Andmine Come by Aleka widely lift of Bellevic, gravely personal

THUNDER

Son which of keeps on himself Policia registrate restauration.

Ackley, analyses of sands from, 668 tests of gravels from, 657

Adair county, sand and gravel in, 55 stone in, 56

Adams county, sand and gravel in, 58 stone in, 59

Afton Junction, gravels near, 575, 685

Aftonian gravels, 54

Akron, gravels near, 517 in Decatur county, 210

in Harrison county, 319

in Iowa county, 346

in Louisa county, 411 in Marshall county, 450

in Monona county, 471

in Union county, 575

in Wapello county, 588

Albany, analyses of sands from, 666 gravels at, 261

tests of gravels from, 656

Alden, quarries at, 316

Algona, Analyses of sand from, 668 tests of gravels from, 657

Allamakee county, abrasion and impact tests of stone from, 650 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, 648

sand and gravel in, 60 stone in, 62, 672 tests of gravels from, 656

Almont, gravel at, 679

Alta, gravels near, 106

Alton, gravel near, 561, 684

Ames, analyses of sands from, 668 gravels at, 569, 684

tests of gravels from, 658

Amsterdam, sand at, 680

Analyses of Iowa coals, 687

Analysis of ash of coal samples, 700 of coal, 757

att green cost, at

and common male of 1900 Allebello Inced int energy level of the Later burner.

calculations, 701 proximate, 692

ultimate, 696

Analyses of coal from (pp. 704-737)

Angus, Greene county, 718 Bear Creek, Wapello county, 716

Bolton, Mahaska county, 730

Colfax, Jasper county, 732

Des Moines, Polk county, 724, 728.

Enterprise, Polk county, 734

Hawkeye, Marion county, 726

High Bridge, Dallas county, 720

Hiteman, Monroe county, 714

New Market, Taylor county, 712

Ogden, Boone county, 710

Rutledge, Wapello county, 722

Rose Hill, Mahaska county, 704

What Cheer, Keokuk county, 708

White City, Mahaska county, 706.

Analyses of stone from

Andrews' quarry, 664

Bealer's quarry, 129

Carpenter quarry, 660

Chalk, Plymouth county, 518

Dearborn & Sons quarry, 662

Gable quarry, 470

Green, J. A., quarry, 662

Iowa Portland Cement Co. quarry,

LeClaire Stone Company, 663, 664

McWilliams-Mowry quarry, 81

Williams, Wilkes, quarry, 661

Wilson quarry, 415

Winterset, 442

Anamosa, gravels near, 372

quarries near, 373, 674

Amamosa dolmites, 48 analyses of limestones from, 662, 664 Anamosa phase in Cedar county, 124 in Jones county, 373 in Linn county, 405 in Scott county, 547 Anderson, A. O., analyses by, 343, 470, 659-664 Anthon, gravels near, 618 Appanoose county, abrasion and impact tests of stone from, 650 analyses of limestone from 659 cementation tests of stone from, 654 mechanical analyses of stone from, 648 sand and gravel in, 68 stone in, 68, 672 Arey, M. F., cited, 301 Arion, gravels near, 202 Armstrong, analyses of sands from, 666 tests of gravels from, 656 Armstrong Bros. Coal Co., 708 Ash in coal, determination, 694 effect on price, 759 Ash in Iowa coals, 743 Atlantic, gravels near, 120 Atwood Coal Co., 704 Auburn Mills, analyses of limestone from, 661 stone at, 268 Audubon county, sand and gravel in, 69 Augusta, quarries at, 232 Average coal, 736 Avoca, gravels near, 528 Avon, gravels at, 683

B

Badger, analyses of sands from, 670
tests of gravels from, 658
Bagley, gravels near, 303
Bain, H. F., 216, 240, 304, 306, 527, 596, 622
Ballinger, quarries near, 399, 675
Bancroft, gravels near, 681
Bayard, gravels near, 303
Beaman, stone near, 302
Bedford, analyses of limestone from, 664
quarry at, 575
Belfast, quarry at, 400

Bellevue, gravels near, 348 quarries at, 351 Belmond, analyses of sands from, 670 gravels at, 630, 685 tests of gravels from, 658 Beloit, gravels near, 426, 557 Bennett Bros. Coal-Co., 728 Benton county, abrasion and impact tests of stone from, 650 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from 648 sand and gravel in, 69 stone in, 71, 672 tests of gravels from, 656 Benton substage in Plymouth county, 517 Bentonsport, analyses of limestone from, 664 gravels near, 579 Berkley, gravels near, 84 Bethany substage, analyses of limestone from, 663 in Adair county, 56 in Decatur county, 213 Bethany substage in Guthrie county, 305 in Madison county, 435 Bettendorf, analyses of limestone from, quarries near, 552, 676 Beyer, S. W., Road and concrete materials of Iowa, 33 Bids for coal, comparison of, 751 rejection of, 749 Big Creek, gravels on, 524 Big Sioux river, gravels on, 425, 511, Black Hawk county, abrasion and impact tests of stone from, 650 analyses of limestone from, 659 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, sand and gravel in, 77, 677 stone in, 79, 672 tests of gravels from, 656

Buchanan gravel-Con.

Blencoe, analyses of sands from, 668 tests of gravels from, 657 Blockley, gravel at, 213 Bloomington, quarry at, 569 Bolton-Hoover Coal Co., 730 Bonaparte, quarries near, 579, 580, 585 Boone county, analyses of sands from, sand and gravel in, 83, 677 tests of gravels from, 656 Boone river, gravels on, 307, 635 Booneville, gravel at, 679 Bouton, gravel at, 679 Bowlders of drift, 54 Boyer river, gravels on, 202 Brandon, quarries at, 101 Bremer county, abrasion and impact tests of stone from, 650 analyses of limestone from, 659 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, 648 sand and gravel in, 85, 677 stone in, 87, 672 tests of gravels from, 656 Brick for road work, 41 Brighton, quarries near, 597 Bristow, quarries near, 109 Buchanan county, abrasion and impact tests of stone from, 650 analyses of limestone from, 659 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, 648 sand and gravel in, 91 stone in, 98, 672 . tests of gravels from, 656 Buchanan gravels, 54 in Benton county, 69 in Black Hawk county, 77 in Bremer county, 85 in Butler county, 107 in Cerro Gordo county, 138 in Cherokee county, 166

in Chickasaw county, 166

in Clay county, 177 in Clayton county, 182 in Davis county, 210 in Delaware county, 216 in Dubuque county, 240 in Fayette county, 259, 264 Buchanan gravels in Franklin county, 288 in Grundy county, 300 in Hardin county, 312 in Henry county, 328 in Howard county, 333 in Humboldt county, 341 in Jones county, 370 in Louisa county, 412 in Marshall county, 450 in Mitchell county, 464 in Pocahontas county, 520 in Sac county, 544 in Winneshiek county, 606 Buena Vista county, analyses of sands from, 666 sand and gravel in, 103, 677 tests of gravels from, 656 Buffalo, cementation tests of stone from, 655 mechanical analyses of stone from, quarry near, 555, 676 Bureau of Standards, 698 Burlington, analyses of limestone from, gravel at, 679 quarries at, 673 Burlington substage in Van Buren county, 578 Burnt clay ballast for road work, 41 Busti, gravels near, 333 Butler county, abrasion and impact tests of stone from, 650 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, 648 sand and gravel in, 107, 677 stone in, 109 tests of gravels from, 656 Butlerville, quarry near, 572

C

Calhoun county, analyses of sands from, 666 sand and gravel in, 111 stone in, 115 tests of gravels from, 656

Calmar, quarry near, 614

Calorific value of coal, 698

Calumet, gravels near, 494, 783

Calvin, Samuel, cited, 66, 69, 85, 91, 136, 170, 219, 220, 240, 333, 345, 366, 367, 465, 466, 505, 605, 607, 613, 616

Cambrian system, rock in, 44
Cambridge, gravels at, 569
Campbell Coal Co., 712
Carbon in coal, 696
Carboniferous system, rock in, 49
Carroll, gravels near, 119
Carroll county, sand and gravel in, 116, 678

Carson, quarries near, 531

Cascade, analyses of limestone from, 660 . cementation tests of stone from, 654 mechanical analyses of stone from, 648

Cass county, sand and gravel in, 120 stone in, 121

Castana, gravels at, 472

Cedar Bluff, quarry at, 130

Cedar county, abrasion and impact tests of stone from, 650 analyses of limestone from, 659 cementation tests of stone from, 654 mechanical analyses of stone from, 648

sand and gravel in, 123 stone in, 123, 672

Cedar creek, gravels on, 539

Cedar Falls, analyses of sands from, 666 cementation tests of stone from, 654

Cedar Falls

gravel at, 79, 677
mechanical analyses of stone from,
648
quarries at, 80, 672
tests of gravels from, 656

Cedar Rapids, cementation tests of stone from, 655 mechanical analyses of stone from, 649

quarries at, 410, 675, 681

Cedar river, gravels on, 274, 412, 464

Cedar Valley, analyses of limestone from, 659 cementation tests of stone from, 654 mechanical analyses of stone from,

