INDEX TO MINING INDUSTRIES.

NOTE.—The letters annexed to the page numbers indicate the position on the page of the matter referred to, and correspond generally to the marginal letters on the page. A few pages, including those containing the tables of analyses, were cast before this system was adopted, and are therefore without the marginal letters; *but even with these, it is believed the use of letters in the index to indicate its position on the page will greatly facilitate finding the reference sought.* In the list of iron-ore mines, given under each county, the following contractions have been used: L., for limonite; M., for magnetite; F., for fossil ore; H., for hematite, other than specular ore; H.(s), for specular hematite; C., for carbonate. The ordinary chemical symbols are used to indicate the elements determined by anaysis in the samples subjected to partial analysis only. If a complete analysis of a sample was made, this is indicated by a small letter c.

A.

ALABAMA.

Coal (bituminous), statistics of the production of, in c. y. (642-645, 674-675).

Iron. Amount in ore mined in c. y. and its per cent. of the total iron in the United States' ore product (19 d); amount of iron in the different kinds and grades of ore mined in the c. y. (28 d); average per cent. of iron in ore mined in c. y. (19 d).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 d); to total amount of ore (74 c).

Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 d, 74 c); average value per ton (19 d); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 a); amount of each kind of ore mined in each county in the c. y. (23 d); amount of each kind and grade of ore, according to its contents of iron, mined in c. y. (27 f); amount of each kind and grade of ore, according to its phosphorous-iron ratio, mined in c. y. (29 d, 30 a); royalty paid on each kind of ore mined in c. y. (32 c).

Iron ore. Statistics of the production of iron ore in c. y. (40-43, 64-69); general averages of these statistics (70-71).

Iron ores. Partial analyses of (536-539); complete analyses of (584, 585).

Iron ores. Occurrence of the Clinton ores (13 c); character and position of the blackband ore (16 a).

Iron ores. Notes on the samples of iron ore collected in Alabama, by W. M. Chauvenet (383-399); iron-ore sample *map* of Alabama, geologically colored (Plate XXXV); *map* of northeast Alabama showing iron-ore deposits (384). SILURIAN LIMONITES.—Bibb county (383-387); Tuscaloosa county (385-387); Shelby county (387); Talladega county (387-389); Calhoun county (389, 391); Cherokee county (390-392). FOSSIL ORES.—Tuscaloosa county (392); Jefferson county (392-393); Saint Clair county (395); Etowahcounty (396-397); Cherokee county (398). CARBONIFEROUS LIMONITES.—Jefferson county (399). BLACKBAND ORES (399).

Iron ores. Notes on the samples of iron ore collected in Alabama, by Bailey Willis (400, 401); Calhoun county limonite (400); Clay county magnetite (400); Franklin county limonite (401); Lamar county limonite (401).

Bibb county. Iron ore: Amount of each kind of iron ore mined in, in c. y. (23 d); statistics of the production of iron ore in, in c. y. (40-43); iron ore deposits of (383 c). Iron-ore mines: Briarfield furnace mine; L.; one sample: Fe,P. (387 a, 536 d). Burns mine; L.; one sample: Fe,P. (385 b, 536 d). De Bardeleben mine; L.; one sample: Fe,P. (385 c, 536 d). Edward's mine, see Burns mine (385 b, 536 d). Ray's, Dr., property; L.; two samples: Fe,P. (386 d, 536 d). Strickland mine; L.; two samples: Fe,P. (383 f, 385 a, 536 d).

Calhoun county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 d); statistics of the production of iron ore in c. y. (40-43). Iron-ore mines: Glover mine; L.; one sample: Fe,P. (389 f, 536 f). Jacksonville mine; L.; one sample: Fe,P. (391 d, 538 a). Meadow mine, Pendergrass property; L.; one sample: Fe,P. (400 d, 538 d). Old Oxford mine; L.; one sample: Fe,P. (390 a, 536 f). Ridge mine; L.; one sample: Fe, P. (400 d, 538 d). Skinner mine; L.; one sample: Fe,P. (390 b, 536 f). Washer mine; L.; one sample: Fe,P. (390 c, 538 a).

ALABAMA—Continued.

Cherokee county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 d); statistics of the production of iron ore in c. y. (40-43); iron ore deposits of (390 d, 398 c). Iron-ore mines: Brown mine; L.; one sample: Fe,P. (391 a, 538 b). Hardin mine; L.; one sample: Fe,P. (392 b, 538 c). Lower mine (Stonewall); L.; one sample: Fe,P. (390 c, 538 b). Rock Run Furnace mine; L.; one sample: Fe,P. (392 a, 538 b). Round Mountain Furnace mine; F.; three samples: Fe,P. (398 c, 538 c). Stonewall (Upper and Lower) mines; L.; two samples: Fe,P. 390 b, 538 b). Tecumseh furnace; L.; one sample: Fe,P. (391 c, 538 b). Tecumseh furnace mines, see Terry, Treadaway, Brown, and Tecumseh furnace (391 a, 538 b). Terry mine; L.; one sample: c. (391c, 538 b, 539 b). Treadaway mine; L.; one sample: Fe,P. (391 a, 538 b). Upper mine (Stonewall); L.; one sample: Fe,P. (390 f, 538 b).

Clay county. Kennedy (J. M.) mine; M.; one sample: Fe,P. (400 f, 538 c).

De Kalb county. Coal (bituminous), statistics of the production of, in c. y. (642-645). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 d); statistics of the production of iron ore in, in c. y. (40-43).

Etowah county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 d); statistics of the production of iron ore in c. y. (40-43); iron-ore deposits of (396 c). Iron-ore mines: Attala mine, see Rising Fawn mine and Rathburn, Foster & Winchester (397 d, 538 c). Rathburn, Foster & Winchester's property; F.; two samples: Fe, P. (397 d, 538 c). Rising Fawn (Attala) mine; F.; three samples: Fe, P. (396 f, 538 c); one sample: c. (397 c, 538 c, 585).

Franklin county. Iron ore mines: Fleming (T. B.) mine; L.; one sample: Fe,P. (401 c, 538 d). Sevier's (Dr.) mine; L.; one sample: Fe,P. (401 c, 538 d).

Jefferson county. Coal (bituminous), statistics of the production of, in c. y. (642-645). Iron ore: Amount of each kind of iron ore mined in, in c. y. (23 d); statistics of the production of iron ore in, in c. y. (40-43). Iron-ore mines: De Bardeleben mine (Birmingham ridge) F.; one sample: Fe,P. (394 c, 536 a); Eureka mine; F.; one sample: c; two samples: Fe,P. (393 d, 536 a, 584). Hickman mine; F.; three samples: Fe,P. (394 f, 536 b). Irondale furnace; F.; one sample: Fe,P. (394 d, 536, c). Little Red Mountain outcrop; F.; one sample: Fe,P. (398 a, 536 b). Massey's Mill outcrop, section (398 a); F.; one sample: Fe,P (398 c, 536 b). New Castle Station mine described; section; (390 c). C. (blackband); three samples: Fe,P. (399 d, 536 b). Old ore-pit near Cahaba river; L.; two samples: Fe,P. (399 a, 536 b c). Potter's (M. L.) property; F.; two samples: Fe,P. (392 f, 393 a, 536 c). Red mountain; F.; one sample: Fe,P. (393 b, 536 b). Rodgers' mine; F.; one sample: Fe,P. (398 d). Van's land; L.; one sample: Fe, P. (399 b, 536 b).

Jackson county. Coal (bituminous), statistics of the production of, in c. y. (642-645).

Lamar county. Vernon mine; L.; two samples: Fe,P. (401 d, 538 d).

Madison county. Coal (bituminous), statistics of the production of, in c. y. (642-645).

Saint Clair county. Iron ore: Amount of each kind of iron ore mined in, in c. y. (23 d); statistics of the production of iron ore in c. y. (40-43); iron-ore deposits of (395 c). Iron-ore mines: Alderholt mine described, section (395 f, 396); F.; two samples: Fe,P. (396 d, 536 c). Woodall mine; F.; three samples: Fe,P. (395 d, 536 c).

ALABAMA—Continued.

Shelby county. Coal (bituminous), statistics of the production of, in c. y. (642–645). Iron ore: Amount of each kind of iron ore mined in, in c. y. (23 d); statistics of the production of iron ore in c. y. (40–43). Iron-ore mines: Shelby Iron Company's mine; L.; two samples: Fe,P.; one sample: c (387 c, 536 c).

Talladega county. Iron ore: Amount of each kind of iron ore mined in, in c. y. (23 e); statistics of the production of iron ore in c. y. (40–43). Iron-ore mines: Alabama furnace; L.; one sample: Fe,P. (387 f, 388 a, 536 f). Bed No. 6 (Clifton); L.; one sample: c. (388 f, 389 c, 536 f). Clifton mine; L.; two samples: Fe,P. (388 c, 536 c). Leny bed (Clifton); L.; one sample: Fe,P. (389 a, 536 f). Side mine; L.; one sample: Fe,P. (389 c, 536 f). Sparks mine; L.; one sample: Fe,P. (389 d, 536 f). Talladega mine; L.; one sample: Fe,P. (388 b, 536 c).

Tuscaloosa county. Coal (bituminous), statistics of the production of, in c. y. (642–645). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 e); statistics of the production of iron ore in, in c. y. (40–43); Iron-ore mines: Eureka Iron Company's mine; L.; one sample: c (386 a, 536 c, 584); one sample Fe,P (394 b, 536 c). Pioneer Iron Company's mine; L.; one sample: Fe,P. (385 d, 536 c). Shamblin and Dickey mine; F.; one sample: Fe,P. (392 c, 536 c). Shelby Coal Company (see Eureka mines), (394 b, 536 c). Tuscaloosa Iron Company's mine; L.; one sample: Fe,P. (385 f, 536 c). Woodward (S. H.); L.; one sample: Fe,P. (386 f, 536 c).

ALASKA.

Coal: Analysis of, Admiralty island (788–789). Copper: statistics of the production of, in c. y. (800).

Analcite (nosean) from Highwood mountains, Montana, analyses of and comparison (728 d, 729 a).

Analyses of coals and lignites of the Northwest, by F. A. Gooch (772–790); of coals and lignites of Washington territory (769–771, 776–781, 790); of coals of Montana (780–789, 790); from Wyoming, New Mexico, Colorado, Oregon, Alaska, Idaho (788, 789).

Analyses of iron ores of the United States, complete (584–601); of iron ores of the United States, partial (536–581); of iron ores, methods employed in the, by A. A. Blair (508–527).

Andesite (augite) of Sixteen-mile Creek mountains, Montana (736 c); (hornblende) of Bozeman coal-fields, Montana (736 f).

Appalachian region, limonites of the (10 c).

Archæan iron ores in Canada (3 c); in Colorado (472 c); of Lake Superior (7 c, 421–455); of McMinn county, East Tennessee (332 f); of Minnesota (457–467); of Missouri (5 a, 9 c, 403–407); of New Jersey (6 c, 145–176); of New York (7 b, 90–122); of North Carolina (7 a, 301–329); of Pennsylvania (6 c, 179); of the United States (3 c); of Virginia (6 f, 263 d).

Archæan in central Montana (607 c).

ARIZONA.

Copper: statistics of the production of, in c. y. (800).

ARKANSAS.

Coal (bituminous), statistics of the production of, in c. y. (642–645, 674–675).

Johnson county. Coal (bituminous), statistics of the production of, in c. y. (642–645).

Pope county. Coal (bituminous), statistics of the production of, in c. y. (642–645).

Sebastian county. Coal (bituminous), statistics of the production of, in c. y. (642–645).

Washington county. Coal (bituminous), statistics of the production of, in c. y. (642–645).

Asbestos, statistics of the production of, in c. y., by states and counties (839); by states (846–847).

Asia, exclusive of British possessions, pounds of iron consumed per head of population (34 c).

Asphaltum, statistics of the production of, in c. y., by states and counties (839); by states (846–847).

Augite-trachytes of Highwood mountains, Montana (726 a).

Austria and Hungary, production of iron ore in, in 1881 (33 c).

Austrian territories, pounds of iron consumed per head of population (34 c).

B.

Barytes, statistics of the production of, in c. y., by states and counties (839); by states (846–847).

Basalts (analcite-nosean) of Highwood mountains, Montana (727 c).

Belgium, pounds of iron consumed per head of population (34 c); production of iron ore in, 1870–1884 (33 b); royalty paid on iron ore and coal in (32 c).

Bell, I. L., on the royalty paid in England for hematite and blackband (32 c); statistics of the output of five iron-producing countries, by (33 d).

Blackband ore, occurrence of (16 a); and ball-ore, Triassic, of Moore county, North Carolina (306 d); of Mineral ridge, Ohio, on horizon of, by Professor Newberry (238 b).

Benton, Edward R. Notes on the samples of iron ore collected in Maryland (245–260); notes on samples of iron ore collected in northern New England (79–87); notes on the samples of iron ore collected in Virginia (261–288); observation of, on the derivation of cavernous limonite in Virginia (11 b, 276 b).

Bessemer ore. Amount of each kind mined in each state in the c. y. (30 c); amount of each kind mined in the United States in the c. y., and its per cent. of total Bessemer ore product (31 b); amount produced from each geological horizon in United States in the c. y. (31 c); in New Jersey, phosphorus-iron ratio in (6 c); in Pennsylvania (6 c); proportion of, according to state (31 a); product in Missouri (20 a); product of the Lake Superior mines in (9 b); product, tonnage, and ratio of in each state (19 c); relative product and value of, in the different states (20 a).

Bog-ore. Method of formation (3 d); relative importance of, in mining (17 a); in eastern counties of North Carolina (302 b); in Nash county, North Carolina (307 d); in Oregon, (16 f).

Booth, Garrett and Blair, analyses by (95 f).

Bowson, W. M. On Potsdam age of certain shales in Botetourt county, Virginia (278 c).

British Columbia. Puget Sound Iron Company's mine, Texada island; M; one sample: Fe,P. (498 d, 580 f); one sample: c. (499).

British Possessions in India. Pounds of iron consumed per head of population (34 c).

British Possessions, exclusive of India. Pounds of iron consumed per head of population (34 c).

Britton, J. B., analysis of Ellingwood Farm iron ore by (137 c); analysis of ore from the Franklin and Clinton mines by (139 c).

Britton, N. L., on the geology of Richmond county, New York, quoted (122 c).

Brooks, T. B., on the age of the iron-ore formation in Jefferson and Saint Lawrence counties, New York (142 b); on the geological position of the Lake Superior iron ores (7 f, 8 c, 423 a, 437 c); description of lake Superior ores quoted (423 c).

Bullion, exports and imports of (830).

C.

CALIFORNIA.

Asphaltum, statistics of the production of, in c. y. (839, 846–847); chromic iron, statistics of the production of, in c. y. (839, 846–847); copper ore, statistics of the production of, in c. y. (800); iron ores (493–496); partial analysis of (538–539).

Amador county. Copper, statistics of the production of, in, in c. y. (800).

Los Angeles county. Asphaltum, statistics of the production of, in c. y. (839).

Napa county. Adams mine; H: four samples: c. (496 a); one sample: Fe,P. (495 f, 538 c).

Placer county. Clipper Gap mine; L. and M.; three samples: Fe,P. (494 f, 495 a, 538 d).

Santa Barbara county. Asphaltum, statistics of the production of, in c. y. (839).

San Luis Obispo county. Chromic iron, statistics of the production of, in c. y. (839).

Cambria Iron Company, analyses made for the (95 f).

Cambrian, see Silurian, Lower.

Campbell, Professor J. L., on geological age of Rich Patch mountain, Virginia (280 b, 281 a); on geological relations of ore-beds of Great North mountain, West Virginia (288 c); on geological relations of sandstones and ore-beds of James River basin, west of the Blue ridge (277 d, 278 c); on Oriskany age of rocks of Brushy mountain, Virginia (279 d); on Potsdam age of iron ores of Shenandoah valley, West Virginia (286 c).

Canada, archean iron ores of (3 c).

Canadian age, iron ores of the (12 a); iron ores of the, in Missouri, yield of in 1880 (12 c).

Carbonate ores and their derivatives: per cent. of, to the total ore tonnage (18 f); percentage of tonnage and metallic-iron product of the (20 f); amount mined in the c. y., and its per cent. of the total product (21 a); amount mined in each geological horizon in each state in the c. y. (21 b); amount mined in each geological horizon in the United States in the c. y. (22 c); amount mined in each state in the c. y. (23 a); amount mined in each ore-producing county in the c. y. (26 a); carrying under 35 per cent. iron, amount produced in the United States in the c. y. (26 c, 28 a); total amount of iron in ore containing over 35 per cent. iron (26 f, 27); carrying over 35 per cent. iron, amount produced in each state in c. y. (27 f, 28); carrying under 35 per cent. iron, amount produced in each state in c. y. (27 f, 28); amount of iron in the different grades of ore mined in each state in the c. y. (28 c); proportion of iron produced from the higher grades (29 c); amount of each grade according to phosphorus-iron ratio mined in each state in the c. y. (30 a); amount of each grade according

Carbonate ores and their derivatives—Continued.
to phosphorus-iron ratio mined in the United States in the c. y. (30 c); amount produced in the United States in the c. y. with a phosphorus ratio greater than 1.00 (31 c, 32 b); amount of royalty paid on, in each state in the c. y. (32 d).
In Alabama (399 c); in Kentucky (292-300); in Maryland (Mesozoic) (245-254); in New York (136 a); in Ohio (16 b, 235-243); in Pennsylvania (202-212); in Virginia, occurrence of (15c).
Carboniferous. Occurrence of the iron ores of the (15 c); amount of this iron ore mined in the United States in the c. y. (22 c); amount of this ore mined in each state in the c. y. (21 b); carboniferous iron ores in Alabama (399 a); in Kentucky (292-300); in Ohio (235-243); general section of the Coal Measure ores of Ohio (287); in Pennsylvania (205-212).
Case, W. H., maps and sections of the Mineville mines by (108 c).
Catskill formation in Virginia, impure iron ore in the (15 c).
Cenozoic. Amount of iron ore mined in the United States in the c. y. (22 c); amount of Bessemer ore mined in the United States in the c. y., and its per cent. of total Bessemer ore product (31 c); amount of limonite mined in each state in the c. y. (21 b).
Center of total iron-ore production in the United States, in c. y. (37 a).
Chauvenet, W. M., notes on samples of iron ore collected in Alabama (383-399); notes on the samples of iron ore collected in Kentucky (289-300); notes on the samples of iron ore collected in Missouri (403-420); notes on the samples of iron ore collected in Tennessee (351-365).
Chester, A. H., analysis of ore from the Franklin and Clinton mines by (139 b).
Chemung formation, Mansfield ore in Pennsylvania (15 b, 219).
Chromic iron ore, statistics of the production of, by states and counties (839); by states (846-847); chromic ore in California (304 c).
Clinton ores. (See Fossil ores.)
Coal (anthracite), statistics of the production of, by states and counties (Table 27), (625-630); statistics of the production of, by states (Table 28) (634-635).
Coal (bituminous), statistics of the production of, east of the 100th meridian, by states and counties (Table 29), (642-676); statistics of the production of, east of the 100th meridian, by states (Table 30), (674-675).
Coal (semi-anthracite), statistics of the production of, east of the 100th meridian, by states (Table 31), (675).
Coal (bituminous and lignite), statistics of the production of, west of the 100th meridian by states and counties (Table 32), (676-678); statistics of the production of, west of the 100th meridian by states (Table 38), (679).
Coal-field, great central, of the United States (3 a).
Coal-fields of Montana, by George H. Eldridge (739-757); of Washington territory, report on, by Bailey Willis (759). (See further under Washington and under Montana.)
Coals and lignites of the Northwest, analyses of (772-790); of Washington territory, proximate analyses of (769-771, 776-781); elementary analyses of (790); of Montana, proximate analyses of (780-789); elementary analyses of (790); of Wyoming, New Mexico, Colorado, Oregon, Alaska, Idaho, analysis of (788-789); lignite of Mouse river, Dakota, its physical characteristics (757 c). (See under Washington and Montana.)
Cobalt and nickel matte, statistics of the production of (844, 850-851).
Cobalt, statistics of the production of, by states and counties (840, 846-847).
COLORADO.
Coals, analyses of (788-789).
Copper: Statistics of the production of, in c. y. (800).
Iron ores: Partial analyses of (538-541).
Iron ores: Notes on the samples of iron ore collected in, by Bayard T. Putnam; map of a portion of Colorado showing position of iron-ore deposits sampled (473); magnetite in Archæan; iron mountain (472 c); magnetic map of (474); Caribou hill (476 c); Jefferson county iron mines (476 f); Calumet, Hecla, and Smithfield mines (477 b); magnetite in Carboniferous (?) limestone; Ainsworth and Stoddard mines (477 c); sketch section at (478); sketch plan of the Stoddard mine (479); magnetic ore from near Hamilton, Park county (480 c). Hematite: Breece iron mine, Leadville (480 d); map showing location of (480); sketch plan of (481). Limonite: Amie mine (Leadville) (482 d); in Sangre de Cristo mountains near Hayden's pass (482 f); sketch map of (483). Carbonate ore and its derivatives.
Arapahoe county. Copper: Statistics of production of in, c. y. (800).
Boulder county. Iron-ore deposits: Caribou Hill mine; M.; two samples: Fe,P. (476 d, 538 c). Marshall mine; C.; one sample; Fe,P. (484 f, 538 c).
Chaffee county. Iron-ore deposits: Arkansas Hills mines (see Hecla mine); M.; two samples; Fe,P. (477 b, 540 b); Calumet mine (477 b, 540 b); Hecla mine (477 b, 540 b).
Costilla county. Iron-ore deposits: Ainsworth and Stoddard mines; M.; five samples: Fe,P.; two samples: c (477 c, 480 a, 538 f).
Fremont county. Iron-ore deposits: Iron Mountain mine; M.; seven samples: Fe,P. TiO_2 (473 d to 476, 538 f, 540 a).
COLORADO—Continued.
Huerfano county. Iron-ore deposits: Near Walsenburg; C.; two samples; Fe,P. (484 f, 538 f).
Jefferson county. Copper: Statistics of the production of, in c. y (800). Iron-ore deposits: "Jefferson County Iron mines"; M.; one sample: Fe,P. (476 f, 538 c).
Lake county. Iron-ore deposits: Amie mine; L.; three samples: Fe,P. (481 d, 540 c). Breece Iron mine: H.; one sample: c; four samples: Fe,P. (480 d, 540 c).
Las Animas county. Iron-ore deposits: El Moro mine; C.; one sample: Fe,P. (484 f, 538 f).
Park county. Iron-ore deposits: Hamilton mine; M.; one sample: Fe,P. (479 c, 540 c).
Saguache county. Iron-ore deposits: Beehive mine; L; one sample: Fe,P. (484 c, 540 b); McClellan mine; L.; one sample: Fe,P. (484 a, 540 b); Poorman's mine; L.; one sample: Fe,P. (484 a, 540 b); Prospect mine; L.; one sample: Fe,P. (484 a, 540 b); Saguache mine; L.; one sample: Fe,P. (484 b, 540 b).
CONNECTICUT.
Iron. Amount in ore mined in c. y. and its per cent. of total iron in United States' ore product (19 c); amount of iron in the different kinds and grades of ore mined in, in the c. y. (28 d); average per cent. of iron in c. y.'s, ore product (19 c).
Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 c); to total amount of ore (74 c).
Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 c, 74 c); average value per ton (19 c); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 a); amount of each kind of ore mined in each county in the c. y. (23 c); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (27 f); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 d, 30 a); royalty paid on each kind of ore mined in c. y. (32 c).
Iron ore. Statistics of the production of, in c. y. (40-43, 64-69); general averages of these statistics (70-71).
Iron ores. Partial analyses of (540-541); complete analyses of (585).
Iron ores. Notes on the samples of iron ores collected in. By Bayard T. Putnam (83-86).
Litchfield county. Iron ore: Amount of each kind of ore mined in, in the c. y. (23 d-26 d); statistics of the production of iron ore in, in c. y. (40-43).
Iron-ore mines. Brookpit or Ore Hill mine; L.; four samples: Fe,P. one c (85 a, 540 d, 585); Brookpit or Ore Hill mine, described; section (84 f). Chapin mine; L.; one sample: Fe,P. (86 b, 540 c). Chapin mine, described (86 a). Chatfield mine; L.; six samples: Fe,P. (84 c, 540 d); Chatfield mine, described; plan (84 c). Davis or Forbes mine; L.; four samples: Fe,P. (85 f, 540 d). Davis or Forbes mine described (85 c). Kent mine; L.; three samples: Fe,P. (83 c, 84 a, 540 c). Kent mine described (83 d). Porter mine mentioned 85 c). Scoville mine (see Chapin mine) (86 a, 540 c).
Conversion of lignite into fuel of high heating power. By F. A. Gooch (791-796).
Cook, G. H., topographical subdivision of the Archæan rocks of New Jersey by (148 b).
Copper industry. Copper-smelting works, statistics of, in c. y. (Table 64) (825); leading statistics of materials, etc., based upon a product of one ton (Table 65) (826); smelting and refining works, east of the 100th meridian, statistics of (Table 67) (826); smelting and refining works, east of 100th meridian, derivation of coal consumed in (827); copper consumed in manufactures in c. y. (828); grand total of smelting works in c. y. (Table 68) (827); imports and exports of copper (830).
Copper ore. Statistics of production of in the census year (798-799); analyses of these statistics, by Charles F. Johnson, jr. (801, 802); imports and exports of (828); analysis of gossan from Ducktown mine, east Tennessee (331 c).
Corundum (emery), statistics of the production of, by states and counties (840); by states (846-847).
Credner, H., geological position of the ores south of lake Superior, according to (7 f).
Cretaceous lignites west of the Missouri river, iron in the (16 c).
Cretaceous in the northwest (see Montana and Washington territories).

D.

DAKOTA.
Analysis of its lignites (786-789); Mouse River coal-field (756 f).
Iron ore of (486).

Dana, J. D., on the genetic relations of the carbonate ores in New York (10 f); on the geological relations of the ore-deposits of Dutchess and Columbia counties, New York (127 d); on the origin of limonite deposits (10 f); on rocks referred to the New England Taconic (10 c).

Davis, W. M., on relation of the coal of Montana to the older rocks (697–701).

DELAWARE.

Iron. Amount in ore mined in c. y., and its per cent. of total iron in United States' ore-product (19 e); amount of iron in the different kinds and grades of ore mined in, in c. y. (28 e); average per cent. of, in ore mined in c. y. (19 e).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 e); to total amount of ore (74 e); rank among iron-ore-producing states in 1870 (74 e).

Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 e, 74 e); average value per ton (19 e); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 a); amount of each kind of ore mined in each county in the c. y. (23 e); amount of each kind and grade of ore, according to its contents in iron, produced in, in c. y. (27 f); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 d, 30 a).

Iron ore. Statistics of the production of iron ore in c. y. (40–43, 66–69); general average of these statistics (70–71).

Iron ores. Partial analyses of (540–541).

Kaolin. Statistics of the production of, in c. y. (842, 848–849).

New Castle county. Iron ore: Amount of each kind of iron ore mined in the c. y. (23 e); statistics of the production of iron ore in c. y. (40–43). Iron-ore mines: Chestnut Hill; L.; one sample: Fe,P. (540 e). Iron Hill; L.; one sample: Fe,P. (540 e).

Kaolin. Statistics of the production of, in c. y. (842).

Devonian. Amount of iron ore mined in, in the United States in the c. y. (22 e); amount of each kind of iron ore mined in each state in the c. y. (21 b); limonite ores of, in Pennsylvania (chiefly Marcellus) (199 e); limonite ores of the Mauch Chunk red shale, Pennsylvania (202 b).

Directory of mines and metallurgical establishments east of 100th meridian (854).

Dyestone ores. (See Fossil ores.)

E.

Egypt. Pounds of iron consumed per head of population (34 e).

Eldridge, George H. Montana coal-fields (739–757); the industries of the base metals (lead, zinc, and copper) (809–830).

Emery (corundum). Statistics of the production of, by states and counties (840); by states (846–847).

Emmons, E. Account of the Arnold Hill mine by, referred to (119 e); account of the Palmer Hill mine by, referred to (119 a); description of the hematite mines in Jefferson and Saint Lawrence counties, New York, referred to (141 f); localities of magnetic ore in Franklin county mentioned by (122 c); on the Adirondack iron ores, reference to (108 a); on the relations of the ore-formation in Jefferson and Saint Lawrence counties, New York (142 b); "veins" of iron ore in Clinton and Essex counties mentioned by (122 b).

England (see also Great Britain). Royalty paid on hematite and calcined blackband in (32 e).

Exports and imports of bullion in c. y. (Table 74) (830); of copper in c. y. (Table 72) (830); of copper ores in c. y. (Table 68) (828); of gold ores in c. y. (Table 69) (829); of lead in c. y. (Table 71) (830); of silver ores in c. y. (Table 69) (829); of tin in c. y. (Table 73) (830); of zinc in c. y. (Table 70) (829).

F.

Feldspar and quartz, statistics of the production of, by states and counties (844); by states (852–853).

Ferriferous limestone ores in Ohio (16 c).

Fossil iron ore. Amount mined in each State in the c. y. (23 a); amount mined in the c. y., and its per cent. of the total product (21 a); amount mined in each geological horizon in the United States in the c. y. (22 e); amount mined in each geological horizon in each state in the c. y. (21 b); amount mined in each ore-producing county in the c. y. (23–26); amount of each grade, according to phosphorus-iron ratio, mined in each state in the c. y. (30 a); amount of each grade, according to phosphorus-iron ratio, mined in the United States in the c. y. (30 e); amount of iron in the different grades of ore mined in each state in the c. y. (28 e); amount of royalty paid in each state in the c. y. (32 d); amount produced in the United States in c. y. with a phosphorus ratio greater than 1.00 (31 e, 32 b); total amount of iron in ore containing under 40 per cent. iron (27 a); total amount of iron in ore containing 40 to 50 per cent. iron (27 a); total

Fossil iron ore—Continued.

amount of iron in ore containing over 50 per cent. iron (27 a); carrying under 40 per cent. iron, amount produced in each state in the c. y. (27–28); carrying under 40 per cent. iron, amount produced in the United States in the c. y. (27 a, 28 e); carrying 40 to 50 per cent. iron, amount produced in each state in c. y. (27 e, 28); carrying 40 to 50 per cent. iron, amount produced in the United States in the c. y. (27 a, 28 e); carrying over 50 per cent. iron, amount produced in each state in c. y. (27 f, 28); carrying over 50 per cent. iron, amount produced in the United States in the c. y. (27 a, 28 e); character of the deposits (13 f); geological sections of the Clinton, in Alabama, New York, Pennsylvania, Tennessee, Wisconsin (14); fossil ore in Alabama (392–398); in Georgia (13 d, 378); in Kentucky (13 c, 291 a); in New York (13 a, 137–141); in Ohio (13 c); in Pennsylvania (13 b, 213–221); in Tennessee (348–350, 351–357); in Virginia (13 e, 280 f); in West Virginia (13 e); in Wisconsin (580, 581).

Foster, J. W., and Whitney, J. D., on the position of the Lake Superior iron ores (7 f).

France. Pounds of iron consumed per head of population (34 e); production of iron ore in, 1870–1884 (33 d); production of iron ore in, in 1882 (33 b); royalty paid on iron ore and coal in (32 e).

Frazer, P., considers Pennsylvania magnetites non-eruptive (11 e).

Fulton, M., plan and section of the Croft mine, Putnam county, New York, by (95 b).

G.

Garnet, statistics of the production of, by states and counties (840); by states (846–847).

Geographical and geological distribution of the iron ores of the United States. By Raphael Pumpelly (3–35).

Geological horizons, proportion of iron-ore product to the (22 a).

Geology of New Jersey, description of mines in, referred to (151 b); diagrams illustrating the pod and shoot structure from (146 a, 147); reference to description of the Cannon mine in (174 f); reference to map of Hibernia mines in (173 a); reference to mention of Mount Pleasant mine in (171 a).

GEORGIA.

Asbestos, statistics of the production of, in, in c. y. *(839, 846–847)*.

Barytes, statistics of the production of, in, in c. y. (839, 846–848).

Coal (bituminous), statistics of the production of, in c. y. (642–645, 674–675).

Hydraulic cement, statistics of the production of, in c. y. (841, 848–849).

Iron. Amount in ore mined in c. y., and its per cent. of total iron in United States ore product (19 e); amount of iron in the different kinds and grades of ore mined in c. y. (28); average per cent. of iron in ore mined in c. y. (19 d).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. iron in ore; to average spot value of ore; to total value of ore (19 e); to total amount of ore 74 e).

Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 e, 74 e); average value per ton (19 e); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. *(23 a)*; *amount of each kind of ore mined in each county in the c. y. (23 e)*; amount of each kind and grade of ore according to its contents of iron, produced in, in c. y. (27 f); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 d, 30 a).

Iron ore. Statistics of the production of iron ore in c. y. (40–43, 64–69); general averages of these statistics (70–71).

Iron ores. Partial analyses of (540–543); complete analyses of (585, 586).

Iron ores. Notes on the samples of iron ore collected in Georgia, by Bailey Willis (367–376); iron ore sample *map* of northwestern Georgia and parts of Alabama, Tennessee and North Carolina (367). LIMONITE.—Fannin county (368); Cherokee county (368); Bartow county (368). SPECULAR ORE (373). LIMONITE.—Polk county (374); Bartow county (376); Floyd county (376); Walker county (?) (377 e); Murray county (377). FOSSIL.—Whitfield county (378).

Magnesian limestone, statistics of the production of, in c. y. (842, 850–851).

Manganese. Notes on the samples of manganese ore collected in Georgia by Bailey Willis (379–382).

Manganese, statistics of the production of, in c. y. (842, 850–851).

Soapstone, statistics of the production of, in c. y. (845, 852–853).

