata*, 209.  
*Lepidium apetalum*, 184.  
   *intermedium*, 184.  
   *virginicum*, 160, 184.
- Leptaena unicostata*, 115, 272, 602, 605,  
   608.  
*Leptandra virginica*, 162, 202.  
*Leptilon canadense*, 160, 161, 208.  
*Leptobolus occidentalis*, 98, 100.  
*Leptorchis hiliifolia*, 174.  
   *trivittatus*, 552.

- Leroy township, 388.  
*Lespedeza capitata*, 190.  
     *leptostachya*, 190.  
 Lettuce, 159, 205.  
 Leverett, F., cited, 563, 585.  
*Liatris cylindracea*, 206.  
     *graminifolia*, 206.  
     *pycnostachya*, 206.  
     *scariosa*, 206.  
*Lilium canadense*, 172.  
     *philadelphicum*, 172.  
     *umbellatum*, 172.  
 Lily, 156, 157, 172, 182.  
 Lily of the Valley, false, 172.  
 Lime, 137, 296, 392, 449, 545, 644.  
 Lime Creek stage, 477.  
 Lime kilns, Brodie, 392.  
     Hurst, 644.  
     Hyer, 646.  
     Joiner, 645.  
     Keystone, 645.  
     Koehler, 296.  
     Lee, 296.  
     Maquoketa, 645.  
     Stoeffler, 296.  
 Limekiln quarry, 344.  
 Lime Springs, altitude of, 57.  
 Limestone, production of, in Iowa, 31,  
     32, 34.  
*Limnorchis hyperborea*, 173.  
*Linaria linaria*, 202.  
     *vulgaris*, 202.  
 Linden, 551.  
 Lingula, 99, 100.  
*Lingula iowensis*, 108, 115, 265, 594.  
     *riciniiformis*, 99, 100.  
 Linn, 551.  
*Linnaea americana*, 204.  
     *borealis*, 204.  
*Linum sulcatum*, 191.  
     *usitatissimum*, 191.  
*Liospira vitruvia*, 254.  
*Liparis liliifolia*, 174.  
 Lithographic limestone, 116, 428, 436.  
     suitable for  
     Portland  
     cement, 117  
*Lithospermum angustifolium*, 200.  
     *canescens*, 200.  
     *gmelini*, 200.  
     *hirtum*, 200.  
     *latifolium*, 200.  
     *linearifolium*, 200.  
 Liver-leaf, heart, 182.  
 Lobelia, 157, 205.  
*Lobelia inflata*, 161, 205.  
     *leptostachys*, 205.  
     *spicata*, 205.  
 "Locus Glacialis", 143.  
 Locust, 153, 155, 156, 190, 553.  
 Loess, Iowan, 130, 286, 376, 445, 490.  
     534, 636.  
     age, 386.  
     character, 130, 286, 376  
     distribution, 382.  
     older type, 376.  
     on Iowan drift, 376  
     461, 490.  
     on paha, 382.  
     origin, theories, 383.  
     phases, 376.  
 Loess, post-Kansan, 60, 126.  
     soil, 131, 270, 393, 496, 639.  
 Long, D. A., 405.  
 Longaker quarry, 435.  
*Lonicera*, 153.  
     *dioica*, 204.  
     *glauca*, 204.  
     *sullivantis*, 204.  
     *tatarica*, 204.  
 Loosestrife, 197.  
*Lophanthus repetoides*, 201.  
     *scrophulariaefolius*, 201.  
 Lopseed, 203.  
 Lousewort, 203.  
 Low quarry, 499.  
 Lower Buff beds, 82.  
 Lower Davenport beds, 345.  
 Lower Magnesian limestone, charac-  
     ter of, 239.  
     outcrops of, 242.  
     use of term, 61,  
     64, 235.  
 Lower Maquoketa beds, 273.  
*Ludwigia polycarpa*, 195.  
 Lungwort, 156, 157, 200.  
 Lupine, 189.  
*Lupinus perennis*, 189.  
 Luthe, F. H., 243.  
*Lychnis alba*, 181.  
     *githago*, 181.  
     *vespertina*, 181.  
*Lycopodium lucidulum*, 164.  
*Lycopus americanus*, 202.  
     *sinuatus*, 202.  
     *virginicus*, 201.  
*Lyellia americana*, 614.  
 Lyme-grass, 168.  
*Lysias hookeriana*, 173.  
 Lytles creek, 587.  
 Macbride, T. H., cited, 520.  
     Geology of Sac and  
     Ida counties, 509.  
     work of, 5.  
*Maclurea bigsbyi*, 90, 94.  
*Maclurina cuneata*, 266.  
*Macrocalyx nycitelca*, 160, 199.  
 Mallow, 159, 194.  
*Malus iowensis*, 153, 188.

- Malva crispa*, 194.  
     *rotundifolia*, 150, 194.  
 Mantle rock, 117.  
     regression, 55.  
 Maple, 153, 154, 155, 156, 193, 551.  
 Maple river, 521.  
 Maps, topographic, 7.  
 Maquoketa, elevation of, 583.  
 Maquoketa Brick Co., 646.  
 Maquoketa Lime quarry, 645.  
 Maquoketa river, 584.  
 Maquoketa stage, 94, 266, 339, 597.  
     analysis of shale,  
         294, 295.  
     character, 44, 96,  
         266, 273, 597.  
     correlation, 94.  
     distribution, 96, 274,  
         599.  
     effect on topography,  
         51, 5.5.  
     exposures, 99, 599.  
     quarries, 136, 643.  
 Maquoketa well, 643.  
     analysis of, 648.  
 Marigold, marsh, 157, 182.  
 Marsh-elder, burweed, 160, 205.  
 Maxfield township, 389.  
 May-apple, 158, 183.  
 Mayne creek, 470.  
     section on, 485.  
 Mayweed, 210.  
 McCullough quarry, 620.  
 McGee, W J, cited, 46, 61, 64, 106,  
     122, 145, 219, 324, 373, 377,  
     411, 461, 467, 567.  
 McGregor water supply, 300.  
     well, 301.  
     analysis of, 302.  
 McQuesney well, 341.  
 Meadow-grass, 167.  
 Meadow-rue, 183.  
 Meadow-sweet, 153, 186.  
 Medicinal plants of Winneshiek coun-  
     ty, 161.  
 Meek and Worthen, cited, 94.  
*Meibomia grandifolia*, 190.  
     *longifolia*, 190.  
     *pauciflora*, 190.  