648 quarries at, 124, 672

Cedar Valley stage, 49 analyses of limestones from, 659, 660, 662, 663

in Benton county, 72 in Black Hawk county, 79

in Bremer county, 87 in Buchanan county, 100

in Cerro Gordo county, 144

in Floyd county, 276

in Johnson county, 364 in Linn county, 411

in Mitchell county, 466

in Scott county, 555 in Worth county, 624

Cementing value of stone, 637

Centerville, cementation tests of stone from, 654

mechanical analyses of stone from, 648

Cerro Gordo county, abrasion and impact tests of stone from, 650 analyses of limestone from, 660 cementation tests of stone from, 654 mechanical analyses of stone from, 648

Cerro Gordo county, sand and gravel in, 136, 678 stone in, 144, 672 Chapin, quarry near, 289 Chariton, quarries near, 417 Chariton conglomerate in Appanoose county, 69 Charles City, analyses of sands from, cementation tests of stone from, 654 gravels at, 275, 680 mechanical analyses of stone from, quarries at, 284, 673 tests of gravels from, 656 Charlotte, cementation tests of stone from, 654 mechanical analyses of stone from, 648 . Cherokee, analyses of sands from, 666 gravels at, 160, 678 tests of gravels from, 656 Cherokee county, analyses of sands from, 666 sand and gravel in, 155, 678 tests of gravels from, 656 Chester, gravels near, 333 Chickasaw, cementation tests of stone from, 654 gravels near; 169 . mechanical analyses of stone from, quarries at, 170 Chickasaw county, abrasion and impact tests of stone from, 650 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, sand and gravel in, 166 stone in, 170 tests of gravels from, 656 Chillicothe, sand near, 590 Churdan, gravels near, 299 Clarinda, analyses of sands from, 668 tests of gravels from, 657 Clarke county, analyses of limestone from, 660 sand and gravel in, 172 stone in, 173 Clarksville, gravels at, 108, 677 quarries at, 110 Clay, burnt, for road work, 41 distribution, 41.

Clay county, analyses of sands from, sand and gravel in, 174, 678 tests of gravels from, 656 Clay Mills, stone near, 372 Clayton, sand at, 678 quarry at, 184 Clayton county, abrasion and impact tests of stone from, 650 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, 648 sand and gravel in, 178, 678 stone in, 183, 673 tests of gravel from, 656 Clemons, analyses of sands from, 668 gravels at. 682 tests of gravels from, 657 Clermont, analyses of limestone from, 661 analyses of sands from, 666 cementation tests of stone from, 654 gravels at, 257, 680 mechanical analyses of stone from, 648 quarries at, 264 tests of gravels from, 656 Cliffland, cementation tests of stone from, 655 mechanical analyses of stone from, 649 Climax, quarry near, 479 Clinton, analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, 648 gravel at, 679 quarries at, 193 tests of gravels from, 656 Clinton county, abrasion and impact tests of stone from, 651 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, sand and gravel in, 191, 679 tests of gravels from, 656 stone in, 193

770

Clutier, analyses of sands from, 668 sand near, 572 tests of gravels from, 658 Coal, purchase of, under specifications, 747 storing of, 746 Coal Measures in Iowa county, 346 Coal samples, preparation, 693 Coal sampling, method, 692 Coals desired, description of, 750 Coburg, sand near, 474 Coggan, quarry near, 409 Coggan stage, analyses of limestones from, 660 in Benton county, 71 in Linn county, 409 Coin, quarries near, 505 Coke from Iowa coals, 743 Colfax, gravel near, 354 Colfax Consolidated Coal Co., 732 Commerce, gravels at, 683 Conglomerate in Guthrie county, 303 Conrad, cementation tests of stone from, 654 mechanical analyses of stone from, 648 quarry at, 302 Coon Mound, gravels on, 601, 685 Coon Rapids, gravels at, 118 Coover, W. F., work of, 42 Coppock, gravel near, 596, 681 Coralville, quarries near, 365 Cornelia, gravels near, 636 Corning, quarry at, 59 Correctionville, analyses of sand from. 670 gravels near, 618, 685 tests of gravel from, 658 Council Bluffs, sand near, 530 Crawford county, analyses of sands from, 666 sand and gravel in, 202 tests of gravels from, 656 Crescent, quarry near, 532 Crescent Coal Co., 706

Cresco, cementation tests of stone from,

quarry at, 336, 674

mechanical analyses of stone from,

Cretaceous system, analyses of limestones from, 664 rock in, 53 in Calhoun county, 115 in Cass county, 121, 123 in Guthrie county, 306 in Plymouth county, 517 in Pottowattamie county, 532 in Sac county, 545 Cylinder, gravels near, 510

D

Dakota conglomerate in Guthrie county, 304 Dakota sandstone in Cass county, 123 Dallas county, sand and gravel in, 204, 679 stone in, 206 Davenport, analyses of sands from, 668 gravels at, 684 tests of gravels from, 658 Davis City, cementation tests of stone from, 654 gravel at, 213 mechanical analyses of stone from, 648 quarries at, 213, 673 Davis county, sand and gravel in, 209 stone in, 210 Decatur county, abrasion and impact tests of stone from, 651 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, 648 sand and gravel in, 210 stone in, 213, 673 tests of gravels from, 656 Decorah, analyses of limestone from, cementation tests of stone from, 655 gravels near, 605, 685. mechanical analyses of stone from, 649 quarries at, 610, 676 DeKalb, analyses of sands from, 666 tests of gravels from, 656 DeKalb limestone, 52 in Decatur county, 215

Delaware county, analyses of sands from, 666 sand and gravel in, 216, 679 stone in, 220, 673 tests of gravels from, 656

Delaware stage in Delaware county, 220

Delhi, quarries near, 223

Delivery of coal, 753

Denison, analyses of sands from, 666 gravels at, 203 tests of gravels from, 656

Department of Bridges and Highways of France, test of stone by, 638

Des Moines, analyses of sands from, 668 gravels near, 527, 683, 684 tests of gravels from, 657

Des Moines county, abrasion and impact tests of stone from, 651 analyses of limestone from, 660 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, 648 sand and gravel in, 225, 679 stone in, 226, 673

Des Moines river, gravels on, 84, 204, 251, 339; 443, 444, 473, 507, 518, 524, 577, 590, 595, 600

Des Moines stage, 51 analyses of limestones from, 659

tests of gravels from, 656

in Appanoose county, '68 in Dallas county, 206

in Davis county, 210

in Guthrie county, 306

in Jasper county, 354

in Lucas county, 416 in Marshall county, 461

in Muscatine county, 485

in Polk county, 527

in Wayne county, 600

Deval test for stone, 643

Devonian system, analyses of limestones from, 659

rock in, 48

in Buchanan county, 98

in Butler county, 109

in Cedar county, 136

in Cerro Gordo county, 144

in Chickasaw county, 170

in Fayette county, 269

in Floyd county, 276

in Howard county, 335

in Johnson county, 364

in Linn county, 406

in Mitchell county, 466

in Muscatine county, 482

in Scott county, 552

De Witt, analyses of sands from, 666 gravel at, 191, 679

tests of gravels from, 656

Diagonal, sand near, 533

Dickinson county, sand and gravel in, 234, 679

Doon, analyses of sands from, 668 gravels at, 418, 682 tests of gravels from, 657

Dorchester, quarries near, 65

Dows, analyses of sands from, 670 gravel near, 287, 636

tests of gravels from, 658

Dubuque, analyses of limestone from, 661

analyses of sand from, 666

gravels at, 239, 679 quarries at, 673

tests of gravels from, 656

Dubuque county, analyses of limestone from, 660

analyses of sands from, 666

sand and gravel in, 238, 679

stone in, 241, 673

tests of gravels from, 656

Dudley, quarries at, 592

Dumont, analyses of sands from, 666 cementation tests of stone from, 654

gravel at 678 mechanical analyses of stone from,

648 quarries near, 109

tests of gravels from, 656

Dyersville, gravels at, 219, 679

E 'a Chart and more

Eagle City, quarries at, 316 Eagle Grove, analyses of sands from, tests of gravels from, 658 Eagle Point, analyses of limestone from, 660 Earlham, analyses of limestone from, 663 cementation tests of stone from, 655 mechanical analyses of stone from. 649 quarries near, 436, 675 Earlham limestone, 52 in Decatur county, 213 in Guthrie county, 305 in Madison county, 436 Earlville, gravels at, 218 Early, analyses of sands from, 668 gravels near, 540 tests of gravels from, 657 East Nishnabotna river, sand on, 474. 504 East Peru, quarries at. 675 Eddyville, analyses of sands from, 668 gravels near, 473, 682, 685 quarries near, 591, 676 tests of gravel's from, 657 Eldora, gravels at, 680 Eldora sandstone in Hardin county, 318 Eldorado, gravels near, 258 Elgin, gravels at. 256 Elkader, analyses of sands from, 666 cementation tests of some from, 654 gravels at, 179 mechanical analyses of stone from, 648 quarry at, 185, 673 tests of gravels from, 656 Elkport, gravels at, 180 Ellis, C. E., analyses of limestone by, 659, 662, 664 Elm Springs, gravels near, 557 Elma, quarries at, 339 Emmet county, analyses of sands from, 12 CO 1 Some sand and gravel in, 251, 679

tests of gravels from, 656

Emmetsburg, gravels near, 509, 683

Engineering Experiment Station, cooperation with, 42

English Creek Coal Co., 726

Enterprise Coal Co., 734

Escka Method for sulphur, 694

Estherville, gravels at, 252, 679

F

Fairbank, quarry at, 100, 271 Fairfield, sand near, 361 Fairport, cementation tests of stone from, 655 mechanical analyses of stone from, Farley, quarries at, 250, 673 Farmington, analyses of limestone from, 664 analyses of sands from, 670 cementation tests of stone from, 655 gravels at, 578, 685 mechanical analyses of stone from, 649 quarries near, 587 tests of gravels from, 658 Farragut, sand near, 462 Fayette, cementation tests of stone from, 654 gravels at, 262 mechanical analyses of stone from, 648 quarries at, 269 Fayette county, abrasion and impact tests of stone from, 651 analyses of limestone from, 661 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, 648 sand and gravel in, 256, 680 stone in, 264, 673 tests of gravels from, 656 Fertile, quarry at, 628 Fixed carbon in coal, 694, 742 Flagler, quarry near, 447 Florenceville, quarry near, 335 Floyd, gravels at, 275, 680 quarries at, 284