Bartow county. Barytes: Statistics of the production of, in c. y. (839); Hydraulic cement: Statistics of the production of, in, c. y. (841). Manganese: Statistics of the production of, in c. y. (842). Magnesian limestone: Statistics of the production of, in c. y. (842). Iron ore: Amount of each kind of iron ore mined in, in c. y. (23 e); statistics of the production of iron ore in, in c. y. (40–43); geology of the iron ores of (368 e). Iron-ore mines: Bartow furnace banks described, map (368 f), L.; four samples: Fe,P,Mn. (368 f to 370 e, 540 f). Big mine; L.; one

GEORGIA—Continued.
Bartow county—Continued.
sample: Fe,P,Mn. (373 d, 542 b). Black mine; L.; one sample: Fe,P. Mn. (371 b, 542 b). Burford mine; L.; one sample; Fe,P.Mn.(372 c, 542 b). Cartersville ore-banks described, map (379 b). Connor mine; H. and L.; one sample: Fe,P. (373 c, 542 b). Crow mine; L.; two samples: Fe,P, Mn. (371 d, 542 a). Giton mine; L.; one sample: Fe,P. (371 c, 542 b). Gray mine; L.; one sample: Fe,P,S,Si.; one sample: c. (373 f, 374 a, 542 c, 585). Irish mine; L.; one sample: Fe,P.Mn. (371 b, 542 b). Kingston (2 miles west of); L.; one sample: Fe,P. (376 c, 542 c). Mumford mine; L.; one sample: c (372 a, 542 c, 585). Peach Tree mine; L.; one sample: Fe,P. (373 c, 542 b). Wheeler mine; L.; two samples: Fe, P,Mn. (370 f, 371 a, 540 f, 542 a). Wild Cat mine; L.; three samples: one c., two Fe,P.S.Si (372 c, 373 b, 542 b, 585). Wood's bank, mentioned, map (374 c); L.; three samples: Fe,P,Mn. (375 a, 542 c).
Catoosa county. Magnesian limestone: Statistics of the production of, in c. y.(842).
Cherokee county. Soapstone: Statistics of the production of, in c. y. (845). Iron-ore mines: Donaldson's (Judge) mine; L.; one sample: Fe,P. (368 d, 540 f). Donaldson's (Judge) mine; M.; two samples: Fe,P. (368 d, 540 f).
Dade county. Coal (bituminous): Statistics of the production of, in c. y. (642-645). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 c); statistics of the production of iron ore in, in c. y. (40-43).
Fannin county, and Cherokee county, North Carolina, map of portions of, showing location of iron mines (328). Iron-ore mines: Jarrett's mine; L.; three samples: Fe,P. (368 b, 540 f).
Floyd county. Iron-ore mines: Ridge Valley furnace; L.; three samples; Fe,P. (376 f, 377 a, 542 d). Flower Branch mine; L.; one sample; Fe,P. (377 b, 542 d).
Fulton county. Asbestos: Statistics of the production of, in c. y. (839).
Murray county. Soapstone: Statistics of the production of, in c. y. (845). Iron-ore mines: Aliculsie valley; L.; one sample: Fe,P. (377 f, 378 a, 542 c). Calico mine; L.; one sample: Fe,P. (378 a, 542 c). Harris's (J. R.) mine; L.; one sample: Fe,P. (377 c, 542 c).
Polk county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 c); statistics of the production of iron ore in c. y. (40-43). Iron-ore mines: Alloway mine; L.; one sample: Fe,P,Mn. (375 f, 376 a, 542 d). Fisher's Creek mine; L.; one sample: Fe,P,Mn. (375 c, 542 c). Folger mine; L.; one sample: Fe,P,Mn. (376 b, 542 d). Lowe's (S. B.) mine; L.; one sample: Fe,P. (542 d). Peck mine; L.; one sample: Fe,P,Mn. (375 b, 542 c). Pennington mine; L.; one sample: Fe,P, Mn. (375 f, 376 a, 542 d). Phillips mine; L.; one sample: Fe,P,Mn.(375 d, 542 c). Snake Pond mine; L.; two samples: Fe,P,Mn. (376 d, 542). Wood's mine; L.; three samples: Fe,P,Mn. (374 d, 375 a, 542 c).
Walker county. Snake Creek gap; L.; one sample: c. (377 c, 542 d, 586).
Whitfield county. Holland's (Trickum) mine; F.; one sample: Fe,P. (378 c, 542 c).
Germany. Pounds of iron consumed per head of population (34 c); production of iron ore in, in 1870-84 (33 d); production of iron ore in, in 1882 (33 b); royalty paid on iron ore and coal in (32 c).
Glacial action, local, on main range of Rocky mountains over Cadotte's pass (712 d).
Glass sand, statistics of the production of, by states and counties (840); by states (848-849).
Gogebic district, Michigan, exploration of (4 c, 9 c, 423 f).
Gold ore. Imports and exports in c. y. (Table 69) (829); gold produced in c. y. (828 a).
Gooch, F. A. Analyses of coals and lignites of the Northwest (772-790); conversion of lignite into fuel of high heating power (791-796).
Graphite. Statistics of the production of, by states and counties (841); by states (848-849).
Great Britain. Cumberland, royalty paid on iron ore and coal in (32 c); pounds of iron consumed per head of population (34 c, 136 a); production of iron ore in, in 1882 (33 b); production of iron ore in, 1870 to 1884 (33 d).

H.

Hall, C. E. On the Laurentian iron-ore deposits in New York (108 a); on the non-titaniferous iron ores of New York (7 c).
Hall, J. Section on the Genesee river, Wayne county, New York, referred to (140 c).
Hamilton shales in Pennsylvania, character of the iron ore of the (15 b).
Helderberg (Lower), limonite ores of, in Pennsylvania (198 c).
Hematite [Including specular but excluding fossil ores]. Exhaustion of (4 c); mined in the Lake Superior region in the c. y., classified according to its contents of metallic iron (8); amount mined in each geological horizon in each state in the c. y. (21 b); amount mined in each geological horizon in the United States in the c. y. (22 c); amount mined in each ore-producing county in the c. y. (23-26); amount mined in each state in the c. y. (23 a); amount mined in the c. y., and its per cent. of the total product (21 a); amount of each grade, according to phosphorus-iron ratio, mined in each state in the c. y. (29 d); amount of each grade, according to phosphorus-iron ratio, mined in the United States in the c. y. (29 f); amount of iron in the different grades of ore mined in each state in the c. y. (28 c); amount of royalty paid on, in each state in the c. y. (32 d); amount produced in the United States in c. y. with a phosphorus ratio greater than 1.00 (31 c, 32 b); amount produced in the United States in c. y. with a phosphorus ratio under 0.05 (31 d); Bessemer, amount mined in each state in the c. y. (30 c); Bessemer, amount mined in the United States in the c. y., and its per cent. of total Bessemer ore product (31 b); carrying 45 to 60 per cent. iron, amount produced in each state in c. y. (27 f, 28); carrying 45 to 60 per cent. iron, amount produced in the United States in the c. y. (26 c, 28 a); carrying over 60 per cent. iron, amount produced in each state in c. y. (27 f, 28); carrying over 60 per cent. iron, amount produced in the United States in the c. y. (26 c, 28 a); total amount of iron in ore containing under 45 per cent. iron (26 f, 27); total amount of iron in ore containing 45 to 60 per cent. iron (26 f, 27); total amount of iron in ore containing over 60 per cent. iron (26 f, 27); carrying under 45 per cent. iron, amount produced in each state in c. y. (27 f, 28); carrying under 45 per cent. iron, amount produced in the United States in the c. y. (26 c, 28 a); royalty paid on, in England (32 c); royalty paid on, in the United States (32 d).
Iron ores in California (405 f); in Georgia (373 f); in Michigan (7 f, 421-452); in Minnesota (457-467); in Missouri (9 d, 403-420); in New York (141-144); and magnetic ores near Gaston, Halifax county, North Carolina (301 d); Huronian, of North Carolina (304 c); Triassic, of Chatham and Moore counties, North Carolina (305 a); Huronian, of Orange county, North Carolina (306 f); in Gaston county, North Carolina (320 d); in York county, South Carolina (320 c); in Tennessee (346 d, 347 c); in Pennsylvania (180); in Utah (402 b); in Virginia (10 b, 264 a, 265 d, 266 a, 267 f, 268 b, 269 c, 270 b, 277 c, 278 a); in Wisconsin (453-455); in Wyoming (485 f).
Höfer, Professor Hans, "Die Kohlen und Eisenerz-Lagerstätten Nordamerikas," in report of the Austrian Commission to the Centennial Exposition, quoted (223 c).
Horton, W. His description of the Sterling mine, Orange county, N. Y., referred to (91 d); minerals associated with the ore in the Forshee mine, Orange county (93 a).
Hudson River slates (formation No. III), limonite ores of, in Pennsylvania (197 f).
Hunt, T. S. On certain magnetite ores of Pennsylvania (11 c, 224, 229 a).
Huronian. Amount of iron ore mined in the United States in the c. y. (22 c); amount of Bessemer ore mined in the United States in the c. y., and its per cent. of total Bessemer ore product (31 c); amount of each kind of iron ore mined in each state in c. y. (21 b); preponderating iron ore of the (22 b).
Iron ores in Virginia (6 f, 264-271); in Michigan (421-452); in Minnesota (457-467); in Missouri (403). In North Carolina: hematite (specular) and magnetic ores near Gaston, Halifax county (301 d); limonite of Johnston county (302 f); limonites (302 f); limonite of Chatham county (303 c); hematite (specular) ores (304 c); magnetic ores of Stokes county (311 d); specular ores of Orange county (306 f); magnetic ore of Lincoln county, North Carolina (316 f); magnetic ore of York county, South Carolina (319 c); magnetic ore of Gaston county, North Carolina (316 f); limonite of Cherokee county, North Carolina (327 c). Iron ores in Wisconsin (453-455).
Hydraulic cement, statistics of the production of, by states and counties (841); by states (848-849).
Hydraulic lime, statistics of the production of, by states and counties (841); by states (848-849).
Hydromica schists, relation of the, to limonite ores (11 a).

I.

IDAHO.
Analysis of float-coal from Kootanai river (788-789).
Lemhi county. Copper, statistics of the production of, in c. y. (800).
Igneous rocks. (See, under Montana, Eruptive Rocks.)
ILLINOIS.
Coal (bituminous), statistics of the production of in c. y. (642-649, 674, 675).
Glass-sand, statistics of the production of, in c. y. (840, 848-849).
Hydraulic cement, statistics of the production of, in c. y. (841, 848-849).
Lead and zinc ore, statistics of the production of, in c. y. (806).
Lead. Statistics of lead-smelting works in c. y. (810); machinery employed in the reduction of lead ores (820); relations of product to lead ores consumed (820).

ILLINOIS—Continued.

Zinc: Average cost of materials, labor, etc., per ton of zinc produced in c. y. (824); mechanical plant employed in the reduction of zinc ores in c. y. (824); percentage of capital employed in c. y. (824); per cent. of the total product of zinc obtained in c. y. (824); representation of the furnace plant of the zinc smelters in c. y. (824); statistics of zinc-smelting works in c. y. (821).

Brown county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Bureau county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Clinton county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Coles county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Fulton county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Gallatin county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Greene county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Grundy county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Henry county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Jackson county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Jasper county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Jersey county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Jo Daviess county. Lead and zinc, statistics of the production of, in c. y. (804-806).

Johnson county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Kankakee county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Knox county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

La Salle county. Coal (bituminous), statistics of the production of, in c. y. (642-649); glass-sand, statistics of the production of, in c. y. (840); hydraulic cement, statistics of the production of, in c. y. (841).

Livingston county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Logan county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Macoupin county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

Madison county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Marion county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Marshall county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

McDonough county. Coal (bituminous), statistics of the production of, in c. y. (642-649).

McLean county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Menard county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Mercer county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Montgomery county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Morgan county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Peoria county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Perry county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Randolph county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Rock Island county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Saint Clair county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Saline county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

ILLINOIS—Continued.

Sangamon county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Schuyler county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Scott county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Shelby county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Stark county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Tazewell county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Vermilion county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Warren county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Washington county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Will county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Williamson county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Woodford county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Imports of iron ore in c. y. (72 c).

Imports and exports of bullion in c. y. (Table 74) (830); of copper in c. y. (Table 72) (830); of copper ores in c. y. (Table 68) (828); of gold ores in c. y. (Table 69) (829); of lead in c. y. (Table 71) (830); of silver ores in c. y. (Table 64) (829); of tin in c. y. (Table 73) (830); of zinc in c. y. (Table 70) (829).

Industries of the base metals (lead, zinc, and copper), by George H. Eldridge (809-830).

Infusorial earth, statistics of the production of, by states and counties (841); by states (848-849).

INDIANA.

Coal (bituminous), statistics of the production of, in c. y. (646-649, 674, 675).

Glass-sand. Statistics of the production of, in c. y. (840, 848-849).

Iron. Amount in ore mined in c. y. and its per cent. of total iron in the United States ore product (19 c); amount of iron in the different kinds and grades of ore mined in, in c. y. (28 c); iron ore mined in c. y. (19 c).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 c); to total amount of ore (74 c).

Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 c, 74 c); average value per ton (19 c); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 a); amount of each kind of ore mined in each county in the c. y. (24 a); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (27 f); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 d, 30 a).

Iron ore. Statistics of the production of iron ore in, in c. y. (40-43, 64-69); general averages of these statistics (70-71).

Kaolin. Statistics of the production of, in c. y. (842, 848-849).

Oil-stones. Statistics of the production of, in c. y. (844, 850-851).

Shoemakers' sandstones. Statistics of the production of, in c. y. (845, 852-853).

Clay county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Daviess county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Dubois county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Fountain county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Gibson county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Greene county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Harrison county. Glass-sand, statistics of the production of, in c. y. (840).

Knox county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Lawrence county. Kaolin, statistics of the production of, in c. y. (842).

Martin county. Coal (bituminous), statistics of the production of, in c. y. (646-649). Iron ore: Amount of each kind of ore mined in the c. y. (24 a); statistics of the production of, in c. y. (40-43).

Orange county. Oil-stone, statistics of the production of, in c. y. (844); shoemakers' sandstone, statistics of the production of, in c. y. (845).

INDIANA—Continued.

Owen county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Parke county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Perry county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Pike county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Spencer county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Sullivan county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Vanderburg county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Vermilion county. Coal (bituminous), statistics of the production of, in c. y. (646-647).

Vigo county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Warren county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Warrick county. Coal (bituminous), statistics of the production of, in c. y. (646-649).

Washington county. Glass-sand, statistics of the production of, in c. y. (840).

IOWA.

Coal (bituminous), statistics of the production of, in c. y. (650-653, 674-675).

Lead. Machinery employed in the reduction of lead ores (820); relation of product to lead ores consumed (820); statistics of lead-smelting works in c. y. (810).

Lead and zinc ores, statistics of the production of, in c. y. (806).

Adams county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Appanoose county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Boone county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Clayton county. Lead and zinc, statistics of the production of, in c. y. (804, 805, 806).

Dallas county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Davis county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Dubuque county. Lead and zinc, statistics of the production of, in c. y. (804-806).

Greene county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Hamilton county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Hardin county. Coal (bituminous), statistics of the production of, in c. y. (650-653),

Jasper county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Jefferson county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Keokuk county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Lee county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Lucas county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Mahaska county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Marion county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Monroe county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Page county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Polk county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Scott county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Taylor county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Van Buren county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

IOWA—Continued.

Wapello county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Warren county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Wayne county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Webster county. Coal (bituminous), statistics of the production of, in c. y. (650-653).

Iron, consumption per head in 1881 (36 a); amount of, in the different kinds and grades of ore mined in each state in the c. y. (28 d); a classification of the ore mined in the Lake Superior region in the c. y., by kinds and contents of (8, 9); consumption per head of population throughout the world (34 e); curve showing the production of, in United States from 1861 to 1865 (35); curve showing the production of, in Great Britain from 1835 to 1884 (35).

Iron ores. The methods employed in the analysis of, by A. A. Blair (509-527); of the United States, partial analyses of (530-581); of the United States, complete analyses of (584-601).

Iron ore. Probable consumption of, in the world from 1885 to 1900 (36 c); probable consumption of, in the world from 1900 to 1950 (36 d); consumed in the United States from 1882 to 1885 (33 a); probable consumption of, in the United States from 1885 to 1900 (36 b); probable consumption of, in the United States from 1900 to 1950 (36 b).

Iron ores. Rapid exhaustion of rich grades of (36 a); exhaustion of the hematite (4 e).

Iron-ore fields of the United States, relation between the area and production in the (18 e).

Iron ores. Geographical and geological distribution of, in the United States (3-36) (see Table of Contents for synopsis of this chapter); notes on the samples of iron ore collected in Alabama (383-399); notes on the samples of iron ore collected in Alabama (400-401); notes on the samples of iron ore collected in Connecticut and Massachusetts (83-87); notes on the samples of iron ore collected in east Tennessee (331-350); notes on the samples of iron ore collected in Georgia (367-378); notes on the samples of iron ore collected in Kentucky (289-300); notes on the samples of iron ore collected in Maryland (245-260); notes on the samples of iron ore collected in Michigan and northern Wisconsin (421-455); notes on the samples of iron ore collected in Missouri (403-420); notes on the samples of iron ore collected in New Jersey (145-177); notes on the samples of iron ore collected in New York (89-144); notes on the samples of iron ore collected in North Carolina (301-329); notes on the samples of iron ore collected in northern New England (79-82); notes on the samples of iron ore collected in Ohio (235-243); notes on the iron ores of Pennsylvania (179-221); report on certain magnetites in eastern Pennsylvania (223-234); notes on the samples of iron ore collected in Tennessee (351-365); notes on the samples of iron ore collected in Virginia (261-288); report of a trip to [the iron-ore deposits] of the Upper Mississippi and Vermilion lake (457-467); notes on the samples of iron ore collected west of the 100th meridian (469).

Iron-ore of the United States, relation of the c. y.'s product, to the geological horizons (22 a); production, center of, in the United States (37 a); production of, by states and rank of states according to production (74 d); production of New Jersey mines, 1880-1885 (34 a); production of the most important districts in the United States, 1883-1884 (34 b); list of counties producing over 100,000 tons of, in c. y. (75 a); product of the Lake Superior region in 1880 (8 e); product in 1890, probable dominant contributors to the (27 d); production of lake Superior mines, 1880-1885 (33 e); production, relation of, to pig-iron production (34 d); output of the six greatest iron-ore producing countries for 1870, 1875, and 1881-1884 (33 d); the world's production of, in 1882 (34 c).

Iron ores. Relative importance of the different varieties produced in the United States in c. y. (20 e); relation of metallic iron and phosphorus to the kinds and grades of (20 a); resources of the United States, plan for the special study of, abandoned (17 a); resources of the United States summarized (17 c); royalties paid on (32 b).

Iron ore. Statistics of the production of, in c. y., by states and counties (48-63); statistics of the production of iron ore by states in c. y. (64-67); statistics of the production of, in c. y., by states (condensed table) (68, 69).

Iron-ore statistics, general analysis of, by C. F. Johnson (68-76); general averages of the statistics of the production of, by states (70, 71).

Iron ore, chromic, in California (304 c); chromic, statistics of the production of, by states and counties (839); by states (846-847).

Iron-ore mines of the United States, alphabetical list of. (See also *Directory of iron-ore mines*, pp. 931-976): A. Abram's creek (see Tenn., Blount co.); Adams mine (see Cal., Napa co.); Adams, Scott & Co. (No. 10½) mine (see Va., Amherst co.); Adelaide mine (see Utah, Iron co.); Aderholt (A. D.) mine (see Ala., Saint Clair co.); Ætna mine (see Tenn., Hickman co.);

Iron-ore mines of the United States, etc.—Continued.

Agate Bay mine (see Minn., Lake co.); Ahl's (Carey) mine (see Pa., Cumberland co.); Ahl's mine (see Pa., Franklin co.); Ainsworth and Stoddard mines (see Colo., Costilla co.); Alabama furnace (see Ala., Talladega co.); Albright's (Joseph) mine (see Pa., Berks co.); Alderholt mine (see Ala., Saint Clair co.); Aliculsie Valley mine (see Ga., Murray co.); Allen mine (see N. J., Morris co.); Alloway mine (see Ga., Polk co.); Alpine furnace (see Jayville mine, N. Y., Saint Lawrence co.); Amenia mine (see N. Y., Dutchess co.); Amie mine (see Colo., Lake co.); Anderson's mine (see Tenn., Monroe co.); Anderson (Estill furnace) mine (see Ky., Powell co.); Andover or Sulphur Hill mine (see N. J., Sussex co.); Anman mine (see Ohio, Tuscarawas co.); Annandale mine (see N. J., Hunterdon co.); Arcadia (Iron property) mine (see Va., Botetourt co.); Archer's creek (see Va., Campbell co.); Arkansas Hills mine (see Hecla mine, Colo., Chaffee co.); Arnold Hill mine (see N. Y., Clinton co.); Asbury mine (see N. J., Hunterdon co.); Attala mine (see Ala., Etowah co.); Aughey (Henry) mine (see Pa., Juniata co.); Aughey (Samuel) mine (see Pa., Juniata co.); Avondale mine (see Md., Carroll co.); Awl (P.) & Bros. mine (see Pa., Fulton co.).

B. Bacon mine (see Mass., Berkshire co.); Bühler Farm mine (see Ohio, Tuscarawas co.); Baker mine (see N. J., Morris co.); Baker's mine (see Pa., Bedford co.); Baker's mine (Blair furnace) (see Pa., Blair co.); Baker mine (see Tenn., Johnson co.); Bald Pate mine (see N. J., Warren co.): Ballou's (N. P.) mine (see N. C., Ashe co.); Banagan and Shurlock mine (see Tenn., Stewart co.); Bank mine) see Mass., Berkshire co.); Bauman (Henry L.) (see Pa., York co.); Baraga mine (see Mich., Marquette co.); Barber (J.) & Co.'s mine (see Pa., Lehigh co.); Barnum mine (see Mich., Marquette co.); Barton Hill mine (see N. Y., Essex co.); Bartow furnace (see Ga., Bartow co.); Bastian's (Elwin) mine (see Pa., Lehigh co.); Bath mine (see Ky., Bath co.); Bays Branch mine (see Ky., Carter co.); Beach mine (see N. J., Morris co.); Beach Glen mine (see N. J., Morris co.); Bear's mine (see Pa., Cumberland co.); Bear Springs furnace (see Tenn., Stewart co.); Beaver mine (see Pa., Franklin co.); Bedford Pike mine (see Pa., Westmoreland co.); Bed No. 6 (Clifton) (see Ala., Talladega co.); Beehive mine (see Colo., Saguache co.); Beekman mine (see N. Y., Dutchess co.); Beer's mine (see N. J., Morris co.); Bell mine (see Tenn., Dickson co.); Bellwood mine (see Tenn., Stewart co.); Beltzhoover mine (see Pa., Cumberland co.); Benfield mine (see Pa., Berks co.); Bennett's mine (see N. Y., Wayne co.); Berring mine (see N. Y., Orange co.); Bessemer mine (see Mich., Marquette co.); Best's mine (see Pa., Cumberland co.); Bethel or Pittsfield mine (see Vt., Rutland co.); Bickle (Andrew) mine (see Pa., Snyder co.); Biery's (Jonas) mine (see Pa., Lehigh co.); Big bank (see Tenn., Unicoi co.); Big Creek mine (see Tenn., Campbell co.); Big Ivey mine (see N. C., Madison co.); Big mine (see Ga., Bartow co.); Big Ore mine (see N. C., Lincoln co.); Big Pond mine (see Pa., Cumberland co.); Billings mine (see Utah, Iron co.); Black mine (see Ga., Bartow co.); Black mine (see S. C., Union co.); Black Hill mine (see N. J., Morris co.); Blacklog Gap (near Orbisonia) mine (see Pa., Huntingdon co.); Blacklog Gap (south side of) mine (see Pa., Huntingdon co.); Blacklog Mountain mine (see Pa., Huntingdon co.); Black Magnetic mine (see Utah, Iron co.); Black River Falls mine (see Wis., Johnson co.); Black Stallion mine (see Utah, Utah co.); Blake mine (see Vt., Rutland co.); Blank's mine (see Pa., Lehigh co.); Blevin's (Armstead) mine (see Tenn., Johnson co.); Blevin's mine (Stony creek) (see Tenn., Carter co.); Bloomary Furnace mine (see W. Va., Hampshire co.); Bloomary mine (see N. C., Nash co.); Bloomfield mines (see Pa., Blair co.); Bloomsburg (Iron Company's) mine (see Pa., Snyder co.); Blowout Mountain mine (see Utah, Iron co.); Blue Springs mine (see Tenn., Unicoi co.); Bollinger's mine (see Pa., York co.); Bompass Cove mine (see Tenn., Unicoi co.); Boney's (D. S.) mine (see N. C., Duplin co.); Bortz's (Alwyn) mine (see Pa., Lehigh co.); Bortz & Koch's mine (see Pa., Lehigh co.); Boston mine (see Mich., Marquette co.); Bowen and Signors mine (see N. Y., Clinton co.); Bowen's mine (see Utah, Beaver co.); Bowers' Furnace mine (see Pa., Franklin co.); Bower's Spring Garden mine (see Md., Baltimore co.); Bowery mine (see Md., Alleghany co.); Bowman (farm) mine (see Ohio, Perry co.); Bowman mine (see Pa., Lebanon co.); Boyertown (Gable, Warwick, Phœnix, California) mines (see Pa., Montgomery co.); Brady's Bend (Iron Company) mine (see Pa., Armstrong co.); Brady mine (see Mo., Phelps co.); Brandon mine (see Vt., Rutland co.); Breece Iron mine (see Colo., Lake co.); Breinig's (Francis) mine (see Pa., Lehigh co.); Breinig's (Thomas) mine (see P., Lehigh co.); Brewster mine (see N. Y., Putnam co.); Bridge's (John) mine (see Pa., Cumberland co.); Brierfield furnace (see Ala., Bibb co.); Brinsmade mine (see N. Y., Essex co.); Brockley mine (see S. C., Spartanburgh co.); Brookpit mine (see Conn., Litchfield co.); Brotherton mine (see N. J., Morris co.); Brower mine (see Pa., Blair co.); Brown's mine (see Ala., Cherokee co.); Brown mine (see N. J., Passaic co.); Brown's mine (see Tenn., Roane co.); Brownbeck's (Frank) mine (see Pa., Berks co.); Brown and Musgrove's mine (see Pa., Armstrong co.);

Iron-ore mines of the United States, etc.—Continued.

Brown's forge (see Tenn., Johnson co.); Brown Hematite mine (see Va., Amherst co.); Brown's (Howard) mine (see Md., Anne Arundel co.); Brown or Shields mine (see N. J., Warren co.); Brown's (P.) mine (see Pa., Lehigh Co.); Brownsport furnace (see Tenn., Decatur co.); Brun mine (see Mich., Menominee co.); Bryan's mine (see Tenn., Montgomery co.); Bryant mine (see N. J., Morris co.); Bucher's mine (see Pa., Lebanon co.); Buchtel mine (see Ohio, Hocking, and Athens co.); Buckhorn mine (see N. C., Barnett co.); Budd mine (see N. J., Sussex co.); Buffalo Gap mine (see Va., Augusta co.); Bull mine (see N. Y., Orange co.); Bundy's mine (see N. Y., Wayne co.); Burns Company mine (see Tenn., James co.); Burns mine (see Ala., Bibb co.); Burford mine (see Ga., Bartow co.); Burke's (Sheriff William) mine (see Tenn., McMinn co.); Burline mine (see Ohio, Vinton co.); Burline mines and Tarr farm (see Ohio, Vinton co.); Burton mine (see Tenn., Dickson co.); Butler mine (see N. J., Bergen co.); Butler mine (see N. Y., Oneida co.); Butler's mine (see Tenn., Johnson co.); Butz's mine (see Pa., Berks co.); Byram mine (see N. J., Morris co.).

C. Cade's Cove (land of William Feezelle) mine (see Tenn., Blount co.); Caglin's mine (see N. Y., Oneida co.); Caledonia mine (see N. Y., Saint Lawrence co.); Calico mine (see Ga., Murray co.); Calico mine (see Pa., Cumberland co.); California mine (see Pa., Berks co.); Callie (old and new banks) mine (see Va., Botetourt co.); Calliman (Thomas) mine (see Pa., Franklin co.); Calumet mine (see Arkansas Hills, Colo., Chaffee co.); Cambria mine (see Mich., Marquette co.); Campbell and Barrett mine (see Pa., Armstrong co.); Camp Creek (George Babb's land) forge (see Tenn., Greene co.); Canada mines (see N. Y., Putnam co.); Canistear mine (see N. J., Sussex co.); Cannon mine (see N. J., Passaic co.); Cannon mine (see Tenn., Carter co.); Canterbury mine (see N. Y., Orange co.); Carden's (Wesley) mine (see Tenn., Carter co.); Caribou Hill mine (see Colo., Boulder co.); Carnes mine (see Va., Botetourt co.); Carpenter mine (see N. J., Warren co.); Carpenter mine (see Tenn., Blount co.); Carr mine (see Mich., Marquette co.); Carter mine (see Va., Wythe co.); Case mine (see N. J., Hunterdon co.); Casper mine (see Tenn., Unicoi co.); Cates (Charles) mine (see Tenn., McMinn co.); Catoctin or Runkel mine (see Md., Frederick co.); Cave mine (see Utah, Beaver co.); Cedar Grove furnace (see Tenn., Perry co.); Cedar Hill mine (see Tenn., Carter co.); Cedar Hill mine (see Mo., Iron co.); Center (No. 2) mine (see Ky., Lyons co.); Center Furnace mine (see Pa., Fayette co.); Chadwell Farm mine (see Va., Wythe co.); Chamber's (William L.) mine (see Pa., Franklin co.); Champion mine (see Mich., Marquette co.); Chapel Hill mine (see N. C., Orange co.); Chapin mine (see Conn., Litchfield co.); Chapin mine (see Mich., Menominee co.); Charlotteburg mine (see N. J., Morris co.); Chateaugay mine (see N. Y., Clinton co.); Chatfield mine (see Conn., Litchfield co.); Chattanooga (1½ mile south of) mine (see Tenn., Hamilton co.); Chauncy Leet mine (see Mass., Berkshire co.); Cheever mine (see Mass., Berkshire co.); Cheever mine (see N. Y., Essex co.); Cherry Valley Iron Company's mine (Capt. B. F. Lewis) (see Ohio, Columbiana co.); Cherry Valley mine (see Mo., Crawford co.); Cheshire mine (see Mich., Marquette co.); Chestnut Hill mine (see Del., New Castle co.); Chestnut Hill mine (see Pa., Lancaster co.); Chestnut mine (see Pa., Cumberland co.); Chestnut Mountain mine (see Va., Appomattox co.); Chicago mine (see Mich., Marquette co.); Chipman mine (see Vt., Rutland co.); Chumbler mine (see Ga., Bartow co.); Church mine (see N. J., Hunterdon co.); Clark's Farm mine (see Pa., Blair co.); Clark furnace (see Tenn., Stewart co.); Clark's (G. W.) mine (see Pa., Somerset co.); Clark mine (see Mo., Crawford co.); Clark Branch mine (see Tenn., Anderson co.); Cleveland mine (see Mich., Marquette co.); Clever's (George) mine (see Pa., Cumberland co.); Clever's (George H.) mine (see Pa., Cumberland co.); Clever's Mammoth mine No. 1 (see Pa., Cumberland co.); Clifton mine (see Ala., Talladega co.); Clifton Forge mine (see Va., Alleghany co.); Clinton mine (see Mo., Phelps co.); Clinton mine (see N. Y., Oneida co.); Clipper Gap mine (see Cal., Placer co.); Clove mine (see N. Y., Dutchess co.); Clove mine (see N. Y., Orange co.); Clove Spring mine (see N. Y., Dutchess co.); Clymer Iron Company's mine (see Pa., Berks co.); Cobb mine (see N. J., Morris co.); Coker's (Clift and Sawyers) mine (see Tenn., Hamilton co.); Coker's mine (see Tenn., Hamilton co.); Cold Creek mine (see Utah, Weber co.); Cole's (George) mine (see Pa., Adams co.); Cole mine (see N. C., Moore co.); Cole's River mine (see W. Va., Monongalia co.); Columbia mine (see Mich., Marquette co.); Columbia Spathic Iron Company's mine (see N. Y., Columbia co.); Colwell (J. A.) mine (see Pa., Armstrong co.); Combs mine (see N. J., Morris co.); Commonwealth mine (see Wis., Marinette co.); Cone mine (see Mass., Berkshire co.); Connor mine (see Ga., Bartow co.); Conrad (Dr. J. D.) mine (see Pa., Snyder co.); Cook mine (see Smith mine, Essex co.); Cooper & Hewitt's mine (see N. Y., Richmond co.); Cooper mine (see N. J., Morris co.);

Iron-ore mines of the United States, etc.—Continued.