*Melica nutica*, 167.  
*Melilotus alba*, 159, 189.  
     *officinalis*, 159, 189.  
*Melilotis serrulata*, 195.  
 Mellon brickyard, 294.  
*Menispermum canadense*, 162, 183.  
*Mentha canadensis*, 202.  
 Mercury, three seeded, 160.  
*Meristina nitida*, 616.  
*Mertensia*, 156, 157.  
     *paniculata*, 200.  
     *virginica*, 200.  
*Mesadenia atriplicifolia*, 211.  
     *reniformis*, 211.  
     *tuberosa*, 211.  
*Metoptoma alla*, 243.  
 Mexican dropseed, 166.  
*Micranthella lobata*, 204.  
*Microstylis ophioglossoides*, 171.  
 Middle Devonian series, 113, 351, 421.  
 Miles, elevation of, 583.  
 Milkweed, 160, 198.  
 Milkwort, 192.  
 Mill creek, 590.  
 Mill Rock, elevation of, 583.  
 Mill spring, 139.  
 Millet, German, 166.  
*Mimulus jamesii*, 202.  
     *ringens*, 202.  
 Mineral production in Iowa, value of  
     by counties, 21.  
     by years, 19.  
 Mineral water, production of, 1905, 19,  
     36.  
 Mint, 157, 202.  
*Mitchella repens*, 203.  
*Mitella diphylla*, 158, 186.  
*Moehringia lateriflora*, 181.  
*Mollugo verticillata*, 180.  
 Mona Junction, elevation of, 417.  
 Monadnocks, 580.  
*Monarda fistulosa*, 201.  
     *scabra*, 157, 201.  
 Monkey-flower, 202.  
 Monmouth, elevation of, 583.  
 Monona brickyard, 295.  
     well, 304.  
*Monotropa hypopitys*, 197.  
     *uniflora*, 197.  
 Moonseed, 183.  
 Moonwort, 157, 163.  
 Moore quarry, 352.  
 Moraines, 463, 538.  
 Morganton quarry, 425.  
 Morts creek, 589.  
 Motherwort, 160, 201.  
 Mott quarry, 485.  
 Mugwort, saw-leaf, 210.  
*Muhlenbergia glomerata*, 159, 166.  
     *mexicana*, 159, 160, 166.  
     *sylvatica*, 166.  
 Mullein, 160.  
*Murchisonia gracilis*, 594.  
     *major*, 595.  
 Musk-root, 204.  
 Mustard, 160, 184, 185.  
*Nabalus albus*, 205.  
     *racemosus*, 205.  
*Napaea dioica*, 194.  
 Nashville, elevation of, 583.

- Nasturtium armoracia*, 184.  
     *officinale*, 184.  
     *palustre*, 184.  
*Naticopsis gigantea*, 479.  
 Natural bridges, 571.  
 Natural gas, occurrence of, in Iowa, 4.  
 New geological names used, 60.  
*Negundo aceroides*, 193, 552.  
     *negundo*, 552.  
*Nepeta cataria*, 201.  
     *glechoma*, 201.  
*Nephrodium goldieanum*, 164.  
     *thelypteris*, 157, 164.  
 Nettle, 160, 201.  
 New Jersey tea, 154, 155, 193.  
 New Richmond sandstone,  
     character 68.  
     distribution,  
         68, 240.  
     exposure, 69.  
     secondary  
         enlarge-  
         ment, 68.  
     use of term,  
         61, 64.  
*Newberria johannis*, 428.  
 Niagara limestone, 60, 109, 275, 342,  
     609.  
     character, 44, 112,  
         276, 610.  
     distribution, 109,  
         276, 609.  
     effect on topog-  
         raphy, 52, 228,  
         577.  
     exposure, 110, 610.  
     fossils, 278, 614.  
     quarries in, 137.  
         292, 643.  
     sections, 276, 610.  
     thickness, 111,  
         280, 609.  
 Nielson quarry, 430.  
 Nightshade, 160, 195.  
*Nileus vigilans*, 104.  
 Nileus beds, 273.  
 Nine bark, prairie, 153, 155, 186.  
 Nordness quarry, 135.  
 Norris, elevation of, 417.  
 Norris, Mr., 356.  
 Norton, W. H., cited, 237, 248, 301, 473,  
     568, 621, 625, 626, 647.  
     Geology of Bremer  
         county, 319.  
     work of, 5.  
*Nuphar advena*, 182.  
 Nut grass, yellow, 168.  
 Nyctelea, 160, 199.  
*Nymphaea advena*, 182.  
     *odorata*, 182.  
 Oak, 154, 155, 156, 176, 177, 561.  
*Oakesia sessilifolia*, 171.  
 Oats, grama, 167.  
 Oil, 546.  
 Olson quarry, 429.  
*Onagra biennis*, 160, 195.  
*Oncoceras pandion*, 254.  
 Oneota limestone, 64, 239.  
     character, 65, 240.  
     distribution, 67, 242.  
         effect on topog-  
         raphy, 50.  
     quarries, 290.  
     suitable for lime,  
         137.  
     thickness, 241.  
     use of term, 61, 64,  
         65, 235.  
 Oneota river, 47, 57.  
 Onion, wild, 158, 171, 172.  
*Onoclea sensibilis*, 157, 163.  
     *strythiopteris*, 163.  
*Onosmodium carolinianum*, 200.  
     *molle*, 200.  
*Onychodus*, 356, 357.  
*Onychodus sigmoides*, 425.  
*Opulaster intermedius*, 153, 186.  
 Orange root, 182.  
 Orbiculoidea, 608.  
*Orchis spectabilis*, 157, 173.  
 Ordovician system, 64, 239, 339, 592.  
 Ornamental plants, care of, 158.  
 Orr, E., 148.  
*Orthis biforata*, 102, 254, 594, 605, 608  
     *flabellulum*, 614.  
     *inequalis*, 483, 486.  
     *insculpta*, 104, 107, 108, 272.  
     *iowensis*, 352, 480.  
     *macfarlanei*, 302.  
     *occidentalis*, 603, 605, 608.  
     *placatella*, 86, 108.  
     *proavita*, 608.  
     *subaequata*, 80, 86, 87, 252, 254,  
         255, 272.  
     *subquadrata*, 80, 104, 108.  
     *testudinaria*, 86, 87, 103, 104,  
         108, 115, 255, 259, 272, 594,  
         601, 603, 605, 608.  
     *tricenaria*, 86, 87.  
     *whitfieldi*, 104, 105, 608.  