Floyd county, abrasion and impact tests of stone from, 651 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, 648 sand and gravel in, 274, 680 stone in, 276, 673 tests of gravels from, 656 Floyd river, gravels on, 486, 511, 561 Forbes limestone in Page county, 504 Forest City, gravels near, 310, 680, 685 Forestville, quarries near, 225 Fort Atkinson, cementation tests of stone from, 655 gravels at, 607 mechanical analyses of stone from, 649 quarries at, 613 Fort Atkinson dolomite in Winneshiek county, 613, 616. Fort Dodge, analyses of sands from, 670 gravels near, 600, 685 quarries near, 601 tests of gravels from, 658 Ft. Dodge, Des Moines and Southern Railway Co., mine of, 710 Fort Madison, cementation tests of stone from, 655 mechanical analyses of stone from, 649 sand at, 681 Fragmental limestone, 52 in Decatur county, 213 in Guthrie county, 305 in Madison county, 436 Franklin, cementation tests of stone from: 655 mechanical analyses of stone from, 649 quarry near, 403 Franklin county, abrasion and impact tests of stone from, 651 analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses or stone from,

Franklin county—Con.
sand and gravel in, 286, 680
stone in, 288
tests of gravels from, 656
Frazer, analyses of sands from, 666
gravels at, 84, 677
tests of gravels from, 656
Frederika, quarries at, 90
Freeport, sand near, 606
Fremont county, sand and gravel in, 293
stone in, 294
French Coefficient of Wear, 643
Fruitland, sand at, 683
Fuhlweiler, 741

G

Galena limestone, 46 analyses of, 660, 664 in Dubuque county, 245 in Jackson county, 350 Galena-Platteville in Clayton county, 183 in Howard county, 335 in Winneshiek county, 609 Garnavillo, limestone at, 673 Garner, gravels near, 309 Garrison, cementation tests of stone from, 654 mechanical analyses of stone from, 648 quarry near, 75 Gas from Iowa coal, 741 Geest as road material, 67, 191 Geode shales in Van Buren county, 579 Geology of Iowa road and concrete materials, 42 George, gravels at, 424 Gifford, analyses of sands from, 668 gravels at, 311, 680 tests of gravels from, 657 Gillett Grove, gravels at, 177 Gilmore City, analyses of stone from, cementation tests of stone from, 655 mechanical analyses of stone from, quarry at, 523, 676

Givin, limestone at, 675 Glacial bowlders, distribution, 41 Glendon, conglomerate near, 304 quarries near, 307 Gordon, 399, 579, 580, 584, 585 Gordons Ferry, quarry at, 349 Gower stage, 48 analyses of limestones from, 659, 662, 664 in Cedar county, 124 in Jones county, 373 in Johnson county, 363 in Scott county, 547 Graettinger, gravels near, 252, 509, 679, Grand Junction, analyses of sands from, 666 gravels at, 680 tests of gravels from, 656 Grand Mound, gravels at, 192, 679 Grand River, gravel at, 213 Grand river, sand and gravel on, 213, 533, 577 Granite, gravels at, 425, 682 Grant, quarry near, 480 Grant City, stone at, 545 Gravel and sand, distribution, 39 Green Horn limestone in Plymouth county, 517 Green Island, gravels near, 349 Greene, cementation tests of stone from, 654 mechanical analyses of stone from, 648 gravels at, 107, 678 quarries near, 111 Greene county, analyses of sands from, 666 sand and gravel in, 295, 680 tests of gravels from, 656 Grundy Center, analyses of sands from, 668 gravels at, 300, 680 tests of gravels from, 657 Grundy county, abrasion and impact tests of stone from, 651 analyses of sands from, 668 cementation tests of stone from, 654 Grundy county—Con.

mechanical analyses of stone from,
648
sand and gravel in, 300, 680
stone in, 302
tests of gravels from, 657
Guthrie county, sand and gravel in,
303
stone in, 305
Guttenburg, cementation tests of stone
from, 654
gravels at, 178, 678
mechanical analyses of stone from,
648
quarry at, 185, 673

Hale, cementation tests of stone from, 654 gravels near, 372 mechanical analyses of stone from, 648 quarries at, 674 Hamilton county, analyses of limestone from, 661 analyses of sands from, 668 sand and gravel in, 307 stone in, 308 tests of gravels from, 657 Hampton, analyses of sands from, 666 cementation tests of stone from, 654 gravels at, 288 mechanical analyses of stone from, 648 quarry at, 291 tests of gravels from, 656 Hancock county, sand and gravel in, 309, 680 Hanlontown, analyses or sands from, 670 tests of gravels from, 658 Hardin county, abrasion and impact tests of stone from, 651 analyses of sands from, 668 cementation tests of stone from, 654 mechanical analyses of stone from, 648 sand and gravel in, s11, 680

stone in, 313, 674

tests of gravels from, 657

Hardness of stone, 638 Harrison county, analyses of sands from, 668 sand and gravel in, 318, 681 stone in, 327, 674 tests of gravels from, 657 Harvey, gravels near, 682 quarry near, 448 Hawarden, analyses of limestone from, 664 gravel near, 559, 684 Hazelton, gravel at, 95 quarries near, 98, 672 Heating of coal in storage, 745 Henry county, sand and gravel in, 328, 681 stone in, 329, 674 Henton, quarry at, 463 Hesper, quarry near, 615 Hess, A. W., work of, 42 High Bridge Coal Co., 720 Hills, sand at, 681 Hillsdale, quarry at, 400 Hixson, A. W., analyses of Iowa coals by, 687 Holland, gravels near, 300 Hopkinton, gravels at, 218 quarries at, 221, 673 Hopkinton stages, 47 analyses of limestones from, 661, 662 in Fayette county, 267 in Jackson county, 352 in Jones county, 372 Hosper, gravel near, 561, 684 Howard county, abrasion and impact tests of stone from, 651 cementation tests of stone from, 654 mechanical analyses of stone from, 648 sand and gravel in, 333, 681 stone in, 334, 674 Hudson, S. D., gravel near, 558, 584 Humboldt, analyses of limestone from, 343, 661 analyses of sands from, 668 quarries at, 343 sand near, 342, 681 tests of gravels from, 657

Humboldt county, analyses of limestone from, 661 analyses of sands from, 668 sand and gravel in, 339, 681 stone in, 343 tests of gravels from, 657 Hurstville, quarry at, 353 Hydrogen in coal, 696

I

Ida county, analyses of sands from, 668 sand and gravel in, 345, 681 tests of gravel from, 657 Ida Grove, analyses of sanus from, 668 gravels at, 345, 681 tests of gravels from, 657 Illinoian drift, 53 Independence, analyses of limestone, from, 659 analyses of sands from, 666 cementation tests of stone from, 654 gravel at, 93 mechanical analyses of stone from, 648 quarries at, 98 tests of gravels from, 656 Indian creek, gravels on, 540, 566 Inoceramus beds in Plymouth county, 517 Ionia, analyses of sands 170m, 666 tests of gravels from, 656 Iowa City, analyses of limestone from, cementation tests of stone from, 654 mechanical analyses of stone from, 648 quarries near, 364 sand near, 363, 681 Iowa coals, value of, 746 washing tests of, 745 Iowa coals for producer gas, 744 Iowa county, analyses of sands from, 668 sand and gravel in, 346 stone in, 346 tests of gravels from, 657

INDEX

Iowa Falls, cementation tests of stone from, 654 mechanical analyses of stone from, 648 quarries at, 313, 674 Iowa river, sand and gravels on, 309, 311, 346, 363, 412, 450, 572, 630 Iowa road and concrete materials, 42 Iowa State College, cooperation with, 42 Iowan drift, 53 Iowan gravels in Grundy county, 301 in Louisa county, 412 in Mitchell county, 464 Iowan sands in Winneshiek county, 607 Iowan stage, 53 Iron in Iowa coals, 743 Irvington, gravels at, 394, 681