Copake mine (see N. Y., Columbia co.); Cornell mine (see Mich., Menominee co.); Cornwall mine (see Pa., Lebanon co.); Costner mine (see N. C., Gaston co.); Cove mine (see Tenn., Johnson co.); Cranberry mine (see N. C., Mitchell co.); Crawford mine (see N. Y., Orange co.); Cregar mine (see under N. J., Hunterdon co.); Creola mine (see Dunkel mine, Ohio, Vinton co.); Cressler's (John H.) mine (see Pa., Cumberland co.); Cressler's (Joseph) mine (see Pa., Franklin co.); Crockett mine (see Tenn., Sullivan co.); Croft mine (see N. Y., Putnam co.); Crown Point mine (see N. Y., Essex co.); Cross-cut (Archer's creek) mine (see Va., Appomattox co.); Cross Mountain mine (see Tenn., Johnson co.); Crowder's mountain mine (see N. C., Gaston co.); Crow mine (see Ga., Bartow co.); Cruikshank & Bro.'s mine (see Pa., Snyder co.); Crumbler (property) mine (see Pa., Perry co.); Cumberland furnace banks (see Tenn., Dickson co.); Curd's mine (see Tenn., Monroe co.); Curtis mine (see N. C., Caldwell co.); Curry mine (see Mich., Menominee co.); Cyclops mine (see Mich., Menominee co.). **D.** Dafford mine (see N. J., Hunterdon co.); Dakin mine (see N. Y., Dutchess co.); Dalliba mine (see Mich., Marquette co.); Dalrymple mine (see N. J., Morris co.); Danbury mine (see N. C., Stokes co.); Daney's (Elias) mine (see Pa., Lehigh co.); Dannemora mine (see N. C., Rockingham co.); Davenport mine (see N. J., Sussex co.); David's (widow) mine (see Tenn., Scott co.); Davis mine (see N. Y., Oneida co.); Davis mine (see Ohio, Lawrence co.); Davis mine (see Tenn., Lawrence co.); Davis (or Forbes) mine (see Conn., Litchfield co.); Dean's mine (see Pa., Blair co.); De Bardeleben mine (see Ala., Bibb co.); De Bardeleben mine (see Ala., Jefferson co.); De Bow mine (see under N. J., Morris co.); De Camp (or Upper Wood) mine (see N. J., Morris co.); Decatur furnace (see Tenn., Decatur co.); De Hart mine (see N. J., Morris co.); Denman (William) mine (see Ohio, Columbiana co.); Denmark mine (see N. J., Morris co.); Denny's mill mine (see Pa., Butler co.); Denny mine (see N. Y., Putnam co.); Denny mine (see Pa., Dauphin co.); Derwin's farm mine (see N. Y., Oneida co.); Dickerson mine (see N. J., Morris co.); Dickey mine (see Va., Alleghany co.); Dickson mine (see N. Y., Jefferson co.); Diggin's (Jos.) mine (see Pa., Huntingdon co.); Dillsburg mines (see Pa., York co.); Diven mine (see Pa., Cumberland co.); Dobbins's mine (see Ga., Bartow co.); Dodge mine (see N. J., Morris co.); Dolly Ann mine (see Va., Alleghany co.); Donaldson's (Judge) mine (see Ga., Cherokee co.); Donnelly's mine (see Tenn., Johnson co.); Donnelly's mine (see Tenn., Monroe co.); Douglas mine (see Pa., Huntingdon co.); Douglass' (Wyeth) mine (see Pa., Franklin co.); Dover Company's (No. 6) mine (see Va., Amherst co.); Dover Company's (No. 11) mine (see Va., Amherst co.); Dover Furnace Hill mine (see Ohio, Tuscarawas co.); Dover mine (see N. Y., Dutchess co.); Dover (near) mine (see Ohio, Tuscarawas co.); Dragon mine (see Utah, Juab co.); Drake's (Henry) mine (see Tenn., Dickson co.); Ducktown mine (see Tenn., Polk co.); Duggers (James) mine (see Tenn., Carter co.); Dull and Bradley's (see Pa., Huntingdon co.); Dull (I. J.) mine (see Pa., Mifflin co.); Duncan mine (see Utah, Iron co.); Dunkel mine (see Ohio, Vinton co.); Dugan's (S. S.) mine (see Ky., Carter co.); Dye bank (see Ohio, Tuscarawas co.). **E.** Eagle furnace mine (see Ohio, Vinton co.); Eagle mine (see Wis., Marinette co.); Earnest's (John) mine (see Pa., Snyder co.); East Bellwood mine (see Tenn., Stewart co.); Edward's mine (see Ala., Bibb co.); Edward's mine (see Mich., Marquette co.); Egbert mine (see N. J., Warren co.); Ege mine (see Pa., Cumberland co.); Eller's (Big creek) mine (see N. C., Madison co.); Ellingwood mine (see N. Y., Oneida co.); Elliott mine (see N. Y., Oneida co.); Ellison mine (see N. C., Gaston co.); El Moro mine (see Col., Las Animas co.); Emmet mine (see Mich., Menominee co.); English mine (see Pa., Franklin co.); Ensor mine (see Md., Frederick co.); Estill Furnace mine (see Ky., Estill co.); Etna Furnace mine (see Pa., Blair co.); Eureka Iron Company's mine (see Ala., Tuscaloosa co.); Eureka mine (see Ala., Jefferson co.); Evan's mine (see N. C., Chatham co.); Eveland mine (see N. J., Hunterdon co.); Evers mine (see N. J., Morris co.); Excelsior and Chesapeake mine (see Utah, Iron co.); Excelsior mine (see Mich., Marquette co.). **F.** Falkner mine (see Pa., Blair co.); Far Mountain mine (see Tenn., Johnson co.); Fayette Furnace mine (see Pa., Fayette co.); Ferguson mine (see Tenn., Carter co.); Ferguson Valley mine (see Pa., Mifflin co.); Ferris mine (see N. C., Surry co.); Ferro Hill mine (see N. Y., Orange co.); Fig and Bayley mine (see Tenn., Stewart co.); "First Vein" (east of "Old Furnace Vein") (see Va., Amherst co.); Fisher's Creek mine (see Ga., Polk co.); Fisher's (Francis) mine (see Pa., Lehigh co.); Fisher Hill mine (see N. Y., Essex co.); Fishing Creek mine (see Pa., Centre co.); Fishkill mine (see N. Y., Dutchess co.); Fitzwater mine (see Mo., Dent co.); Flat o' the Mountain mine (see Tenn., Blount co.); Fleetwood Iron Company's mine (see Pa., Berks co.); Fleming's (T. B.) mine (see Alabama, Franklin co.); Florence (or Eagle) mine (see Wis., Marinette co.); Flower Branch mine (see Ga., Floyd co.); Fogel's (William B.) mine (see Pa., Lehigh co.); Folger mine (see Ga., Polk co.); Forbes (or Davis) mine (see Conn., Litchfield co.); Ford mine (see N. J., Morris co.); Forest City mine (see Mich., Marquette co.); Forestdale or Blake mine (see Vt., Rutland co.); Forest of Dean mine (see N. Y., Orange co.); Forney mine (see N. C., Lincoln co.); Forshee mine (see N. Y., Orange co.); Foster mine (see Mich., Marquette co.); Fox Farm mine (see Pa., Clarion co.); Fox Mountain (Shenandoah Iron Works) mine (see Va., Rockingham co.); Franconia mine (see N. H., Grafton co.); Franklin and Clinton mine (see N. Y., Oneida co.); Frazeysburg mine (see Goff, McGinnis, Millstead, McDonald mines) (see Ohio, Muskingum co.); Fredericks mine (see Pa., Berks co.); French Creek mine (see Pa., Chester co.); Friel and Millbrook's mine (see Md., Prince George co.); Friend mine (see Wyo., Carbon co.); Frisco Mining and Smelting Company's mine (see Utah, Beaver co.); Fritch & Brothers' mine (see Pa., Berks co.); Fritz mine (see Pa., Berks co.); Frost mine (see Md., Alleghany co.); Fuller's (Dr.) mine (see Pa., Fayette co.); Fulton mine (see Ky., Lyon co.); Furgerson (Iron Hill furnace) mine (see Ky., Carter co.); Furnace Run mine (see Pa., Lycoming co.); Furnace View mine (see N. J., Sussex co.); Furstenburg (furnace) mine (see Md., Baltimore co.); Furstenburg mine (see Md., Baltimore co.). **G.** Gable mine (see Pa., Berks co.); Gackenbach's mine (see Pa., Lehigh co.); Garlic mine (see Pa., Franklin co.); Gaston (5 miles south of) mine (see N. C., Halifax co.); Gates or Putnam mine (see N. Y., Essex co.); Gay and Lewis mine (see Va., Alleghany co.); Geary's (Charles) mine (see Pa., Berks co.); Gee Creek Gap mine (see Tenn., Polk co.); George's (Benjamin) mine (see Pa., Franklin co.); Gilton mine (see Ga., Bartow co.); Givens' (A.) mine (see Va., Alleghany co.); Glade mine (see Va., Wythe co.); Glendon mine (see Hibernia mines) (see N. J., Morris co.); Glick's (Charles) mine (see Pa., Lehigh co.); Glover mine (see Ala., Calhoun co.); Gochenauer and Rohrer's mine (see Pa., Franklin co.); Godfrey mine (see Vt., Bennington co.); Goff mine (see Ohio, Muskingum co.); Good's (Michael) mine (see Pa., Franklin co.); Goodrich mine (see Mass., Berkshire co.); Goodrich mine (see Mich., Marquette co.); Gore furnace mine (see Ohio, Hocking co.); Gorgas mine (see Pa., Cumberland co.); Gove mine (see N. J., Morris co.); Grace or Ferrel mine (see Va., Augusta co.); Graham mine (see Pa., Juniata co.); Grammis' (Jacob) mine (see Pa., Lehigh co.); Grand Union and Mozelle mine (see Mo., Phelps co.); Granger or Pittsford mine (see Vt., Rutland co.); Grave-yard mine (see Tenn., Stewart co.); Gray mine (see Ga., Bartow co.); Gray mine (see N. J., Hunterdon co.); Greasy Creek mine (see N. C., Mitchell co.); Great Western mine (see Utah, Iron co.); Green mine (see N. J., Sussex co.); Green Pond mine (see N. J., Morris co.); Greene Ridge mine (see Tenn., Greene co.); Green Spring mine (see Md., Baltimore co.); Greenway mine (see Va., Nelson co.); Greenwood furnace (4 miles from) mine (see Pa., Huntingdon co.); Greenwood mine (see N. Y., Orange co.); Greise & Wendling's mine (see Pa., Berks co.); Gribben mine (see Mich., Marquette co.); Gridley mine (see N. Y., Dutchess co.); Griffith's Jerome) mine (see Tenn., Monroe co.); Grim's mine (see Md., Frederick co.); Groeble Farm mine (see Ohio, Tuscarawas co.); Groh mine (see Pa., Lebanon co.); Grove mine (see Pa., Cumberland co.); Grun's mine (see Tenn., James co.); Guilford mine (see Pa., Franklin co.); Guiterman's mine (see Pa., Berks co.); Gulf mine (see N. C., Chatham co.); Guth's (Calvin) mine (see Pa., Lehigh co.); Guth's (Francis) mine (see Pa., Lehigh co.). **H.** Hackleberney mine (see N. J., Morris co.); Hager mine (see N. J., Hunterdon co.); Haight mine (see N. Y., Columbia co.); Haine & Klutz's mine (see Pa., Berks co.); Hale mine (see N. Y., Essex co.); Hale mine (see Tenn., Monroe co.); Half-Moon mine (see W. Va., Grant co.); Hamilton mine (see Colo., Park co.); Hampton's mine (see N. C., Ashe co.); Hamum's (Dr.) mine (see Tenn., Unicoi co.); Hankwell's (William) mine (see Pa., Juniata co.); Hann mine (see N. J., Morris co.); Hanover Switch mine (see Md., Hanover co.); Hardin mine (see Ala., Cherokee co.); Hard ore mine (see N. C., Stokes co.); Harris's (I. R.) mine (see Ga., Murray co.); Hawkins mine (see Mo., Dent co.); Hayes mine (see Pa., Lycoming co.); Hecla mine (see Arkansas Hills, Colo., Chaffee co.); Hecla furnace mine (see Ohio, Lawrence co.); Heike's mine (see Pa., Cumberland co.); Heits mine (see Ohio, Tuscarawas co.); Heffner's (Charles) mine (see Pa., Berks co.); Hegeman or Smith mine (see Md., Baltimore co.); Hematite mine (see Utah, Utah co.); Heninger's (John) mine (see Pa., Lehigh co.); Henrietta mines (see Pa., Blair co.); Henry Clay mines, Nos. 1, 2, and 3 (see Pa., Cumberland co.); Henry's (John) mine (see Ohio, Columbiana co.); Hensinger Heirs' mine (see Pa., Lehigh co.); Hewitt mine (see N. J., Passaic co.); Hibernia mines (see N. J., Morris co.); Hickman mine (see Ala., Jefferson co.); Hickory Hill mine (see N. J., Morris co.); Hickory Hollow or Salisbury mine (see Va., Botetourt co.); Hick's mine (see Pa., Huntingdon co.); High Bridge mine

Iron-ore mines of the United States, etc.—Continued.

(see N. J., Hunterdon co.); High Ledge mine (see N. J., Morris co.); Hill and Tarwater mine (see Tenn., Rhea co.); Hill mine (see N. J., Sussex co.); Hill mine (see N. Y., Putnam co.); Hill mine (see Tenn., McMinn co.); Hillsdale mine (see N. Y., Columbia co.); Hinch's mine (see Tenn., Bradley co.); Hindman's mine (see Pa., Clarion co.); *Hirsh and Hiestand* mine (see Pa., Juniata co.); Hodge mine (see Tenn., Carter co.); Hogencamp mine (see N. Y., Orange co.); Horgsett, Watt & Co.'s mine (see Pa., Fayette co.); Holland's (Trickum) mine (see Ga., Whitfield co.); Hollidaysburg and Gap Iron Company's mine (see Pa., Blair co.); Hollidaysburg mine (see Pa., Blair co.); Hollow bank (see Va., Shenandoah co.); Horner mine (see Pa., Blair co.); Hoover's (R.) mine (see Pa., Bedford co.); Hope mine (see N. J., Passaic co.); Hope mine (Mont Alto Iron Company) (see Pa., Franklin co.); Hope mine (see W. Va., Monongalia co.); Hopewell mine (see Pa., Chester co.); Horse Creek (J. and C. Graybeal's) mine (see N. C., Ashe co.); Horse Hollow mine (see Mo., Phelps co.); Horton's (J. L.) mine (see N. C., Chatham co.); Houck and Granniss' mine (see Pa., Lawrence co.); Howard mine (see Pa., Centre co.); Huddleson mine (see Va., Alleghany co.); Hude or Stanhope mine (see N. J., Sussex co.); Hudson Drift mine (see Ohio, Lawrence co.); Huffine's mine (see Tenn., Washington co.); *Huff mine (see N. J., Morris co.)*; Hugh Kelley mine (see Ohio, Tuscarawas co.); Humboldt mine (see Mich., Marquette co.); Hunnewell furnace mine (see Ky., Greenup co.); Hurley Brothers' mine (see N. Y., Wayne co.); Hurley mine (see Tenn., Carter co.); Hurd mine (see N. J., Morris co.); Hurdtown mine (see N. J., Morris co.); Hurst mine (see Va., Wythe co.); Hyatt mine (see N. C., Surry co.). **I.** Ice Ferry mine (see W. Va., Monongalia co.); Indiana mine (see Mich., Marquette co.); Irish mine (see Ga., Bartow co.); Irondale furnace (see Ala., Jefferson co.); Irondale mine (see N. J., Morris co.); Iron Hill mine (see Del., New Castle co.); Iron Hill mine (see Ky., Carter co.); Iron Hill mine (see R. I., Providence co.); Iron Hill mine (see Tenn., Rhea co.); Iron Mountain mine (see Colo., Fremont co.); Iron Mountain mine (see Mo., Saint François co.); Iron Mountain mine (see Wyo., Laramie co.); Iron Point mine (see Ohio, Perry co.); Ironton Railroad Company's mine (see Pa., Lehigh co.); Iron Ridge mine (see Mo., Crawford co.) **J.** *Jackson mine (see Mich., Marquette co.); Jackson Mountain* mine (see Nev., Humboldt co.); Jacksonville mine (see Ala., Calhoun co.); Jacob's Creek mine (see Pa., Westmoreland co.); Jalapa mine (see Tenn., Monroe co.); Janett's mine (see Ga., Fannin co.); Jayville (Alpine furnace) mine (see N. Y., Saint Lawrence co.); Jefferson County mine (see Colo., Jefferson co.); Jobst's (H. and F.) mine (see Pa., Lehigh co.); Johnsey mine (see Ga., Bartow co.); Johnson mine (see Va., Pulaski co.); Johnson mine (see Va., Wythe co.); Johnson mine (see W. Va., Monongalia co.); Johnson's ridge of Elk Knob (see N. C., Ashe co.); Jones (Jennings) mine (see Pa., Franklin co.); Jones mine (see Pa., Berks co.); Junction City mine (see Ohio, Vinton co.). **K.** Kahart mine (see N. J., Morris co.); Kaiser's (Harry) mine (see Pa., Lehigh co.); Kane (or Silverhorn) mine (see N. J., Hunterdon co.); Katahdin mine (see Me., Piscataquis co.); Kearney mine (see N. Y., Saint Lawrence co.); Keck and Ritter's mine (see Pa., Lehigh co.); Keel Ridge mine (see Mich., Menominee co.); *Keene mine (see N. Y., Jefferson co.); Keener mine (see Tenn.,* Unicoi co.); Kehm's (Solomon) mine (see Pa., Lehigh co.); Kelley mine (see Md., Baltimore co.); Kendrick's mine (see Tenn., Meigs co.); Kennedy's (J. M.) mine (see Ala., Clay co.); Kennedy mine (see Va., Augusta co.); Kent mine (see Conn., Litchfield co.); Keystone mine (see Mich., Marquette co.); Killian mine (see N. C., Lincoln co.); King mine (see N. J., Morris co.); King mine (see Tenn., Johnson co.); Kingston (2 miles west of) mine (see Ga., Bartow co.); Kinzer's (John) mine (see Pa. Mifflin co.); Kishpaugh mine (see N. J., Warren co.); Klein's mine (see N. Y., Oneida co.); Kline's (D. K.) mine (see Pa., Berks co.); Kline's (Henry) mine (see Pa., Lehigh co.); Kline's (James) mine (see Pa., Lehigh co.); Kline's (Jesse) mine (see Pa., Lehigh co.); Koontz and Meyers mine (see Pa., Cumberland co.); Koser's (Jacob) mine (see Pa., Franklin co.); Kraemlich and Lichtenwalner's mine (see Pa., Lehigh co.); Kreischmann's mine (see Pa., Lehigh co.); Kurtz's (widow) mine (see Pa., Lehigh co.). **L.** *La Frois's (J.) mine (see N. Y., Wayne co.); La Grange mine (see* Tenn., Stewart co.); Lake Angeline mine (see Mich., Marquette co.); Lake Mahopac (island) (see N. Y., Putnam co.); Lake mine (see N. Y., Orange co.); Lake Superior hematite mine (see Mich., Marquette co.); Lake Superior mine (see Mich., Marquette co.); Lake Superior mine (see Utah, Beaver co.); Lambert mine (see Ky., Carter co.); Lamb mine (see Mo., Phelps co.); Lamb mine (see Tenn., Greene co.); Lane mine (see Pa., Huntingdon co.); Large's mine (see N. J., Hunterdon co.); Larc's (Jesse) mine (see Pa., Lehigh co.); Lawrence mine (see N. J., Morris co.); Lauer's (Milton) mine (see Pa., Lehigh co.); Laurel Fork mine (see Tenn., Johnson co.); Laurel mines Nos. 1 and 2 (see Pa., Cumberland co.); Lawrenceburg (six miles southwest of) mine (see Tenn., Lawrence co.); Lawrence furnace (see Ohio, Lawrence co.); Lawrence mine (see N. J., Morris co.); Lead mine (see Tenn., Washington co.); Leaybed (Clifton) mine (see Ala., Talladega co.); Lee mine (see N. Y., Essex co.); Lee mine (see S. C., York co.); Leet's (Nathaniel) mine (see Mass., Berkshire co.); Lehman's *(J. C.) mine (see Pa., Cumberland co.); Leib mine (J. S. Whitmer & Co.)* (see Pa., Franklin co.); Leicester mine (see Vt., Addison co.); Leidig & Hoffer mine (see Pa., Cumberland co.); Lemont Furnace mine (see Pa., Fayette co.); Levan's (Daniel) mine (see Pa., Lehigh co.); Lewis' (Capt. B. F.) mine (see Ohio, Columbiana co.); Lewis mine (see W. Va., Grant co.); Lewis' (Samuel) mine (see Pa., Berks co.); Lewistown Section mine (see Pa., Mifflin co.); Lichtenwalner's (Frank S.) mine (see Pa., Lehigh co.); Lichtenwalner's (Levi) mine (see Pa., Lehigh co.); Lime Kiln mine (see Pa., Franklin co.); Limestone Ridge Mining Company's mine (see Pa., Perry co.); Linthicum's (A. S.) mine (see Md., Anne Arundel co.); Lips mine (see Tenn., Carter co.); Little's mine (see N. C., Cherokee co.); Little Kearney mine (see N. Y., Saint Lawrence co.); Little Red Mountain outcrop (see Ala., Jefferson co.); Lone Mountain mine (see Tenn., Anderson co.); Longdale mine (see Va., Alleghany co.); Love's Furnace mine (see Tenn., Sevier co.); Lowe mine (see Tenn., Hamilton co.); *Lowell mine (see Mich., Menominee co.); Lower mine (see Ala., Cherokee co.)*; Lowe's (S. B.) mine (see Ga., Polk co.); Lower or Third (one mile northwest of Mansfield) mine (see Pa., Tioga co.); Lower Wood mine (see N. J., Morris co.); Lowmore mine (see Va., Alleghany co.); Lowthian mine (see Mich., Marquette co.); Lucy's mine (see Pa., Franklin co.); Ludington mine (see Mich., Menominee co.); Ludwig's New mine (see Pa., Lehigh co.); Ludwig's Old mine (see Pa., Lehigh co.). **M.** Mayberry mine (see N. J., Hunterdon co.); Magiffin (J. S.) mine (see Pa., Fayette co.); Mahopac mine (see N. Y., Putnam co.); Main bank (see Tenn., Washington co.); Malthy mine (see N. Y., Dutchess co.); Manganese mine (see Mich., Marquette co.); Manhattan mine (see N. Y., Dutchess co.); Mann's (J. H.), Logan Gap mine (see Pa., Mifflin co.); Mantooth (James) mine (see Tenn., Cocke co.); Maple Grove Mill mine (see Pa., Lehigh co.); Marck's (P.) mine (see Pa., Lehigh co.); Marion mine (see Tenn., Wayne co.); Marshall mine (see Colo., Boulder co.); Marshall *mine (see Utah, Iron co.); Marsh mine (see Mo., Crawford co.)*; Martin's mine (see W. Va., Mineral co.); Maryland or Ellicott's mine (see Md., Baltimore co.); Mason and Bliss mine (see Mass., Berkshire co.); Massey's Mill mine (see Ala., Jefferson co.); Mast mine (see Tenn., Johnson co.); Matilda Furnace mine (see Pa., Mifflin co.); Maud vein, Stapleton mine (see Va., Amherst co.); Maxwell (land grant) mine (see N. Mex., Colfax co.); Maxwell mine (see Tenn., Carter co.); May's mine (see Va., Botetourt co.); McAleary's mine (see Pa., Huntingdon co.); McCarthy's mine (see Pa., Huntingdon co.); McCleary's (Robert) mine (see Pa., Franklin co.); McClellan mine (see Colo., Saguache co.); McCollum mine (see N. Y., Putnam co.); McComber mine (see Mich., Marquette co.); McCormick's (Robert) mine (see Pa., Mifflin co.); McCreechan's mine (see Pa., Cumberland co.); McDonnald mine (see Ohio, Muskingum co.); McFarland's (R. P.) mine (see Pa., Franklin co.); McGarvey mine (see Mo., Crawford co.); McGinnis mine (see Ohio, Muskingum co.); McGowan *(Stewart's run) mine (see Pa., Lycoming co.)*; McHose mine (see Pa., Franklin co.); McKee's (George) mine (see Pa., Mifflin co.); McKenna mine (see Mich., Menominee co.); McLaughlin's (J.) mine (see Ohio, Perry co.); McNeal mine (McCormick & Co.) (see Pa., Franklin co.); McPheese mine (see Pa., Blair co.); McVeytown gap, Rose mine (see Pa., Franklin co.); Meadow (Pendergrass property) mine (see Ala., Calhoun co.); Means mine (see Pa., Franklin co.); Mentzer's (David) mine (see Pa., Franklin co.); Merkel's (Mrs. John) mine (see Pa., Berks co.); Michael's mine (see W. Va., Grant co.); Michigamme mine (see Mich., Marquette co.); Middle or Second (on Bixby's hill) mine (see Pa., Tioga co.); Miller pit (see N. Y., Essex co.); Miller's (Charles) mine (see Pa., Berks co.); Miller's (Charles) mine (see Pa., Lehigh co.); Miller mine (see Va., Rockingham co.); Miller's (William) mine (see Pa., Berks co.); Millon mine (see N. J., Morris co.); Millstead mine (see Ohio, Muskingum co.); Milsap and Orchard mine (see Mo., Dent co.); Milton mine (see Ohio, Jackson co.); Milwaukee mine (see Mich., Marquette co.); Mine 21 (see N. Y., Essex co.); Mine 81 (see N. Y., Clinton co.); Mine Mountain mine (see N. C., Gaston co.); Mine ore-bank (see Pa., York co.); Mine Ridge mine (James Mantooth), (see Tenn., Cocke co.); Mineral Ridge (Tod, Wells & Co.) mine (see Ohio, Columbiana co.); Mineville mines (see N. Y., Essex co.); Missouri Furnace Company's mine (see Mo., Saint Louis co.); Mitchell mine (see Mich., Marquette co.); Mitchell mine (see N. Y., Columbia co.); Mitchell, Wilson, and Riley's mine (see Md., Anne Arundel co.); Money's mine (see Utah, Beaver co.); Monkton mine (see Vt., Addison co.); Monroe furnace (see Ohio, Jackson co.); Montauk (or Beach) mine (see N. J., Morris co., mine); Monteith's mine (see N. C., Cherokee co.); Morse's mine (see N. C., Cherokee co.); Mory's

Iron-ore mines of the United States, etc.—Continued.

(G. and W.) mine (see Pa., Lehigh co.); Mory's (Morgan) mine (see Pa., Lehigh co.); Moselem mine (see Pa., Berks co.); Moser's (Oliver) mine (see Pa., Lehigh co.); Mound mine (see Tenn., Stewart co.); Mountain mine (see Pa., Huntingdon co.); Mountain Peak mine (see Utah, Iron co.); Mount Alto Iron Company's mine (see Pa., Franklin co.); Mount Bank (see Tenn., Blount co.); Mount Holly mine (see Pa., Cumberland co.); Mount Hope mines (see N. J., Morris co.); Mount Hope mine (see N. Y., Washington co.); Mount Olive mine (see N. J., Morris co.); Mount Pleasant mine (see N. J., Morris co.); Mount Savage mine (see Ky., Carter co.); Mount Torsey or Virginia mine (see Va., Augusta co.); Moxahala mine (see Ohio, Perry co.); Moyer's mine (see Pa., Lebanon co.); Muirkirk mine (see Md., Prince George co.); Mullen's (Charles) mine (see Pa., Cumberland co.); Mullen mine (see Pa., Cumberland co.); Munford mine (see Ga., Bartow co.); Mush's (B., G. & Co.) mine (see Pa., Perry co.); Myers mine (see Pa., Cumberland co.). **N.** Nail or Forshee mine (see N. Y., Orange co.); Nankwell's (Richard) mine (see Pa., Juniata co.); Napier's furnace mine (see Tenn., Lawrence co.); National mine (see Mich., Marquette co.); Naylor & Co.'s (No. 6¾) mine (see Va., Amherst co.); Near Mountain mine (see Tenn., Johnson co.); Neighbour mine (see N. J., Hunterdon co.); Nelson Bush mine (see N. Y., Clinton co.); Nelson mine (see Mich., Marquette co.); Nelson mines (see N. C., Stokes co.); New Bed mine (see N. Y., Essex co.); Newcastle Coal and Iron Company's mine (see Ala., Jefferson co.); New Castle Station mine (see Ala., Jefferson co.); New Castle mine (see Pa., Lawrence co.); New Dorp mine (see N. Y., Richmond co.); New mine (see N. J., Warren co.); Neshannock mine (see Pa., Lawrence co.); Newman's (G. S.) mine (see Tenn., Sevier co.); New York Hematite mine (see Mich., Marquette co.); New York mine (see Mich., Marquette co.); Noble mine (see Va., Wythe co.); Nolan shaft (see N. Y., Essex co.); Norris or Whitaker mine (see Md., Baltimore co.); North Garden mine (see Va., Albemarle co.); Northwestern Iron Company's mine (see Wis., Dodge co.); Norton's mine (see N. Y., Oneida co.); Norway mine (see Mich., Menominee co.); Nova Scotia mine (see Mo., Dent co.); Nye mine (see Tenn., Dickson co.). **O.** Oakdale mine (see Tenn., Roane co.); Oak Springs mine (see Utah, Iron co.); O'Brien's (James) mine (see Md., Prince George co.); Odensess (Jacob) mine (see Md., Baltimore co.); Ogden mines (see N. J., Sussex co.); Ogden's Corners (one mile southeast of) mine (see Pa., Tioga co.); Olcar mine (see W. Va., Mineral co.); Old Bank mine (see Va., Shenandoah co.); Old Bed mine (Witherbee, Sherman co.) (see N. Y., Essex co.); Old Carrick Furnace mine (see Pa., Franklin co.); Old Furnace mine (see N. J., Hunterdon co.); Old Maramec mine (see Mo., Phelps co.); Old Mill Creek furnace (see Tenn., Hickman co.); Old Mount Pleasant mine (see Pa., Franklin co.); Old Ogden mine (see N. J., Sussex co.); Old ore pit near Cahaba river (see Ala., Jefferson co.); Old Oxford mine (see Ala., Calhoun co.; Old Peach Orchard mine (see Pa., Cumberland co.); Old State furnace mine (see Ky., Bath co.); Old Southampton mine (see Pa., Franklin co.); Old Sterling mine (see N. Y., Jefferson co.) Oliphant Furnace mine (see Pa., Fayette co.); Olive (furnace) mine (see Ohio, Lawrence co.): O'Neil (or Forshee) mine (see under N. Y., Orange co.); Ontario Furnace Company's mine (see N. Y., Wayne co.); Orbiston mine (see Ohio, Athens co.); Orchard mine (see N. J., Morris co.); Oregon mine (see Md., Baltimore co.); Oregon (or Scott) mine (see N. Y., Orange co.); Ore Hill mine (see Conn., Litchfield co., Brookpit mine); Ore Hill mine (see N. C., Chatham co.); Orion mine (see Mich., Marquette co.); Ormond mine (see N. C., Gaston co.); Otter River mine (see Va., Campbell co.); Outlaw's (E. C.) mine (see Tenn., Stewart co.); Oxford Furnace mines (see N. J., Warren co.); Oxford mine (see Va., Campbell co.); Ozark mine (see Mo., Phelps co.) **P.** Paddy's Rest Creek mine (see Wis., Jackson co.); Palmer Hill mine (see N. Y., Clinton co.); Palmer mine (see Mich., Marquette co.); Panic or White Rock mine (see Va., Smyth co.); Pardee mine (see N. J., Sussex co.); Pass Orchard mine (see Pa., Franklin co.); Patterson mine (see Pa., Blair co.); Patton mine (see Oreg., Clackamas co.); Patty's mine (see Tenn., McMinn co.); Pawling mine (see N. Y., Dutchess co.); Peach Tree mine (see Ga., Bartow co.); Pea Ridge (Blaucet Bros.) mine (see Ky., Greenup co.); Peck mine (see Ga., Polk co.); Pedunk mine (see under N. Y., Washington co.); Peffer mine (see Pa., Cumberland co.); Pendill mine (see Mich., Marquette co.); Pennington mine (see Ga., Polk co.); Pennsylvania Furnace mine (see Ky., Greenup co.); Pepper mine (see N. C., Stokes co.); Pepper mine (see Pa., Cumberland co.); Perkins (or Saginaw) mine (see Mich., Menominee co.); Peters and Mowry mine (see Tenn., Knox co.); Peterman's (George) mine (see Pa., Perry co.); Peters' mine (see N. J., Passaic co.); Petty mine (see N. J., Hunterdon co.); Phillips mine (see Ga., Polk co.); Phœnix mine (see Pa., Berks co.): Piatts land (see Tenn., Roane co.); Pidcock mine (see N. J., Hunterdon co.); Pike's Peak (or Hill) mine

Iron-ore mines of the United States, etc.—Continued.