*Orthoceras*, 100, 254, 594.  
*Orthoceras crebescens*, 618.  
     *primigenium*, 243.  
     *sociale*, 108.  
     *unionensis*, 344.  
 Orthoceratites of Platteville limestone,  
     84.  
 Orthothetes, 483.  
 Orton, E., cited, 60.  
*Oryzopsis melanocarpa*, 166.

- Osborn, Herbert, cited, 568, 626.  
*Osmorrhiza brevistylis*, 196.  
*Osmunda claytoniana*, 157, 163.  
Ossian, elevation of, 56, 57.  
*Ostrya virginiana*, 154, 176, 559.  
Otter creek, 469.  
    elevation of, 583.  
    section at, 483.  
Owen, D. D., cited, 45, 218, 451.  
Owen beds, 479.  
    quarries in, 500.  
Oxalis, yellow, 160.  
*Oxalis corniculata*, 191.  
    *stricta*, 160, 191.  
    *violacea*, 191.  
Ox-eye, rough, 209.  
*Oxybaphus nyctagineus*, 180.  
Ozark, elevation of, 583.
- Paha, origin, 380.  
    sections in, 379.  
    types, 55, 377.  
Painted-cup, 203.  
Pammel, L. H., cited, 148.  
    work of, 5.  
*Panax quinquefolium*, 196.  
Panicum, 165.  
*Panicum capillare*, 160, 165.  
    *crus-galli*, 159, 165.  
    *dichotomum*, 160, 165.  
    *glabrum*, 160, 165.  
    *latifolium*, 165.  
    *sanguinale*, 160, 165.  
    *scribnerianum*, 165.  
    *unciphyllum*, 165.  
*Paracyclas elliptica*, 115.  
*Parastrophia schofieldi*, 254.  
*Parietaria pennsylvanica*, 178.  
Parilla, yellow, 183.  
Parker, G. M., 548.  
*Parnassia caroliniana*, 185.  
Parsnip, 159, 196.  
*Parthenium intergrifolium*, 209.  
*Parthenocissus quinquefolia*, 154, 193  
Partridge-berry, 203.  
Partridge pea, 160, 189.  
Pasque-flower, 157, 183.  
*Pastinaca sativa*, 159, 196.  
Pea, veiny, 191.  
Pea-nut, hog, 131.  
Peat, Franklin county,  
    analysis, 505.  
    occurrence, 495.  
    use, 504.  
Peat, work of Survey on, 3.  
*Pedicularis canadensis*, 203.  
    *lanceolata*, 203.  
*Pellaea atropurpurea*, 164.  
    *gracilis*, 164.  
Pelmulder, Chas., 548.
- Pennyroyal, 200, 201.  
*Pentamerella arata*, 422.  
    *obsolescens*, 422.  
*Pentamerus maquoketa*, 616.  
    *oblongus*, 279, 616, 644.  
    beds, 279.  
    *pergibbosus*, 616.  
*Penthorum sedoides*, 185.  
*Pentstemon*, 157.  
Pepper grass, 160, 184.  
Pepper root, 184.  
*Perantium pubescens*, 174.  
Perry township, elevation of, 583.  
*Persicaria*, 179.  
*Petalostemon candidus*, 190.  
    *violaceus*, 190.  
*Phegopteris calarea*, 163.  
    *robertiana*, 163.  
*Philotria canadensis*, 170.  
*Phleum pratense*, 166.  
Phlox, 156, 157, 199.  
*Phlox divaricata*, 157, 199.  
    *pilosa*, 199.  
*Phryma leptostachya*, 203.  
*Physalis lanceolata*, 202.  
    *philadelphica*, 202.  
    *pubescens*, 160.  
    *virginiana*, 202.
- Physiography, Black Hawk county,  
    412.  
    Bremer county, 324.  
    Clayton county, 219.  
    Franklin county, 458.  
    Jackson county, 568.  
    Sac and Ida counties,  
    574.  
    Winneshiek county, 47.
- Physocarpus opulifolius*, 186.  
*Physostegia parvifolia*, 201.  
    *virginiana*, 201.  
"Pictured Rocks", 223, 246.  
Pigweed, 180.  
Pikes Peak, 222.  
*Pilea pumila*, 178.  
Pimpernel, yellow, 196.  
*Pimpinella integerrima*, 196.  
Pine, 154, 155, 156, 164.  
Pine creek, 57.  
Pine-sap, 197.  
*Pinus strobus*, 154, 164.  
Pinweed, 194.  
Pipsissewa, 197.  
Plainfield, elevation of, 327.  
Plane tree, 186.  
*Plantago major*, 159.  
    *rugeli*, 160.  
Plantain, 159, 160, 170, 174, 208, 211.  
Plants of Winneshiek county, 147.  
*Platanus occidentalis*, 186.



- Platteville limestone, 82, 247.  
 (See also Trenton).  
 fossils of, 84.  
 quarries in, 134.  
 use of term, 61, 80, 81, 235.
- Platystoma niagarensis*, 276, 617.
- Platystrophia bifurcata*, 103.
- Plectambonites sericea*, 82, 86, 87, 94, 102, 103, 104, 107, 108, 115, 272, 594, 602, 605, 608.
- Pleistocene system, 119, 281, 361, 439, 488, 531, 633.
- Pleurisy-root, 198.
- Pleurotomaria lenticularis*, 254, 261.
- Plum, 189, 554, 555.
- Poa pratensis*, 160, 167.
- Podophyllum peltatum*, 158, 162, 183.
- Poison ivy, 192.
- Polanisia trachysperma*, 185.
- Polemonium reptans*, 158, 199.
- Polk township, 390.
- Polygala sanguinea*, 192.  
*senega*, 162, 192.  
*verticillata*, 191.  
*viridescens*, 192.
- Polygonum amphibium*, 179.  
*aviculare*, 179.  
*camporum*, 179.  
*convolvulus*, 159, 180.  
*douglasii*, 180.  
*dumetorum*, 180.  
*emersum*, 179.  
*hydropiper*, 179.  
*incarnatum*, 179.  
*lapathifolium*, 179.  
*muhlenbergii*, 179.  
*pennsylvanicum*, 160, 179.  
*persicaria*, 179.  
*sagittatum*, 180.  
*scandens*, 180.  
*tenue*, 180.  
*virginianum*, 180.
- Polymnia canadensis*, 209.  
*wedalia*, 209.
- Polypodium vulgare*, 163.
- Polypody, 163.