J

Jackson county, abrasion and impact tests of stone from, 651 analyses of limestone from, 662 analyses of sands from, 668 cementation tests of stone from, 654 mechanical analyses of stone from, sand and gravel in, 348, 681 stone in, 349 tests of gravels from, 657 Janesville, gravel at, 86, 677 Jasper county, sand and gravel in, 354 stone in, 354 Jefferson, analyses of sands from, 668 gravels at, 680 tests of gravels from, 657 Jefferson county, sand and gravel in, stone in, 361 Jesup, quarries at, 100 Johnson county, abrasion and impact tests of stone from, 651 analyses of limestone from, 662 cementation tests of stone from, 654 mechanical analyses of stone from. 648 sand and gravel in, 363, 681 stone in, 363, 674

Jones county, abrasion and impact tests of stone from, 651 analyses of limestone from, 662 analyses of sand from, 668 cementation tests of stone from, 654 mechanical analyses of stone from, 648 sand and gravel in, 369 stone in, 372, 674 tests of gravels from, 657

K Kamrar, analyses of sands from, 668 gravels near, 307 tests of gravels from, 657 Kansan drift, 54 Kansan gravels in Winneshiek county, 606 Kellogg, quarries near, 356 Keokuk, cementation of tests of stone from, 655 mechanical analyses of stone from, 649 quarries at, 398, 675 Keokuk limestone in Des Moines county, 232 in Lee county, 396 in Van Buren county. 579 Keokuk county, sand and gravel in, 387 stone in, 388, 674 Keosauqua, analyses of limestone from, cementation tests of stone from, 655 mechanical analyses of stone from, 649 quarries at, 585 Keyes, Charles, 226, 399 Keystone Coal Mining Co., 724 Kilbourn, quarries at, 584 Kinderhook stage, analyses of limestones from, 661, 663 rock in, 49 in Des Moines county, 226 in Franklin county, 289, 293 in Hardin county, 313 in Humboldt county, 343 in Jasper county, 355

Kinderhook stage—Con.
in Louisa county, 413
in Marshall county, 453
in Tama county, 572
in Washington county, 596
Kingsley, gravels near, 517, 683
Kjeldahl method for nitrogen, 698.
Klemme, gravels at, 309
Klondyke, gravels near, 425
Knight, N., analyses of limestone by, 659, 660
Kossuth county, analyses of sands from, 668

L

sand and gravel in, 393, 681

tests of gravels from, 657

Lainsville, gravels near, 349 Lake City, analyses of sands from, 666 garvels at, 113 stone near, 115 tests of gravels from, 656 Lake View, gravels near, 540, 684 Lamoni, quaries near, 215 Lanesboro, gravels near, 116, 678 Langdon, analyses of sands from, 666 Lansing, analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from, 648 quarries at, 64, 672 tests of gravels from, 656 Laporte City, cementation tests of stone from, 654 limestone at, 672 mechanical analyses of stone from, 648 quarries near, 82 Larrabee, gravel at, 166 Lawler, gravels near, 169 Le Claire, analyses of limestone from, 664 cementation tests of stone from, 655 mechanical analyses of stone from, 649 quarries at, 676

Le Claire dolomites, 48 in Cedar county, 134 in Johnson county, 363 in Jones county, 372, 378 in Linn county, 405 in Scott county, 547 Lee county, abrasion and impact tests of stone from, 652 cementation tests of stone from, 655 mechanical analyses of stone from, 649 sand and gravel in, 395, 681 stone in, 395, 675 Lees, James H., coals sampled by, 692 descriptions of mines by, 702 work of, 42 Le Grand, quarries at, 453, 675 Le Mars, analyses of sands from, 668 gravels near, 512, 683 quarries near, 518 tests of gravels from, 657 Leon, analyses of sands from, 666 tests of gravels from, 656 Lewis, quarries near, 122 sandstone at, 120 Lime City, analyses of limestone from, 129, 659 Lime creek, gravels on, 136, 623 Lime creek shales in Cerro Gordo county, 150 in Floyd county, 276 in Franklin county, 288 Limestone, distribution, 40 Linn county, abrasion and impact tests of stone from, 652 cementation tests of stone from, 655 mechanical analyses of stone from, sand and gravel in, 404, 681 stone in, 405, 675 Linn Grove, gravels at, 103 Linwood, quarry near, 555 Lithographic City, quarry at, 283 Little Cedar river, gravels on, 464

Little Floyd river, gravels on, 486

Little Ocheyedan river, gravels on, 502

Little Rock, gravels at, 424 Little Rock river, gravels on, 424 Little Sioux river, gravels on, 103, 155, 174, 234, 346, 616 Little Turkey river, gravels on, 260 Littleport, gravels at, 182 Littleton, gravel at, 95 quarries at, 100 Livermore, sand near, 342 Logan, limestone at, 674 Lohrville, gravels near, 114 Lonsdale, E. H., 121, 474, 475 Louisa county, abrasion and impact tests of stone from, 652 analyses of limestone from, 662 cementation tests of stone from, 655 mechanical analyses of stone from, 649 sand and gravel in, 411 stone in, 413, 675 Lourdes, gravels at, 333 Loveland, gravels near, 530 Lowden, cementation rests of stone from. 654 mechanical analyses of stone from, 648 quarry near, 133 Lowell, quarries near, 329 Lower Burlington limestone in Des Moines county, 229 in Lee county, 396 Lower Coal Measures, 51 Lower Davenport stage, analyses of limestone from, 659 Luana, cementation tests of stone from, 654 mechanical analyses of stone from, quarries near, 67, 189 Lucas county, sand and gravel in, 416 stone in, 416 Lundteigen, analyses by, 659, 660, 663 Lycurgus, quarries near, 66 Lynnville, quarries near, 355 Lyon county, analyses of sands from, sand and gravel in 417, 682 stone in, 430

tests of gravels from, 657

Lyons, cementation tests of stone from, 654 mechanical analyses of stone from, 648 quarries near, 197

M

Macbride, T. H., 155, 177, 251, 255, 343, 486, 495, 496, 501, 507, 508, 523 Macedonia, quarries near, 531 Madison county, abrasion and impact tests of stone from, 652 analyses of limestone from, 663 analyses of sands from, 668 cementation tests of stone from, 655 mechanical analyses of stone from, 649 sand and gravel in, 435 stone in, 435, 675 tests of gravels from, 657 Madrid, gravel at, 679 Mahaska county, analyses of limestone from, 663 analyses of sands from, 668 sand and gravel in, 443, 682 stone in, 443, 675 tests of gravels from, 657 Manchester, analyses of sands from, 666 gravels at, 217 tests of gravels from, 656 Mapleton, analyses of sands from, 668 tests of gravels from, 657 Maquoketa, analyses of limestone from, analyses of sands from, 668 cementation tests of stone from, 654 gravels near, 349 mechanical analyses of stone from, 648 tests of gravels from, 657 Maquoketa river, gravel on, 203, 216, 238, 241, 349, 369 Maquoketa stage, 46 analyses of limestones from, 661 in Clayton county, 185 in Dubuque county, 249 in Fayette county, 264 in Howard county, 335 in Jackson county, 350 in Winneshiek county, 613

Marble Rock, analyses of sands from,

gravels at, 276, 680 quarries at, 280

tests of gravels from, 656

Marion county, analyses of limestone from, 663

analyses of sands from, 668 sand and gravel in, 444, 682

stone in, 445 tests of gravels from, 657

Marshall county, analyses of limestone from, 663

analyses of sands from, 668 sand and gravel in, 450, 682 stone in, 453, 675

tests of gravels from, 657

Marshalltown, sand at, 682

Marston, 448

Mason City, analyses of limestone from. 660

cementation tests of stone from, 654 gravels at, 138, 678 quarries near, 147, 672