(see N. J., Sussex co.); Pilot Knob mine (see Mo., Iron co.); Pilot Mountain (Hyatt's) mine (see N. C., Surry co.); Pine Creek furnace mine (see Pa., Armstrong co.); Pine Grove mine (see Pa., Cumberland co.); Piney furnace mine (see Tenn., Dickson co.); Pinion mine (see Tenn., Lawrence co.); Pioneer Iron Company's mine (see Ala., Tuscaloosa co.); Pipe (Clark furnace) mine (see Tenn., Stewart co.); Pitney mine (see N. J., Morris co.); Pittsburgh and Lake Superior mine (see Mich., Marquette co.); Pittsfield Bethel mine (see Vermont, Rutland co.); Pittsford Granger mine (see Vermont, Rutland co.); Pittsville mine (see Va., Pittsylvania co.); Plantation mine (see S. C., York co.); Pochuck mine (see N. J., Sussex co.); Poison Branch mine (see N. C., Ashe co.); Pomeroy mine (see Mo., Dent co.); Pond mines Nos. 1 and 2 (see Pa., Franklin co.); Poorman's mine (see Colo., Saguache co.); Porter mine (see Connecticut, Litchfield co.); Poplar Branch mine (see N. C., Surry co.); Poplar Springs mine (see Tenn., Montgomery co.); Potter's (M. L.) mine (see Ala., Jefferson co.); Potter mine (see N. Y., Washington co.); Pott's shaft (see N. Y., Essex co.); Prairie River mine (see Minn., Itasca co.); Pratt (or Sackett) mine,, see N. Y., Putnam co.); Promise mine (Mont Alto Iron Company) (see Pa., Franklin co.); Prospect mine (see Colo., Saguache co.); Propst's (N.) mine (see N. C., Burke co.); Prosser mine (see Oreg., Clackamas co.); Pryer mine (see N. Y., Oneida co.); Puget Sound Iron Company's mine (see Brit. Col., Texada island); Puget Sound Iron Company's mine (see Wash., Jefferson co.); Putnam (or Gates) mine (see N. Y., Essex co.). **Q.** Queen of the West mine (see Utah, Utah co.); Queen's Station mine (see Tenn., Carter co.); Quiggleville mine (see Pa., Lycoming co.); Quinnesec mine (see Mich., Menominee co.). **R.** Raapp mine (see Pa., Cumberland co.); Race mine (see Tenn., Stewart co.); Radley mine (see N. J., Hunterdon co.); Ragon mine (see Tenn., James co.); Railroad mine (see Mo., Crawford co.); Railroad mine (see Pa., Franklin co.); Railroad mine (see Va., Campbell co.); Raines and Weaver mine (see Va., Rockingham co.); Raines mine (see Va., Rockingham co.); Ramsey's (Alexander) property (see Pa., Huntingdon co.); Ramsoms mine (see N. C., Watauga co.); Randall Hill mine (see N. J., Morris co.); Rankines mine (see Tenn., Johnson co.); Rapp mine (see N. J., Warren co.); Rathburn, Foster & Winchester's mine (see Ala., Etowah co.); Ravenscliffe mine (see Va., Wythe co.); Rays mine (see Ohio, Jackson co.); Ray's (Dr.) property (see Ala., Bibb co.); Razer's (Squire J. H.) mine (see Tenn., Blount co.); Rebecca mine (see Pa., Blair co.); Redback or Spruce Swamp mine (see N. Y., Orange co.); Red Bank mine (see Pa., Blair co.); Red Belt mine (see Va., Appomattox co.); Red mine (see S. C., Spartanburgh co.); Red mine (see Tenn., Dickson co.); Red mine (see Tenn., Wayne co.); Red Mountain mine (see Ala., Jefferson co.); Red Ore mine (see Pa., Blair co.); Red Shear mine (see Tenn., Carter co.); Reid mine (see Mo., Phelps co.); Republic mine (see Mich., Marquette co.); Retreat bank (see Va., Botetourt co.); Rever and Coster mine (see Md., Baltimore co.); Reynolds mine (see N. Y., Columbia co.); Reynolds, Ryne & Arnold mine (see Md., Anne Arundel co.); Richard's mine (see N. J., Morris co.); Rich Hill mine (see Va., Pulaski co.); Richlands mine (see N. C., Watauga co.); Richmond Furnace mine (see Pa., Franklin co.); Ridgley mine (see Md., Baltimore co.); Ridge mine (see Ala., Calhoun co.); Ridge Valley furnace mine (see Ga., Floyd co.); Riegel mine (see N. J., Warren co.); Riga mine (see N. Y., Dutchess co.); Rinesmith's mine (see Pa., Perry co.); Ringwood (Cannon, Peter, Hope & Hewitt) mines (see N. J., Passaic co.); Rising Fawn mine (see Ala., Etowah co.); Ritter's (J.) mine (see Pa., Lehigh co.); Riverside mine (see Mo., Dent co.); Robbin's Run mine (see Ky., Carter co.); Robert's, J. D.) mine (see Tenn., Roane co.); Roberts mine (see N. J., Sussex co.); Robeson Farm mine (see Pa., Blair co.); Robinson's (John) mine (see Pa., Juniata co.); Rockaway Valley mine (see N. J., Morris co.); Rock's (George) mine (see Pa., Franklin co.); Rocks' (Jacob) mine (see Pa., Franklin co.); Rocky Mount mine (see Va., Franklin co.); Rock ore mine (see Wis., Dodge co.); Rock Run furnace (see Ala., Cherokee co.); Rodenburg mine (see under N. J., Hunterdon co.); Rodgers' mine (see Ala., Jefferson co.); Rogers' mine (see N. C., Stokes co.); Rolling-Mill mine (see Mich., Marquette co.); Romig's (Reuben) mine (see Pa., Lehigh co.); Rose mine (see N. Y., Putnam co.); Rose Point mine (see Pa., Lawrence co.); Roseville mine (see N. J., Sussex co.); Rose mine (see Pa., Mifflin co.); Roth's (John) mine (see Pa., Lehigh co.); Rough and Ready furnace mine (see Tenn., Stewart co.); Round Mountain furnace (see Ala., Cherokee co.); Rowe's mine (see Pa., Berks co.); Rowland mine (see Mich., Marquette co.); Ruby (or Plaster) mine (see Pa., Franklin co.); Ruch & Brother's mine (see Pa., Lehigh co.); Ruth mine (see Pa., Franklin co.). **S.** Sackett mine (see N. Y., Putnam co.); Sadler (or Stack) mine (see Va., Alleghany co.); Saginaw mine (see Mich., Marquette co.); Saginaw mine (see Mich., Menominee co.); Saguache mine (see Colo., Saguache

Iron-ore mines of the United States, etc.—Continued.

co.); Sailor Boy mine (see Utah, Utah co.); Salisbury mine (see Mich., Marquette co.); Saint Clair or Busket mine (see Mo., Franklin co.); Salone mine (see Pa., Clinton co.); Samson mine (see N. J., Morris co.); Sampson's (Cripple creek) mine (see Va., Wythe co.); Sandy Ridge mine (see Pa., Huntingdon co.); Sarah Furnace mine (see Pa., Blair co.); Sargent's (Tuscarawa Iron Works) mine (see N. C., Guilford co.); Sayers and Oglesby mine (see Va., Wythe co.); Schneider's (David) mine (see Pa., Lehigh co.); School-house mine (see Ky., Lyon co.); Scholl (J. D.) & Co.'s mine (see Pa., Lehigh co.); Schwartz's mine (see Pa., Lehigh co.); Scioto mine (see Ohio, Scioto co.); Scofield's mine (see under N. J., Morris co.); Scotia (No. 1) mine (see Mo., Crawford co.); Scott mine, (see N. J., Morris co.); Scott or Oregon mine (see N. Y., Orange co.); Scoville (or Chapin) mine (see Conn., Litchfield co.); Scrub Oak mine (see N. J., Morris co.); Seam's (Conrad) mine (see Pa., Lehigh co.); Seaton mine (see Tenn., Blount co.); "Second Vein" (east of "Old Furnace Vein") (see Va., Amherst co.); Section Six mine (see N. C., Cherokee co.); Section Twelve mine (see Mich., Marquette co.); Semi-Magnetic mine (see Va., Wythe co.); Sevier's (Dr.) mine (see Ala., Franklin co.); Shade's (Dr. J. A.) mines (see Pa., Huntingdon co.); Shaefer mine (see Pa., Berks co.); Shamblin and Dickey mine) (see Ala., Tuscaloosa co.); Shankweller mine (see Pa., Lehigh co.); Sharp mine (see Tenn., Sullivan co.); Shawnee Furnace mine (see Ohio, Perry co.); Sheirer's mine (see Pa., Lehigh co.); Shelby Coal Company's mine (see Ala., Tuscaloosa co.); Shelby Iron Company's mine (see Ala., Shelby co.); Shepherd's mine (see Ky., Lawrence co.); Shepherd Mountain mine (see Mo., Iron co.); Sheridan mine (see Tenn., Stewart co.); Sherman mine (see Mass., Berkshire co.); Shields mine (see N. J., Warren co.); Shirtleff mine (see N. Y., Jefferson co.); Shopp mine (see Pa., Cumberland co.); Short Mountain mines (see Pa., Blair co.); Sickles mine (see N. J., Sussex co.); Side mine (see Ala., Talladega co.); Sieger's (Samuel) mine (see Pa., Lehigh co.); Silverhorn mine (see under N. J., Hunterdon co.); Silver Mountain mine (see S. C., York co.); Simmon's Mountain mine (see Mo., Dent Co.); Skaggs (George L.) mine (see Md., Prince George co.); Skellenger Farm mine (see N. J., Morris co.); Skinner mine (see Ala., Calhoun co.); Sligo Furnace mine (see Pa., Clarion co.); Sligo Furnace mine (see Mo., Dent Co.); Slippery Gutmine (see Va., Amherst co.); Small's (John) mine (see Pa., Franklin co.); Smith's (A. G.) mine (see Ohio, Columbiana co.); Smith, Duncan, and Avery's mine (see Pa., Franklin co.); Smithgrove (southeast of) mine (see Pa., Snyder co.); Smith (Jacob) mine (see Md., Baltimore co.); Smith's (J. and D.) mine (see Pa., Lehigh co.); Smith-McAlister mine (see Va., Alleghany co.); Smith's (Major W. R.) mine (see Tenn., Cocke co.); Smith mine (see N. C., Chatham co.); Smith mine (see Tenn., Bradley co.); Smith mine (see N. Y., Essex co.); Smyer's (D. H.) heirs' mine (see Pa., Berks co.); Snake Creek Gap mine (see Ga., corner of Gordon, Walker, and Whitfield cos.); Snake Pond mine (see Ga., Polk co.); Soister mine (see Pa., Blair co.); Solomon's mine (see Tenn., Roane co.); Songa Hollow (Brown's forge) mine (see Tenn., Johnson co.); South Cross mine (see Utah, Iron co.); South Jackson mine (see Mich., Marquette co.); "Southern States' Coal, Iron, and Land Company's" Wolf creek mine (see Tenn., Cocke co.); Sparks mine (see Ala., Talladega co.); Specular mine (see Tenn., Carter co.); Speedwell mine (see Va., Wythe co.); Spengler mine (see Va., Botetourt co.); Splitrock Pond mine (see N. J., Morris co.); Springfield mine (see Md., Carroll co.); Springfield mines (see Pa., Blair co.); Springfield (Southern Railroad Company) mine (see Ohio, Jackson co.); Spring Hill or Wadsworth mine (see W. Va., Monongalia co.); Spruce Swamp (or Redback) mine (see N. Y., Orange co.); Spurr Mountain mine (see Mich., Baraga co.); Stambach's (William) mine (see Pa., Huntingdon co.); Stanfield's (Lewis) mine (see Tenn., Scott co.); Stanhope (or Hude) mine (see N. J., Sussex co.); Staley mine (see N. J., Warren co.); Staunton mine (see Mo., Franklin co.); Steel's mine (see Tenn., Montgomery co.); Stein's (Henry) mine (see Pa., Lehigh co.); Steininger's (Jacob) mine (see Pa., Lehigh co.); Stephens mine (see Ga., Bartow co.); Stephens mine (see Tenn., Greene co.); Stephenson mine (see Mich., Menominee co.); Steven's mine (see N. Y., Orange co.); Sterling mine (see Mich., Marquette co.); Sterling mine (see N. J., Morris co.); Sterling mine (see N. Y., Orange co.); Steven's mine (see N. Y., Rockland co.); Steward mine (see Mich., Marquette co.); Stewardson Furnace mine (see Pa., Armstrong co.); Stewart (Robbin's Run) mine (see Tenn., Carter co.); Stickney Iron Company's mine (see Md., Baltimore co.); Stimson mine (see Mo., Phelps co.); Stinger's (Squire) mine (see Pa., Franklin co.); Stone Dye mine (see Tenn., McMinn co.); Stonewall mine (see Va., Appomattox co); Stonewall mine (see Ala., Cherokee co.); Stony Brook (or Pike's Peak) mine (see N. J., Sussex co.,); Stouffer's (Jacob) mine (see Pa., Franklin co.); Stoutenburgh mine (see N. J., Morris co.); Stout's

Iron-ore mines of the United States, etc.—Continued.

mine (see Tenn., Johnson co.); Strickland mine (see Ala., Bibb co.); Strickler mine (see Pa., Cumberland co.); Strickler's mine (see Pa., Lebanon co.); Stuart or Sunk mine (see N. Y., Putnam co.); Styles mine (see N. Y., Morris co.); Sulphur Hill mine (see N. J., Sussex co.); Summit (or Tip Top) mine (see N. Y., Orange co.); Sunk mine (see N. Y., Putnam co.); Swaringen (farm) mine (see Ohio, Jackson co.); Swartz & Fogel's mine (see Pa., Lehigh co.); Swatara mine (see Pa., Dauphin co.); Swayze mine (see N. J., Warren co.); Swengle and Dunning mine (see Pa., Snyder co.); Sylvan Lake mine (see N. Y., Dutchess co.). **T.** Talbot mine (see Md., Baltimore co.); Talladega mine (see Ala., Talladega co.); Tatham Brothers mine (see Pa., Berks co.); Taylor's (Isaac) mine (see Pa., Huntingdon co.); Taylor mine (see Mich., Marquette co.); Taylor mine (see N. Y., Orange co.); Taylor mine (see Tenn., Carter co.); Taylor's mine (see Tenn., Johnson co.); Teabo mine (see N. J., Morris co.); Tecumseh furnace mine (see Ala., Cherokee co.); Tefft mine (see N. Y., Essex co.); Tellico mine (see Tenn., Monroe co.); Terry mine (see Ala., Cherokee co.); Theall & McCollum mines (see N. Y., Putnam co.); Thomas Iron Company's mines (see Pa., Lehigh co.); Thomas mine (see Md., Frederick co.); Thomas mine (see Mo., Dent co.); Thomas (or Shields) mine (see N. J., Warren co.); Thompson mine (see Pa., Blair co.); Three Top Mountain mine (see Va., Shenandoah co.); Tilly Foster mine (see N. Y., Putnam co.); Tip Top (or Summit) mine (see N. Y., Orange co.); Todd mine (see N. Y., Putnam co.); Tollis' (John) mine (see N. Y., Richmond co.); Tomotla mine (see N. C., Cherokee co.); Tompkins mine (see Tenn., Johnson co.); Topping mine (see N. J., Morris co.); Tower's Spring mine (see N. Y., Dutchess co.); Towle mine (see N. Y., Richmond co.); Treadaway mine (see Ala., Cherokee co.); Tremblay's mine (see N. Y., Clinton co.); Trexler's (E. H.) mine (see Pa., Berks co.); Trexler & Kline's mine (see Pa., Lehigh co.); Trice mine (see Va., Alleghany co.); Trigg Furnace mine (see Ky., Trigg co.); Turkey Hill, or West End mine (see N. J., Hunterdon co.); Tuscaloosa Iron Company's mine (see Ala., Tuscaloosa co.); Two River Range mine (see Minn., Saint Louis co.); Tyson's Four Corners mine (see N. Y., Richmond co.); Tyson Furnace mine (see Vt., Windsor co.). **U.** Udree mine (see Pa., Berks co.; Union mine (see N. Mex., Santa Aña co.); Union Furnace Company's mine (see Pa., Union co.); Upper mine (see Ala., Cherokee co.); Upper or Mansfield mine (see Pa., Tioga co.); Upper Wood (or De Camp) mine (see Hibernia mines, N. J., Morris co.). **V.** Valley Pond mine (see N. Y., Dutchess co.); Van's Land mine (see Ala., Jefferson co.); Van Syckles (or Church) mine (see N. J., Hunterdon co.); Varner mine (see Tenn., Greene co.); Vernon Furnace mine (see Tenn., Montgomery co.); Vermilion Range mines (see Minn., Saint Louis co.); Vernon mine (see Ala., Lamar co.); Vernon mines (see Pa., Fayette co.); Verplanck Point mine (see N. Y., Westchester co.); Vineyard mine (see Tenn., Hamblen co.); Vulcan mine (see Mich., Menominee co.); Vulcan mine (see Utah, Beaver co.); Vulcan mine (see Utah, Weber co.). **W.** Wah-Wah mine (see Bowens mine, see Utah, Weaver co.); Walsenburg mine (see Colo., Huerfano co.); Walton mine (see Va., Wythe co.); Wanderer mine (see Utah, Iron co.); War Eagle mine (see Utah, Iron co.); Warwick mine (see N. Y., Orange co.); Warwick mine (see Pa., Berks co.); Washer mine (see Ala., Calhoun co.); Washer mine (see Pa., Perry co.); Washington Forge mine (see N. J., Morris co.); Washington Furnace mine (see Ohio, Lawrence co.); Washington mine (see N. J., Warren co.); Wash Place mine (see Tenn., Johnson co.); Watkins mine (see Mo., Dent co.); Wawayanda mine (see N. J., Sussex co.); Wayne Furnace mine (see Tenn., Wayne co.); Wean mine (see N. J., Hunterdon co.); Weaver's (Benjamin) mine (see Pa., Lehigh co.); Weaver mine (see Pa., Cumberland co.); Webster (Smith, Duncan and Avery) mine (see Pa., Franklin co.); Weed mine (see N. Y., Columbia co.); Weiler (Dankle) mine (see Pa., Berks co.); Wehman's (George) mine (see Pa., Franklin co.); Welsh mine (see N. J., Warren co.); Welcker's (B. F.) property (see Tenn., Roane co.); Weldon mine (see N. J., Morris co.); Welling mine (see N. J., Sussex co.); Wells mine (see N. Y., Oneida co.); Welsh shaft (see N. Y., Essex co.); Werner & Reinhart's mine (see Pa., Lehigh co.); West bank (see Va., Shenandoah co.); West Bellwood mine (see Tenn., Stewart co.); West End (or Turkey Hill) mine, N. J., Hunterdon co.); West Point furnace (see N. Y., Orange co.); Wharton (Saucon Iron Company) mine (see Pa., Northampton co.); Wheatfield mine (see Pa., Berks co.); Wheat mine (see Mich., Marquette co.); Wheeler mine (see Ga., Bartow co.); White mine (see Tenn., Wayne co.); White Rock (Mount Alto Iron Company) mine (see Pa., Franklin co.); Whitely's (Nathan) mine (see Pa., Lehigh co.); Wiand's mine (see Pa., Lehigh co.); Widow Kerr's mine (see Tenn., Blount co.); Wiestling mine (see Franklin co.); Wild Cat mine (see Ga., Bartow co.); Wild Cat opening (see Pa., Cumberland co.); Willard mine (see Utah, Box Elder co.); Williams mine (see N. C., Surry co.); Williams mine (see N. J., Sussex co.); Williams

Iron-ore mines of the United States, etc.—Continued.
mine (see Tenn., Hamblen co.); Willis mine (see N. J., Morris co.); Will's mine (see Va., Alleghany co.); Wilson's Mill mine (see N. C., Johnson co.); Wilson mine (see Tenn., Blount co.); Winthrop mine (see Mich., Marquette co.); Winkler's mine (see Ohio, Tuscarawas co.); Wolf Creek mine (see Tenn., Cocke co.); Woodall mine (see Ala., Saint Clair co.); Woods mine (see Ga., Bartow co.); Woods mine (see Ga., Polk co.); (see Md., Baltimore co.); Wood's (property) mine (see Va., Botetourt co.); Wood's (Sterret) mine (see Pa., Cumberland co.); Woodward (S. H.) mine (see Ala., Tuscaloosa co.); Worley furnace (see Tenn., Dickson co.); Wright or Budd mine (see N. J., Sussex co.); Wyan (farm) mine (see Ohio, Tuscarawas co.). **Y.** Yellow Ridge mines (see N. C., Gaston co.); Yingst's mine (see Pa., Lebanon co.); Yokel's (George) mine (see Md., Prince George co.); Young's (J.) mine (see Pa., Lycoming co.). **Z.** Ziegler's (David) mine (see Pa., Berks co.); Ziegler's (Jonathan) mine (see Pa., Berks co.); Ziegler's mine (see Pa., Lawrence co.); Zane mine (see Mo., Crawford co.); Zoar (near) mine (see Ohio, Tuscarawas co.).
Irving, R. D. Geological position of ores south of lake Superior, according to (7 f).
Italy. Production of iron ore in, in 1882 (33 b).

J.

Johnson, C. F., jr. Analyses of the statistics of the production of anthracite coal in Pennsylvania (636-639); analyses of the statistics of the production of bituminous coal (681-687); analysis of the copper statistics (801); general analysis of iron-ore statistics (68-76).

K.

KANSAS.
Coal (bituminous), statistics of the production of, in c. y. (650-653, 674-675).
Lead and zinc ore, statistics of the production of, in c. y. (804-805, 806).
Lead. Machinery employed in the reduction of lead ores (820); relation of product to lead ores consumed (820); lead-smelting works, statistics of, in c. y. (811).
Zinc. Average cost of materials, labor, etc., per ton of zinc produced in c. y. (824); mechanical plant employed in the reduction of zinc ores in c. y. (824); percentage of capital employed in c. y. (824); per cent. of the total product of zinc obtained in c. y. (824); representation of the furnace plant of the zinc smelters in c. y. (824); zinc-smelting works, statistics of, in c. y. (821).
Atchison county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Brown county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Chautauqua county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Cherokee county. Coal (bituminous), statistics of the production of, in, c. y. (650-653); lead and zinc ore, statistics of the production of, in c. y. (804-805).
Cloud county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Coffey county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Crawford county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Douglass county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Franklin county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Greenwood county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Jefferson county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Labette county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Leavenworth county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Linn county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Montgomery county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Nemaha county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Neosho county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Osage county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Pottawatomie county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
KANSAS—Continued.
Republic county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Shawnee county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Wilson county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Woodson county. Coal (bituminous), statistics of the production of, in c. y. (650-653).
Kaolin, statistics of the production of, by states and counties (842); by states (848-849).
KENTUCKY.
Coal (bituminous), statistics of the production of, in c. y. (654-657; 674-675).
Iron. Amount in ore mined in c. y., and its per cent. of total iron in the United States' ore product (19 c); amount of iron in the different kinds and grades of ore mined in the c. y. (28 c); average per cent. in iron-ore mined in c. y. (19 c).
Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent of iron in ore; to average spot value of ore; to total value of ore (19 c); to total amount of ore (74 c).
Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 c, 74 c); average value per ton (19 c); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 a); amount of each kind of ore mined in each county in the c. y. (23 f); amount of each kind and grade of ore, according to its contents of iron, produced, in c. y. (27 f); amount of each kind and grade of ore, according to its phosphorus iron ratio, produced in c. y. (29 d, 30 a); royalty paid on each kind of ore mined in c. y. (32 c).
Iron ore. Statistics of the production of iron ore in c. y. (40-43, 64-69); general averages of these statistics (70-71).
Iron ores. Partial analyses of (542-545); complete analyses of (586).
Iron ore. Residuary limonite (15 d); occurrence of carbonate ore (15 d); occurrence of the Clinton ores (13 f).
Iron ore. Notes on the samples of iron ore collected in Kentucky. By W. M. Chauvenet (289-300). Iron-ore sample map of Kentucky (geologically colored) (Plate XXXI). Cumberland River region. LIMONITES. Lyon county (289 f). Trigg county (290 c). Kentucky and Red River region, map of (290). Bath county, FOSSIL (291). CARBONATE ores and their derivatives of the Coal Measures (292). Estill county (292 c). Hanging Rock region (293 d). Map of the Hanging Rock region. Greenup county (294). Carter county (296). Lawrence county (299).
Bath county. Coal (bituminous), statistics of the production of, in c. y. (654-657). Iron ore: Amount of each kind of iron ore mined in the c. y. (23 f); statistics of the production of, in c. y. (40-43). Iron-ore mines: Bath furnace mines; C.; two samples: Fe,P. (292 b, 542 b); Old Slate furnace mine; L.; one sample: Fe,P. (291 f, 292 a, 542 f); Pergem (Bath furnace) mine; section (292 b).
Bell county. Coal (bituminous), statistics of the production of, in the c. y. (654-657).
Boyd county. Coal (bituminous), statistics of the production of, in c. y. (654-657). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 f); statistics of the production of, in c. y. (40-43).
Breathitt county. Coal (bituminous), statistics of the production of, in c. y. (654-657).
Butler county. Coal (bituminous), statistics of the production of, in c. y. (654-657).
Caldwell county. Coal (bituminous), statistics of the production of, in c. y. (654-657).
Carter county. Coal (bituminous), statistics of the production of, in c. y. (654-657). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 c); statistics of the production of, in c. y. (40-43). Iron-ore mines: Bay's mine; section; L.; one sample: Fe,P. (299 c, 544 c); Duzan's (S. S.) mine; section; C.; one sample; Fe,P. (296 c, 544 b); Furgerson mine (Iron Hill furnace); section; C.; one sample: Fe,P. (297 f, 544 c); Iron Hill property (see Furgerson mine) (297 f, 544 c); Lambert mine; section; C.; three samples: Fe,P. (296 f, 297 a, 544 c); Mount Savage mines; C.; one sample; Fe,P. (299 b, 544 c); Robbin's Run (or Stewart) mine; section; L. and C.; five samples: Fe,P. (298 b, 544 c); Stewart's mine (see Robbin's Run mine) (298 b, 544 c).
Clay county. Coal (bituminous), statistics of the production of, in c. y. (654-657).
Clinton county. Coal (bituminous), statistics of the production of, in c. y. (654-657).
Crittenden county. Coal (bituminous), statistics of the production of, in c. y. (654-657).

KANSAS—Continued.

Daviess county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Edmonson county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Elliott county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Estill county. Coal (bituminous), statistics of the production of, in c. y. (654–657). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 f); statistics of the production of, in c. y. (40–43). Iron-ore mines: Estill Furnace bank; C.; one sample; Fe,P. (293 b, 542 f).

Floyd county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Garrett county. Coal (bituminous), statistics of the production of, in c. y. (658–661).

Grayson county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Greenup county. Coal (bituminous), statistics of the production of, in c. y. (654–657). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 f); statistics of the production of iron ore in c. y. (40–43). Iron-ore mines: Blancet mine; (see Pea Ridge mine); Hunnewell furnace mines; C.; two samples: Fe,P. (296 a, 544 b). Pea Ridge mine (Blancet Bros.); section; C.; one sample: Fe,P (295 b, 544 b). Pennsylvania furnace mines; L. and C., 5 samples: Fe,P. (295 c, 544 a); Reuben's mine; section; two samples: Fe,P. (294 f, 544 a). Turkey Lick mine (see Hunnewell furnace mines).

Hancock county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Harlan county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Henderson county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Hopkins county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Jackson county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Johnson county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Knox county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Laurel county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Lawrence county. Coal (bituminous), statistics of the production of, in c. y. (654–657). Iron-ore mines: Shepherd's mine; section; L.; one sample; c.; one sample, Fe,P. (299 f, 300 a, 544 b, 586).

Lee county. Coal (bituminous), statistics of the production of, in c. y, (654–657),

Letcher county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Lyon county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 f); statistics of the production of iron ore in c. y. (40–43). Iron-ore mines: Center Bank (No. 2); L.; one sample: Fe,P. (290 d, 542 f). Fulton mine; L.; one sample: Fe,P. (289 f, 542 f); School-house mine, near Center furnace; sections; L.; one sample: Fe,P. (289 f, 542 f).

Madison county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Magoffin county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Martin county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

McLean county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Menifee county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Montgomery county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Morgan county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Muhlenburgh county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Ohio county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Owsley county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Perry county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Pike county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

KANSAS—Continued.

Powell county. Coal (bituminous), statistics of the production of, in c. y. (654–657). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 f); statistics of the production of iron ore in c. y. (40–43). Iron-ore mines: Anderson mine (Estill furnace); section; C.; two samples: Fe,P. (292 c, 542 f).

Pulaski county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Rockcastle county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Rowan county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Trigg county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (23 f); statistics of the production of iron ore in c. y. (40–43). Iron-ore mines: Trigg furnace mine; L.; one sample: Fe,P. (290 c, 542 f).

Union county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Wayne county. Coal (bituminous), statistics of the production of, in c. y. (654–457).

Webster county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Whitley county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Wolfe county. Coal (bituminous), statistics of the production of, in c. y. (654–657).

Kerr, W. C., assigns Danbury schists in North Carolina to Upper Laurentian (7 a).

Killibrew, J. B. Map by, showing relations of ore-beds sampled in Campbell, Scott, and Anderson counties, Tenn. (348, 349 c).

L.

Lake Superior region [see also Michigan and Wisconsin]: Archæan ores (7 c, 9 b); product of the, in 1880 (8 c); production of iron mines of, 1880–1885 (33 c); production of iron mines, 1883–1884 (34 b); product of Bessemer ore from (9 b); table showing a classification of ores mined in the c. y. according to kind of ore and its contents of metallic iron (8 f, 9 a); table showing a partial classification of ores mined in the c. y. according to phosphorus ratios (9).

Laurentian. Preponderating iron ore in the (22 b); amount of each kind of iron ore mined in, in each state in the c. y. (21); amount of iron ore mined in, in the United States in the c. y. (22 c); amount of Bessemer ore mined in, in the United States in the c. y., and its per cent. of total Bessemer ore product (31 c); magnetite of New Jersey (145–177); magnetite of New York (89–144); magnetite of North Carolina (7 a, 308 c, 315 b, 316 c, 322 d, 327 c); Upper, magnetic ores of Mitchell county, N. C. (326 f).

Lead. Accessory products of the smelting-works in c. y. (815); average days' wages earned in the different processes in c. y. (818); comparative view of industry for years 1850, 1860, 1870, and 1880 in c. y. (821); consumed in manufactures in c. y. (828); cost of producing one ton of, by regions and processes (819 d); cost of producing one ton of, by states and regions (819 b); imports and exports of (830); industry, comparative view of, for years 1850, 1860, 1870, 1880 (821); localities employing fluxes in c. y. (813); machinery employed in the reduction of ores by regions and processes in c. y. (821); machinery employed in the reduction of ores by states in c. y. (820); percentages of capital employed in the reduction of, in the different processes in c. y. (819); percentage of capital employed in the reduction of, in the various states in c. y. (815); percentage of total yield in c. y. (818); percentage of ore worked up by various processes in c. y. (819); produced in c. y. (828); production of one ton by regions and processes in c. y. (819); production of one ton by states and regions, in c. y. (819); relation of product to ores consumed, by regions and processes in c. y. (820); relation of product to ores consumed, by states in c. y. (820); smelting, percentage of lead yielded by various processes of (818 f); smelting-works, statistics of, by regions and processes (816, 817); smelting-works, statistics of, by states, etc., in c. y. (810, 811, 812); smelting-works, wages paid per day in (814); sources of coke used in smelting-works in c. y. (812).

Lead ore. Percentage of, worked up by the various processes (818 b); consumed, relation of product to, by regions and processes (820); consumed, relation of product to, by states (820); statistics of the production east of the 100th meridian, by counties, in c. y. (804–805); statistics of the production east of the 100th meridian, by states, in c. y. (806).

Lesley, Prof. J. P. On great fault in fossil ores of Elk Fork valley, Tennessee (349 c); on the geological position of the Pennsylvania magnetites (11 e); state geologist, second geological survey of Pennsylvania, permission to reprint analyses (179 c).

Lignite. Conversion of, into fuel of high heating power (791–796).

Limonite. Amount mined in the c. y., and its per cent. of the total ore product (21 a); amount mined in each geological horizon in each state in the c. y. (21 b); amount mined in each geological horizon in the United States in the c. y. (22 c); amount mined in each state in the c. y. (23 a); amount mined in each ore-producing county in the c. y. (23–26); carrying under 40 per cent. iron, amount produced in each state in c. y. (27 f, 28); carrying under 40 per cent. iron, amount produced in the United States in the c. y. (26 e); carrying 40 to 50 per cent. iron, amount produced in each state in c. y. (27 f, 28); carrying 40 to 50 per cent. iron, amount produced in the United States in the c. y. (26 e); carrying over 50 per cent. iron, amount produced in each state in c. y. (27 f, 28); carrying over 50 per cent. iron, amount produced in the United States in the c. y. (26 e); total amount of iron in ore containing under 40 per cent. iron (26 e, 27); total amount of iron in ore containing 40 to 50 per cent. iron (26 e, 27); total amount of iron in ore containing over 50 per cent. iron (26 e, 27); amount of iron in the different grades of ore mined in each state in the c. y. (28 e); amount of each grade, according to phosphorus-iron ratio, mined in the United States in the c. y. (29 f); amount of each grade according to phosphorus-iron ratio mined in each state in the c. y. (29 d); amount produced in the United States in c. y. with a phosphorus ratio under 0.05 (31 d); amount produced in the United States in c. y. with a phosphorus ratio greater than 1.00 (31 e, 32 b); amount of royalty paid on, in each state in the c. y. (32 d); mined in the Lake Superior region in the c. y., classified according to its contents in metallic iron (9).

Bessemer ore. Amount mined in each state in the c. y. (30 e); amount mined in the United States in the c. y., and its per cent. of total Bessemer ore product (31 b).

Limonite of the Siluro-Cambrian limestones and schists (10 c); forms of (10 d); origin of (10 f); deposits of the Lower Silurian, yield of, in 1880 (11 d); Oriskany, character and position of the (15 a); residuary, occurrence of, in Kentucky and Tennessee (15 c).