- Pondweed, 170.
- Popejoy, elevation of, 466.
- Poplar, 155, 156, 174, 560.
- Populus alba*, 174  
*balsamifera*, 174  
*candicans*, 154, 174.  
*deltoides*, 153, 174, 560.  
*grandidentata*, 154, 174.  
*monilifera*, 174, 560.  
*tremuloides*, 154, 174, 559.
- Portland cement, manufacture in Iowa, 2.  
 plants erected in Iowa, 36.
- materials, abundance in Iowa, 3.  
 work of Survey on, 2.
- Portulaca oleracea*, 159, 181.
- Post-glacial deposits, 494, 638.
- Post-Kansan lcess, 60, 126.
- Postville, elevation of, 57.
- Potamogeton fluitans*, 170.  
*foliosus*, 170.  
*lonchites*, 170.  
*pauciflorus*, 170.
- Potato vine, wild, 198.
- Potentilla arguta*, 187.  
*canadensis*, 187.  
*fruticosa*, 187.  
*monspeiensis*, 187.  
*norvegica*, 187.  
*tridentata*, 187.
- Potsdam series, 62, 237.
- Potters Siding, elevation of, 327.
- Prairie creek, 589.
- Prairie du Chien, well at, 305.
- Prairie Spring township, elevation of, 583.
- Prasopora simulatrix*, 85.
- Pre-glacial topography, 47, 386.
- Pre-Kansan drift, character, 361.
- Prenanthes alba*, 205.  
*racemosa*, 205.
- Preston, brickyard at, 646.  
 elevation of, 584.
- Primrose, evening, 160, 195.
- Prionocyclus wyomingensis*, 530.
- Producers of mineral products in Iowa, number of, 20.
- Productella concentrica*, 487.  
*lachrymosa*, 479.  
*subalata*, 113, 115, 133, 345.
- Productella beds, 115.
- Prunella vulgaris*, 201.
- Prunus americana*, 189, 554.  
*chicasa*, 555.  
*hortulana*, 554.  
*pennsylvanica*, 155, 189.  
*pumila*, 153, 189.  
*serotina*, 154, 162, 189, 555.  
*virginiana*, 154, 162, 189, 555.
- Pteridium aquilinum*, 164.
- Pterinea demissa*, 608.
- Pteris aquilina*, 164.
- Ptychodus calceolus*, 356.  
*compressus*, 356.  
*ferox*, 356.
- Puccoon, 200.
- Pulsatilla hirsutissima*, 157, 161, 183.
- Purslane, 159, 181, 192.
- Purtell quarry, 423.
- Putty root, 174.

- Pycnanthemum lanceolatum*, 201.  
*linifolium*, 201.
- Pyrola elliptica*, 197.  
*secunda*, 197.
- Pyrus arbutifolia*, 188.  
*coronaria*, 188, 555.  
*iowensis*, 555.
- Quarries, Andrews, 487, 500.  
 Archibald, 619.  
 Bartlett, 425.  
 Beatty, 431.  
 Beebe, 353.  
 Benson, 486.  
 Boyle, 256, 291.  
 Brodie, 359.  
 Buchan, 433.  
 Camp, 435.  
 Carpenter, 427.  
 Cedar River Stone Co., 391.  
 Dean, 354.  
 Dehn, 259, 292.  
 Dolomite, 276.  
 Eads, 620.  
 Eagle, 437.  
 Embertson, 292.  
 Ferguson, 291.  
 Ft. Atkinson, 107.  
 Fosselmann, 354.  
 Glass, 293.  
 Green, 136.  
 Halloran, 134, 135.  
 Harmon, 436.  
 Harris & Cole, 429.  
 Hurst, 615.  
 Hyler, 646.  
 Joiner, 645.  
 Keystone Lime Co., 645.  
 Kinderhook, 498.  
 Limekiln, 344.  
 Longaker, 435.  
 Low, 498.  
 Maquoketa Lime Co., 645.  
 McCullough, 620.  
 Moore, 352.  
 Morganton, 425.  
 Mott, 485.  
 Nichols, 354.  
 Nielson, 430.  
 Nordness, 135.  
 Olson, 429.  
 Pin Hook, 645.  
 Purtell, 423.  
 Raymond, 423.  
 Rierson, 292.  
 Rima, 360.  
 Robertson, 433.  
 Round, 428.  
 Schoulte, 292.  
 Sousley, 277, 292.
- Stickfort, 291.  
 Stoops, 226, 262, 281.  
 Thoreson, 292.  
 Waterloo, 421.  
 Weber, 134.  
 Williams, 292.
- Quarter Section run, 327.
- Quercus alba*, 154, 162, 177.  
*borealis*, 177.  
*coccinea*, 177.  
*macrocarpa*, 177, 561.  
*rubra*, 154, 176, 561.  
*schnuckii*, 176.  
*texana*, 176.  
*velutina*, 177.
- Rafinesquina alternata*, 82, 97, 103, 104,  
 107, 108, 254,  
 261, 272, 602,  
 608.  
*delloidea*, 594.  
*minnesotensis*, 254, 261.
- Ragweed, 160, 206.
- Rainy Lake region, gold from, 141.
- Ranunculus abortivus*, 183.  
*aquatilis*, 183.  
*fascicularis*, 157, 183.  
*ovalis*, 183.  
*pennsylvanicus*, 183.  
*recurvatus*, 183.  
*rhomboideus*, 183.  
*septentrionalis*, 183.
- Raphistoma lenticulare*, 254.  
*multivolvatum*, 243.  
*paucivolvatum*, 243.  
*pepinense*, 243.
- Raspberry, 154, 161, 186.
- Ratibida pinnata*, 209.
- Raymond, elevation of, 417.  
 sections at, 423, 424.
- Readlyn, elevation of, 327.
- Receptaculites oweni*, 90, 91, 93, 141,  
 142, 260, 266,  
 595, 596.  
 zone, 93, 595.
- Red-root, 154, 193.
- Red-top, 166.
- Reed-grass, Indian, 166.
- Reforestation, method of, 152.
- Reid, Harvey, 568, 648.
- Rensselaeria johanni*, 422.
- Residual materials, 117, 281, 360, 439,  
 630.  
 soil, 49, 640.
- Rhus glabra*, 154, 161, 192, 553.  
*hirsuta*, 154, 192.  
*radicans*, 153, 161, 192.  
*toxicodendron*, 161, 192.  
*typhina*, 192, 554.
- Rhynchodus occidentalis*, 356.