Mason City substage in Worth county, 624

Massilon, quarry near, 130

McGregor, analyses of sands from, 666 quarry at, 673

tests of gravels from, 656

McIntire, quarry near, 471

Meek & Hayden, 517

Michael, L. G., analyses by, 439, 442, 660, 661, 663, 664

Middle Raccoon river, gravels on, 118

Middle river, sand in, 55

Middletown, limestone at, 673

Milford, gravels at, 174, 234, 679

Milford, quarry near, 480

Miller, B. L., 358

Millinerville, gravels near, 511

Mills county, analayses of sands from, 668 effect on price, 761

sand and gravel in, 461

stone in, 462

tests in gravels from, 657

Millville, gravels at, 181

Mines sampled, description, 702

Minnesota, abrasion and impact tests of stone from, 653

cementation tests of stone from, 655 mechanical analyses of stone from,

Mississippi river, sand on, 60, 225, 238, 348, 413, 481

Mississippian series, rock in, 49

Missouri river, gravels on, 528, 621 Missouri stage, 52

analyses of limestones from, 660, 663, 664

in Adair county, 56

INDEX

in Adams county, 59

in Cass county, 121

in Clarke county, 173

in Dallas county, 208

in Decatur county, 213

in Fremont county, 294

in Guthrie county, 305

in Harrison county, 327

in Lucas county, 417

in Madison county, 435

in Mills county, 462

in Montgomery county, 475

in Page county, 504

in Pottawattamie county, 531

Missouri Valley, analyses of sands from, 668

gravels at, 681

tests of gravels from, 657

Mitchell, gravel near, 466

Mitchell county, abrasion and impact tests of stone from, 652

analyses of limestone from, 663

analyses of sands from, 668

cementation tests of stone from, 655 mechanical analyses or stone from,

649

sand and gravel in, 464, 682

stone in, 466, 675

tests of gravels from, 657

Mohawkian series, 46

Moisture in coal, determination, 693

loss of, 738

Monmouth, cementation tests of stone from, 654

mechanical analyses of stone from, 648

780 INDEX

Monona county, analyses of sands from, 668 sand and gravel in, 471 tests of gravels from, 657 Monroe county, sand and gravel in, 473 stone in, 473 Montgomery county, analyses of limestone from, 663 analyses of sands from, 668 sands and gravel in, 474 stone in, 475 tests of gravels from, 657 Monticello, cementation tests of stone from, 655 gravels near, 370 mechanical analysis of stone from, Montour, analysis of sands from, 668 cementation tests of stone from, 655 quarries at, 676 mechanical analyses of stone from, tests of gravels from, 658 Montpelier, quarries near, 483 Montrose, cementation tests of stone from. 655 limestone at, 675 Montrose cherts in Des Moines county, 232 in Van Buren county, 578 Moravia, quarry at, 69 Morgan, S. M., 343 Morning Sun, analyses of limestone from, 662 cementation tests of stone from, 655 mechanical analyses of stone from, quarry near, 413, 675 Moscow, quarries near, 482 Motor, gravels at, 180 Mount Auburn, cementation tests of stone from, 654 mechanical analyses of stone from, Mount Pleasant, quarries near, 331, 674 Mount Vernon quarries at, 406, 675 Murray, analyses by, 661

Muscatine, analyses of sands from, 668
sand at, 481, 683
tests of gravels from, 657
Muscatine county, abrasion and impact
tests of stone from, 652
analyses of sands from, 668
cementation tests of stone from, 655
mechanical analyses of stone from, 649
sand and gravel in, 481, 683
stone in, 482
tests of gravels from, 657
Muscatine Island, sand on, 481

N

Nahant, sand at, 684 Nashua, gravels near, 169 quarries near, 285 Nasset, quarry near, 611 Nebraskan or sub-Aftonian drift, 54 Neola, gravels near, 528 New Albin, quarries near, 65 New Hampton, gravels at, 167 New Oregon, gravels, near, 334 New Richmond, sandstone, 45 New Ulm, abrasion and impact tests of stone from, 653 cementation tests of stone from, 655 mechanical analyses of stone from, Newberry, analyses by, 664 Newport, gravels near, 372 Niagaran series, 47 analyses of limestone from, 659, 660 in Bremer county, 87 in Buchanan county, 98 in Cedar county, 128 in Clayton county, 186 in Clinton county, 193 in Delaware county, 220 in Dubuque county, 249 in Fayette county, 267 in Jackson county, 351 in Johnson county, 363 in Jones county, 372

in Linn county, 405 in Scott county, 547

in Winneshiek county, 614

Nichols, analyses of sands from, 668 tests of gravels from 657 Niobrara division in Plymouth county, Nishnabotna river, gravels on, 120, 462, 529, 556 Nitrogen in coal, 698 Nora Springs, quarries at, 276 Nordness, quarry near, 611, 615 North Farley, quarries at, 250 North McGregor, cementation tests of stone from, 654 mechanical analyses of stone from, 648 quarries near, 186 North Raccoon river, gravels on, 116, 205, 295 North river, sand on, 435 Norway, sand at, 71 Oakland, sand at, 530, 528 O'Brien county, analyses of sands from, sand and gravel in, 485, 683 tests of gravels from, 657 Ocheyedan, gravels near, 503, 683

0

Ocheyedan Mound, gravels on, 496, 683 Ocheyedan river, gravels on, 502 Oelwein, analyses of sands from, 666 gravels at, 262, 680 tests of gravels from, 656 Olin, cementation tests of stone from, gravels near, 372 mechanical analyses of stone from, 648 quarries near, 384 Oneota limestone, 45 in Allamakee county, 62 in Clayton county, 183 in Winneshiek county, 609 Oneota river, sand on, 60, 61, 604 Ordovocian system, rock of, 45 in Clayton county, 183 in Dubuque county, 241 in Howard county, 334 in Winneshiek county. 609

Osage, analyses of limestone from, 663 analyses of sands from, 668 cementation tests of stone from, 655 gravels near, 464, 682 mechanical analyses of stone from, 649 quarries near, 469, 675 tests of gravels from, 657 Osage stage, 50 analyses of limestones from, 660 in Des Moines county, 229 in Keokuk county, 388 in Lee county, 398 in Louisa county, 413 in Washington county, 596 Osceola, analyses of limestone from, 660 quarry near, 173 Osceola county, analyses of sands from, sands and gravel in, 495, 683 tests of gravels from, 675 Oskaloosa, analyses of limestone from, Osterdock, gravels at, 180 Otis stage, analyses of limestones from, 659, 660 in Linn county, 410 Otter creek, gravels on, 501 Ottumwa, analyses of limestone from, analyses of sands from, 670 cementation tests of stone from, 655 mechanical analyses of stone from, 649 quarries near, 595, 676 sand at, 685 tests of gravels from, 658 Owen, D. D., cited, 604 Owen beds in Franklin county, 288 Oxford Junction, analyses of sands from, 668 tests of gravels from, 657

P

Pacific Junction, analyses of sands from, 668 tests of gravels from, 657

Packham, L. S., work of, 42 Page county, analyses of sands from, 668 sand and gravel in, 504 stone in, 504 tests of gravels from, 657 Palo Alto county, sand and gravel in, 506, 683 Panora, quarry near, 306 Parr, S. W., 698, 741 Paullina, analyses of sands from, 668 gravels near, 491, 683 tests of gravels from, 657 Peake, 683 Pella, analyses of limestone from, 663 Pella substage in Henry county, 330 in Jefferson county, 362 in Mashaska county, 443 in Marion county, 446 in Wapello county, 591 Pennsylvanian series, rock in, 51 Pentamerus beds in Delaware county, 220 Peorian stage, 53 Permian system, rock in, 53 Peru, analyses of limestone from, 663 cementation tests of stone from, 655 mechanical analyses of stone from, 649 Phillips Fuel Co., 716, 722 Pilot Mound, analyses of sands from, 666 gravels at 85, 677 tests of gravels from, 656 Pisgah, analyses of sands from, 668 tests of gravels from, 657 Plainfield, gravels at, 677 quarries at, 89 Plano, limestone at, 672 Platteville stage, 46 analyses of limestones from, 660, 661 in Allamakee county, 63 in Dubuque county, 242 in Jackson county, 349 in Winneshiek county, 610 Pleistocene series, materials in, 53

Plymouth county, analyses of sands from, 668 sand and gravel in, 511, 683 tests of gravels from, 657 Pocahontas county, abrasion and impact tests of stone from, 652 cementation tests of stone from, 655 mechanical analyses of stone from, 649 sand and gravel in, 518 stone in, 520, 676 Polk county, analyses of sands from, sand and gravel in, 524, 683 stone in, 527 tests of gravels from, 657 Pope, George S., 747 Portland, stone at, 149 Portland cement for road work, 42 Postglacial deposits, 53 Postville, dolomite at, 673 Potsdamian series, rock in, 44 Pottawattamie county, sand and gravel in, 528 stone in, 531 Poweshiek county, sand and gravel in, 533 Prairie du Chien limestone, 45 in Clayton county, 183 Price for coal, determination of, 759 Princeton, quarries near, 551 Proposals to furnish coal, 747 Proterozoic, rock in, 42

Q

Quarries—
Ackenbaum, 415
Albee, 603
Allen, 285
Amana Society, 346
Anamosa, 383
Andrews, 292
Arquitt & Sons, B. N., 250, 673
Aungst Brothers, 72
Banning, Peter, 272
Barber, A. A., 198
Bartlett & McFarlane, 672
Beach, August, 675
Beal, 223
Bealer, 124

Quarries-Con. Becker, John, 673 Belden Stone Company, 148 Benson, Oren, 292 Berry, Richard, 480 Bettendorf Stone Co., 676 Bitsche, Albert, 673 Boland Stone Co., 676 Bopp, J. W., 673 Boswell, 214 Boyle, A. C., 673 Boyle, Frank, 187 Brooks, Chas. M., 673 Brown, 208 Bryant, W. C., 414, 675 Bryant-McLaughlin Asphalt Paving Company, 674 Buchan, E. J., 672 Bull, 344 Burlington Quarry Co., 675 Burns, 505 Burr, Matthias, 673 Burrough's, 134 Byrne & Saul, 673 Cameron & McManus, 675 Carey, Thomas, 197 Carpenter, 173, 484 Carter, 174 Cary's, 135 Cedar Valley Stone Company, 672 Chambers, Jas., 57 Champion No. 1, 377 Chicago and Northwestern Railway, 675 Chicago, Rock Island and Pacific Railway, 365, 400, 580, 615 Chilton, Chas., 676 City quarry, Burlington, 230 Clark, 555 Clayton county, 189 Clermont Brick and Tile Co., pit of, 271 Clinton City, 194 Colton, J. E., 675 Cook, 388 Cresco Stone & Concrete Company, 674 Davis, Perry and Isaac, 585 Davis City Stone Crusher Co., 673 Dearborn & Sons, 378, 674