Limonite in Alabama (Silurian), (383–392); (Carboniferous) (399); in Colorado (482); in Connecticut (Lower Silurian) (83–86); in Georgia (Huronian) (328); Lower Silurian (367–378); in Kentucky (sub-Carboniferous) (289, 290); in Maine (Cenozoic) (79); in Maryland (Lower Silurian) (254); in Massachusetts (Lower Silurian) (86, 87); in Michigan (Huronian) (432–436); in New Jersey (Lower Silurian) (176, 177); in New York (Cenozoic) (123–126); Helderberg (927 b); Lower Silurian (127–135); in North Carolina (Huronian) (302 f, 303 e, 302 b, 303 b, 327 e); in Moore co. (Triassic) (306 e); in Gaston co. (321 c); in Caldwell co. (Upper Laurentian) (322 d); in Ohio (see Carbonates and derivatives); in Oregon (16 f, 436); in Pennsylvania: of the Siluro-Cambrian formation (181 c); of the Hudson River slates (Formation No. III) (197 f); of the Lower Helderberg and Oriskany formations (198 c); of the Medina formation (198 c); of the Devonian, chiefly of the Marcellus formation (199 e); of the Mauch Chunk red shale (202 b); in Tennessee, character of the (10 d); sub-Carboniferous, of Tennessee (357–364); in Tennessee (331–346, 357–364); Lower Silurian, of Polk county (331 d); of McMinn county (332 c); of Monroe county (332 f); of Blount county (334); of Sevier county (335 f); of Hamblen county (336); of Cocke county (336 b); of Greene county (337 a); of Washington and Unicoi counties (338 a); of Carter and Johnson counties (339 d); in Utah (490); in Virginia (11 c, 264 a, 265 a, 266 a, 267 c, 268 b, 269 b, 270 b, 271 f, 273 f, 274 d, 275 a, 276 c, 277 a, 279 a, 281 c, 283 d, 284 d, 285 a, 286 a, 287 a, 288 a).

Limonite (bog) in Washington territory (497).

Lindgren (Waldemar). Notes on the Laramie series in Montana (743 f); on eruptive rocks of Montana, (719–737).

Little (Professor George). On age of Georgia iron ores (367 a); reference to the geology of Bartow county, Georgia, by (368 e).

Lower Coal Measures in Ohio, carbonate ore of the (16 b).

Lower Helderberg limestones in Pennsylvania, limonite in the (13 f).

Lower limestone ore in Kentucky (15 d).

M.

Magnesian limestone, statistics of the production of, by states and counties (842); by states (850–851); in southern Missouri, leaching of the; section (12 b).

Magnetite. Amount mined in the c. y., and its per cent. of the total ore product (21 a); amount mined in each geological horizon in each state in the c. y. (21 b); amount mined in each geological horizon in the United States in the c. y. (22 c); amount mined in each state in the c. y. (23 a); amount mined in each ore-producing county in the c. y. (23–26); carrying under 45 per cent. iron, amount produced in the United States in the c. y. (26 d); carrying 45 to 60 per cent. iron, amount produced in the United States in the c. y. (26 e); carrying over 60 per cent. iron, amount produced in the United States in the c. y. (26 e); total amount of iron in ore containing under 45 per cent. iron (26 e, 27); total amount of iron in ore containing 45 to 60 per cent. iron (26 e, 27); total amount of iron in ore containing over 60 per cent. iron (26 e, 27); carrying under 45 per cent. iron, amount produced in each state in c. y. (27 f, 28); carrying 45 to 60 per cent. iron, amount produced in each state in c. y. (27 f, 28 a); carrying over 60 per cent. iron, amount produced in each state in c. y. (27 f, 28); amount of iron in the different grades of ore mined in each state in the c. y. (28 e); amount of each grade, according to phosphorus iron ratio, mined in each state in the c. y. (29 d); amount of each grade, according to phosphorus iron ratio, mined in the United States in the c. y. (29 f); amount produced in the United States in c. y. with a phosphorus ratio greater than 1.00 (31 d, 32 b); amount produced in United States in c. y. with a phosphorus ratio under 0.05 (31 d); amount of royalty paid on, in each state, in the c. y. (32 d); in the Lake Superior region in the census year, classified according to its contents in metallic iron (8); of the Mesozoic sandstone in Pennsylvania, product of, in 1880 (12 a).

Magnetite, Bessemer. Amount mined in each state in the c. y. (30 e); amount mined in the United States in the c. y., and its per cent. of total Bessemer ore product (31 b).

Magnetite in Alabama (400); in Maryland, Lower Silurian (257 e); in Michigan, Huronion (428–432); in New Jersey, Laurentian (145–170); in New Hampshire (80); in New York, Laurentian (89–122); in Vermont (82); in Virginia, Huronian (265 a, 266 a, 267 e, 270 d, 271 f, 277 b); near Gaston, Halifax county, N. C. (301 d); (Titaniferous), Lower Laurentian, of Forsythe, Guilford and Rockingham counties, N. C. (308 e); Huronian, of Stokes county, N. C. (311 d); Upper Laurentian, of Surry county, N. C. (315 b); Lower Laurentian, of Lincoln county, N. C. (316 e); Huronian of Lincoln county, N. C. (316 f); Titaniferous, Upper Laurentian?, Burke county, N. C. (322 d); Upper Laurentian of Ashe county, N. C. (324 b); Upper Laurentian, of Mitchell county, N. C. (326 f); Upper Laurentian, of Madison county, N. C. (327 f); Huronian of York county, S. C. (319 b); Pennsylvania, analyses of (179 d); in Pennsylvania, report on certain ores of, by Bailey Willis (223–234).

MAINE.

Copper. Statistics of the production of, in c. y. (798, 799).

Iron. Amount in ore mined in c. y., and its per cent. of total iron in the United States' iron-ore product (19 e); amount of iron in the different kinds and grades of ore mined in the c. y. (28 e); average per cent. of iron in ore mined in c. y. (19 e).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 e); to total amount of ore (74 e).

Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 e, 74 e); average value per ton (19 d); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 a); amount of each kind of ore mined in each county in c. y. (24 a); amount of each kind and grade of ore, according to its contents of iron, produced in c. y. (27 f); amount of each kind and grade of ore, according to its phosphorus iron ratio, produced in c. y. (29 d, 30 b).

Iron ore. Bessemer, amount of each kind mined in c. y. (30 e); its per cent. of the Bessemer ore product of the United States (30 e).

Iron ore. Statistics of the production of iron ore in c. y. (44–47, 64–69); general average of these statistics (70, 71).

Iron ore. Complete analyses of (586); partial analyses of (544, 545).

Iron ores. Notes on the samples collected in. By Edward R. Benton (79).

Mica, statistics of the production of, in c. y. (843, 850, 851).

Hancock county. Copper ore, statistics of the production of, in c. y. (798, 799).

Oxford county. Mica, statistics of the production of, in c. y. (843).

Piscataquis county. Iron ore: Amount of each kind of iron ore mined in the c. y. (24 a); statistics of the production of iron ore in, in c. y. (44–47). Iron ore mines: Katahdin; L.; three samples: Fe, P. in two; one c. (79 b, 544 d).

Manganese ore in Georgia (379–382); in Tennessee (336 a, 339 d); statistics of the production of, by states and counties (842): by states (850–851).

Mansfield ore in the Pennsylvania Chemung formation.

Marcellus Formation, Limonite ores of, in Pennsylvania (199 e); carbonate ores (203 a).

Mather, W. W. Geology of the First District of New York by, reference to (91 d, 94 b); section of the Forest of Dean mine by, referred to (94 b); on the iron-ore deposits of Richmond county, N. Y. (122 e); the Canterbury ore-mine of, in Orange county, N. Y. (127 b).

Mauch Chunk red shale, limonite ores of (202 b).

MARYLAND.

Asbestos. Statistics of the production of, in c. y. (839, 846–847).

Coal (bituminous), statistics of the production of, in c. y. (658–661, 674–675).

Chromic iron. Statistics of the production of, in c. y. (839, 846–847).

Copper. Statistics of the production of, in c. y. (798–799).

Glass-sand. Statistics of the production of, in c. y. (840, 848–849).

MARYLAND—Continued.

Hydraulic cement. Statistics of the production of, in c. y. (841, 848-849).

Infusorial earth. Statistics of the production of, in c. y. (841, 848-849).

Iron. Amount in ore mined in c. y., and its per cent. of total iron in the United States' iron-ore product (19 e); amount of iron in the different kinds and grades of ore mined in, in c. y. (28 e); average per cent. of iron mined in c. y. (19 e).

Iron ore. Order of the state according to the amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 e); to total amount of ore (74 e).

Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 e, 74 e); average value per ton (19 e); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 a); amount of each kind of ore mined in each county in the c. y. (24 b); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (27 f); amount of each kind and grade of ore, according to its phosphorus iron ratio, produced in, in c. y. (29 d, 30 b).

Iron ore. Statistics of the production of, in c. y. (44-47, 64-69); general averages of these statistics (70-71).

Iron ore, partial analyses of (544 to 547).

Iron ores. Notes on the samples of iron ore collected in, by Edward R. Benton (245-260); MESOZOIC ores (carbonates and derivatives) (245); *map* of eastern Maryland, showing location of iron-ore banks sampled (245); Baltimore county (245); Prince George county (248 e): ores from OTHER HORIZONS than the Mesozoic; Baltimore county: Limonite (254 f); Carroll county: Limonite (257 d); magnetite (257 e); Frederick county: Limonite (258 b); fossil (260 a).

Kaolin. Statistics of the production of, in c. y. (842, 848, 849).

Lead and zinc. Statistics of the production of, in c. y. (804-805, 806.

Quartz and feldspar. Statistics of the production of, in c. y. (844, 852, 853).

Soapstone. Statistics of the production of, in c. y. (845, 852, 853).

Alleghany county. Coal (bituminous), statistics of the production of, in c. y. (658-661). Hydraulic cement, statistics of the production of, in c. y. (841). Iron ore, amount of each kind of iron ore mined in, in the c. y. (24 b); statistics of the production of iron ore in, in c. y. (44-47). Iron ore mines: Bowery mine; L.; ore sample: Fe,P. (259 c, 246 d); Frost mine, F.; one sample: Fe,P.,P. (260 a, 546 d).

Anne Arundel county. Glass-sand: Statistics of the production of, in c. y. (840). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 a). Iron ore: Statistics of the production of, in, in cy. (44-47). Iron-ore mines: Howard Brown's mine (see Mitchell, Wilson, and Riley) (251 f, 246 c); Linthicum (A. S.) mine, H and C; two samples: Fe,P. (251 c, 546 b); Mitchell, Wilson and Riley's (Howard Brown) mine; section; C.; two samples: Fe,P. (251 f, 252 a, 546 c); Reynolds, Kyne, and Arnold mine; section; C.; two samples: Fe,P. (253 a, 546 c).

Baltimore county. Asbestos, statistics of the production of, in c. y. ((839); Chromic iron, statistics of the production of, in c. y. (839). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 b); statistics of the production of, in c. y. (44-47). Soapstone, statistics of the production of, in c. y. (845). Iron-ore mines: Bower's Spring Garden; C.; one sample: Fe,P. (544 e); Furstenburg's Furnace mine (Stemmer's run); C.; four samples: Fe,P. (247 f, 248 a, 544 e); Furstenburg mine; section; C.; one sample: Fe,P. (246 d, 247 c, 544 c); Green Spring mine; L.; one sample: Fe,P. (257 b, 546 a); Hegeman or Smith mine; C.; with H. and L.; one sample: Fe,P.,P, in Fe (247 a, 246 b, 544 e); Kelley mine; section; L.; one sample: Fe,P. (255 e, 544 f); Maryland or Ellicott's mine; C.; with H. and L.; two samples: Fe,P. (254 d, 544 f); Norris or Whitaker mine; H. with C.; one sample: Fe,P.,P, in Fe (253 c, 544 f); Odensess (Jacob); section; C.; one sample: Fe,P. (252 f, 253 d, 544 f); Oregon mine; section; L.; two samples: Fe,P. (256 a, 257 a, 546 a); Rever and Koster mine; section; sketch of ore nodules; C.; with H. and L.; one sample: Fe,P. (246 d, 247 c, 544 c); Ridgeley mine; L.; one sample: Fe,P. (254 f, 544 f); Smith's (Jacob) mine; section; C.; with H. and L.; one sample: Fe,P. (245 b, 544 c); Stickney (Iron Company) mine; C.; H. with L.; two samples: Fe,P. (254 a, 644 f); Talbot mine; L.; one sample: Fe,P. (255 d, 544 f); Woods mine; L.: one sample: Fe,P. (255 a, 544 f).

Calvert county. Infusorial earth, statistics of the production of, in c. y. (841).

Carroll county. Copper, statistics of the production of, in c. y. (798, 799). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 b); statistics of the production of iron ore in, in c. y. (44-47). Iron-ore mines: Avondale mine; L.; one sample: Fe,P. (257 d, 546 c); Springfield mine; M.; two samples: Fe,P. (257 e, 258 a, 546 c).

Cecil county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 b); statistics of the production of iron ore in, in c. y. (44-47). Kaolin, statistics of the production of, in c. y. (842). Quartz and feldspar, statistics of the production of, in c. y. (844).

MARYLAND—Continued.

Frederick county. Iron ore: Amount of each kind of iron ore mined in, in c. y. (24 b); statistics of the production of iron ore in, in c. y. (44-47). Iron-ore mines: Catoctin or Kunkel mine; L.; two samples: Fe,P. (258 f, 259 a, 546 d); Ensor mine; section; L.; two samples: Fe,P. (258 b, 546 c); Grim's mine; L.; one sample: Fe,P. (259 b, 546 d); Thomas mine; L.; one sample: Fe,P. (259 d, 546 d). Lead and zinc, statistics of the production of, in c. y. (804, 805, 806).

Harford county. Asbestos, statistics of the production of, in c. y. (839). Chromic iron, statistics of the production of, in c. y. (839). Iron ore: Amount of each kind of iron ore mined in the c. y. (24 b); statistics of the production of, in c. y. (44-47). Quartz and feldspar, statistics of the production of, in c. y. (844).

Howard county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 b); statistics of the production of iron ore in, in c. y. (44-47). Iron-ore mines: Hanover Switch mine; C.; two samples: Fe,P. (544 e).

Montgomery county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 b); statistics of the production of iron ore in, in c. y. (44-47).

Prince George's county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 b); statistics of the production of iron ore in, in c. y. (44-47). Iron-ore mines: Friel & Milbrook mine; section; H.; two samples: Fe,P. (250 d, 546 b); Muirkirk mine; C.; with H. and L.; two samples; Fe,P. (250 b, 546 b); O'Brien (James) mine; section; H.; a little C.; one sample: Fe,P. (251 a, 546 b); Skaggs (George L.) mine; section; C.; with H. and L.; one sample: Fe,P. (248 e, 546 b); Yokel (George) mine; C. and H; one sample: Fe,P. (248 f, 546 b).

Washington county. Hydraulic cement, statistics of the production of, in c. y. (841). Iron ore: Amount of each kind of iron ore mined in the c. y. (24 b); statistics of the production of iron ore in, in c. y. (44-47).

MASSACHUSETTS.

Corundum (emery). Statistics of the production of, in c. y. (840, 846-847).

Glass-sand. Statistics of the production of, in, in c. y. (840, 848, 849).

Iron. Amount in ore mined in c. y., and its per cent. of total iron in the United States' iron-ore product (19 d); amount of iron in the different kinds and grades of ore mined in, in the c. y. (28 e); average per cent. of iron in ore mined in c. y. (19 d).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 d); to total amount of ore (74 e).

Iron ore. Amount and value of the c. y.'s product and their per cent. of amount and value of the United States' product (19 d, 74 e); average value per ton (19 d); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 b); amount of each kind of ore mined in each county in the c. y. (24 e); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (28 a); amount of each kind and grade of ore, according to its phosphorus iron ratio, produced in, in c. y. (29 d, 30 b); royalty paid on each kind of ore mined in, in c. y. (32 e).

Iron ore. Statistics of the production of iron ore in c. y. (44-47, 64-69); general averages of these statistics (70, 71).

Iron ores. Partial analyses of (541-547).

Iron ores. Notes on the samples of iron ore in, collected by Bayard F. Putnam (86-87); general remarks on the (86 e); map showing location of iron mines east of the Hudson river (128).

Mica. Statistics of the production of, in c. y. (843, 850-851).

Nickel. Statistics of the production of, in c. y. (843, 850-851).

Quartz and feldspar. Statistics of the production of, in c. y. (844, 852-853).

Berkshire county. Glass sand, statistics of the production of, in c. y. (840). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 c); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 b); statistics of the production of iron ore in c. y. (44-47). Iron-ore mines: Bacon mine, L.; two samples: Fe,P. (87 f, 546 e). Bank mine; L.; two samples: Fe,P. (87 d, 546 e). Chauncey Leet mine; L.; one sample: Fe,P. (86 d, 546 e). Cheever mine; L.; two samples: Fe,P. (87 b, 546 e). Cone mine; L.; one sample: Fe,P. (87 a, 546 e). Cone mine described (87 a). Goodrich mine; L.; two samples: Fe,P. (86 f, 546 e). Nathaniel Leet mine; L.; one sample: Fe,P. (86 e, 546 e). Mason and Bliss mine mentioned (87 f). Sherman mine mentioned (87 f).

Hampden county. Corundum, statistics of the production of, in c. y. (840). Mica, statistics of the production of, in c. y. (843). Quartz and feldspar, statistics of the production of, in c. y. (844).

Middlesex. Nickel, statistics of the production of, in c. y. (843).

McCreath, A. S. Analysis o ore from Hill mine, Putnam co., N. Y., by (98 e); analyses of Pennsylvania iron ores by (179 b); remarks on limonite ores of Hudson River slates in Pennsylvania (197 f); on origin of carbonate ores of the Siluro-Cambrian Formation in Pa., and analyses (202 d); analy-

McCreath, A. S.—Continued.
ses of carbonate ores of Marcellus Formation (203 a); analyses of carbonate ores of Mauch Chunk Red Shale Formation, Pa. (204); analyses of carbonate ores of the Pottsville Conglomerate, Pa. (205); notes and analyses of carbonate ores of the Lower Productive Coal Measures (205 c); notes on carbonate ores of the Lower Barren Measures of Pa. (210 b); notes and analyses of the carbonate ores of the Upper Productive Measures of Pa. (211 b); notes on the carbonate ores of the Upper Barren Measures (partly Permian) (212 c); notes and analyses of the fossil ores of the Clinton Formation in Pa. (213 a); analyses of fossil ores of Chemung Formation in Pa. (220).
Medina Formation, limonite ores of, in Pa. (198 d).
Metallurgical establishments and mines east of the 100th meridian, directory of (854).
Metals, consumption of, in manufactures (828).
Mesozoic [see also in Montana, under Jurassic and Cretaceous]; amount of carbonates and derivatives mined in each state in the c. y. (21 b); amount of iron ore mined in the United States in the c. y. (22 c); carbonates and derivatives of Maryland (245-254); sandstone of Pennsylvania, magnetite ores associated with (223-234).
Mica mines of New England, by N. S. Shaler (832-836).
Mica, statistics of the production of, by states and counties (843); by states (850, 851).
MICHIGAN:
Coal (bituminous), statistics of the production of, in c. y. (658-661, 674, 675).
Copper, statistics of the production of, in c. y. (798, 799).
Hydraulic cement, statistics of the production of, in c. y. (841, 848, 849).
Iron. Amount in ore mined in c. y., and its per cent. of total iron in the United States' iron-ore product (19 c); amount of iron in the different kinds and grades of ore mined in, in the c. y. (28 c); average per cent. of iron in ore mined in c. y. (19 c).
Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 c); to total amount of ore (74 c).
Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 c, 74 c); average value per ton (19 c); relation of the product to the area of iron-ore fields in (18 c); tonnage and value of high-grade ores in (20 b); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 b); amount of each kind of ore mined in each county in the c. y. (24 c); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (28 a); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 d, 30 b); royalty paid on each kind of ore mined in, in c. y. (32 c).
Iron ore. Bessemer, amount of each kind mined in c. y. (30 c); its per cent. of the Bessemer ore product of the United States (30 c); proportion of Bessemer ore produced in (31 a); product of Bessemer ore in (9 b).
Iron ore. Statistics of the production of iron ore in c. y. (44-47, 64-69); general average of these statistics (70, 71).
Iron ores. Complete analyses of (586-591); partial analyses of (530-535).
Iron ores. Notes on the samples of iron ore collected in Michigan and northern Wisconsin, by Bayard T. Putnam (421-455); *map* (geological) of parts of Michigan and Wisconsin, showing position of belts of iron ore (421); Marquette iron region, *map* of (422); mines producing ore of Class I (hard specular) (424); mines producing ore of Class II (magnetic and slate) (428); mines producing ore of Class III (soft hematite); Negaunee range (432); Teal Lake range (434); Salisbury range (434); mines producing ore of Class IV (flag ore) (436); Menominee iron region (437); *map* of the Menominee iron region (438); Wisconsin (453).
Quartz and feldspar. Statistics of the production of, in c. y. (844, 852, 853).
Baraga county. Iron mines: Spurr Mountain mine; M.; one sample: Fe,P, S,Al,Mn,SiO_2 (431 a, 530 f).
Marquette county. Iron ore: Amount of each kind of ore mined in, in c. y. (24 c); statistics of the production of iron ore in, in c. y. (44-47); rank among counties producing over 100,000 tons of iron ore in c. y. (75 a). Iron-ore mines: Baraga mine; H.; not sampled (432 c). Barnum mine; H.(s); one sample: Fe,P,S,Si,Al,Mn,Ti,Si (426 f, 530 c). Bessemer mine; H.; one sample: Fe,P,S,Si,Al,Mn (434 d, 532 c). Boston mine; H.(s); one sample: c (428 b, 530 d, 587). Cambria mine; H.; one sample: Fe,P,S,Si,Al (434 c, 532 c). Carr mine; H.; not sampled (436 d). Champion mine; product of iron ore in c. y. and its value and the number of employés (75 d); M. and H.(s); four samples: Fe,P,S,Al,Mn,Ti,Si (429 b, 530 d). Cheshire mine; H.; one sample: Fe,P,S,Si,Al,Mn (437 a, 532 c). Chicago mine; H.; not sampled (432 f). Cleveland Iron Mining Company's mine; product of iron ore in c. y. and its value and the number of employés (75 d); H.(s); two samples: Fe,P,S,Si,Al,Mn,Ti,Si (425 a, 530 a). Columbia mine; H.(s); not sampled (432 c). Dalliba mine; H.(s); not sampled (428 d); Edwards mine; M. and H.(s); two samples: Fe,P,S,Si,Al,Mn,Ti, Si (428 f, 429 a1530 d). Excelsior mine; H.(s); not sampled (428 a). Forest City mine; H.; not sampled (434 c). Foster mine; H.; not sampled (435 a). Goodrich mine; H.(s); not sampled (428 a). Gribben mine; H.; not sampled (436 d). Humboldt mine; M. and H.(s); one sample: Fe, P,S,Si,Al,Mn,Si (428 f, 530 d). Indiana mine; H.; not sampled (432 d). Jackson mine; product of iron ore in c. y., and its value and the number of employés (75 d); H.(s); two samples: Fe,P,S,Si,Al,Mn,Ti,Si (424 f, 530 a). Keystone mine; M. and H.(s); one sample: C.; one sample: S,P, Fe,Al,Ti,Si (429 c, 530 c). Lake Angeline mine; H.(s); four samples: Fe,P.,S,Si,Al,Mn,Ti (427 a, 530 c). Lake Superior hematite mine; H.; one sample: Fe,P,S,Mn,Si (435 f, 532 d). Lake Superior iron mine; product of iron ore in c. y., and its value and the number of employés (75 d); H.(s); four samples: Fe,P,S,Si,Al,Mn,Ti,Si,P. (426 a, 530 b). Lowthian mine; H.; one sample: Fe,P,S,Si,Al,Mn (436 c, 532 d). Manganese mine; H.; one sample: Fe,P,Si,Al (433 a, 532 b). McComber mine; H.; two samples: c.; two samples: S,P,Fe,Si,Al,Mn (433 c, 532 b, 589). Michigamme mine; product of iron ore in c. y., and its value and the number of employés (75 d); M.; two samples: c.; four samples: Fe,P,S,Al,Mn,Si (430 a, 530 c, 586, 587). Milwaukee mine; H.; not sampled (433 b). Mitchell mine; H.; not sampled (436 a). National mine; H.(s); not sampled (427 c). Nelson mine; H.; one sample: Fe,P,S,Si,Al,Mn (434 f, 532 c). New York hematite mine; H.; not sampled (432 f). New York mine; H.(s); two samples: c.; two samples; Fe,P,S,Si,Al,Mn,Ti,Si (425 c, 530 b, 589). Orion mine; H.; not sampled (432 f). Palmer mine; H.; one sample: Fe,P,S,Si,Al,Mn (436 c, 532 c). Pendill mine; H.; not sampled (432 f). Pittsburgh and Lake Superior mine; H.; not sampled (436 d). Republic mine; product of iron ore in c. y., and its value and the number of employés (75 d); H.(s) and M.; two samples: c.; six samples: P.,Fe,S,Si,Mn (431 c, 530 f, 587). Rolling Mill mine; H.; one sample: Fe,P,S,Si,Al,Mn (432 d, 532 b). Rowland mine; H.; not sampled (432 d). Saginaw mine; H.(s); one sample: Fe,P, S,Si,Al,Mn,Ti,Si (427 f, 530 c). Salisbury mine; H.; three samples: Fe, P,S,Si,Al,Mn (435 a, 532 d). Section 12 mine; H.; not sampled (434 b). South Jackson mine; H.; two samples: Fe,P,S,Si,Al,Mn (434 a, 532 c). Sterling mine; H.(s); three samples: Fe,P. (428 d, 530 d). Steward mine; M.; not sampled (431 b). Taylor mine; H.; not sampled (437 b). Wheat mine; H.; not sampled (436 c). Winthrop mine; H.; two samples: Fe,P, S,Si,Al,Mn (436 a, 532 d). Quartz and feldspar, statistics of the production of, in c. y. (844).
Menominee county. Iron ore: Amount of each kind of iron ore mined in, in c. y. (24 c); rank among counties producing over 100,000 tons of iron ore in c. y. (75 a); statistics of the production of iron ore in (44-47). Iron-ore mines: Breen mine; H.; three samples: Fe,P. (440 a, 532 c). Chapin mine; H. (s); two samples: c.; one sample; Fe,P. (451 a, 534 c, 589). Cornell mine; H. (s); two samples: c. (452 c, 534 c, 588, 589). Curry mine; H.(s); four samples; Fe,P. (442 c, 532 f). Cyclops mine; H. (s); five samples; Fe,P,S,Al (447 d, 534 c). Emmet mine; H.(s); eight samples; Fe,P,S,Si, Al. (437 f, 532 c). Lowell mine; H.(s); one sample: Fe,P. (440 c, 532 c). Ludington mine; H.(s); one sample: Fe,P. (451 f, 534 c). McKenna (or Keel Ridge) mine; H. (s); one sample; c.; one sample; Fe,P. (450 a, 534 c, 590). Norway & Cyclops mine, product of iron in c. y., and its value and the number of employés (75 d); H. (s); one sample: c.; seven samples: Fe,P. (455 d, 534 c, 589). Perkins mine (see Saginaw mine); H. (s); seven samples: Fe,P. (443 a, 534 a). Pit No. 3 or New Vulcan mine; H.(s); one sample: c.; five samples: Fe,P. (441 c, 532 f, 590). Quinnesec mine; product of iron in c. y. and its value and the number of employés (75 d); H.(s); five samples: c.; two samples: Fe,P,S,Si (448 c, 449, 534 d, 587, 588); Saginaw mine (Perkins); H. and H.(s); seven samples: Fe,P. (443 a, 534 b). Stephenson mine; H.(s); one sample: c.; five samples: Fe,P. (444 b, 534 b, 590). Vulcan mine; product of iron ore in c. y. and its value and the number of employés (75 d); H.(s); one sample: c.; one sample: Fe,P. (440 f, 532 f, 590).
Houghton county. Copper, statistics of the production of, in c. y. (798-799).
Isle Royale county. Copper, statistics of the production of, in c. y. (798-799).
Jackson county. Coal (bituminous), statistics of the production of, in c. y. (658-661).
Kalamazoo county. Hydraulic cement, statistics of the production of, in c. y. (841).
Keweenaw county. Copper, statistics of the production of, in c. y. (798-799).
Ontonagon county. Copper, statistics of the production of, in c. y. (798-799).
Shiawassee county. Coal (bituminous), statistics of the production of, in c. y. (658-661).
Mineral soap, statistics of the production of, by states and counties (843); by states (850-851).

Mines and metallurgical establishments east of 100th meridian, directory of (854).
Minor minerals of the United States (831-853); statistics of production of, in the census year (837-853).
MINNESOTA:
Iron-ores. Partial analyses of (546-547).
Iron ores. Report of a trip on the Upper Mississippi and to Vermilion lake, Minnesota, by Bailey Willis (457-467); *map* of a part of northern Minnesota, showing route traversed (457); letter of transmittal (451); magnetite ore near Agate bay (459 a); outline of trip to Upper Mississippi (459 c); *map* of the Pokegoma iron region (458); sketch of Pokegoma falls (459); sketch of the lower rapid, Prairie river (460); outline of trip to Vermilion lake (461 a); narrative (461 b); distorted bands of specular ore in Jasper (461); geology (462 b); Plates XXVII, XXXVIII, and XXXIX (462 f, 464 a); black slate and sandstone inclosed in schist (462); sketch-map of the Two Rivers range (463); notes on the occurrence of iron ore (464 c); crystallized quartz in specular ore, Two Rivers range (464); vertical section in the Two Rivers range, showing specular ore in banded jasper (465); sketch maps of an ore-body on the Vermilion range (465, 466).
Itasca county. Iron ore: Prairie River mine; M. and H.(s); one sample: Fe,P. (460 c, 546 f).
Lake county. Iron ore: Agate Bay; M.; one sample: Fe,P. (458 f, 546 f).
Saint Louis county. Iron ore: Two Rivers range; H.(s); two samples: Fe,P. (464 c, 546 f); Vermilion range; H.(s); four samples: Fe,P.(465 c, 466 f).
MISSOURI:
Barytes. Statistics of the production of, in c. y. (839, 846-847).
Coal (bituminous). Statistics of the production of, in c. y. (658-661, 674-675).
Copper. Statistics of the production of, in c. y. (798-799).
Iron. Amount in ore mined in c. y., and its per cent. of total iron in the United States iron-ore product (19 e); amount of iron in the different kinds and grades of ore mined in, in the c. y. (28 c); average per cent. of iron in ore mined in c. y. (19 e).
Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 c); to total amount of ore (74 c).
Iron ore. Amount and value of c. y.'s product and their per cent. of the amount and value of the United States' product (19 e, 74 c); average value per ton (19 d); amount of each kind of ore mined in the c. y. (23 b); amount of each kind of ore mined in each county in the c. y. (24 c); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (28 a); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 c, 30 b); production of iron mines, 1883-1884 (34 b); royalty paid on each kind of ore mined in, in c. y. (32 c).
Iron ore. Statistics of the production of iron ore in c. y. (48-51, 64-69); general averages of these statistics (70-71).
Iron ore, Bessemer. Amount of each kind mined in c. y. (30 c); its per cent. of the Bessemer ore product of the U. S. (30 c); proportion of Bessemer ore produced in (31 a).
Iron ores. Partial analyses of (548-549); complete analyses of (591-592).
Iron ores. Archæan (5 a, 9 c, 10 a); of the sub-Carboniferous (15 d); of the Canadian (12 a); of the Canadian, yield of, in 1880 (12 c).
Iron ores. Notes on the samples of iron ore collected in, by W. M. Chauvenet; specular ores in porphyry (Archæan); Saint François county (403); Iron county (405); specular ores in sandstone (Lower Silurian); Salem district (Dent county); map of Dent county, showing banks of specular ore sampled (407); Phelps county, map of, showing banks of specular ore sampled (402); Crawford county, map of, showing sampled deposits of specular ore (416); Franklin county (419).
Lead and zinc ore. Statistics of the production of, in c. y. (806).
Lead. Statistics of lead-smelting works in c. y. (811); machinery employed in the reduction of lead ores (820); relation of product to lead ore consumed (820).
Nickel. Statistics of the production of, in c. y. (843, 850-857).
Nickel and cobalt matte. Statistics of the production of, in c. y. (844, 850-851).
Zinc. Average cost of materials, labor, etc., per ton of, in c. y. (824); percentage of capital employed in c. y. (824); per cent. of the total product of zinc obtained in c. y. (824); representation of the furnace plant of the zinc-smelters in c. y. (824); statistics of zinc-smelting works in c. y. (821).
Adair county. Coal (bituminous), statistics of the production of in c. y. (658-661).
Audrain county. Coal (bituminous), statistics of the production of, in c. y. (658-661).
Barton county. Coal (bituminous), statistics of the production of, in c. y. (658-661).
Bates county. Coal (bituminous), statistics of the production of, in c. y. (658-661).
MISSOURI—Continued.
Boone county. Coal (bituminous), statistics of the production of, in c. y. (658-661).
Carroll county. Coal (bituminous), statistics of the production of, in c. y. (658-661).
Callaway county. Coal (bituminous), statistics of the production of, in c. y. (658-661).
Cass county. Coal (bituminous), statistics of the production of, in c. y. (658-661).
Cedar county. Coal (bituminous), statistics of the production of, in c. y. (658-661).
Chariton county. Coal (bituminous), statistics of the production of, in c. y. (658-661).
Christian county. Lead and zinc ore, statistics of the production of, in c. y. (804-805).
Cole county. Coal (bituminous), statistics of the production of, in c. y. (658-661); lead and zinc ore, statistics of the production of, in c. y. (804-805).
Cooper county. Coal (bituminous), statistics of the production of, in c. y. (658-661).
Crawford county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 c); statistics of the production of iron ore in, in c. y. (48-51); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 b). Iron-ore mines: Cherry Valley mine; H. (s); one sample: c.; two samples: Fe,P. (418 c, 548 b, 592). Clark mine; H. (s); one sample: Fe,P). 418 a, 548 b). Iron Ridge mine; H.; one sample: Fe,P. (417 a, 548 b). Marsh mine, H.; one sample: Fe,P. (417 c, 548 c). McGarvey mine; H.; one sample: Fe,P. (419 d, 548 c). Merimec Iron Mining Co.'s mine; product of iron ore in c. y. and its value and the number of employés (75 d). Railroad mine; H. (s); one sample: Fe,P. (48 a, 548 b). Scotia mine; disturbance of the ore-bodies in the; section (12). (No. 1) mine; H. (s); one sample: Fe,P. (418 f, 548 c). Zane mine; H.; one sample: Fe,P. (417 e, 548 b).
Dade county. Coal (bituminous), statistics of the production of, in c. y. (658-661). Iron ore, statistics of the production of iron ore in c. y. (48-51). Lead and zinc, statistics of the production of, in c. y. (804-805).
Dent county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 c); statistics of the production of, in c. y. (48-51); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 b). Iron-ore mines: Fitzwater mine; H. (s); one sample: Fe,P. (413 a, 548 f). Hawkins mine; H.; one sample: Fe,P. (414 f, 548 c). Milsap and Orchard mine; H. (s); two samples: Fe,P. (410 b, 548 c). Nova Scotia (furnace) mine; H. (s); two samples: Fe,P. (408 b, 548 f). Pomeroy mine; H. (s); one sample: Fe,P. (410 c, 548 c). Riverside mine; H.(s); two samples: c. (409 b, 548 f, 529). Simmons Mountain mine; H. (s); one sample: Fe,P. (409 f, 548 c). Sligo Furnace mine; H.; two samples: Fe,P. (411 d, 548 f). Thomas mine; H.; one sample: Fe,P. (411 a, 548 c). Watkins mine; H.; one sample: Fe,P.,S. (413 b, 548 c).
Franklin county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 c); statistics of the production of iron ore in, in c. y. (48-51). Lead and zinc, statistics of the production of, in c. y. (804-805). Iron-ore mines: Saint Clair or Busket mine; H. (s); two samples: Fe, P. (420 a, 548 b). Staunton mine; H.; two samples: Fe,P. (419 f, 548 a).
Gasconade county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 c); statistics of the production of, in, in c. y. (48-51).
Greene county. Lead and zinc ore, statistics of the production of, in, in c. y. (804-805).
Henry county. Coal (bituminous), statistics of the production of, in, in c. y. (658-661).
Iron county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 c); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 b); statistics of the production of, in c. y. (48-51). Iron ore mines: Cedar Hill mine; H.(s); one sample: Fe,P. (407 a, 548 c). Pilot Knob mine; H.(s); two samples: c.; one sample: Fe,P.(S) (405 a, 548 c, 591, 592); product of iron ore in c. y. and its value and the number of employés (75 d). Shepherd Mountain mine; H.(s); one sample: c. (406 c, 548 c, 591).
Jasper county. Lead and zinc ore, statistics of the production of, in c. y. (804-805).
Jefferson county. Lead and zinc ore, statistics of the production of, in c. y. (804-805).
Johnson county. Coal (bituminous), statistics of the production of, in c. y. 658-661).
La Fayette county. Coal (bituminous), statistics of the production of, in c. y. (658-661).
Lincoln county. Coal (bituminous), statistics of the production of, in c. y. (658-661).