- Rhynchonella anticostiensis*, 603, 605.  
*Rhynchotrema capax*, 103, 107, 108, 272, 594, 603, 605, 608.  
     *inaequivalvis*, 86.  
     *perlamellosa*, 108.  
*Ribes cynosbati*, 153, 186.  
     *floridum*, 153, 186, 554.  
     *gracile*, 186.  
     *missouriensis*, 153, 186, 554.  
     *rubrum*, 155, 186.  
 Rice, mountain, 166.  
 Richland township, elevation of, 584.  
 Ridgeway, elevation of, 57.  
 Road materials, 138, 297, 391, 450, 502, 544.  
 Robertson quarry, 433.  
*Robinia pseudacacia*, 155, 190, 553.  
 Rock analyses, 343.  
 Rock-cress, 185.  
 Rocket, purple, 184.  
 Root river system, 57.  
*Roripa armoracia*, 184.  
     *nasturtium*, 184.  
     *palustris*, 184.  
*Rosa arkansana*, 154.  
     *blanda*, 154, 187.  
     *humilis*, 154, 188.  
     *sayi*, 188.  
     *woodsii*, 188.  
 Rose, 154, 155, 187, 188.  
 Round quarry, 428.  
*Rubus americanus*, 186.  
     *canadensis*, 187.  
     *nigrobaccus*, 162.  
     *occidentalis*, 152, 154, 161, 187.  
     *procumbens*, 154, 162, 187.  
     *strigosus*, 154, 161, 186.  
     *triflorus*, 186.  
     *villosus*, 187.  
*Rudbeckia hirta*, 209.  
     *laciniata*, 160, 209.  
     *triloba*, 209.  
 Rue, goat's, 190.  
 Rue-anemone, 157, 182.  
*Rumex acetosella*, 160, 179.  
     *altissimus*, 179.  
     *britannica*, 160, 179.  
     *crispus*, 159, 179.  
     *patientia*, 160, 179.  
     *verticillatus*, 179.  
 Rush, 169, 171.  
 Rush-grass, 166.  
 Rue, wild, 168.  
 Sabula, elevation of, 584.  
     well, 647.  
 Sac and Ida counties, Geology of, 509,  
     alluvial deposits, 541.  
     Buchanan gra-  
     vels, 533.  
     building stone, 546.  
     clay, 543.  
     coal, 546.  
     Colorado stage, 529.  
     Cretaceous system, 526.  
     Dakota sandstone, 526.  
     drainage, 521.  
     economic products, 543.  
     forestry notes, 549.  
     Fort Benton shales, 529.  
     gravel, 544.  
     Iowan stage, 534.  
     Kansan drift, 531.  
     lime, 545.  
     loess, 534.  
     physiography, 514.  
     Pleistocene system, 531.  
     soils, 542.  
     stratigraphy, 525.  
     synoptical table, 525.  
     topography, 511.  
     water power, 548.  
     water supply, 547.  
     Wisconsin drift, 535.  
     gravels, 539.  
     moraine, 538.  
 Sage, wood, 200.  
*Sagittaria latifolia*, 170.  
     *rigida*, 170.  
 St. Croix sandstone, 62, 237.  
 St. Doctus, elevation of, 584.  
 St. John, O. H., cited, 324, 411, 573.  
 St. John's-wort, 160, 194.  
 St. Peter sandstone analysis, 244.  
     character, 65, 73, 243.  
     economic value, 79.  
     effect on topography, 78.  
     exposures, 75, 245.  
 St. Sebald, shale from, analysis, 294.  
 Salicin, 162.

- Salisbury, R. D. cited 219, 631.
- Salix alba*, 175.  
*amygdaloides*, 153, 175, 560.  
*cordata*, 153, 175, 560.  
*discolor*, 153, 175.  
*ericocephala*, 175.  
*humilis*, 154, 175.  
*interior*, 153, 175.  
*longifolia*, 175, 560.  
*lucida*, 153, 175.  
*missouriensis*, 175.  
*nigra*, 153, 174.  
*petiolaris*, 175.
- Salomonina commutata*, 157, 172.
- Salsola kali*, 180.  
*tragus*, 160, 180.
- Sambucus canadensis*, 153, 161, 203, 567.  
*pubens*, 154, 203.  
*racemosa*, 203.
- Sand and gravel, 138, 297, 450, 500, 544, 646.
- Sandbur, 160, 166.
- Sand-lime brick, production in Iowa, 1904, 19.  
 1905, 19, 35.
- Sandstone, production of in Iowa, 31, 34.
- Sanguinaria canadensis*, 158, 162, 184.
- Sanicle, 196, 206.
- Sanicula marylandica*, 196
- Saponaria officinalis*, 181.  
*vaccaria*, 181.
- Sardeson, F. W., cited, 247.
- Sarsaparilla, wild, 195.
- Savage, T. E., cited, 96, 97, 148, 149, 347, 400, 458, 461, 462, 507.  
 Geology of Jackson county, 563.  
 work of, 5, 13.
- Saxifraga pennsylvanica*, 185.
- Saxifrage, 185, 186.
- Schmidt well, 341, 362.
- Schnoeder well, 363.
- Schwem well, 362.
- Scirpus americanus*, 169.  
*atrovirens*, 169.  
*cyperinus*, 169.  
*iacustris*, 169.  
*pungens*, 169.  
*validus*, 169.
- Scouring-rush, 163.
- Scrophularia marylandica*, 166, 202.
- Scutellaria cordifolia*, 200.  
*lateriflora*, 161, 200.  
*parvula*, 200.  
*versicolor*, 200.
- Secondary enlargement of New Richmond sandstone, 68.
- Section, Bartlett quarry, 425.  
 Baskin run, 348.  
 Beebe quarry 353.  
 Bellevue, 600.  
 Buchan quarry, 433.  
 Carpenter quarry, 427.  
 Clausing well, 253.  
 Clayton, 256.  
 Corwin township, 533.  
 Cox creek, 262.  
 Denver Junction, 364.  
 Eagle Point Lime Works, township, 437.  
 Elk creek, 267.  
 Elkader, 262.  
 Frederika, 359.  
 Green Island, 603.  
 Guttentberg, 256.  
 Hurstville, 615.  
 Longaker quarry, 435.  
 McGregor, 256.  
 Moore quarry, 352.  
 Nichols quarry, 354.  
 Nielson quarry, 430.  
 Old Limekiln quarry, 344.  
 Pahoid hill, 365.  
 Quarter Section run, 344, 347.  