Quarries-Con. Dolese Brothers, 456, 675, 676 Eagle Point Lime Works, 245, 673 Earlham Land Co., 439, 675 Eckels, 596 Eddyville Stone Co., 676 Ellis Park Stone Co., 675 Ellsworth Stone Company, 314, 674 Erickson Co., F., 674 Ernest, 352 Evans, William, 67 Falker, Cyrus, 588 Fetter, A. V., 672, 673, 675 Fort Dodge Portland Cement Co., 523, 676 Fox, 121 French, 59 Frink, 134 Gable, W. H., 470 Gallaman, 614 Gipple, C. J., 415 Graner, 403 Gray, J. E., 416 Green & Sons, J. A., 377, 674 Green, Melvin, 611 Grimes, 274 Grommoll, 552 Hale, 385 Hallman, John, 336 Halloran, Maurice, 610, 676 Hartman, W. A., 675 Harrison and Deitz, 675 Hecht's, 135 Hempeler, J. A., 673 Henry, A. M., 674 Herwehe, A., 357 Hinkle Estate, 676 Hornbaker, Mark, 588 Huehl, F. C., 201 Hurst's lime, 353 Interstate Development Co., 283 Iowa Portland Cement Co., 439 Iowa Sugar Company, 675 Ivory, Daniel, 673 Johnson, Jas. A., 673 Kemper, 357 Keokuk Ry. & Construction Co., 675 Keystone, 353 Kidder, 273 Kieffer, A. B., 672

Quarries-Con. Kiel, Henry, 201 Kirchner, Albert, 673 Kirkpatrick, 190 Knudt, 189 Koestner, Geo. J., 673 Kregel, E. W. and H. D., 673 Kunkle, Geo. W., 673 Kuppinger, Henry, 147, 672 Lafferty, John, 591 Lames, Andrew, 592 Lang, H. J., 386 Langley, 187 LeClaire Stone Co., 548, 552, 676 LeGrand Quarry Co., 455 Lewis, 469 Linwood Quarry Co., 555, 676 Loetcher, 271 Loftus, 231 Loop; 222 Lorence, Wesley J., 674 Low, William, 290 Manion, Frank, 674 Marshall, J. M., 416 Marten, John, 531 Matthews, Charles, 111 Mayer, 443 McCalla, 476 McGlade Brothers, 673 McGuire, Victor, 674 McLeod's, 130 McManus & Tucker, 675 Merriam, 222 Milesi, Peter, 250 Miller, 133, 230, 390, 601 Mississippi River Power Co., 675 Monson's, 361 Moore, W. H., 111 Mores, 88 Morgan, 356 Mott, D. W., 291 Murphy, Robert, 58 Nagle, C. F., 672, 675 Nielson, Jens, 80, 672 Northcutt, William, 355 O'Farrell Contracting Co., 249, 673-Osborne, Albert, 674 Parmelee, A. E., 675 Peckenpaugh & Sons, C. F., 674

Quarries-Con. Penitentiary, 383 Perry, W. P., 56 Peru Stone & Cement Co., 675 Picnic Point, 231 Pinhook. 353 Price, 587 Purcell, Thomas, 194 Quimby Stone & Fuel Co., 672 Rambo, W. O., 672 Randall, G. W., 676 Rickell, 387 Roberts, George, 122 Ronen, John, 383, 674 Royce, Russell B., 674 Rude, Peter, 66 Rummel, 384 Salisbury, 336 Santa Fe Railway, 400 Sawyer, E. P., 673 Short's, 173 Siege, Anthony, 673 Simons, Albert, 65, 672 Smith quarry, 190 Smith, Mrs. A., 201 Smith, P. C., 676 Snapp, David, 531 Snouffer, J. J., 410 Southern Iowa Stone Co., 675 State Quarries, 366 State Reformatory, 383, 674 Stennett, W., 475 Stevens, 572 Stone City, 378 Stoops, 188 Stumbaugh, 387 Swan, Wm. B., 69, 672 Swanson, 308 Swenson, Seward, 67 Talkington, 600 Thurston, J. L., 416 Tibey Brothers, 249, 673 Tigue, 398 Tucker and McManus, 399 Union Park, 194 Vold, John A., 676 Walgren's, 361 Walk, H. J., 189 Waterloo Dredging Company, 672 Quarries-Con. Waterloo Stone Co., 81 Weber, 388 Weber, E. H., 615 Welsh, Thos., 673 Whann's, 135 Whitlach, H. E., 675 Whitmore, 598 Wilcox, 220 Williams, Wilkes, 267, 673 Williams and Davis, 269 Wilson, Chas. B., 413, 675 Winter, 331 Woodward, C. O., 386 Quarry, quarries at, 456 analyses of limestone from, 663 Quasqueton, gravels at, 94 Quaternary system, materials in, 53 Quimby, gravels at, 159

R

Raccoon river, gravel on, 111, 527, 534 Rathbun, analyses of limestone from, 659 Reasnor, quarries near, 356 Reasnor, sand near, 354 Red Oak, analyses of sands from, 668 sand near, 474 · tests of gravels from, 657 Red Rock, quarry near, 449 Red Rock sandstone, analysis of, 358 in Jasper county, 356 in Marion county, 449 Redfield, gravels at, 205 quarry near, 207 Rejection of coal, causes, 757 Rembrandt, sands at, 106 Remsen, gravels near, 517 Ringgold county, sand and gravel in, 533 River Junction, 681 Riverside, sand near, 596 Riverton, quarries near, 294 Rochester, analyses of limestone from,

Rock Rapids, analyses of sands from, 668
gravels at, 423, 682
tests of gravels from, 657
Rock River, gravels on, 418, 560
Rock Valley, gravels near, 560
Rockford, quarries at, 279
Rockville, gravels at, 219
Rodney, analyses of sands from, 668
tests of gravels from, 657
Rolfe, sand near, 520
Ruthven, gravels near, 177, 510
Rutland, quarries at, 343

S

Sabula, gravels near, 349, 681 Sac City, analyses of sands from, 668 gravels at, 539, 684 Sac county, analyses of sands from, sand and gravel in, 534, 681 stone in, 545 tests of gravels from, 657 Saint Anthony, analyses of sands from, 668 tests of gravels from, 657 Saint Croix sandstone, rock in, 44 Saint Donatus, quarry at, 350 Saint Louis stage, 50 analyses of limestone from, 661, 663, in Davis county, 210 in Des Moines county, 233 in Hamilton county, 308 in Henry county, 329 in Humboldt county, 344 in Jefferson county, 361 in Keokuk county, 389 in Lee county, 399 in Marion county, 445 in Monroe county, 473 in Pocahontas county, 520 in Story county, 569 in Van Buren county, 580 in Wapello county, 591 in Washington county, 597 in Webster county, 601

659

Saint Peter sandstone in Allamakee county, 163 in Clayton county, 188 in Dubuque county, 241 Sample, collection of, 754 preparation of, 755 Sampling of coal, 754 Sand and gravel, distribution, 39 Sand and gravel pits-Ahrens, T. H., 109, 678 Amsterdam Tile Works, 680 Anderson, William, 429 Bainbridge, Geo., 683 Balzer, F. F., 683 Barnes, Mrs. Eliza, 275, 680 Bartlett & McFarlane, 677 Beacon, Thos., 683 Belmond Cement Mfg. Co., 685 Beltman, John, 684 Bernatz, A. J., 685 Berninghausen, Fred, 680 Beutin, Frank, 679 Booneville, 679 Borlang, O. A., 334 Bower, John, 685 Boyle, 188 Bremer county, 677 Briggs, 559, 684 Builders Sand & Gravel Co., 684 Burns, F. A., 679 Butler, J. W., 107, 678 Carr, R. E., 684 Cedar Falls Sand & Material Co., 78, 677 Cherokee Construction Co., 678 Cherckee Sand & Gravel Co., 160, 678 Chicago & North Western Railway, 298, 312, 394, 456, 677, 679, 680, 681, 684 Chicago, Burlington & Quincy Railroad, 474, 578, 581, 585 Chicago, Great Western Railway, 677, 678, 683, 685 Chicago, Milwaukee & St. Paul Railway, 202, 296, 369, 558, 678, 679, 680, 684 Chicago, Rock Island & Pacific Railway, 425, 499, 578, 679, 680, 682, 683, 685