MISSOURI—Continued.

Linn county. Coal (bituminous), statistics of the production of, in c. y. (658-661).

Livingston county. Coal (bituminous), statistics of the production of, in c. y. (658-661).

Macon county. Coal (bituminous), statistics of the production of, in c. y. (658-661).

Madison county. Lead and zinc ore, statistics of the production of, in c. y. (804-805); nickel, statistics of the production of, in c. y. (843).

Moniteau county. Coal (bituminous), statistics of the production of, in c. y. (658-661); lead and zinc ore, statistics of the production of, in c. y. (804-805).

Monroe county. Coal (bituminous), statistics of the production of, in c. y (658-661).

Newton county. Lead and zinc ore, statistics of the production of, in c. y. (804-805).

Morgan county. Lead and zinc ore, statistics of the production of, in c. y (804-805).

Nodaway county. Coal (bituminous), statistics of the production of, in c. y. (658-661).

Phelps county. Iron ore: Amount of each kind of ore mined in, in the c. y. (24 d); statistics of the production of iron ore in, in c. y. (48-51). Iron-ore mines: Brady mine (see Smith mine); H.; one sample: Fe,P. (414 a, 548 d). Clinton mine; H.; one sample: Fe,P. (414 a, 548 d). Grand Union and Mozelle mine; H.(s); three samples: Fe,P.(Cu) (415 f, 548 d). Horse Hollow mine; H.; one sample: Fe,P. (415 d, 548 d). Lamb mine; H.; one sample: Fe,P. (413 d, 548 d). Old Maramec mine; H.; one sample: Fe,P. (415 a, 548 d). Ozark mine; H.(s); one sample: Fe,P. (415 c, 548 d). Reed mine (see Grand Union mines) (415 f, 548 f). Stimson mine; H.; one sample: Fe,P. (414 d, 548 d).

Platte county. Coal (bituminous), statistics of the production of, in c. y. (658-661).

Putnam county. Coal (bituminous), statistics of the production of, in c. y. (658-661).

Ralls county. Coal (bituminous), statistics of the production of, in c. y. (658-661).

Randolph county. Coal (bituminous), statistics of the production of, in c. y (658-661).

Ray county. Coal (bituminous), statistics of the production of, in c. y. (658-661).

Saint Charles county. Coal (bituminous), statistics of the production of, in c. y. (658-661).

Saint Clair county. Coal (bituminous), statistics of the production of, in c. y. (658-661).

Saint François county. Iron ore, amount of each kind of iron ore mined in, in the c. y. (24 c). Iron-ore mines: Iron Mountain mine, product of iron ore in c. y. and its value and the number of employés (75 d); rank among counties producing over 100,000 tons of iron ore in c. y. (75 a); statistics of the production of, in c. y. (48-51); character and position of the ores of (9 c); product of, in 1880 (9 f); H.(s); five samples: Fe,P. (403 c, 548 c). Lead and zinc ore, statistics of the production of, in c. y. (804-805). Nickel, statistics of the production of, in c. y. (843). Nickel and cobalt matte, statistics of the production of, in c. y. (844).

Saint Genevieve county. Copper ore, statistics of the production of, in c. y. (798-799).

Saint Louis county. Iron-ore mines: Missouri Furnace Company's mine; H.(s) one sample: Fe,P. (420 f, 548 c).

Saline county. Coal (bituminous), statistics of the production of, in, in c. y. (658-661).

Schuyler county. Coal (bituminous), statistics of the production of, in c. y. (658-661).

Sullivan county. Coal (bituminous), statistics of the production of, in c. y. (656-661.)

Vernon county. Coal (bituminous), statistics of the production of, in c. y. (658-651).

Washington county. Barytes, statistics of the production of, in c. y. (839). Iron ore: Amount of each kind of iron ore mined in the c. y. (24 d); statistics of the production of, in c. y. (48-51). Lead and zinc ore, statistics of the production of, in c. y. (804-806).

Wright county. Lead and zinc ore, statistics of the production of, in c. y. (804-805).

MONTANA.

Belt Butte, on Belt creek. Section of (742 f).

Belt creek. Mica-augite-trachyte of (723 b).

Belt mountains, at head of South fork of the Musselshell (741 a).

Big Belt range. An elliptical anticlinal of Paleozoic slates cut by granite dikes (705 e); distortions of this anticlinal; these slates form greater part of mountains (705 f); presumed structure of eastern flank; of western flank; "wash" of recent date; southerly extent of the slate anticlinal (706 a); a synclinal eastward; forming summits; extent of same; resemblance to Pennsylvania structure (706 b); lower quartzites and limestones west of slate anticlinal; extent of (706 c); their structure north of Boulder creek (706 d); slates of Boulder Creek valley; of Benton gulch; of Smith's river; probability of a fault between mountain center and Benton gulch (706 e); its character and effects; an unbroken monoclinal, equivalent of the slates farther north; measurement of series; cut off on north by fault at Dry Creek range; extent of displacement (706 f); increasingly persistent easterly strike on northern slope of valley next beyond quartzites (707 a); intrusive granitic rocks in central part of anticlinal; their effects; characterized by quartz and feldspar crystals; diabase weathering into soil on margin of mountains; near Grenson and Boulder creeks (707 b); benches in basins of Deep and Boulder creeks; bench south of Diamond City (707 c); well preserved lateral moraine; its height above valley bottom (707 d).

Birdtail mountains. Eruptive rocks of (730 f).

Bozeman coal-field (746 b); analyses of coal from (780-783); horizon of its coals (698 c); its coal-seams (748 c); section of its strata (747 a); list of its fossils (747 c).

Bridger range at Flathead pass. Structural section across (700, sec. 2, 701 d); geological structure of (705 b); topographical form and extent of (705 b); structural relations of Paleozoic, Archæan, and Mesozoic rocks of (705 b); local anticlinals and synclinals observed by Hayden; supposed heavy fault in; reasons for it (705 c); overthrow of Carboniferous and Mesozoic at Flathead pass (705 c); valleys separating foothills from range; creeks flowing in them; age of foothills doubtful (705 d); change of dip and strike between range and foothills (705 e); Bridger uplift contemporaneous with that of other central Montana ranges—after represented epochs of Cretaceous (705 e).

Bull Mountain coal-field (753 c); analyses of coals from (782-785); physical characteristics of its coal (754 f).

Bull mountains. Topography of (753 d).

Cambrian series in Rocky Mountain range in Montana (719 c).

Cadotte's pass, over main range, section (structural) (700, sec. 8, 703 b).

Carboniferous limestone in Rocky Mountain range in Montana (720 a, 721).

Central: Cambrian in (697 c); Archæan in (697 c); Cretaceous in (698 a); in Cretaceous, Tertiary, and Post-Tertiary times (704 b); horizon of its coals (697; Jurassic in (698 a); Lower Carboniferous in (697 c); Mesozoic series in (697 f); mountain structures in (703-712); Potsdam limestone in (697 d); Quaternary in (698 a); Tertiary in (698 a).

Analyses of coals and lignites of (779-789); elementary composition of coals and lignites (790); Bozeman coal-field, analyses of coals (780-782); Bull Mountain coal-field, analyses of coals (782-785); Rock Creek coal-fields, analyses of coals (784-787); Gallatin Valley coal-field, analyses of coals (786, 787); Hell Gate, Missoula river, coal, analyses of (786, 787); Gardiner coal-field, analyses of coals (786, 787); Flathead river coal, analyses of (786, 787); Sun river coal, analyses of (786, 787); eastern Montana, analyses of coals (786, 787); Judith Basin coal-field, analyses of coals (784, 785).

Coal of Bozeman coal-field, Montana, its physical characteristics (756 d); of Bull Mountain coal-field, Montana, its physical characteristics (754 f); horizon of, in Bozeman coal-field, Montana (698 c); of Montana, horizon of (697).

Coal-fields, of Montana, by George H. Eldridge (739); general topography of (739, 740); Bozeman, coal-field (746 b); Bull mountain, coal-field (753 c); Gardiner river, coal-field (754 b); northern, coal-field (751 b); Rock creek, coal-field (755 d); coal-seams of Bozeman coal-field, Montana (748 c).

Colorado series in Montana (743 d).

Copper. Statistics of the production of, in c. y. (800).

Crazy mountains, eruptive rocks of (700, sec. 2, 701 e, 737 a).

Cretaceous formation in Montana, probable thickness of (746 a); fossils of central Montana (713 d, 714 c, 718 b); in Rocky Mountain range in Montana (719 c); in central Montana (698 a).

Dearborn district, Montana, eruptive rocks of (731 e); hornblende-andesite of (732 c); hornblende-dacite of (732 d); liparite of (732 a).

Dearborn river (Middle fork), Montana, section (columnar) (698 c, 699, sec. 8).

Diabase (quartz) of Big Belt mountains, Montana (735 c).

Drainage of Big Belt range, Montana (707 c); of Highwood mountains, Montana (710 b); of Little Belt mountains, Montana (709 d); of Rocky mountains (main range, over Cadotte's pass, Montana (712 d).

Eruptive rocks. By Waldemar Lindgren (719); of Montana, age of, résumé (737 b); of Big Belt range, Montana (707 a); of Big Belt mountains, Mon.

MONTANA—Continued.
Eruptive rocks—Continued.
tana (734 d); of Birdtail mountains, Montana (730 f); of the Crazy mountains, Montana (737 a); in Crazy mountains, Montana (709, sec. 2, 701 c); of Dearborn district, Montana (731 e); of Highwood mountains, Montana (724 c); in Little Belt mountains, Montana (700, sec. 4, 702 d, 709 c); in front of main range of Rocky mountains, northern Montana, southwest of Fort Benton (730); of Mullen pass and Jefferson county, Montana (733 b); of Mullen pass, Little Blackfoot river, Montana (703 d); in Rocky mountains (main range over Cadotte's pass), Montana (711 c); of Sun River district, Montana (730 c).
Flathead pass (see Bridger range).
Flathead river, analyses of coals from (786, 787).
Fault-line at base of Rocky mountains in Montana (720 d, 731 f).
Fort Benton series in Montana, section (742 f).
Fossils from central Montana, Alphabetical list of: Allorisma (715 d, f). Ammonites, cordiformis, var. *distans* (713 f); ? imprint of (718 b). Anomia (744 c); gryphorynchus (745 a); micronema (745 a). *Astarte Packardi*, allied to (714 b). Athyris (714 e, 716 c, 717 c); hirsuta (716 d, f, 717 c, 718 c); or Nucleospira (718 d); like *planosulcata* (717 a); subtilita (714 c); like it 717 a); sublamellosa (715 c); like it (717 c); trinucleata (715 f). *Atrypa reticularis* (715 e). Aviculopecten (715 d). Baculites (744 d). Belemnite 714 d). Bellerophon (716 c, 717 c); Bivalves (714 d). Bryozoans (714 c). Bulimus (744 c, f); longiusculus (745 a, b); subelongatus (745 e). Camptonectes bellistriata (713 e, 714 d); extenuatus ? (713 e, 718 c). Chætetes (717 d, 718 b). Chonetes (715 a, 717 c); Illinoisensis (714 e, 716 b, c, e, 717 c, f); planumbona (717 a); like it (715 b, 716 f, 717 c); like *setigera* (717 f). Colemenateres (745 f). Conocephalites (715 c, 717 d, e, f); like *minor* (715 f). Conophyllum, like *C. Sedaliensis* (714 b). Corbicula (744 c, d); cytheriformis (745 a). Corbula (744 c, d); perundata (745 a); subtrigonalis (745 a, b); undifera (745 b); sp.? (714 a). Crepicephalus (717 f). Crinoids, fragments (714 e, 715 b, d, 716 e, 733 d). Cyathophylloid coral (717 b). Cyathoxonia (715 c). Dikellocephalus (717 e). Echinoid, new form (714 b). Entolium (718 e). Eumetria Verneuiliana (715 b, d, 716 b, d, e, f). Euomphalus (715 e, 717 b); laxus (716 f); like it (718 d). Exogyra (714 c); *costata ?* (714 c, 747 d). Favosites (717 d). Fenestella (714 e, 716 e, 717 d, 718 e, d). Fenestelloids (717 c). Gervillia, sp. nov. Montanensis (713 e), Glauconome (715 d, 716 e, 718 c, d). Glycimeris Berthoudi (714 c, 747 d). Goniobasis (744 c, f, 745 a); Endlichi (745 b); tenuicarinata (745 b, e). Goniomya Montanensis (714 a); allied to, sp. nov. (714 a); allied to, gen. and sp. nov. (714 b). Grammatodon inornatus (713 f, 714 b). Gryphæa (713 e, 714 d, 747 c); like *vesicularis* (714 c, 747 d). Gyrodes depressa (714 d, 747 d). Helix (744 c, 745 b); vetusta ? (745 a). Homomya ?, sp. nov. (713 f). Hyolithes, like *gregarius* (717 f); primordialis (717 f). Inoceramus, sp. nov., doubtful sp. (718 a); fragments, problematicus, umbonatus, undabundus (713 e, 714 c, 747 c). Lingula (715 e). Lithostrotion (715 c, 717 b). Loxonema (716 f). Lucina, sp. nov. (713 f). Mactra *Siouxensis*, like it (714 c, 747 d); Warrenana (744 d). Martinia lineata (716 f). Melania (745 a). Michelina expansa (715 f). Mytilus Whitii (713 f). Natica (714 c); Naticopsis or Euomphalus (717 b); Naticopsis (714 b); depressa (714 d, 747 d). Nucleospira (718 d). *Obolella* (715 e). Orthis (715 c); dubia (717 e); Michelina (714 f, 715 f, 717 f); like it (715 b, d, e, 717 d). Ostrea (714 c, 744 c, f), or Gryphæa (714 d, 713 e, 747 c); or Exogyra (714 c); congesta (718 a, b, 714 c, d, 747 c); glabra (744 d, 745 a); strigilecula (713 f, 714 c, 718 c, 747 d). *Oxytoma mucronata* (718 b). Panopea or Glycimeris (714 d, 747 d). Pecten 713 f); Pectenoid shell (718 e). Pentacrinites asteriscus (718 f). Perna (713 e); like it (713 f). Pholadomya Berthoudi (714 d, 747 e); Kingi (713 f). Physa (744 c); Bridgerensis (745 a); felix (745 b). Pinna, sp. nov. (713 f); Lakesi (714 b); Lakesi ? (747 d). Polypora (716 e). Pseudomonotis curta (718 e). Pteria, like *linguiformis* (714 d, 747 e); sp.? (747 e). Placentaceras placenta, var. intercalaris (744 d, 759 f). Platyceras (716 d); acutirostris (715 c, 717 b); like it (714 f); like *ammon* (718 c); like *symmetricus* (715 c). Platycrinus (714 e, 716 b, e, 717 f). Pleuromya subcompressa (713 f). Pleurotomaria (716 d). Productus (715 a, b, 716 a, c, 717 a); like bimesialis (718 b, c); like *elegans* (714 f); like *hirsutus* (714 f, 715 f); like *Indianensis* (715 c); like *Nebrascensis* (715 a, b, 716 d, f, 717 c); pileiformis (716 d, e, 718 b); Prattenanus (716 f); Rogersi (714 f); semireticulatus (715 e, 716 c, d, e, f, 717 c, 718 b); like it (715 c, 718 d); like *Shumardi* (718 d); like *spinulicosta* (715 e); tenuicostatus (715 e, f). Retzia punctulifera (715 d). Rhynchonella (716 d, 717 b, e, d, e); mutata (714 e, 715 a, d, 716 b, 717 d, e, 718 c, d). Schizodus (715 d). *Sphæriola* 718 b). Sphærium (744 f); formosum (745 b); subellipticum (745 a). Spirifera, centronata (714 b, e, f, 715 b, e, 716 a, b, d, f, 717 e, f, 718 c, d, e, 723 d); like it (717 d); lineata (714 f, 716 f); like it (718 c); planoconvexa (718 c, 716 f); pseudolineata (715 c, 718 c); like it (716 d): Rockymontana (714 c, 717 b); Rockymontana ? (714 b); like *S. Rockymontana* (714 e, 717 b); setigera (714 f, 715 b, c, 716 b, c, d, e. 718 c, d); striata (714 f,

MONTANA—Continued.
Fossils from central Montana, etc.—Continued.
715 c, 717 e, 718 c, e); like it (717 a); like *S. scobinata* (718 d); possibly dorsal valve of a *Syringothyris* (717 b). Spiriferina centronata (717 c); perhaps *S. Kentuckensis* (717 d); spinosa (714 c, 716 b, c, f, 717 c); perhaps it (717 d). Stictopora (714 c, 715 a, d, e, 717 c). Streptorhynchus (714 b, f, 715 b, e, 716 d, 717 b, d); crassum (716 f); like it (716 e, 718 c); resemb. *S. Chemungensis* (715 f, 716 a, b, e, 717 c, e). Strophomena rhomboidalis (715 d, e, 716 e, 718 d). Syncyclonema (718 e). Syringopora (714 b, e, 717 a, e). Tancredia ? sp. undes. (713 f, 718 f). Tellina, like it, gen. and sp. nov. (713 f). Terebratula formosa (716 c, f, 717 b, c, 718 c); like *inornata* (718 e); turgida (715 b, d, f); like it (717 c). Trematopora (715 b, 717 c). Trigonia, sp. nov. Montanensis (714 a). Trilobites (715 c, 717 f). Tulotoma Thompsoni (745 b). Turritella, like it (714 c, 747 e). *Unio* (718 b, 744 c); Conesii (745 a). Viviparus Conradi (745 a, b). Volsella subimbricata (713 f); laticostata (745 a). Zaphrentis (715 d, 716 c, e, 717 b, c, d, 718 b, c).
Fossils from central Montana. Remarks on, by R. P. Whitfield (712, 713).
Gallatin Valley coal-field, analyses of coals from (786–787).
Gardiner coal-field (756 b), analyses of coals from (786–787).
Glacial action in Big Belt range (707 d).
Geological structure of the Big Belt range (705 e); of the Bridger range (705 b); of Highwood mountains (709 f); of Little Belt mountains (707 c); of the Rocky mountains (main range, over Cadotte's pass), and of the plains (710 c).
Geology, general, of Rocky mountains in (719 d).
Hell gate, Missoula river, analyses of coals from (786, 787).
Highwood mountains. Extent and configuration; consist of slates or slaty sandstones; cut by dikes; these described (709 f); volcanic conglomerate southeast of pass (710 a); analyses of analcite (noscan) from, and comparison (728 d, 729 a); augite-trachytes of (726 a); basalts (analcite-noscan) of (727 c): drainage of (710 b); eruptive rocks (700, sec. 4, 702 d, 709 f, 724 c); geological structure of (709 f); sanidinite of (725 f); trachytes of (725 d); volcanic conglomerate (725 b).
Hornblende-andecite of Big Belt mountains (735 d); of Dearborn district (732 c).
Hornblende dacite. Contact of, with carboniferous limestones on Tillinghast creek; sketch and section (721); contact of, with Silurian ? limestone on Tillinghast creek, Little Belt mountains; section (722); of Dearborn district (732 d); of Tillinghast creek, Little Belt mountain, lithology of (722 c).
Hornblende granitite of Mullen pass and Jefferson county (733 b).
Jefferson county, eruptive rocks of (733 b).
Judith mountains, three miles southwest of Maiden, section of (741 d).
Jurassic of central Montana (698 a), fossils of (713 d, 714 d, 778 e).
Laramie series in Rocky Mountain range in (719 e); series, section of, near crossing of road from Dry creek to White Sulphur springs (736 c); conglomerate near Bozeman coal field (736 c); thickness of, near Livingston (736 c); notes on, by Waldemar Lindgren (743 f); estimated thickness of in Montana (743 f, 744 f, 745 f); in Montana (744 b, 745, 757 b); Fort Benton, series in Montana, section (742 f); Colorado, series in Montana (743 d).
Laurentian gneiss in Rocky Mountain range in (719 e).
Liparite of Mullen pass and Jefferson county (733 b); of Sixteen-mile Creek basin (736 c); of Dearborn district (732 a).
Little Belt mountains, section (columnar) (698 e, 699, sec. 4); drainage of (709 d); eruptive rocks of (720 d); its extent; observations confined to western part; geological structure on Belt creek (707 c); Mesozoic and Paleozoic strata probably once continuous across region; effect of erosion; the limestones worn away to Sheep's creek and below Neihart; quartzite exposed; structure produced by igneous extrusions (707 f); detail description of section 4 (708 a, 709 b); probable faults in quartzite (708 c); exposures of quartzite in gorge of O'Brien's creek; overlying Archæan gneiss unconformably (708 d); character of the gneiss; occurrence of intrusive granite (708 e); limestone series on Belt creek and Dry fork (708 f); thickness of Cambrian quartzites and limestones; of Carboniferous rocks (708 a); Carboniferous, surrounded by Jurassic and Cretaceous; dome structure (708 b); massive intrusive dacite; forming mountains (708 c); of post-Carboniferous age (708 d); Otter creek, section (structural) (700, sec. 5, 702 c); west of Barker, structural section (700, sec. 4, 702 c, 708 a, 709 b).
Lower Carboniferous in central Montana (697 e); fossils of central Montana (712, 714 b, 715 c, 716, 717 d, 718 b); rocks of Mullen pass, Little Blackfoot river (703 d).
Mesozoic series in central Montana (697 f).
Mica-augite-trachyte of Belt creek (723 b).
Mountain structure in central Montana (703, 712).
Muir, south of, section (columnar) (698 e, 699, sec. 1, A).

MONTANA—Continued.
Mullen pass; eruptive rocks of (733 b); head of Little Blackfoot river; eruptive and Lower Carboniferous rocks (703 d).
Porphyrite (hornblende) of Big Belt mountains (735 b); (quartz) of Big Belt mountains (735 a); (quartz-augite) of Big Belt mountains (734 f).
Potsdam fossils of central (712 f, 715 c, 717 d); limestones in central (697 d).
Quaternary in central (698 a).
Relation of the coal of, to the older rocks, by W. M. Davis (697-701).
Rock Creek coal-field (755 d); analyses of coals from (784-787).
Rocky mountains (main range, over Cadotte's pass), geological structure (710 c); extinct river system (710 d); later river system (710 d); arrested elevation shown by "bench" on Missouri; none on the Teton; "The breaks," how formed (710 c); amount of erosion in Highwood and Crazy mountains, estimated (710 f); drift of pebbles and bowlders on the plains described and classified (710 f, 711 a); horizontal strata beyond Sun river; basaltic eruptives near Fort Shaw; thickness, overlying horizontal Cretaceous beds, and originating in Cretaceous times (711 c); form of the dikes; size; effect in retarding erosion (711 d); estimated amount of denudation; origin of present smooth surface (711 e); conclusion drawn from bowlders from northeast; decrease of eruptives after passing Dearborn river; faulting probable (711 f); general theory of mountain structure here (712 a); Cambrian strata about Cadotte's pass; main range a synclinal of oldest bedded rocks, broken by faults along axis (712 c); glacial action on (712 d); drainage of (710 d, 712 d); main range, northern Montana, eruptive rocks from front of (730 c); Cambrian series in (719 c); Carboniferous limestone in (720 a, 721); Cretaceous series in (719 c); fault-line in base of (720 d, 731 f); general geology of, in Montana (719 d); general topography of, in Montana (719 b); Laramie series in (719 c); Laurentian gneiss of (719 c).
Sanidinite of Highwood mountains (725 f).
Section at Belt Butte on Belt creek (742 f); at Benton gulch (columnar) (698 c, 699, sec. 6); at Flathead pass (columnar) (698 c, 699, sec. 2); of Laramie series near crossing of road from Dog creek to White Sulphur springs (736 c); of Little belt mountains (columnar) (698 c, 699, sec, 4); at Middle fork of Dearborn river (columnar) (698 c, 699, sec. 8); at Otter creek (columnar) (698 c, 699, sec. 5); south of Muir (columnar) (698 c, 699, sec. 1 A); of Wall mountain (columnar) (698 c, 699, sec. 3); of Yellowstone, Lower cañon (columnar) (698 c, 699, sec. 1); of Belt mountains at head of South fork of the Musselshell (741 a); of Cretaceous strata under coal of Judith basin (751 c); of the Judith mountains, 3 miles SW. of Maiden (741 d); (structural), across Bridger range, at Flathead pass (700, sec. 2, 701 d); (structural), Big Belt range at Boulder creek (700, sec. 7, 703 a); (structural), Cadotte's pass, over Main range (700, sec. 8, 703 b); (structural), Little Belt mountains, Otter creek, 5 miles northeast of Barker (700, sec. 5, 702 c); (structural), of Little Belt mountains west of Barker (700, sec. 4, 702 c, 708 a-709 b); (structural), northward from Benton gulch, northeast of Big Belt range (700, sec. 6, 702 f); (structural), through Lower Yellowstone cañon (700, sec. 1, 701 c); (structural), Wall mountain to Deep creek, south end of Big Belt range (700, sec. 3, 701 f); from Lower Yellowstone cañon to the prairie (740 d).
Tertiary in central Montana (698 a).
Topography, general, of the Montana coal-fields (739, 740 c); general, of the Rocky mountains (719 b); of Bull mountains (753 d).
Trachytes of Highwood mountains (725 d).
Volcanic conglomerate of Highwood mountains (725 b).
Sixteen-Mile creek, rocks of (730 c).
Sun River district. Eruptive rocks of (730 c); analyses of coals from (786, 787).
Tillinghast creek, Little Belt mountains. Contact of hornblende-dacite with Carboniferous limestones, sketch and section (721); contact of hornblende-dacite with Silurian? limestone, section (722); lithology of its hornblende-dacite (722 c).
Wall mountain, section (columnar) (698 c, 699, sec. 3); to Deep creek, south end of Big Belt range, structural section (700, sec. 3, 701 f).
Moore, P. N., in Geological Survey of Kentucky, division of iron ores of Hanging Rock region of Kentucky (293 c); on age of ore deposit of Lambert mine, Carter county, Kentucky (296 f, 297 a).

N.

NEBRASKA.
Coal (bituminous), statistics of the production of, in c. y. (662-665, 674-675).
Pawnee county. Coal (bituminous), statistics of the production of, in c. y. (662-665).
Copper. Statistics of the production of, in c. y. (800).
NEVADA.
Iron ore. Partial analyses of (550-551).
Mineral soap. Statistics of the production of, in c. y. (843, 850-851).
NEVADA—Continued.
Elko county. Mineral soap, statistics of the production of, in c. y. (843).
Humboldt county. Iron-ore mines: Jackson Mountains; M.; one sample: Fe, P. (493 a, 550 a).
Newberry, J. H., on horizon of Mineral Ridge blackband ore (238).
New England, mica mines of, by N. S. Shaler (832-836); Northern, notes on the samples of iron ore collected in (79-82); Southwestern, map showing location of iron mines east of the Hudson river (83).
NEW JERSEY.
State geologist, annual report of, reference to account of Pochuck mine, Warren county, in (177 a); mention of limonite deposits in (176 b).
Glass-sand. Statistics of the production of, in c. y. (840, 848-849).
Infusorial earth. Statistics of the production of, in c. y. (841, 848-849).
Iron. Amount in ore mined in c. y. and its per cent. of total iron in the United States iron-ore product (19 c); amount of iron in the different kinds and grades of ore mined in, in the c. y. (28 c); iron, average per cent. of iron in ore mined in c. y. (19 c).
Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 c); to total amount of ore (74 c).
Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 c, 74 c); average value per ton (19 d); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23); amount of each kind of ore mined in each county in the c. y. (24 d); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (28 a); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 c, 30 b); relative tonnage and spot value of iron ore produced in (29 c); product in c. y. and its value and the number of employés in the mines (75 d); production of iron mines 1880-1885 (34 a); royalty paid on each kind of ore mined in c. y. (31 c).
Iron ore. Statistics of the production of, in c. y. (48-57, 64-69); general averages of these statistics (70, 71).
Iron ore. Bessemer, amount of each kind mined in c. y. (30 c); its per cent. of the Bessemer ore-product of the United States (30 c); phosphorus-iron ratio in (6 c); rank of the state in the proportion of Bessemer to non-Bessemer ore produced (29 c); proportion of Bessemer ore produced in the state (31 a).
Iron ores. Partial analyses of (550-553); complete analyses of (593); character of (6 a).
Iron ores. Notes on the samples of, collected in New Jersey, by Bayard T. Putnam (145-177); MAGNETIC ORES (145 c): geological map of New Jersey (146); diagrams showing the structure of the ore-beds (147, 148 a); Pequest belt (149): map of New Jersey, showing location of iron mines (150); Warren county (149 c); Sussex county (151 b); Musconetcong belt: Sussex county (154 d); Morris county (156 a); Hunterdon county (162 b); Passaic belt: map of a group of mines near Dover (163); Hunterdon county (164 c); Morris county (164 e); Passaic county (175 f); Ramapo belt: Morris county (176 a); LIMONITE: Warren county (176 b); Hunterdon county (176); Warren county (176 f); Sussex county (177 a).
Lead and zinc ore. Statistics of the production of, in c. y. (804-805, 806).
Ocher. Statistics of the production of, in c. y. (844, 850-851).
Bergen county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 d); statistics of the production of iron ore in, in c. y. (48-51). Iron-ore mines: Butler mine mentioned (175 f).
Camden county. Glass-sand, statistics of the production of, in c. y. (840).
Cumberland county. Glass-sand, statistics of the production of, in c. y. (840).
Gloucester county. Glass-sand, statistics of the production of, in c. y. (840).
Hunterdon county. Iron ore: Amount of each kind of iron ore mined in, in c. y. (24 d); statistics of the production of iron ore in, in c. y. (48-51); limonite mines in, described (176 c). Iron-ore mines: Annandale mine mentioned (164 c). Asbury mine mentioned (162 c). Case mine mentioned (162 c). Church or Van Syckles' mine mentioned (162 c). Cregar mine mentioned (164 c). Dafford mine mentioned (176 c). Eveland mine mentioned (162 c). Gray mine mentioned (162 b). Hager mine described (164 a); M.; one sample: Fe, P, S. (164 b, 552 f). High Bridge mine described (164 c); M.; one sample: Fe, P, S. (164 d, 552 f). Large's mine mentioned (164 c); M.; one sample; Fe, S, P. (165 d). Maberry mine mentioned (162 c). Neighbor mine mentioned (176 c). Old Furnace mine mentioned (164 c). Petty mine mentioned (162 c). Pidcock mine mentioned (162 c). Radley mine mentioned (176 c). Rodenburgh mine mentioned (162 c). Silverhorn or Kane mine mentioned (164 c). Swayze mine mentioned (162 d). Turkey Hill or West End mines described (162 d); M.; three samples: Fe, P, S. (162 f, 552 c). Wean mine mentioned (176 c).

NEW JERSEY—Continued.

Monmouth county. Ocher, statistics of the production of in c. y (844).