 Raymond quarry, 423, 424.  
 Robert creek, 257.  
 Round quarry, 428.  
 Sabula, 647.  
 St. Sebald, 266, 268.  
 Tripoli, 343.  
 Turkey river, 270.  
 Volga, 269.  
 Waterloo quarry, 421.
- Sections Cedar Valley, 352—360, 421—438.  
 Cretaceous, 531.  
 Des Moines, 623.  
 Devonian, 391, 623.  
 Galena-Platteville, 255—260, 593, 596.  
 Kinderhook, 483—486.  
 Lime creek, 478, 479.  
 Lower Magnesian limestone, 72.  
 Maquoketa, 267—273, 339, 600, 603.  
 Niagara, 276, 277, 343, 613—620.  
 Pleistocene, 282, 362—379, 443, 533—540.  
 St. Peter, 76.  
 Wapsipicon, 348, 351.  
 Wells, 303, 339—341, 351, 352, 398, 402, 474, 647.
- Sedges, 169, 170.  
*Selaginella rupestris*, 164.

- Senecio aureus*, 211.  
*balsamitae*, 211.  
 Senega, 162.  
*Setaria germanica*, 166.  
*glauca*, 159, 160, 166.  
*italica*, 166.  
*viridis*, 160, 166.  
 Shadbush, 153, 188.  
 Shakopee limestone, 71, 241.  
     use of term, 61, 64.  
 Shale, analysis of, 294, 295.  
     Hackberry, 477.  
 Shaler, N. S., cited, 573.  
 Sheep-berry, 153, 155, 204.  
 Sheep sorrel, 160, 179.  
 Sheffield, elevation of, 466.  
 Shepherd's purse, 159, 185.  
 Shimek, B., acknowledgments, 146.  
     cited, 60, 126.  
     Plants of Winneshiek county, 147.  
     work on loess, 5.  
 Shooting star, 156, 157.  
*Sibbaldiopsis tridentata*, 187.  
 Sickle-pod, 185.  
*Sieversia ciliata*, 187.  
*Silene alba*, 181.  
     *antirrhina*, 181.  
     *stellata*, 157, 181.  
*Silphium laciniatum*, 209.  
     *perfoliatum*, 209.  
 Silurian system, 109, 275, 342, 609.  
 Silver creek, 522.  
*Sinapis alba*, 184.  
     *nigra*, 161.  
 Sinks, 571.  
*Sisymbrium canescens*, 185.  
     *officinale*, 160, 184.  
*Sisyrinchium angustifolium*, 157, 173.  
*Sium cicutaefolium*, 196.  
 Skull-cap, 200.  
 Smartweed, 160, 179.  
*Smilacina racemosa*, 172.  
     *stellata*, 172.  
 Smilax, upright, 172.  
*Smilax ecirrhata*, 172.  
     *herbacea*, 172.  
     *hispidia*, 154, 172, 561.  
 Snakeroot, 158, 192, 196.  
 Sneeze-weed, 210.  
 Snowberry 204.  
 Soapwort, 181.  
 Soils, 131, 290, 393, 446, 495, 542, 639, 642.  
     alluvial, 130, 290, 394, 446, 497, 541, 640.  
     drift, 132, 290, 393, 495, 542.  
     loess, 131, 290, 393, 447, 496, 542, 639.  
     residual, 131, 497, 640.  
     sandy, 639.  
*Solanum nigrum*, 160.  
*Solidago bicolor*, 207.  
     *canadensis*, 207.  
     *flexicaulis*, 206.  
     *hispida*, 207.  
     *lanceolata*, 207.  
     *latifolia*, 206.  
     *missouriensis*, 207.  
     *nemoralis*, 207.  
     *rigida*, 207.  
     *rigidiuscula*, 207.  
     *serotina*, 157, 207.  
     *serotina gigantea*, 207.  
     *speciosa*, 157, 207.  
     *tennifolia*, 207.  
     *uliginosa*, 207.  
     *ulmifolia*, 158, 207.  
 Solomon's seal, 157, 172.  
*Sonchus asper*, 160, 205.  
*Sophia intermedia*, 185.  
 Soursley's quarry, 277, 292.  
 South Fork township, elevation of, 584.  
 Sow-thistle, 160, 205.  
 Spanish needle, 160, 210.  
*Sparganium eurycarpum*, 170.  
*Spartina cynosuroides*, 159, 167.  
*Spathyema foetida*, 171.  
 Speedwell, 160, 202.  
 Spiderwort, 171.  
 Spikenard, 172, 195.  
 Spike-rush, 168.  
*Spiraea salicifolia*, 153, 186.  
*Spiranthes gracilis*, 174.  
*Spirifer bimesialis*, 420.  
     *disjuncta*, 479.  
     *eurutines*, 422.  
     *hungerfordi*, 480.  
     *manni*, 422.  
     *oweni*, 422.  
     *parryanus*, 424.  
     *pennatus*, 113, 115, 133, 345, 355, 420, 422.  
         beds, 352, 420, 421.  
     *subrotundatus*, 484.  
     *subumbonus*, 113, 115, 116.  
     *subvaricosus*, 116, 422.  
     *whitneyi*, 479, 480.  
*Spirodela polyrrhiza*, 171.  
*Sporobolus cuspidatus*, 166.  
 Spring beauty, 157, 180.  
 Spring creek, 469.  
     section at, 484.  
 Springs, Winneshiek county, 139.  
 Spruce, Norway, 155, 156.  
 Spurge, 160, 192.  
 Squaw weed, swamp, 211.  
 Squirrel corn, 184.  
*Stachys aspera*, 201.  
     *palustris*, 201.  
*Staphylea trifolia*, 154, 192.  
 Star-grass, 173.

- Stead Bros. & Guenther brickyard, 449.
- Steironema ciliatum*, 197.  
*longifolium*, 197.  
*quadriflorum*, 197.
- Stellaria longifolia*, 181.  
*media*, 181.
- Stipa spartea*, 166.
- Stitchwort, 181.
- Stoeffler lime kiln, 296.
- Stone, production of, by counties, 32.  
 by years, 19, 34.  
 classified, 31, 34.
- Stoop quarry, 226, 262, 291.
- Strapxollus claytonensis*, 243.  
*cyclostomus*, 429.  
*pristiniformis*, 243.
- Stratigraphy of Black Hawk county, 419.  
 Bremer county, 335.  
 Clayton county, 233.  
 Franklin county, 472.  
 Jackson county, 590.  