Sand and gpavel pits-Con. Chicago, Saint Paul, Minneapolis & Omaha Railway, 512, 683, 685 Clarksville Brick Mfg. Co., 677 Clayton White Sand Co., 678 Clinton Sand & Gravel Co., 679 Cole Bros., 684 Commercial Sand Co., 684 Concrete Stone Co., 681 Coon River Sand Co., 683 Corbett, Mrs. Rozella, 404, 682 Cox, P. R., 323, 681 Cram, Frank, 683 Dalton Co., 683 Decorah Cement Sidewalk Co., 685 Des M. Building Material Co., 684 Des Moines River Sand Co., 685 Des Moines Sand Co., 683 DeWitt, 679 Doon Sand & Gravel Co., 682 Doty, Geo. M., 683 Dubuque Sand & Gravel Co., 679 Eddyville Sand Co., 443, 682 Einspanjer, J. H., 681 Elliott, 472 Empire Sand & Material Co., 685 Estherville Cement Prod. Co., 252, Eureka Cement Tile Co., 677 Fais, F. W., 678 Fleming & Son, John, 617, 685 Fogt, F. S., 301 Fort Dodge, Des Moines & Southern Railway, 677 Fort Madison Sand & Gravel Co., 681 Forest City Cement Prod. Co., 685 Frazer Cement Products Co., 677 Fudge, J. O., 120 Fuhrman, Fred, 678 Gifford Sand & Gravel Co., 680 Gilleas & Co., M. J., 160, 621, 678, 685 Glidden, John, 684 Graettinger Tile Works, 683 Great Northern Railway, 418, 682 Green, P. H., 107, 678 Greenlee & Greenlee, 684 Griffin, P. C., 86 Griffith, G. L., 683

Sand and gravel pits-Con. Grundy Center Brick & Tile Co., 680 Hagerman, 327 Hall, Robert, 346, 681 Hammon, Frank, 683 Hanson, Ira, 263, 680 Harris, Leon, 683 Harris, W. T., 678 Hawarden Sand & Gravel Co., 565, Hawkins, M. N., 682 Hayes, W. C., 681 Hills Sand & Gravel Co., 681 Horrabin Sand & Materials Co., 681 Hospers Cement Products Co., 684 Howard county, 681 Hull, John, 327 Humboldt Cement Products Co., 340 Hyink, Joseph, 684 Ida Grove Cement Products Co., 345 Illinois Central Railway, 512, 617, 678, 679, 683, 685 Interstate Material Co., 684 Iowa Sand & Gravel Co., 682 Iowa State College, 684 Iverson gravel, 425 Jaeger, Joseph, 681 Jardine, 327 Kelly Sand & Fuel Co., 679 Kennedy & Molder, 540 Kings Crown Plaster Co., 681 Kingsley Milling Co., 683 Lake View Sand & Gravel Co., 684 Lanesboro Cement Tile Co., 678 Lang, H. J., 370 Larimer & Shaffer, 681 Larrabee, Chas., 685 Laun, Alfred, 275, 680 Leander, C. J., 681 Lehatcha & Pattengill, 423, 682 LeMars Brick & Tile Co., 683 Libbey gravel, 423 MacDowell, C. R., 682 Mackridge, W. H., 679 Marshall Sand Co., 682 Mason City Cement Products Co., 678 Mason City Sand Co., 138, 678

Mathews, Geo. E., 681

Sand and gravel pits-Con. McClellan, A., 677 McCormick, 543 McCracken Bros., 683 McGavern, 325 Mefford, 326 Mefford, John, 327 Miller, 258 Miller & Montgomery, 418, 682 Miller & Son, C., 680 Mills Sand & Gravel Company, 204 Minneapolis & St. Louis Railway, 312, 677, 679, 680, 682 Mitchell, J. B., 334 Moran, H. A., 685 Moran & Hempel, 618 Murray Hill, 326 Muscatine Sand Co., 683 Nelson, N. W., 465, 682 Northern Gravel Co., 482, 683 Northwestern Drain & Construction Co., 681 Oak Park Sand Co., 684 Ordway, 472 Osage Cement Prod. Co., 464, 682 Ottumwa Sand Co., 590, 685 Palmer Sand Co., 685 Peckenpaugh, 323 Persia, 326 Pet, Geo. W., 677 Peyton, 325 Rathburn, W. E. Jr., 681 Robinson, 323 Russell, J. H., 677 Sabula Sand & Gravel Co., 681 Sac City Cement Prod. Co., 539, 684 Sampson, John, 698 Sand Valley Sand Co., 682 Schneider, Geo. A., 679 Scott, Eric W., 543 Scott county, 192, 679 Scott Sand & Gravel Co., 684 Sedgwick, J. E., 677 Shadbold Lumber Co., 509, 683 Shaller, Phil, 539, 684 Sheffield Cement Prod. Co., 287, 680 Sibley Cement Co., 683 Sinnett gravel, 481 Smith, P. M., 78, 677

Sand and gravel pits-Con. Stahl sand, 257 Standard Construction Co., 681 Stevens, T. L., quarry of, 592 Stoll Estate, Martin, 680 Tabor, Russell J., 682 Tanner, A. S., 299, 680 Tavenor, J. I., 685 Tuttle, 327 Van der Veer, C., 684 Van Meter, 679 Wabash Railroad, 684 Wallace, 192, 324 Waterloo Cement Products Co., 677 Waterloo Dredging Co., 677 Waterloo Granite Block Co., 677 Welch Bros., 618, 685 Weniger, 473 Wilke gravel, 308 Wilson, J. A., 444, 682 Winton, John, 235 Woodruff, A. L., 677 Zippe & Fletcher Co., 679

Sand hills in Scott county, 546 Sand Spring, quarries near, 225 Sandstone, distribution, 40 Sangamon stage, 53 Sargent Bluff, gravel near, 623 Savage, T. E., cited, 69, 246, 349, 442 Scott, C. E., work of, 42 Scott county, abrasion and impact tests of stone from, 652 analyses of limestone from, 663 analyses of sands from, 668 cementation tests of stone from, 655 mechanical analyses of stone from, 649 sand and gravel in, 545, 684 stone in, 547, 676 tests of gravels from, 658 Selma, limestone at, 676 Seney, gravels at, 511 Service tests on coal, 752 Shakopee limestone, 45 Sheffield, analyses of sands from, 666 gravel at, 680 tests of gravel from, 656

Shelby county, sand and gravel in, 556 Sheldon, gravels near, 486, 683 Shell Rock, analyses of sands from, 666 quarries near, 111 tests of gravels from, 656 Shell Rock river, gravel on, 107, 276, Shellsburg, cementation tests of stone from, 654 gravel at, 70 mechanical analyses of stone from, 648 quarry near, 75, 672 Shimek, B., 319, 471 Showman, quarries near, 390 Sibley, analyses of sands from, 668 gravels near, 496, 583 tests of gravels from, 657 Sigourney, quaries near, 390, 674 Silurian system, rock in, 47 in Cedar county, 124 in Scott county, 547 Sioux City, analyses of sands from, 670 quarries near, 518 sand near, 622 tests of gravels from, 658 Sioux county, analyses of limestone from, 664 sand and gravel in, 557, 684 Sioux quartzite in Lyon county, 430 Sioux Rapids, analyses of sands from, 666 gravels at, 103, 677 tests of gravels from, 656 Skunk river, sand on, 354, 566, 596 Smith, John E., 301 Solon, limestone at, 674 Soper's mills, gravels at, 566 South Amana, analyses of sands from. 668 tests of gravels from, 657 South English river, sand in, 387 Spechts Ferry, analyses of limestone from, 660 quarry at, 242 Specific gravity of coal, 699

Spencer, gravels at, 175, 678

tests of gravels from, 656

Spillville, gravels at, 608 Spirit Lake, gravels near, 237 Springville substage in Henry county, in Keokuk county, 389 Springville, gravels near, 405, 682 State Quarry stage, 49 in Johnson county, 366 Steamboat Rock, gravels at, 311 Steiger, George, analyses by, 660, 662, 663, 664 Stennett, analyses of limestone from, 663 Stennett, quarries near, 475 Stennett limestone, 52 Stockton, gravel near, 481 Stone City, analyses of limestone from, cementation tests of stone from, 654 mechanical analyses of stone from, 648 quarries at, 674 Storing of coal, 746 Storm Lake, analyses of sands from, 666 tests of gravels from, 656 Storm Lake, sand on, 107 Story county, analyses of sands from, 668 sand and gravel in, 565, 684 stone in, 569 tests of gravels from, 658 Strawberry Point, quarry near, 186 Sulphur in Iowa coals, 694, 745 Sutherland, gravels near, 493

T

Sweetland Creek beds, in Muscatine

county, 484

Tama county, abrasion and impact tests of stone from, 652 analyses of sands from, 668 cementation tests of stone from, 655 mechanical analyses of stone from, 649 sand and gravel in, 571 stone in, 572, 676 tests of gravels from, 658

Taylor county, analyses of limestone from, 664 sand and gravel in, 574 stone in, 575 Tests and analyses of Iowa limestones, sands and gravels, 637 Thayer, gravels at, 576 Thornton, gravels near, 143 Tilton, J. L., 306 Tipton, cementation tests of stone from, 654 mechanical analyses of stone from, 648 Toughness of stone, 638 Tracy, analyses of limestone from, 448, 663 analyses of sands from, 668 quarry near, 445 sand at, 682 tests of gravels from, 657 Traer, sand near, 572 Turin, gravels at, 472 Turkey River, gravels on, 178, 255, 333 Tyson, H. B., work of, 42

П

Udden, J. A., 359, 484, 528, 533
Union county, sand and gravel in, 575, 685
Upper Burlington limestone in Des
Moines county, 229
in Lee county, 396
in Louisa county, 413
Upper Iowa river, gravels on, 333, 604