Morris county. Infusorial earth, statistics of the production of, in c. y. (841). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 d); statistics of the production of iron ore in, in c. y. (48–51); rank among counties producing over 100,000 tons of iron ore in c. y. (75 a); map of a group of iron mines near Dover (163). Iron-ore mines: Allen mine described (171 c); M.; one sample: Fe,P. (171 d, 552 d). Baker mine described (169 e); M.: one sample: Fe,P. (169 f, 552c). Beach Glen mine mentioned (172 f); M.; one sample: Fe,P,Cr (172 f, 552 e). Beach or Montauk mine mentioned (173 f). Beer's mine mentioned (176 a). Black Hill mine mentioned (169 e). Brotherton mine described (168 a); M.; one sample: Fe,P,Ti (168 a, 552 c). Bryant mine described (167 d); M.; two samples: Fe,P,Ti (167 c, 552 b). Bryan mine described (168 b); M.; four samples: Fe,P. (168 b, 552 c). Charlotteburgh mine mentioned (174 d); M.; one sample: Fe,P. (174 d, 552 f). Cobb mine described (174 a); M.; one sample: Fe,P. (174 b). Comb's mine described (166 d); M.; one sample: Fe,P,Ti (166 f, 552 b). Cooper mine mentioned (166 c); M.; one sample: Fe,P,Ti (166 d, 552 c). Dalrymple mine described (166 f, 167 b); M.; two samples: Fe,P,Ti (167 c, 552 c). De Bow mine mentioned (176 a). De Camp or Upper Wood mine described (173 b). De Hart mine described (166 f); see Lawrence and De Hart mine (167 b, 552 c). Denmark Pond mine mentioned (172 c); M.; one sample: Fe,P. (172 e, 552 c). Dickerson mine described (169 c); M.; three samples: Fe,P. (169 d, 552 c). Dodge mine described (156 d); M.; one sample: (156 f, 550 f). Evers mine mentioned (167 c); M.; one sample: Fe,P,Ti (167 f, 552 c). Ford mine described (156 a); M.; one sample: Fe,P. (156 c, 550 f). Glendon Hibernia mine described (173 b); product of iron ore in c. y. and its value and the number of employés (75 d); M.; one sample: Fe,P. (173 d, 552 c). Gove mine mentioned (161 c). Green Pond mine described (174 b); M.; one sample: Fe,P. (174 c, 552 f). Hacklebarney mine described (164 f); M.; ten samples: Fe,P,S. (164 f, 165 f, 550 f, 552 a). Hann mine mentioned (162 b). Hibernia mines described (173 a); M.; five samples: Fe,P. (173 c, 552 c). Hickory Hill mine; M.; one sample: Fe,P. (172 d, 552 c). High Ledge mine mentioned (161 c). Huff mine mentioned (170 c). Hurd mine described (170 b); M.; one sample: Fe,P. (170 b, 552 d). Hurd or Hurdtown mine described (157 c); see, of (5); M.; one sample: c. (157 f, 550 f, 593). Irondale mines described (170 a). Kahart mine mentioned (176 a). King mine mentioned (161 c, 167 c). Lawrence and De Hart mine; M.; two samples: Fe, P., Ti (167 b, 552 c). Lawrence mine described (166 f). Lower Wood or Andover (Hibernia) mine described (173 a); M.; one sample: Fe, P. (173 d, 552 c). Millon mine described (168 f); N.; one sample: Fe,P. (169 a). Mount Hope mines described (171 f); M.; four samples; Fe,P. (172 a, 172 c, 552 d); product of iron ore in c. y. and its value and the number of employés (75 d). Mount Olive mine described (161 d); M.; two samples: Fe,S,P. (161 c, 550 f). Mount Pleasant mine mentioned (170 f); M.; one sample: Fe,P. (171 a, 552 d). Orchard mine described (170 d); M.; one sample: Fe,P. (170 c, 552 d). Pitney Farm mine mentioned (161 c); M.; one sample: Fe,S,P. (164 f, 552 b). Randall Hill mine described (169 a); M.; one sample: Fe,P. (169 c, 552 c). Richard's mine described (171 b); M.; three samples: Fe,P. (171 c, 552 d). Rockaway Valley or De Camp mine mentioned (174 c). Samson mine described (166 b); M.; one sample: Fe,P,S. (166 c, 552 c). Scofield mine mentioned (156 d). Scott (Hibernia) mine described (173 b); M.; two samples: Fe,P. (173 c). Scrub Oak mine mentioned (170 a). Sickles mine described (158 a). Skellenger Farm mine mentioned (166 f). Splitrock Pond mine mentioned (174 b). Sterling mine described (170 a); M.; one sample: Fe,P. (170 b, 552 c). Stoutenburgh mine described (161 f); M.; one sample: Fe,S,P. (162 b, 550 f). Styles mine; M.; one sample: Fe,P. (166 c, 552 b). Teabo mine described (171 d); M.; one sample: Fe,P. (171 f, 552 d). Topping mine described (166 a); M.; one sample: Fe,P,S. (166 a, 552 b). Washington Forge mine described (170 c); M.; one sample: Fe,P. (170 f, 552 d). Weldon mine described (157 a); M.; one sample: Fe,P,S. (157 b, 550 f). Willis mine described (173 c); M.; one sample: Fe,P. (173 f, 552 c).

Passaic county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 d); statistics of the production of iron ore in, in c. y. (48–51). Iron-ore mines: Brown mine mentioned (175 f). Cannon mine: mentioned (174 f); M.; one sample: Fe,P. (174 f, 550 c). Hewitt mine described (175 d); M.; one sample: Fe,P. (175 d, 550 c). Hope mine described (175 a); two samples: Fe,P. (175 a, 550 c). Peter mine described (174 f); M.; one sample: Fe,P. (174 f, 550 c). Ringwood mines (see Cannon, Peter, Hope, and Hewitt mines) (174 f, 175 a, 550 c). Ringwood mines described; map (174 c, 175).

Salem county. Glass-sand, statistics of the production of, in c. y. (840).

Sussex county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 b); statistics of the production of iron ore in, in c. y. (48–51); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 b). Iron-ore mines: Andover mine described; plan (151 c, 152); see Sulphur Hill mine (151 c, 550 d). Canistear mine described (154 d); M.; one sample: Fe,P,S. (154 c, 550 d). Davenport mine described (155 a); M.; one sample: Fe,P,S. (155 b, 550 c). Furnace Vein mine (see Hill mine) (153 c, 550 d). Green mine mentioned (154 d). Hill (or Furnace vein) mine described (153 d); M.; one sample: Fe,P,S.; one sample: c. (153 c, 550 d, 593). Hude or Stanhope mine described (158 d); M.: one sample; Fe,S,P. (158 f, 550 c). Wright or Budd mine described (158 b). Ogden mines described (154 f). Old Ogden mine mentioned (155 c). Pardee mine described (155 d); M.; one sample: c. (156 c, 550 d, 593). Pike's Peak or Furnace Vein mine described (see Hill mine). Pike's Peak or Stony Brook mine mentioned (174 c). Pochuck mine mentioned (177 a); L.; one sample: Fe,P,S. (177 b). Roberts mine described (155 c); M.; two samples: Fe,P,S. (155 d, 550 c). Roseville mine described (151 a); M.; one sample: Fe,S,P. (151 c, 550 c). Sulphur Hill mine; M.; seven samples: Fe,P,S,Mn,Ti; one sample: c. (151 c, 153 b, 550 d, 593). Sickles's mine; M.; one sample: Fe,S,P. (158 b, 550 c). Wawayanda mine mentioned (154 d). Welling mine mentioned (154 d). Williams' mine mentioned (154 d). Wright or Budd mine; M.; one sample: Fe,S,P. (158 c, 550 c).

Lead and zinc ore. Statistics of the production of, in c. y. ((804, 805).

Warren county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 d). Statistics of the production of iron ore in, in c. y. (48–51); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 b). Iron-ore mines: Bald Pate mine mentioned (159 b); M.; one sample: Fe,P,S, (159 c, 550 c); Brown mine mentioned (176 f); see Shields mine (176 f). Carpenter mine mentioned (176 b). Egbert mine mentioned (158 f); M.; one sample: Fe,S,P, (550 c, 159 a). Jenny Jump mountain, exploration shafts sunk on (149 f). Kishpaugh mine described (149 c); M.; two samples: Fe,P,S,Mn,Ti (149 d, 550 c). New mine shaft described; plan (159 c); M.; four samples: Fe,P,S,Mn,Ti (160 a, 160 c, 550 c). Oxford Furnace mines described (159 c). Rapp mine mentioned (176 b). Riegel mine mentioned (176 b). Shields mine described (176 d); L.; one sample: c. (176 d, 550 c, 593). Staley mine mentioned (159 c). Swayze mine mentioned (177 a). Thomas mine mentioned (176 f); see Shields mine (176 f). Washington mine described (161 a); M.; two samples: Fe,P,S,Mn,Ti (161 b, 550 c). Welch mine mentioned (159 c, 160 c); M.; two samples: Fe,P,S,Mn,Ti (160 f, 550 c).

NEW HAMPSHIRE.

Copper ore. Statistics of the production of, in c. y. (798–799).

Iron ore: Notes on the samples of iron ore collected in, by Edward R. Benton (80). Iron-ore sample *map* of Vermont and part of New Hampshire (81).

Mica. Statistics of the production of, in c. y. (843, 850–851).

Quartz and feldspar. Statistics of the production of, in c. y. (844, 852–853).

Scythe-stones. Statistics of the production of, in c. y. (845, 852–853).

Soapstone. Statistics of the production of, in c. y. (845, 852–853).

Grafton county. Copper, statistics of the production of, in c. y. (789–799); Mica, statistics of the production of, in c. y. (843); Scythe-stones, statistics of the production of, in c. y. (845). Iron ores, partial anayses of (550–551). Iron-ore mines: Franconia mine described (80 a); M.; one sample: Fe,P. (80 b, 550 b).

Hillsborough county. Soapstone, statistics of the production of, in c. y. (845).

NEW MEXICO.

Coal. Analysis of Raton (788–789).

Copper. Statistics of the production of, in c. y. (800).

Iron ores, partial analyses of (552–553).

Colfax county. Maxwell landgrant; M.; one sample: Fe,P. (499 f, 552 f).

Santa Afia county. Union mine; M.; one sample: Fe,P. (499 d, 552 f).

NEW YORK.

Asbestos. Statistics of the production of, in c. y (839, 846–847).

Glass-sand. Statistics of the production of in, in c. y. (840, 848–849).

Graphite. Statistics of the production of, in c. y. (841, 848–849).

Hydraulic cement. Statistics of the production of, in c. y. (841, 848–849).

Hydraulic lime. Statistics of the production of, in c. y. (841, 848, 849).

Iron. Amount in ore mined in c. y. and its per cent. of total iron in the United States' iron-ore product (19 c); amount of iron in the different kinds and grades of ore mined, in the c. y. (28 c); average per cent. of iron in ore mined in c. y. (19 c).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 c); to total amount of ore (74 c).

NEW YORK—Continued.

Iron ore. Amount and value of the c. y.'s product, and their per cent. of the amount and value of the United States' product (19 c, 74 c); average value per ton (19 c); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 b); amount of each kind of ore mined in each county in the c. y. (24 c); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (28 a); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 c, 30 b); average value of ore produced in, compared with New Jersey (20 d); product of iron ore in c. y. and its value and the number of employés in the mines (75 d); royalty paid on each kind of ore mined in c. y. (32 c).

Iron ore. Statistics of the production of, in c. y. (18-51, 64-69); general averages of these statistics (70-71).

Iron ore, Bessemer, amount of each kind mined in c. y. (30 c); proportion of Bessemer ore produced (31 a).

Iron ores. Complete analyses of (593, 594); partial analyses of (554-559).

Iron ores, Archæan, character and disposition of (7 f). Spathic ores (12 f). Clinton hematite ores (13 a).

Iron ores. Notes on the samples of iron ore collected in New York, by Bayard T. Putnam (89-144). *Map* of New York (geologically colored) showing position of iron mines (Plate XXV). MAGNETIC ORES (90); *map* showing location of iron mines in Orange and Putnam counties (90); Orange county (91); Putnam county (95). Washington county: *Map* of a portion of Washington county showing position of iron mines (105 c). Essex and Clinton counties: *Map* of the Lake Champlain iron region (107). Franklin and Saint Lawrence counties (112 c). LIMONITES.—Richmond county (Staten island): Geological *map* of Staten island (123 a); *map* of part of Staten island showing location of iron mines (123 d). Orange county. Dutchess and Columbia counties: *Map* showing location of iron mines east of the Hudson river (128). Columbia county (135). CARBONATE ORE (136). FOSSIL ORE.—Oneida county: *Map* of a portion of, showing position of fossil ore-mines (137); *map* showing the outcrop of the fossil ore-bed near Clinton (138). Wayne county: *Map* showing the outcrop of the fossil ore-bed in Ontario township (140). HEMATITE.—*Map* showing the location of the hematite ore-mines in Jefferson and Saint Lawrence counties (141).

Kaolin, statistics of the production of, in c. y. (842, 848-849).

Pyrites, statistics of the production of (for sulphuric acid), in c. y. (844, 852-853).

Quartz and feldspar, statistics of the production of, in c. y. (844, 852-853).

Talc, statistics of the production of, in (845, 852-853).

Clinton county. Iron ore: Amount of each kind of iron ore mined in, in c. y. (24 c); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 b); statistics of the production of iron ore in c. y. (48-51). Iron-ore mines: Arnold Hill mine described (119 c); M.; six samples: Fe,P,Ti (119 c, 120 c, 558 b). Bowen & Signor's mine described (120 c); M.; two samples: Fe,P,Ti (120 f, 558 a). Chateaugay mine described (121 b); M.; three samples: Fe,P,Ti (121 b, 558 c); output of iron ore, 1883-1884 (34 b). Mine 81 described (122 a); M.; two samples: Fe,P, Ti (122 b, 558 c). Nelson Bush mine described (120 c); M.; two samples: Fe,P,Ti (120 d, 558 b). Palmer Hill mine described; plate (118 c); M.; four samples: Fe,P. (119 b, 556 f). Tremblay's mine described (121 a); M.; two samples: Fe,P,Ti (121 a, 558 b).

Columbia county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 c); description of the iron-ore deposits in (127 c, 135 b); occurrence of carbonate ore in (136 a); statistics of the production of iron ore in c. y. (48-51). Iron ore mines: Columbia Spathic Ore Company's mine; one sample: Fe,P. (136 a, 554 d). Copake mine mentioned (135 a); M.; two samples: Fe,P. (135 c, 554 d). Haight mine mentioned (135 f). Hillsdale mine mentioned (135 f). Mitchell mine mentioned (135 f). Reynolds mine mentioned (135 f); M.; one sample: Fe,P. (135 b, 554 d). Weed mine mentioned (135 c); M.; one sample: Fe,P. (135 d, 554 d).

Dutchess county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 c); description of iron-ore deposits in (127 c, 128 d); New York and Harlem Railroad belt of ores described (130 c); rank among counties producing over 100,000 tons of iron ore in c. y. (75 a); statistics of the production of iron ore in c. y. (48-51). Iron-ore mines: Amenia mine described; plan (132 c, 133); L.; one sample: Fe,P. (132 f 556 c). Beekman mine described (129 d); L.; two samples: Fe,P,Mn (129 f, 556 a). Clove mine described (130 b); L.; two samples: Fe,P. (130 b, 556 b). Clove Spring mine described (130 b); L.; two samples: Fe,P. (130 d, 556 b). Dakin mine described (134 f); L.; one sample: Fe,P. (135 a, 556 a). Dover mine described (131 f); L.; two samples: Fe,P. (132 a, 556 b). Fishkill mine described (128 c); L.; one sample: c. (128 c, 556 b, 594). Gridley mine described (132 b); L.; one sample: Fe,P.; one sample: c. (132 c, 556 c, 594). Maltby mine described (134 b); L.; two samples: Fe,P. (134 d, 556 c).

NEW YORK—Continued.

Dutchess county—Continued.

Manhattan mine described; plan (133, 134 a); M.; two samples: Fe,P,Mn (134 b, 556 c). Pawling mine described; plan (131 a); L.; two samples: Fe,P. (131 c, 554 f). Riga mine described; plan (134 d); L.; one sample: Fe,P. 134 f, 556 c). Sylvan Lake mine described (129 b); L.; two samples: Fe,P,Mn (129 d, 556 b). Tower's Spring mine (see Clove Spring mine); L.; two samples (130 b, 556 c). Valley Pond mine described (130 c); L.; two samples: Fe,P. (130 f, 556 a). Kaolin, statistics of the production of, in c. y. (842).

Erie county. Hydraulic cement, statistics of the production of, in c. y. (841).

Essex county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 c); rank among counties producing over 100,000 tons of iron ore in c. y. (75 a); statistics of the production of iron ore in c. y. (48-51). Iron-ore mines: Mines in Schroon township mentioned (118 a). Mineville mines, position of the ore-bodies in the, section (7 c). Barton Hill mine described; plan (108 b, 109); M.; one sample: Fe,P,Ti (108, 556 f); character of the ore in (7 c). Brinsmade mine described (110 a); M.; one sample: Fe,P,Ti (see Welch shaft) (110 a, 111 c, 556 c). Cheever ore-bed described; plan (112 c, 113); M.; six samples: Fe,P,Ti (112 d, 556 d); mentioned (106 f). Cook's mine mentioned (106 f, 108 b). Crown Point mines described; map (116 b, 117); product of iron ore in c. y. and its value and the number of employés (75 d); M.; four samples: Fe,P,Ti (116 d, 556 c). Fisher Hill mine mentioned (108 b); M.; one sample: Fe,P,Ti (108 c, 556 d); character of the ore in (7 c). Gate's or Putnam mine described (118 c); M.; two samples: Fe,P,Ti (118 b, 556 c). Hale mine described (118 c); M.; two samples: Fe,P,Ti (118 c, 556 c). Lee mine described; plan (115 a); M.; two samples: Fe,P,Ti (116 b, 556 c); mentioned (108 a). Miller mine described (110 a); M.; one sample; Fe,P,Ti (111 c, 556 f); section through Miller pit (7 c). Mine 21 described (110 c); M.; three samples: Fe,P,Ti (111 c, 556 d); mentioned (106 f, 108 c); ore-bodies in (7 d); product of iron ore in c. y. and its value and the number of employés (75 d). Mineville mines described (108 a). New Bed mine described; plan (108 b, 109); M.; one sample: Fe,P,Ti (108 c, 556 d); character of the ore in the (7 c). Nolan shaft; M.; one sample: Fe,P,Ti (111 c, 556 c). Old Bed mine described (110 b); M.; three samples: Fe,P,Ti (111, 112, 556 f); mentioned (106 f, 108 b); product of iron ore in c. y. and its value and the number of employés (75 d). Pott's shaft; M.; one sample: Fe,P,Ti (111 c, 556 f). Putnam's or Gate's mine; M.; two samples: Fe,P,Ti (118 c, 556 c). Smith mine (Cook's shaft) described (112 c); M.; two samples: Fe,P,Ti (112 d, 556 d); mentioned (106 f). Tefft shaft; M.; one sample: Fe,P,Ti (111 c, 556 f). South Barton Hill mine; M.; one sample: Fe,P,Ti (108 c, 556 d). Welch shaft (see Brinsmade mine); M.; one sample: Fe,P. (110 a, 111 c, 556 c).

Franklin county. No ore produced in 1880 in (122 c).

Jefferson county. Iron ore: Amount of each kind of iron ore, mined in, in c. y. (24 c); statistics of the production of iron ore in, in c. y. (48-51). Map showing the location of the hematite ore mines (141); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 d). Iron-ore mines: Dickson mine described (142 f); H.; one sample: Fe,P. (142 f, 558 d). Keene mine described (143 b); H.; one sample: Fe, P. (143 d, 558 d). Old Sterling mine described (142 f); H.; one sample: Fe,P. (143 b, 558 d). Shirtleff mine described (142 c); H.; one sample: Fe,P. (142 c, 558 d).

Oneida county. Glass-sand, statistics of the production of in c. y. (849). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 c); deposits of fossil ores in, map (136 d); map of a portion of Oneida county, showing position of fossil ore mines (137); map showing the outcrop of the fossil ore-bed near Clinton (138); statistics of the production of, in c. y. (48-51). Iron-ore mines: Butler ore-bed described (138 d); F.; one sample: (138 d, 139 a, 558 c). Caglin's mine mentioned (140 b); F.; one sample: Fe,P. (140 c, 558 c). Clinton mine described (138 c). Davis mine described (136 f); F.; one sample: Fe,P. (137 a, 558 c). Derwin's farm mine mentioned (139 c); F.; one sample: Fe,P. (139 f, 558 c). Ellingwood mine mentioned; F.; Fe,P. (137 c). Elliott mine mentioned; F.; Fe,P. 139 c). Franklin and Clinton mines described (138 c); F.; five samples: c; one sample: Fe,P. (138, 139 b, 558 c). John Klein's mine mentioned (140 a); F.; one sample: Fe,P. (140 a, 558 a). Norton's mine; F.; one sample: Fe,P. (139 d, 558 c). Pryer mine mentioned (139 d); F.; one sample: Fe,P. (139 f, 558 c). Wells mine described (137 d); F.; one sample: Fe,P. (137 d, 558 d).

Onondaga county. Hydraulic cement, statistics of the production of, in c y. (841). Hydraulic lime, statistics of the production of in c. y. (841).

Orange county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 c); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 b); statistics of the production of iron ore

NEW YORK—Continued.
Orange county—Continued.
in, in c. y. (48-51); limonite deposit in, described (127 b); magnetic ores, remarks on the (89 c); map showing location of iron mines in Orange and Putnam co.'s (90). Iron-ore mines: Bering mine mentioned (89 f). Bull mine described (93 b); M.; one sample: Fe,P,S,Ti, Mn (554 b). Canterbury mine; M.; one sample: Fe,P,Mn (127 c, 554 c). Clove mine mentioned (93 b). Cornwall Hematite; L.; one sample: Fe,S,P,Ti,Mn (554 c). Crawford mine described (89 c); M.; one sample: Fe,P,S,Mn,Ti (554 a). Ferro Hill mine mentioned (93 c). Forest of Dean mine described; sec. (93 f); M.; one sample: Fe,P,S. (94 b, 554 c). Forshee O'Neil or "Nail" mine described (92 f); M.; one sample: Fe,P,S,Mn (93 b, 554 b). Greenwood mines mentioned (see Hogencamp, Pine Swamp) (92 c). Hogencamp mine described (92 c); M.; one sample: Fe,S,P,Mn (92 f, 554 b). Lake mine mentioned; M.; one sample: Fe,S,P,Mn (92 a, 554 b). Mines west of the Hudson river mentioned (94 c). Oregon mine; M.; one sample: Fe, S,P,Mn,Ti (90 d, 554 b). Queensborough mine (near) mentioned (94 c). Redback or Spruce Swamp mine described (91 a); M.; one sample: Fe, P,S. (91 b, 554 a). Scott or Oregon mine described (92 c); M.; one sample: Fe,S,P,Ti,Mn (92 d, 554 b). Spruce Swamp or Redback mine; M.; one sample: Fe,P,S. (91 b, 554 a). Sterling mine described; map (91 b); M.; two samples: Fe,S,P. (91 f, 554 f). Summit mine; M.; one sample: Fe, S,P,Mn,Ti (92 c, 554 b). Stevens' mine; M.; one sample: Fe,S,P,Mn,Ti (92 d, 554 d). Taylor mine mentioned (93 d). Tiptop or Summit mine described (92 b); M.; one sample: Fe,S,P,Mn,Ti (92 c, 554 b). Warwick mine mentioned; M.; one sample: Fe,P,S. (93 c, 554 b).
Oswego county. Glass-sand, statistics of the production of, in c. y. (840).
Putnam county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 d); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 b); statistics of the production of iron ore in, in c. y. (48-51); magnetic ores, remarks on the (89 c, 94 c); map showing location of iron mines in Orange and Putnam counties (90). Iron-ore mines: Brewster mine described (101 d); M.; one sample: Fe,P. (102 a, 554 c). Canada mines mentioned (98 b). Croft mine described; plan; sec. (95 a, 96); M.; two samples: Fe,P. (554 d). Denny mine mentioned (98 b). Hill mine described (98 c); M.; one sample: Fe,P. (98 d, 554 c). Lake Mahopac Iron Company's mine described; plan (98 c, 99); M.; one sample: Fe,P,Mn. (554 c). West Point furnace; M.; one sample: Fe,P. (99 a, 554 c). McCollum mine described; map (100 a); M.; three samples: Fe,P,Ti,Mn (101, 554 c). Pratt mine mentioned (98 a); M.; one sample: Fe,P. (98 a, 554 c). Rose mine mentioned (98 b); M.; one sample: Fe, P,Mn (98 c, 554 c). Sackett mine mentioned (98 a); M.; one sample: Fe, P. (554 c). Stuart or Sunk mine described; plan; sec. (97 a); M.; one sample: Fe,P,Ti (554 c). Theall mine described; map (100 a); M.; one sample: Fe,P. (101 c, 554 c). Tilly Foster mine described; plan (102 a, 103 c); M.; nine samples: Fe,P.; two samples: c. (103-105, 554 f, 593, 594); product of iron ore in c. y. and its value and the number of employés (75 d); referred to (98 f). Todd mine described; map (94 c); M.; one sample: Fe,P. (94 f, 554 d).
Rensselaer county. Graphite, statistics of the production of, in c. y. (841).
Richmond county. Asbestos, statistics of the production of, in, in c. y. (839). Geological map of Staten Island (123). Map of part of Staten Island showing location of iron mines (123). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 c); statistics of the production of, in c. y. (48-51). Iron-ore mines: Cooper & Hewitt's mine described; plan (126 d); L.; three samples: Fe,P,Mn (126 d, 127 b, 554 c). New Dorp mine described; plan (124 a, 125); mentioned (122 f); M.; three samples: Fe, P,Ti,Mn; one sample: c. (124 b, 554 c, 594). Towle mine mentioned; plan (122 f, 124 c, 125). Tolles' (John) mine; L.; one sample: Fe,P. (126 f, 554 c). Tyson Four Corners mine described; plan (124 f, 125); L.; three samples: Fe,P,Mn,Ti,Cr (126 b, 554 c).
Rockland county. Steven's mine; M.; one sample: Fe,P. (94 d, 554 d).
Saint Lawrence county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 c); statistics of the production of, in c. y. (48-51); iron-ore deposits known in (122 c); map showing the location of the hematite ore mines (141). Iron-ore mines: Alpine furnace (see Jayville mine); M.; one sample: Fe,P,Ti (122 d, 558 c). Caledonia mine described (143 d); H.; three samples: Fe,P. (143 f, 558 c). Jayville mine (see Alpine furnace); M.; one sample: Fe,P,Ti (122 d; 558 c). Kearney mine: H.; one sample: Fe,P. (144 b, 558 c). Kearney mine described (144 a). Little Kearney mine described (144 a); H.; one sample: Fe,P. (144 b, 558 c). Pyrite (for sulphuric acid), statistics of the production of, in c. y. (844). Talc, statistics of the production of, in c. y. (845).
Sullivan county. Quartz and feldspar, statistics of the production of, in c. y. (844)
Ulster county. Hydraulic cement, statistics of the production of, in c. y. (841).

NEW YORK—Continued.
Washington county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 f); map of a portion of Washington county, N. Y., showing position of iron mines (115); statistics of the production of, in c. y. (48-51). Iron-ore mines: Mount Hope mine described (106 b); M.; one sample: Fe,P,Ti (106 c, 556 c). Pedunk mine mentioned (115 c). Potter mine described; plan (115 c); M.; one sample: Fe,P,Ti (102 a, 556 c). Quartz and feldspar, statistics of the production of, in c. y. (844).
Wayne county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 f); statistics of the production of iron ore in, in c. y. (48-51); iron-ore deposits in, described; map (140 c); map showing the outcrop of the fossil ore-bed in Ontario township (140). Iron-ore mines: Bennett's mine mentioned (140 f); not sampled (140 f). Bundy's mine; F.; one sample: Fe,P. (141 b, 558 d). La Frois's (J.) mine; F.; one sample: Fe, P. (141 b, 558 d). Ontario Furnace Company's mine; F.; four samples: Fe,P. (141 b, 558 d).
Westchester county. Iron ore: Verplanck Point mine; M.; one sample: Fe,P. (94 d, 554 d).
Nickel, statistics of the production of, by states and counties (843); by states (850-851).
Nickel and cobalt matte, statistics of the production of (844, 850-851).
NORTH CAROLINA.
Coal (bituminous), statistics of the production of, in c. y. (662-665, 674-675).
Copper. Statistics of the production of, in c. y. (798-799).
Corundum. Statistics of the production of, in c. y. (840, 846-847).
Graphite. Statistics of the production of, in c. y. (841, 848-849).
Iron. Amount in ore mined in c. y. and its per cent. of total iron in the United States' iron-ore product (19 f); amount of iron in the different kinds and grades of ore mined in, in the c. y. (28 c); average per cent. of iron in ore mined in c. y. (19 f).
Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 f); to total amount of ore (74 c).
Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 b, 74 c); average value per ton (19 f); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 f); amount of each kind of ore mined in each county in the c. y. (24 f); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (28 b); amount of each kind and grade of ore, according to its phosphorus iron ratio, produced in, in c. y. (29 b, 30 b).
Iron ore. Statistics of the production of, in c. y. (52-55, 64-69); general average of these statistics (70, 71).
Iron ore. Bessemer, amount of each kind mined in c. y. (30 c); its per cent. of the Bessemer ore product of the United States (30 c).
Iron ores. Partial analyses of (558-563); complete analyses of (594-596).
Iron-ore. Blackband, with Triassic coal (18 a); character of Laurentian, in (7 a).
Iron ores. Notes on samples of iron ores collected in North Carolina, by Bailey Willis (301-329); iron-ore sample *map* of North Carolina (geologically colored) (Plate XXXII); ores near Gaston, Halifax county (301 d); sketch *map* of vicinity of Gaston (301); bog-ores of eastern countries (302 b); specular, hematite, limonite, and blackband ores of Chatham, Moore, Harnett, and Johnson counties (302 f); Chapel Hill mine (306 f); titaniferous magnetite of Guilford and Rockingham counties (308); magnetic ores of Stokes and Surry counties (311); magnetic and limonite ores of Lincoln and Gaston counties, North Carolina, and York county, South Carolina.
Mica, statistics of the production of, in c. y. (843, 850-851).
Soapstone, statistics of the production of, in, in c. y. (845, 852-853).
Ashe county. Copper, statistics of the production of, in c. y. (798-799). Iron ores: Upper Laurentian magnetic ores of (324 b). Ashe and Johnston counties, map of portions of, showing location of iron mines (324). Iron-ore mines: Ballow (N. B.) mine, near Helton creek; Upper Laurentian; described; M.; one sample: Fe,P. (325 b, 562 b). Hampton's mine; M.; one sample: Fe,P. Horse Creek mine (Graybeal and Hampton); Upper Laurentian; described; M.; one sample: Fe,P. (324 c, 562 b). Johnson's ridge of Elk Knob; L.; one sample: Fe,P, Cu. (562 b). Poison Branch mine, near New river; Upper Laurentian; described; M.; two samples: Fe,P, S (325 a, 562 b).
Burke county. Upper Laurentian Titaniferous magnetite of (322 d). Propst's (N.) mine; described; sketch map (322 d); L.; one sample: Fe,P. (322 c, 560 b).
Caldwell county. Upper Laurentian limonite of (322 d). Curtis mine; M.; one sample: Fe,P. (323 a, 560 c).
Catawba county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 f); statistics of the production of iron ore in c. y. (52-55).

NORTH CAROLINA—Continued.

Chatham county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Character of the blackband ore in (16 c); Triassic hematite and Huronian limonite of (303 c); Triassic hematite of (305 a). Iron-ore mines: Evans mine; Huronian; described (304 d); H.; one sample: Fe,P. (304 d, 558 f). Gulf mine; L.; one sample: Fe,P. (306 f, 558 f). Horton's (J. L.) mine; Triassic; described; C. (blackband); two samples: Fe,P. (306 d, 558 f). Smith mine, near Lockville; Triassic; described; sketch-map (305 b); H.; one sample: Fe,P. (560 b). Ore Hill mine; Huronian; described; sketch-map; L. and H.; three samples: two Fe,P.,S, one c (303 c, 558 f, 560 a, 594).

Cherokee county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 f); statistics of the production of iron ore in c. y. (52-55). Huronian limonite of (327 c). And Fannin county, Georgia, map of portions of, showing location of iron mines (328). Iron-ore mines: Little's mine, near Murphy; Huronian; described (328 f); L.; one sample: Fe,P. (562 a). Monteith's mine, near Murphy; Huronian; described (328 f); one sample: Fe,P. (562 a). Morse mine; Huronian; described; L.; one sample: Fe,P. (327 c, 560 f). Section Six mine, near Murphy; Huronian; described (328 d); L.; one sample: Fe,P,S (560 f). Tomotla mine; Huronian; L.; one sample: Fe,P. (327 f, 560 f). Soapstone, statistics of the production of, in c. y. (845).

Duplin county. Iron mines: Boney (D. T.) bog; one sample: Fe,P. (302 c, 558 f).

Forsythe county. Lower Laurentian: Titaniferous magnetic ore of (308 c).

Gaston county. Iron ore: Hematite (martite) in (320 d); Huronian magnetic ore of (316 f); limonite of Ormond and Mine mountain mines (321 c); limonite ore in (320 d). Iron ore mines: Costner mine; Huronian?; described (318 a); M.; two samples: Fe,P. (560 d). Crowder's mountain mine; Huronian; described; sketch-map (320 d); M. and L.; two samples: Fe,P. (560 c). Ellison mine; Huronian?; described (318 c); M.; one sample: Fe P. (560 d). Mine Mountain mine, near Whetstone mountain; Huronian; described (321 f); L.; two samples: c. (560 d, 595). Ormond mine, near King's Mountain station; Huronian; described; sketch-map (321 c); L.; one sample: Fe,P. (560 c). Yellow Ridge mines; Huronian?; described; sketch-map, sections; M.; three samples: Fe, P,S (318 d, 560 c).