 Sac and Ida counties, 525.  
 Winneshiek county, 58.
- Strawberries, 187.
- Strawberry Point, water supply, 304.
- Streptelasma, 34.
- Streptelasma corniculum*, 85, 594, 605, 608.
- Stricklandinia castellana*, 617.
- Stromatopora, 343, 344.
- Stromatopora erratica*, 422.  
 beds, 432.
- Stropheodonta arcuata*, 480.  
*demissa*, 116, 355, 424, 480.
- Strophomena incurvata*, 85, 87, 608.  
*nutans*, 603.  
*planumbona*, 87, 104, 608.  
*rugosa*, 87, 255.
- Struthiopteris struthiopteris*, 157, 163.
- Sullivantia ohionis*, 186.  
*sullivantii*, 186.
- Sumach, 154, 155, 192, 553.
- Sumner, elevation of, 327.  
 strata at, 401.
- Sumner township, 388.  
 well, 401.  
 section of, 402  
 strata in, 404.
- Sunflower 160, 209, 210.
- Survey, Iowa Geological, unpublished work of, 1.
- Sweet Cicely, 196.
- Sweet-clover, 189.
- Sycamore, 186.
- Symphoricarpos occidentalis*, 154, 204, 557.  
*racemosus*, 204.
- Symplocarpus foetidus*, 171.
- Syn-desmon thalictroides*, 157, 182.
- Synosma suaveolens*, 211.
- Synthetodus, 357.
- Syringopora tenella*, 278, 279.  
 beds, 279.
- Sysymbrium officinale*, 184.
- Taenidia integerrima*, 196.
- Tanacetum vulgare*, 160, 210.
- Tansy, 160, 210.
- Tansy-mustard, 185.
- Taraxacum officinale*, 159, 205.
- Taxus canadensis*, 153, 165.
- Temperatures in Ice Cave, 144.
- Ten Mile creek, 57.
- Tentaculites sterlingensis*, 272, 608.
- Tephrosia virginiana*, 190.
- Terebratula elia*, 422.  
*jucunda*, 422.  
*romingeri*, 422.
- Terraces, 59, 124, 129, 287, 445, 493, 582.
- Teucrium canadense*, 200.
- Thalictrum dioicum*, 183.  
*purpurascens*, 183.
- Thelypodium pinnatifidum*, 184.
- Thicker, Quarystone Beds of Platteville, 82.
- Thin, Brittle Beds of Platteville, 82.
- Thistle, 159, 160, 180, 201, 211.
- Thornapple, 159.
- Tickseed, stiff, 210.
- Tick-trefoil, 190.
- Tile plant, Beamer, 646.  
 Fox, 502.  
 Mellon, 243.  
 Wilson Brothers, 501.
- Tilia americana*, 154, 194, 551.
- Timothy, 159, 166.
- Tobacco, Indian, 205.
- Topographic maps, 7.
- Topography, effect of geological formations on, 49.
- Topography, pre-glacial, 386.
- Topography of Kansan drift, 365.
- Topography of Black Hawk county, 412.  
 Bremer county, 324.  
 Clayton county, 219.  
 Franklin county, 458.  
 Jackson county, 568.  
 Sac and Ida counties, 514.  
 Winneshiek county, 47.
- Touch-me-not, 193.
- Tradescantia bracteata*, 171.  
*reflexa*, 171.  
*virginica*, 171.
- Trees and shrubs of Winneshiek county, 153.

- Trenton limestone, 80, 247.  
(see also Plattville.)  
character, 82, 251.  
distribution, 82, 258.  
dolomitization, 250.  
thickness, 82, 258.
- Trifolium arvense*, 189.  
*hybridum*, 190.  
*pratense*, 189.  
*procumbens*, 160.  
*repens*, 160, 190.
- Trillium*, 157.  
*erectum*, 172.  
*nivale*, 158, 172.
- Triosteum aurantiacum*, 204.  
*perfoliatum*, 204.
- Tripoli, elevation of, 327.
- Trochonema umbilicata*, 94, 254.
- Trout creek, 57.
- Tufa, exposure of, 125.
- Turkey river, 224, 232.
- Twayblade, 174.
- Twin-flower, 204.
- Typha latifolia*, 170.
- Udden, J. A., cited, 631.
- Ulmus americana*, 153, 178, 557.  
*fulva*, 154, 162, 178, 557.  
*racemosa*, 154, 178.
- Unconformities, 132, 289, 448, 641.
- Unifolium canadense*, 172.
- Upham, Warren, cited, 457, 465.
- Upper Devonian series, 477.
- Upper Iowa river, 47, 57.
- Urtica gracilis*, 160, 178.
- Urticastrum divaricatum*, 178.
- Utricularia vulgaris*, 203.
- Uvularia grandiflora*, 157, 171.  
*sessilifolia*, 157, 171.
- Vaccaria vaccaria*, 181.
- Vagnera racemosa*, 157, 172.  
*stellata*, 157, 172.
- Valley trains in Winneshiek county, 59.
- Vallisneria spiralis*, 170.
- Velvet-leaf, 160, 194.
- Verbascum*, 160.
- Verbena, 160.  
*bracteosa*, 200.  
*hastata*, 200.  
*stricta*, 200.  
*urticifolia*, 200.
- Veronia fasciculata*, 206.
- Veronica anagallis*, 202.  
*anagallis-aquatica*, 202.  
*arvensis*, 202.  
*peregrina*, 160, 202.  
*virginica*, 202.
- Vervain, 200.
- Vetch, 158, 190.
- Vetchling, 191.
- Viburnum, 162.  
*Viburnum dentatum*, 154, 204.  
*lentago*, 153, 154, 204.  
*opulus*, 154, 162, 203.  
*prunifolium*, 162, 557.  
*pubescens*, 203.
- Vicia americana*, 158, 190.  
*angustifolia*, 191.  
*cracca*, 190.  
*sativa*, 191.
- Viola canadensis*, 195.  
*palmata*, 195.  
*papilionacea*, 157, 195.  
*pedata*, 157, 194.  
*pedatifida*, 157, 194.  
*pubescens*, 157, 195.  
*scabriuscula*, 195.
- Violet, 156, 157, 172, 194, 195.
- Virginia creeper, 154, 155, 193.
- Virgin's-bower, 153, 157, 183, 552.
- Vitis riparia*, 193, 552.  
*vulpina*, 153, 193.
- Volga river, 224, 232.  
section on, 269.
- Wahoo, 153, 192.