V

Valley Junction, sand at, 684

Van Buren, cementation tests of stone from, 655
mechanical analyses of stone from, 649

Van Buren county, abrasion and impact tests of stone from, 652
analyses of limestone from, 664
analyses of sands from, 670

Van Buren county—Con.
cementation tests of stone from, 655
mechanical analyses of stone from,
649
sand and gravel in, 577, 685
stone in, 578, 676
tests of gravels from, 658

Verdi substage in Hamilton county, 309

in Henry county, 330 in Jefferson county, 362 in Keokuk county, 389 in Marion county, 445 in Washington county, 598

Van Meter, gravel at, 679

Vernon Springs, quarries at, 336 Villisca, quarry near, 480

sand near, 474

Vinton, analyses of sands from, 666 cementation tests of stone from, 654 mechanical analyses of stone from.

quarries near, 75
sand at, 70
tests of gravels from, 656
Viola, gravels at, 404, 682
Volatile combustible matter in coal,
694, 740

Volga river, gravels on, 178, 261

W

Wadena, gravels at, 262
Wapello Coal Co., 714
Wapello county, abrasion and impact tests of stone from, 653
analyses of limestone from, 664
analyses of sands from, 670
cementation tests of stone from, 655
mechanical analyses of stone from, 649,
sand and gravel in, 588, 685
stone in, 591, 676
tests of gravels from, 658
Wapsipinicon river, gravels on, 169, 333, 372, 464

Wapsipinicon stage, 49 analyses of limestone from, 659, 660, 663 in Bremer county, 87 in Buchanan county, 99 in Johnson county, 364 in Linn county, 411 in Scott county, 555 Warren county, sand and gravel in, 595 Warsaw shales in Lee county, 397 in Van Buren county, 579 Washington, quarry near, 596 Washington county, sand and gravel in, 595 stone in, 596 Washta, gravels at, 156 Waterloo, analyses of limestone from, cementation tests of stone from, 654 mechanical analyses of stone from, 648 quarries near, 81, 672 sand at, 677 Waterman creek, gravels on, 493 Waterson, sand near, 534 Waucoma, gravels near, 260 quarries at, 273 Waukon, quarries near, 65, 672 Waverly, analyses of limestone from, 659 analyses of sands from, 666 cementation tests of stone from, 654 gravels at, 85, 677 mechanical analyses of stone from, 648 quarries at, 88 tests of gravels from, 656 Wayne county, sand and gravel in, 599 stone in, 600 Weathering of coal, 741 Webster, C. L., 284 Webster City, analyses of limestone from, 661

analyses of sands from, 668

tests of gravels from, 657

gravels near, 307

Webster county, analyses of sands from, 670 sand and gravel in, 600, 685 stone in. 601 tests of gravels from, 658 Weems, J. B., analyses by, 448, 523, 661 Weller, Stuart, 226 Wellman, quarry near, 597 Wellsburg, analyses of sands from, 668 gravels near, 300 tests of gravels from, 657 West Nishnabotna river, gravels on, West Point, limestone at, 675 West Union, quarries at, 274, 673 gravels at, 264 Westerville limestone, 52 in Decatur county, 216 Westfield, quarries near, 518 Wever, quarry at, 396 What Cheer, Keokuk county, 708 Wheatland, analyses of sands from, 666 tests of gravels from, 656 Wheeler, 741 White, C. A., 329, 517 White City, analyses of sands from, 668 tests of gravels from, 657 Wilder, F. A., 177, 425 Williams, Ira A., 236, 342, 425, 486, 493, 543, 562 Williams, Ira, work of, 42 Willow creek, gravels on, 513 Winnebago county, sand and gravel in, Willow Grove Coal Co., 718 pact tests of stone from, 653 analyses of limestone from, 664 603, 685 Winneshiek county, abrasion and imcementation tests of stone from, 655 mechanical analyses of stone from, 649 sand and gravel in, 604, 685

stone in, 609, 676

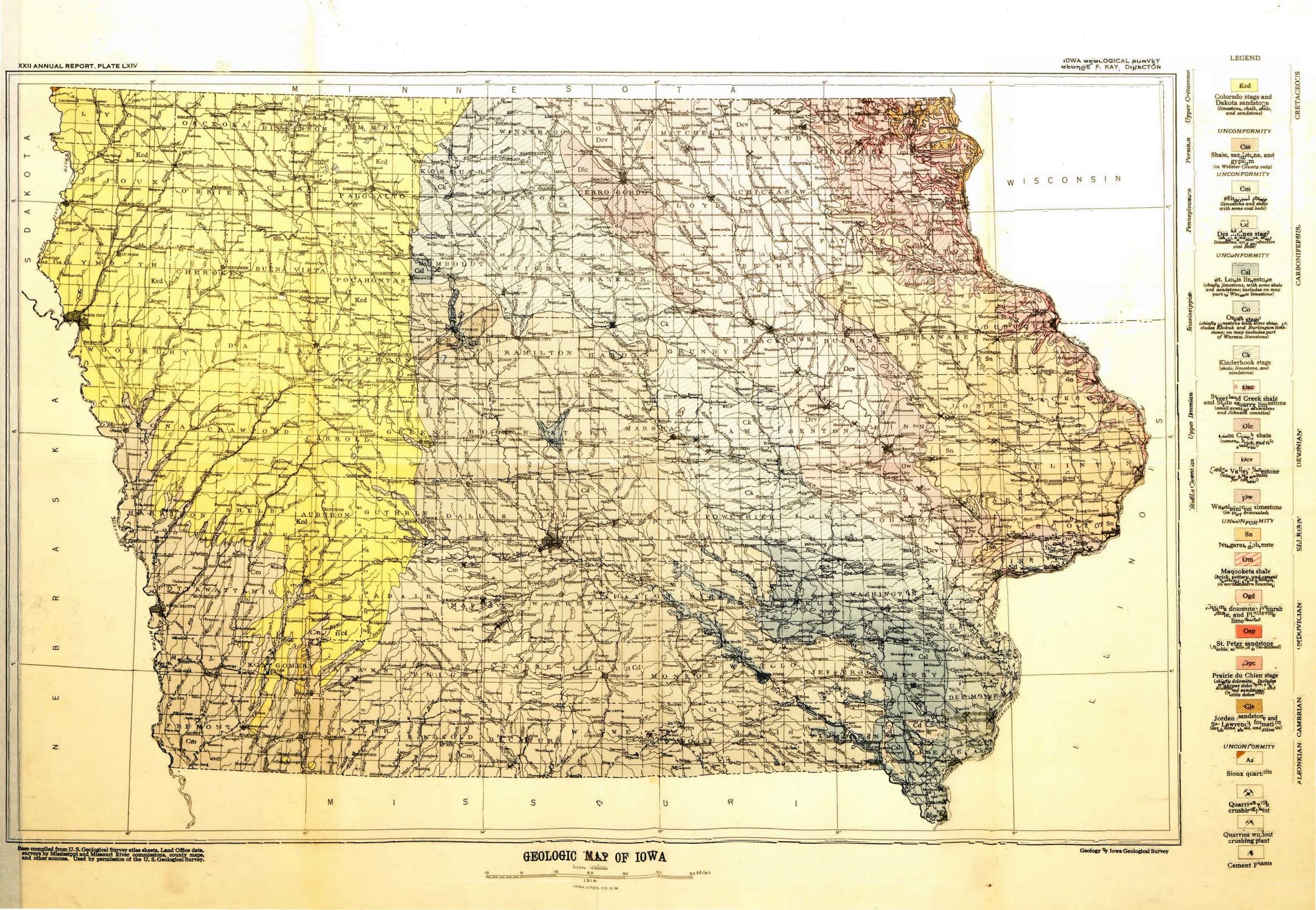
Winterset, analyses of limestone from, cementation tests of stone from, 655 mechanical analyses of stone from, 649 quarries near, 440, 675 sand near, 435 Winterset limestone, 52 in Decatur county, 215 in Madison county, 440 Winthrop, gravel pit at, 97 Wisconsin drift, 53 Wisconsin gravels in Allamakee county, 61 in Boone county, 84 in Buena Vista county, 103 in Carroll county, 116 in Calhoun county, 115 in Cerro Gordo county, 136 in Clay county, 174 in Dallas county, 206 in Dickinson county, 234 in Emmet county, 251 in Franklin county, 286 in Greene county, 295 in Guthrie county, 303 in Hamilton county, 307 in Hancock county, 309 in Hardin county, 311 in Humboldt county, 339 in Kossuth county, 393 in Louisa county, 413 in Marshall county, 450 in O'Brien county, 486 in Osceola county, 495 in Palo Alto county, 507 in Plymouth county, 511 in Sac county, 534 in Story county, 565 in Worth county, 623

Woodbury county, analyses of sands from, 670 sand and gravel in, 616, 685 stone in, 623 tests of gravels from, 658 Worth county, analyses of sands from, 670 sand and gravel in, 623 stone in, 624 tests of gravels from, 658 Worthington, gravels near, 241 Wright, H. F., Road and Concrete Materials of Iowa, 33.

Wright county, analyses of sands from, 670 sand and gravel in, 629, 685 tests of gravels from, 658

Y

Yarmouth or Buchanan deposits, 54



Iowan