- Wake-robin, 153, 172.
- Walker, C. W., 301.
- Wall Lake, 517.  
"walls" of, 517.
- Walnut, 153, 155, 156, 175, 558.
- Wapsipinicon limestone, 113, 345, 420, 438.  
analysis, 351.  
divisions, 345.  
sections, 348, 351.
- Wapsipinicon river, 327.
- Warren township, 389.
- Washburn, altitude of, 417.
- Washington township, 398.
- Washingtonia claytoni*, 196.
- Water crow-foot, white, 156, 183.
- Water horizons, presence of in Iowa, 4.
- Water-leaf, 158, 199.
- Water-plantain, 170.
- Water powers, 140, 305, 394, 452, 507, 548.
- Water supplies, 139, 300, 395, 450, 505, 547, 647.
- Waterloo, section at, 421.  
water supply of, 450.
- Waterloo & Cedar Falls brick yard, 449.
- Waverly, elevation of, 327.  
strata at, 401.  
loess-Kansan area, character, 370.  
well, 342, 397.

- section, 398.  
 strata, 400.  
 Weber quarry, 134.  
 Weems, J. B., cited, 259, 647.  
 Wells, Ackley, 476.  
     Bauman, 340.  
     Bennett, 351.  
     Buhr, 340.  
     Chase, 351.  
     Clausing, 339.  
     Cotton, 351.  
     Falcher, 362.  
     Farrington, 363.  
     Hampton, 474.  
     Maquoketa, 648.  
     McQuesney, 341.  
     Sabula, 647.  
     Schmidt, 341, 362.  
     Schnoeder, 363.  
     Schwem, 362.  
     Sumner, 401.  
     Waverly, 342, 397, 398.  
     Winzenberg, 340.  
     Zwanziger, 340.  
 West Fork, terraces on, 493.  
 Wheat-grass, 168.  
 White, C. A., cited, 40, 44, 64, 143, 219,  
     457, 513, 519, 567.  
 Whitfield, R. P., cited, 324, 422.  
 Whitlow-grass, Carolina, 185.  
 Whitney, J. D., cited, 106, 218, 410,  
     567.  
 Wilder, F. A., cited, 452, 514.  
     report for 1905, 1.  
 Williams, Ira A.,  
     Geology of Franklin county,  
     449.  
     work of, 5.  
 Willow, 153, 154, 155, 175, 560.  
 Willow-herb, 157, 195.  
 Wilson Brothers, tile plant, 501.  
 Wilson Junction, elevation of, 417.  
 Winchell, N. H., cited, 237, 239, 248.  
 Winneshiek county, Geology of, 37.  
     alluvium, 130.  
     altitudes, 56.  
     annotated list of  
     plants, 162.  
     area, 43.  
     Brainard shale,  
     97, 108.  
     Buchanan grav-  
     els, 122.  
     building stones,  
     133.  
     Cambrian system,  
     62.  
     Canadian series,  
     64.  
     caves, 141.  
     Cedar Valley  
     limestone, 113.  
     clays, 138.  
     Clermont shale,  
     98, 105.  
     Cresco - Calmar  
     ridge, 45, 56, 57.  
     Decorah shale, 84.  
     Devonian system,  
     113.  
     drainage, 57.  
     driftless area to-  
     pography, 43, 47.  
     economic pro-  
     ducts, 133.  
     effect of geologi-  
     cal formations  
     on topography,  
     49.  
     Elgin shaly lime-  
     stone, 98, 102.  
     flora of, 147.  
     forest problems,  
     150.  
     Ft. Atkinson  
     limestone, 98,  
     106.  
     Galena limestone,  
     87.  
     geest, 59, 117.  
     geographic rela-  
     tions of strata,  
     58.  
     geological forma-  
     tions, 44, 61.  
     gold, 140.  
     Iowan drift, 128.  
     Iowan loess, 130.  
     Iowan sand ter-  
     races, 129.  
     Isotelus beds, 98.  
     Jordan sandstone,  
     62.  
     Kansan drift, 49,  
     119.  
     lime, 137.  
     loess, 126, 130.  
     Maquoketa beds,  
     94.  
     medicinal plants,  
     161.  
     Middle Devonian  
     series, 113.  
     new geological  
     names, 60.  
     Niagara lime-  
     stone, 109.  
     Oneota limestone,  
     64.



- Ordovician sys-  
tem, 64.  
paha, 55.  
physiography, 47.  
Platteville lime-  
stone, 80.  
Pleistocene sys-  
tem, 119.  
post-Kansan loess,  
126.  
Potsdam series,  
62.  
re-erosion of man-  
tle rock, 55.  
relief, 57.  
residual mater-  
ial, 117.  
road materials,  
138.  
St. Croix sand-  
stone, 62.  
Silurian system,  
109.  
soils, 131.  
springs, 139.  
stratigraphy, 58.  
table of forma-  
tions, 60.  
terraces, 59, 124.  
topography, 47.  
trees and shrubs,  
153.  
Trenton series,  
80.  
unconformities,  
132.  
valley trains, 59.  
Wapsipinicon  
limestone, 113.  
water powers,  
140.  
water supplies,  
139.  
Winslow, elevation of, 417.
- Wintergreen, 197.  
Winzenberg well, 340.  
Wisconsin drift, character, 492, 536.  
moraines, 463.  
sections, 538.  
soils, 495, 537.  
topography, 463, 535.  
Wisconsin drift area, 463.  
drift plain, topography, 466.  
gravel trains and terraces,  
493.  
gravels, 539.  
Wolf-berry, 154, 204, 557.  
*Woodsia ilvensis*, 163.  
Wood-sorrel, 191.  
Wool-grass, 169.  
Wormwood, 210.  
Worth, Dr. F., acknowledgments, 146.  
Worthen, A. H., cited, 410.  
Werthen, Meek and, cited, 94.
- Xanthium canadense*, 206.  
*echinatum*, 160, 206.  
*Xanthoxylum americanum*, 154, 162,  
191, 551.
- Yam root, 173.  
Yarrow, 210.  
Yellow river, 58.  
Yew, American, 153, 165.
- Zaphrentis, 278, 343.  
*Zaphrentis gigantea*, 422.  
*stokesi*, 278, 616.  
Zinc and lead, production of, 1903, 19.  
1904, 19.  
1905, 15.  
35.
- Zizia aurea*, 196.  
Zwanziger well, 340.  
*Zygadenus elegans*, 171.  
*modesta*, 605.  
*Zygospira*, 601.