Guilford county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 f); statistics of the production of, in c. y. (52-55); Titaniferous magnetic ore of (308 c). Iron ore mines: Tuscarora mine; Lower Laurentian; described; sketch-map (308, 309); M.; one sample: Fe,P. (560 b).

Halifax county. Iron ores near Gaston (301 d); sketch-map; described (301 d); 5 miles south of; surface pieces; M.; one sample: Fe,P. (302 a, 558 c).

Harnett county. Buckhorn mine; Huronian; described; section (304 c); H.; one sample: Fe,P. (558 f).

Haywood county. Mica, statistics of the production of, in c. y. (843).

Jackson county. Mica, statistics of the production of, in c. y. (843).

Johnston county. Iron ore: Huronian limonite of (302 f); and Ashe county, map of portions of, showing location of iron mines (224). Iron-ore-mines: Wilson's Mills mine; Huronian; described (302 f); L.; one sample: Fe, P. (558 f).

Lincoln county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 f); statistics of the production of iron ore in c. y. (52-55); Huronian magnetic ore of (316 f); Lower Laurentian magnetic ore of (316 f). Iron-ore mines: Big mine; Huronian?; described; sketch-map (316 f); M.; one sample: c. (560 d, 595). Forney mine; Lower Laurentian; described (316 c); M.; one sample: Fe,P. (560 d). Killian's mine; Lower Laurentian; described (316 c); M.; one sample: Fe,P. (560 d).

Macon county. Corundum, statistics of the production of, in c. y. (840). Mica, statistics of the production of, in c. y. (843).

Madison county. Corundum, statistics of the production of, in c. y. (840). Iron ore: Upper Laurentian magnetic ores of (327 c). Iron-ore mines: Big Ivy (Eller's) mine; described; section (327 b); M.; one sample: Fe,P.; (327 c, 560 f).

McDowell. Mica, statistics of the production of, in c. y. (843).

Mitchell county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (24 f); statistics of the production of iron ore in c. y. (52-55). Mica, statistics of the production of, in c. y. (843). Upper Laurentian magnetic ores of (326 f). Iron-ore mines: Cranberry mine; described; sketch map (325 d, 326); M.; two samples: c.; two samples: Fe,P.,S. (325 f, 560 f, 596). Greasy Creek mine; M.; one sample: Fe,P. (327 a, 560 f).

Moore county. Iron ore: Hematite in the Trias in (16 c); Triassic blackband and ball ore of (306 d); Triassic hematite of (305 a); Triassic limonites of (306 c). Iron-ore mines: Cole mine, near Lockville; Triassic; described; sketch map, section (320); H.; one sample: Fe,P. (306 a, 560 b). Gulf mine, half mile west of the gulf; Triassic; described (306 d).

NORTH CAROLINA—Continued.

Nash county. Iron ore: Bog-ore in (302 d). Iron-ore mines: Bloomary mine, near Toisnot swamp; Tertiary; recent; described; section; bog; one sample: Fe,P. (302 d, 558 f).

Orange county. Iron ore: Huronian specular ores of (306 f). Iron-ore mines: Chapel Hill mine; Huronian?; described; sketch-map and sections (306 f, 307); H.(s); one sample: Fe,P,S; one sample c. (560 c, 595).

Rockingham county. Iron ore: Titaniferous magnetic ore of (308 c). Iron-ore mines: Dannemora mine; Lower Laurentian; described; sketch-map (308, 310); M.; one sample: c.; one sample: Fe,P,S. (560 b, 595).

Stokes county. Iron ore: Huronian magnetic ores of (311 d). Iron-ore mines: Sketch-map of vicinity of Danbury (312); Cherry mine, near Danbury; Huronian (314 f). Danbury, 8 miles west of; L.; one sample: Fe,P. (316 c, 560 c). Hard-Ore mine, near Danbury; Huronian; described; M.; one sample: Fe,P. (311 d, 560 b). Nelson's mines, near Danbury; Huronian; described; sketch-map and section (313); M.; two samples: Fe,P. (311 f, 312 a, 313 a, 560 c). Pepper mine, near Danbury; Huronian; described (314 f); M.; one sample: Fe,P. (560 c). Roger's mine, near Danbury; Huronian; described; sketch-map (313 f); M.; one sample: c. (560 c, 595). Smith's mine, near Danbury; Huronian (313 d).

Surry county. Iron ore: Amount of each kind of ore mined in, in the c. y. (24 f); statistics of the production of iron ore in, in c. y. (52-55); Upper Laurentian magnetic ores of (315 b). Iron-ore mines: Ballington mine, near Pilot Mountain post-office; Upper Laurentian (315 d). Crowders mine; Upper Laurentian (316 b). Ferris mine, near Pilot Mountain post-office; Upper Laurentian; described; M.; four samples: Fe,P,S (315 b, 560 c). Hyatt's bank; M.; two samples: Fe,P, see Pilot Mountain mine (315 d, 560 c). Pilot mountain, see Hyatt's mine (7 miles west of post-office); described; section (315 d); M.; two samples: Fe,P. (315 d, 560 c). Poplar Branch mine; Upper Laurentian; described; M.; one sample: Fe,P. (316 f, 560 d). Stanley's mine; Upper Laurentian (316 f). William's mine; Upper Laurentian; described; M.; one sample: Fe,P. (316 b, 560 c).

Swain county. Soapstone, statistics of the production of, in c. y. (845).

Wake county. Graphite, statistics of the production of, in c. y. (841).

Watauga county. Iron-ore mines: Ramsour's mine (see Richland's mine) (324 a, 560 f). Richland's mine; Huronian?; described; H.(s); one sample: Fe,P. (324 a, 560 f).

Yancey county. Mica, statistics of the production of, in c. y. (843).

O.

Ocher, statistics of the production of, by states and counties (844); by states (850-851).

OHIO.

Coal (bituminous), statistics of the production of, in c. y. (662-665, 674-675).

Iron. Amount in ore mined in c. y. and its per cent. of the total ore in the United States' ore product (19 f); amount of iron in the different kinds and grades of ore mined in, in the c. y. (28 c); average per cent. of iron in ore mined in c. y. (19 f).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 f); to total amount of ore (74 c).

Iron ore. Amount and value of c. y.'s product and their per cent. of the amount and value of the United States' product (19 f, 74 c); average value per ton (19 d); amount of each kind and grade, according to its contents of iron, produced in, in c. y. (28 b); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 c, 30 b); amount of each kind of ore mined in each county in the c. y. (25 a); amount of each kind of ore mined in each geological horizon in c. y. (21 b); amount of each kind of ore mined in c. y. (23 b); tonnage and value of low-grade Carboniferous ores in (20 a); royalty paid on each kind of ore mined in c. y. (32 c).

Iron ore. Statistics of the production of, in c. y. (52-55, 64-69); general average of these statistics (70-71).

Iron ores. Partial analyses of (562-565).

Iron ores. Phosphorus-iron ratio in ores from (32 a); occurrences of block-ore in the sub-Carboniferous limestone in (15 d); horizons of the kidney-ores in (16 b); horizons of carbonate ores in (16 b); ferriferous limestone ores in (16 c).

Iron ores. Notes on the samples of iron ore collected in, by Bailey Willis (235-243); *map* of the iron ores of the Coal Measures (236); general *section* of the Ohio Coal Measures, showing approximate relation of the iron ores sampled (237). Blackband (238 c); block-ores: Professor Orton's classification of (239 b); limestone kidney-ore near Zoar and Dover (240 a); limestone ore (240 c); Tuscarawas blackband (241 d); Iron Point blackband (242 c); Columbiana county ores (242 f); kidney or pebble ore of Middle fork of Little Beaver river (243 a).

OHIO—Continued.

Athens county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of ore mined in, in the c. y. (25 a); statistics of the production of, in c. y. (52-55). Iron-ore mines: Orbiston mine; C.; (blackband) one sample: Fe,P. (242 e, 584).

Belmont county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Carroll county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Columbiana county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 a); statistics of the production of, in c. y. (52-55). Iron-ore mines: Cherry Valley Iron Company's mine; L. and C.; two samples: Fe,P.; (243 a, 564 d). Denman (William); C. and L.; two samples: Fe,P. (243 a, 564 d). Henry's (John) mine, at Mineral Ridge; Coal Measures; described (238 b). C. (blackband); two samples: Fe,P., (238 c, 564 d). Lewis's (Capt. B. F.) mine; C.; one sample: Fe,P. (243 a). Smith (A. G.); C.; two samples: Fe,P. (243 a, 564 d). Todd, Wells and Company's mine at Mineral Ridge; Coal Measures; described (238 b); C. (blackband); two samples: Fe,P, (238 b, 564 d).

Coshocton county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Cuyahoga county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 a); statistics of the production of, in c. y. (52-55).

Gallia county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 a); statistics of the production of, in c. y. (52-55).

Guernsey county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Harrison county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Hocking county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 a); statistics of the production of, in c. y. (52-55). Iron-ore mines: Buchtel mine: C.; one sample: Fe,P. (241 b, 564 a). Gore furnace; L.; two samples: Fe,P. (240 f, 562 f).

Holmes county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Jackson county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 a); statistics of the production of, in c. y. (52-55). Iron-ore mines: Milton Furnace mines, near Herndon; Coal Measures; described (239 e); C.; two samples: Fe,P, (239 e, 562 e). Monroe Furnace mines; Coal Measures; described (239 d); C. L. H.; six samples: Fe,P. (259 e, 240 e, 562 e). Byers' station mine (Ray's ore), near Jackson; Coal Measures; described (238 f). Ray's mine; L.; one sample: Fe,P. (238 f, 562 e). Springfield Southern Railroad Company's mine (Davis ore), near Jackson; Coal Measures; described; section (238 d); C. Swaringen Farm mine, near Milton; Coal Measures; described (239 f); C.; one sample: Fe,P, (239 f, 240 f, 562 f).

Jefferson county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Lawrence county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 b); rank among counties producing over 100,000 tons of iron ore in c. y. (75 a); statistics of the production of, in c. y. (52-55). Iron-ore mines: Davis mine; C.; five samples: Fe,P, (238 f, 562 e). Hecla furnace mines; Coal Measures; described (241 a); C.; five samples: Fe,P. (562 e). Hudson drift; C.; two samples: Fe,P. (240 e, f, 562 d). Lawrence furnace; C.; one sample: Fe,P. (562 e). Olive (furnace) mine; C. (blackband); two samples: Fe,P. (242 e, 562 e). Washington furnace; C.; five samples: Fe,P. (240 e, f, 562 d).

Mahoning county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 b); statistics of the production of, in c. y. (52-55).

Medina county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Meigs county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Monroe county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Morgan county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Muskingum county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 b); statistics of the production of, in c. y. (52-55). Iron-ore mines: Frazeysburg mine (see Goff, McGinnis, Millstead, McDonald mines); C.; four samples: Fe,P. (239 f, 564 c); Goff mine (Frazeysburg); Coal Measures; described (239 c, 564 c). McDonald mine (Frazeysburg); Coal Measures; described (239 c, 564 c). McGinnis mine (Frazeysburg); Coal Measures; described (239 c, 564 c). Millstead mine (Frazeysburg); Coal Measures; described (239 c, 564 c).

Noble county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Perry county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 b); statistics of the production of iron ore in c. y. (52-55). Iron-ore mines: Bowman (farm) mine; C.; (blackband); two samples: Fe,P. (242 e, 564 b). Iron Point mine; C. and L.; (blackband); two samples: Fe,P. (242 e, 564 b). McLaughlin's Drift mine; Coal Measures; described (239 e); C.; two samples: Fe,P. (239 e, 564 e). Moxahala mine; C.; (blackband); two samples: Fe,P. (242 e, 564 e). Shawnee Furnace mine ("Pat Moore farm"); Coal Measures; described (239 f); C.; one sample: Fe,P. (239 f, 564 b).

Portage county. Coal (bituminous), statistics of the production of, in c. y, (662-665).

Scioto county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 b); statistics of the production of iron ore in c. y. (52-55). Iron-ore mines: Scioto Furnace mines; Coal Measures; described (239 c); C.; six samples: Fe,P. (239 c, 562 f).

Stark county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 b); statistics of the production of iron ore in c. y. (52-55).

Summit county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Trumbull county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 b); statistics of the production of iron ore in c. y. (52-55).

Tuscarawas county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 b); statistics of the production of iron ore in c. y. (52-55). Iron-ore mines: Anman Farm mine, near Dover; Coal Measures; described (240 a); C.; one sample: Fe,P. (240 a, 564 e). Bühler Farm mine; described; map (241); C.; (blackband); five samples: Fe, P. (242 b, 564 e). Dover Furnace Hill mine; C.; (blackband); two samples: Fe, P. (242 b, 564 e). Dover (near) mine; C.; one sample: Fe,P. (239 f, 564 e). Dye mine; C.; (blackband); three samples: Fe,P. (242 e, 564 f). Groeble Farm mine; C.; (blackband); one sample: Fe,P. (242 a, 564 e). Heit's Farm mine (rock ore), near Dover; Coal Measures; described (239 f); C.; one sample: Fe,P. (564 e). Hugh Kelley mine; C.; (blackband); four samples: Fe,P. (242 b, 564 f). Winkler's mine; C.; one sample: Fe,P. (241 a, 564 e). Wyan (farm) mine; C.; (blackband); two samples: Fe,P. (242 e, 564 f). Zoar Society mine, near Zoar; Coal Measures; described (240 a); C.; two samples: Fe,P. (240 a, 564 e).

Vinton county. Coal (bituminous), statistics of the production of, in c. y. (662-665). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 b); statistics of the production of iron ore in c. y. (52-55). Iron-mines: Burline (Eagle furnace) mine; H. (Coal Measures): one sample: Fe,P. (240 e, 564 b). Burline mines and Tan farm; L. and C.; two samples: Fe,P. (240 e, 564 b). Creola Furnace mines ("Dunkel ore"); Coal Measures; described (239 c); C.; one sample: Fe,P. (239 e, 564 b). Dunkel mine (see Creola furnace) (239 e, 564 b). Eagle furnace (Radclift district; C.?; one sample: Fe,P. (240 e, 564 b). Junction City mine; C.; two samples: Fe,P. (239 e, 564 e).

Washington county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Wayne county. Coal (bituminous), statistics of the production of, in c. y. (662-665).

Oil-stone. Statistics of the production of, by states and counties (844); by states (850-851).

OREGON.

Coal. Analysis of (788-789).

Iron. Amount in ore mined in c. y. and its per cent. of total iron in the United States' ore product (19 f); amount of iron in the different kinds and grades of ore mined in, in the c. y. (28 f); average per cent. of iron in ore mined in c. y. (19 d).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 f); to total amount of ore (74 e).

Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' ore product (19 f, 74 e); aver.

OREGON—Continued,

Iron ore. Amount and value of c. y.'s product, etc.—Continued.
age value per ton (19 d); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 b); amount of each kind of ore mined in each county in the c. y. (25 c); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (28 b); amount of each kindand grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 c, 30 b).

Iron ore. Statistics of the production of iron ore in c. y. (52-55, 64-69); general averages of these statistics (70, 71).

Iron ores. Partial analyses of (566-567).

Clackamas county. Iron ore: Amount of each kind of ore mined in, in the c. y. (25 c); statistics of the production of iron ore in, in c. y. (52-55). Iron-ore mines: Patton mine; L.; one sample: Fe,P.(497 c, 566 b). Prosser mine; described; section (16 f, 496 c); L.; two samples: Fe,P. (496 c, 566 a).

Oriskany limonites, character and position of the (15 a); in Pennsylvania (198 c); of Virginia (279 d).

Orton, Professor Edward. General section of Ohio Coal Measures (237); on horizon of crystalline carbonate ores ("Hudson ore") in Ohio (240 d); on the horizons of the ores of the Lower Coal Measures in Ohio (16 b).

P.

PENNSYLVANIA.

Barytes, statistics of the production of, in c. y. (839, 846-847).

Coal (anthracite), statistics of the production of, in c. y. (625-630, 650-651).

Coal (bituminous), statistics of the production of, in c. y. (666-669, 674-675).

Chromic iron, statistics of the production of, in c. y. (839, 846-847).

Cobalt, statistics of the production of, in c. y. (840, 846-847).

Copper, statistics of the production of, in c. y. (798-799).

Garnet, statistics of the production of, in c. y. (840, 846-847).

Glass-sand, statistics of the production of, in c. y. (840, 848-849).

Graphite, statistics of the production of, in c. y. (841, 848-849).

Hydraulic cement, statistics of the production of, in c. y. (841, 848-849).

Iron. Amount in ore mined in c. y. and its per cent. of total iron in the United States' ore product (19 f); amount of iron in the different kinds and grades of ore mined in, in the c. y. (28 f); average per cent. of iron in ore mined in c. y. (19 f).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 f); to total amount of ore (74 c).

Iron ore. Amount and value of the c. y.'s product and their per cent. of the United States product (19 f, 74 c); average value per ton (19); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 b); amount of each kind of ore mined in each county in the c. y. (25 c); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (28 b); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 c, 30 b); product of iron ore in c. y. and its value and the number of employés in the mines (75 d); royalty paid on each kind of ore mined in, in c. y. (32 c).

Iron ore. Statistics of the production of iron ore (52-59, 64-69); general averages of these statistics (70-71).

Iron ore. Bessemer; proportion of Bessemer to non-Bessemer ore produced in (20 c); amount of each kind mined in c. y. (30 c); its per cent. of the Bessemer ore product of the United States (30 c); proportion of Bessemer ore produced in (31 a).

Iron ores, partial analysis of (566, 567).

Iron ores: Archæan (6 c); magnetites, geological relations of the (11 c); magnetic ore, product of, in 1880 (12 a); Clinton hematite ores in (13 b); Second geological survey, ore beds of the Clinton group in Snyder county, according to (13 c); Oriskany ores in (15 a); limonite of the Hamilton shales in (15 b); "Red-ore bed" in (15 c); iron stones of the Coal Measures (15 c); relation of the iron product to the area of the ore-fields in (18 c).

Iron ores. Notes on the, of Pennsylvania compiled from the reports and unpublished material of the Second Geological Survey of Pennsylvania, J. P. Lesley, state geologist, and the Census Schedules, by Bayard T. Putnam, with geological *map* (Plate XXIX) showing position of iron mines (179-221). MAGNETITE (179 f). HEMATITE (180). LIMONITE.—Limonites of the Siluro-Cambrian formation; limonite ores in the Hudson river slates (Formation III) (197 f); limonite ores of the Medina formation (198 d); limonite ores of the Lower Helderberg and Oriskany formation (198 b, 199 d); limonite ores of the Devonian, chiefly of the Marcellus formation (199 e); limonite ores of the Mauch Chunk red shale (202 b). CARBONATE ORES.—Carbonate ores of the Siluro-Cambrian formation (202 d); carbonate

PENNSYLVANIA—Continued.

Iron ores. Notes on the, etc.—Continued.
ores of the Marcellus formation (203 f); carbonate ores of the Pocono (?) formation (203 f); carbonate ores of the Mauch Chunk Red Shale formation (204 a); carbonate ores of the Pottsville conglomerate. Carbonate ores of the Coal Measures and their derivatives: A. Of the Lower Productive Coal Measures (Freeport, Kittanning, and Clarion Groups) (205 c); B. Of the Lower Barren Measures (210 c); C. Of the Upper Productive Measures (211 b); D. Of the Upper Barren Measures (partly Permian) (212 c). FOSSIL ORES of the Clinton formation (213 c); of the Chemung formation (219 c).

Iron ore. Report on certain magnetites, by Bailey Willis (223).

Lead and zinc, statistics of the production of, in c. y. (806).

Nickel, statistics of the production of, in c. y. (843, 850-851).

Soapstone, statistics of the production of, in c. y. (845, 852-853).

Adams county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 c); statistics of the production of iron ore in c. y. (52-59); hematite ores of (181 a); Siluro-Cambrian limonite ores of (194 c). Iron-ore mines: Cole's (George) mine; H.; one sample: c. (181 a).

Allegheny county. Coal (bituminous), statistics of the production of, in c. y. (666-669). Iron ore: Amount of each kind of iron ore mined in the c. y. (25 c); statistics of the production of iron ore in c. y (52-59).

Armstrong county. Coal (bituminous), statistics of the production of, in c. y. (666-669). Iron ore: Amount of each kind of iron ore mined in the c. y. (25 c); statistics of the production of iron ore in c. y. (52-59); carbonate ores of Lower Productive Coal Measures of (206 b). Iron-ore mines: Stewardson Furnace mine; C.; six samples (206 f, 207 a). Pine Creek Furnace mine; C.; one sample: c. (207 a). Campbell and Barrett mine; c.; one sample: c. (207 a). Colwell (J. A.) mine; c.; one sample: c. (207 a). Brady's Bend (Iron Company) mine; C.; one sample: c. (207 b). Brown & Musgrove's mine; C.; one sample: c. (207 a).

Beaver county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

Bedford county. Coal (bituminous), statistics of the production of, in c. y. (666-999). Iron ore: Amount of each kind of iron ore mined in the c. y. (25 c); statistics of the production of iron ore in c. y. (52-59). Siluro-Cambrian limonite ores of (107 d). Iron-ore mines: Baker's mine; L.; one sample: c. (107 c). Hoover (R.) mine; L.; one sample: c. (107 c).

Berks county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 c); rank among counties producing over 100,000 tons of iron ore in c. y. (75 a); statistics of the production of, in c. y. (52-59). Siluro-Cambrian limonite ores of (186 a). Magnetic ore of (179 f, 180). Magnetite mines of (225 d). Iron-ore mines: Albright's (Joseph) Bank mine; L.; one sample: c. (186 c). Benfield Bank mine; L.; one sample; c. (186 c). Boyertown mines described; map of (230, 233). Brownbeck's (Frank) mine; one sample: c (186 c). Butz's mine; M.; one sample: Fe,S,P,SiO_2 (180 a). California mine, Boyertown; described; map; M.; two samples: Fe,P. (229 d, 566 c) Clymer Iron Company's mine; M.; one sample: Fe,Mn,P,SiO_2 (179 f, 180 a). Fleetwood Iron Company's mine; L.; one sample: C (186 a). Frederick's mine; M.; one sample: Fe,S,P,SiO_2 (180 a). Fritch & Brother's mine; M.; one sample: Fe,Mn, Al_2O_3,CaO,MgO,S,SiO_2 (180 a). Fritz Island mine, near Reading; described; M.; one sample: Fe,P. (229 c, 566 c). Gable mine, Boyertown; M.; one sample: Fe,P. (229 d, 566 c); described (233 c). Geary's (Charles) mine (Rittenhouse gap); M.; one sample: Fe,S,P,SiO_2 (180 a). Greiss & Wendlings mine; M.; one sample: Fe,S,P,SiO_2 (180 a). Guitterman's mine; one sample: Fe,Mn,Al_2O_3,CaO,MgO,S,P,SiO_2 (180 a). Haines & Klutz's mine; M.; one sample: Fe, S, P, SiO_2 (180 a). Heffner's (Charles) mine; L.; one sample: C. (186 a). Jones' mine, near Springfield; described; section; M.; two samples: Fe,P, (225 d, 566 d). Kline's (D. K.) mine; L.; one sample: c. (186 a). Lewis' (Samuel) mine; L.; one sample: c. (186 a). Merkel's (Mrs. John) mine; L.; one sample: c. (186 a). Miller's (Charles) mine; L.; one sample: c. (186 a). Miller's (William) mine; L.; one sample: c. (186 a). Moselem Bank mine; L.; three samples: c. (186c). Phœnix mines, Boyertown; described, map (229 c, 230). Phœnix mine; M.; one sample: Fe,P. (229 d, 566 c). Rowe's mine; M.; one sample: Fe,P. (566 c). Shaefer mine; L.; one sample: C. (186 c). Smyer's (D. H.) Heirs' mine; L.; one sample: C. (186 a). Tatham Brothers' mine; M.; one sample: Fe,Al_2O_3,CaO,MgO,S,P,SiO_2 (180 a). Troxler's (E. H.) mine; L.; one sample: C. (186 a). Udree mine; L.; one sample: C. (186 a). Warwick mine, Boyertown, described; map (230-232); M.; one sample: FeP. (231 a to 233, 566 c). Weiler (Dankle) mine; L.; one sample: C (186 c). Wheatfield mine (near Reading); described; section (228 c); M.; one sample: Fe,P. (229 b, 566 c). Ziegler's (David) mine; L.; one sample: c. (186 a). Ziegler's (Jonathan) mine; L.; one sample: c (186 a).

PENNSYLVANIA Continued.

Blair county. Coal (bituminous), statistics of the production of, in c. y. (666-669). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 c); rank among counties producing over 100,000 tons of iron ore in c. y. (75 a); Clinton ores of (219 a); statistics of the production of, in c. y. (52-59); Siluro Cambrian limonite ores of (195 c, 196, 197); occurrence of limonite in the Lower Helderberg limestone (13 f). Iron-ore mines: Baker's mine (Blair furnace); L.; four samples: c. (198 f, 199 b). Bloomfield mines; L.; five samples: three c.; two Fe,Mn,S,P,Al,CaO,MgO,SiO_2 (196 c, 197 a). Brower mine; L.; one sample: c. (196 b). Clark Farm mine; L.; one sample: c. (195 f). Dean's mine; L.; one sample: C. (196 c). Etna furnace mine; L.; one sample: c. (195 f). Falkner mine; L.; one sample: c. (195 f). Henrietta mines; L.; one sample: c. (195 c). Hollidaysburg mine; F.; two samples: c. (219 c). Hollidaysburg and Gap Iron Company's mine; F.; two samples: c. (219 d). Hoover mine; L.; one sample: c. (195 f). McPheese mine; L.; one sample: c. (196 d). Patterson mine; L.; one sample: c. (196 b). Rebecca mine; L.; one sample; c. (196 d). Red Bank mine; L.; one sample: c. (196 c). Red Ore mine; L.; one sample: c. (196 d). Robeson Farm mine; L.; one sample: c. (195 f). Sarah Furnace mine; L.; two samples: c. (196 d). Sarah Furnace mine; F.; one sample: c. (219 c). Short Mountain mines; L.; one sample: c. (195 f). Soister mine; L.; one sample: c. (196 d). Springfield mines; L.; four samples: c. (196 c). Thompson mine; L.; one sample: c. (196 d).

Bradford county. Coal (bituminous), statistics of the production of, in c. y. (666-668).

Bucks county. Iron ore, statistics of production of, in c. y. (52-59).

Butler county. Coal (bituminous), statistics of the production of, in c. y. (666-669). Iron ore: Amount of each kind of iron ore mined in the c. y. (25 c); statistics of the production of iron ore in c. y. (52-59). Carbonate ores of Lower Productive Coal Measures of (207 b). Iron-ore mines: Denny's mill mine; C.; one sample: c. (207 c).

Cambria county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

Cameron county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

Carbon county. Coal (anthracite), statistics of the production of, in c. y. (625-630). Iron ore: Amount of each kind of iron ore mined in c. y. (25 c); statistics of the production of, in c. y. (52-59); carbonate ores of (204).

Centre county. Coal (bituminous), statistics of the production of in c. y. (666-669). Iron ore: Amount of each kind of iron ore mined in c. y. (25 c); statistics of the production of iron ore in c. y. (52-59). Siluro-Cambrian ores of (195 a). Iron-ore mines: Fishing Creek mine (Curtin Brothers); L.; one sample: c. (195 b). Howard mine; L.; one sample: c. (195 c).

Chester county. Iron ore: Amount of each kind of ore mined in, in the c. y. (25 c); statistics of the production of iron ore in c. y. (56-59). Siluro-Cambrian limonite ores of (193 c). Iron-ore mines: French Creek mines described (225 b, 231 c, 233 f); M.; two samples: Fe,P (233 d, 566 d). Hopewell mine, near Saint Mary's, described (234); M.; one sample: Fe,P (234 a). Saint Mary, mines near (225 b, 234 a).

Clarion county. Coal (bituminous), statistics of the production of, in c. y. (666-669). Iron ore: Amount of each kind of iron ore mined in c. y. (25 c); statistics of the production of iron ore in c. y. (56-59). Carbonate ores of, Lower Productive Coal Measures of (207 d). Iron-ore mines Fox farm mine; C.; one sample: c. (207 f). Hindman's mine; C.; one sample: c. (207 f). Sligo Furnace mine; C.; one sample: c. (207 f).

Clearfield county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

Clinton county. Coal (bituminous), statistics of the production of, in c. y. (666-669); Siluro-Cambrian limonite ores of (194 c). Iron-ore mines: Salona mine; L.; two samples: c. (194 f).

Columbia county. Coal (anthracite), statistics of the production of, in c. y. (625-630). Iron ore: Amount of each kind of ore mined in, in the c. y. (25 d); statistics of the production of iron ore in c. y. (56-59). Clinton ores of (213 c).

Crawford county. Cussewago township the center of total iron-ore production of the United States (37 c).

Cumberland county. Iron ore: Amount of each kind of ore mined in, in c. y. (25 d); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 b); Siluro-Cambrian limonite ores of (188 a, 190 a); statistics of the production of iron ore in c. y. (56-59). Iron-ore mines: Ahl's (Carey) bank; L.; one sample: c. (10 a). Bear's bank; L.; one sample: c. (190 a). Beltzhoover bank; L.; two samples: c. (188 f). Best's bank; L.; one sample: c. (190 a). Big Pond bank; L.; one sample: c. (188 b). Bridge's (John) opening; L.; one sample: c. (188 b). Calico mine; L.; two samples: c. (188 b). Chestnut bank; L.;

PENNSYLVANIA—Continued.

Cumberland county—Continued.

one sample: c. (188 b). Clay (Henry) bank, (Nos. 1, 2, and 3); L.; four samples: c. (188 d). Clever Mammoth bank (No. 1); L.; one sample: c. (188 b). Clever (George) bank; L.; one sample: c. (188 b). George H. Clever bank; L.; one sample: c. (188 b). Cressler's (John H.) bank; L.; one sample: c. (188 b). Divon tract: L.; one sample: c. (188 d). Ege bank; L.; two samples: c. (188 f). Gorgas bank; L.; one sample; c. (190 a). Grove bank; L.; two samples: c. (188 d, 188 f). Heike's bank; L.; one sample: c. (190 a). Koontz & Myers mine; L.; one sample: c. (188 d). Laurel mines (Nos. 1 and 2); L.; two samples: c. (188 d). Lehman (J. C.) Bank No. 2: L.; one sample: c. (188 f). Leidig & Hoffer bank; L.; one sample: c. (188 f). McCreechan's bank; L.; one sample: c. (190a). Mount Holly bank; L.; two samples: c. (188). Mullen's (Charles) bank; L.; one sample: C. (190 a). Mullen bank; L.; one sample: c. (188 f). Myer's bank; L.; one sample: c. (190 a). Old Peach Orchard mine; L.; one sample: c. (188 b). Peffer bank; L.; one sample: c. (188 b). Pepper bank; L.; one sample: c. (188 f). Pine Grove mine; L.; one sample: c. (188 d). Raapp bank; L.; one sample: c. (190 a). Shopp bank; L.; one sample: c. (190 a). Strickler bank; L.; one sample: c. (188 f). Weaver mine; L.; one sample: c. (190 a). Wild Cat opening; L.; one sample: c. (188 d). Woods (Sterrett) bank; L.; one sample: c. (190 a).

Dauphin county. Coal (anthracite), statistics of the production of, in c. y. (625-630). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 d); statistics of the production of iron ore in c. y. (56-59). Siluro-Cambrian limonite ores of (187 d). Iron-ore mines: Derry mine; L.; one sample: c. (187 c). Swatara mine; L.; one sample: c. (137 c).

Delaware county. Garnet, statistics of the production of, in c. y. (840).

Elk county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

Fayette county. Coal (bituminous), statistics of the production of, in c. y (666-669). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 d); statistics of the production of iron ore in c. y. (56-59); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 b); carbonate ores of the Mauch Chunk red shale (204 c); carbonate ores of Lower Productive Coal Measures of (208 a); carbonate ores of Upper Productive Measures of (Pittsburgh coal horizon) (15 f. 211 b). Iron-ore mines: Center Furnace mines; C.; two samples: Fe,S,P,SiO_2 (204 f). Fayette Furnace mine; C.; two samples: Fe,S,P,SiO_2 (208 b). Fuller's (Dr.) mine; C.; one sample: c. (211 c). Hoggsett, Watt and Co.'s mine; C.; three samples: Fe,S,P,CaO,MgO,SiO_2 (212 d). Lemont mines; seven samples: Fe,S,P,SiO_2; one sample, c. (204 c, 212 b). Magiffin (J. S.) mine; C.; one sample: c. (208 d). Oliphant Furnace mine; C.; two samples: c. (211 f, 212 a). Vernon mines; c.; two samples: Fe,S,P,SiO_2 (204 c).

Franklin county. Barytes, statistics of the production of, in c. y. (839). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 d); statistics of the production of iron ore in c. y. (56-59). Devonian limonite ores of (202 c); Siluro-Cambrian limonite ores of (190 d, 191, 192). Iron-ore mines: Ahl's mine; L.; one sample: c. (193 a). Beaver mine; L.; one sample: c. (192 c). Bower's Furnace mine; L.; one sample: c. (202 b). Calliman (Thomas) mine; L.; one sample: c. (193 a). Chamber's (William L.) mine; L.; one sample: c. (193 d). Cressler (Joseph) mine; L.; one sample: c. (193 d). Douglass (Wyeth) mine; L.; one sample: c. (192 c). English mine; L.; one sample; c. (193 b). Garlick mine; L.; one sample: c. (192 d). George (Benjamin) mine; L.; one sample: c. (192 f). Gochenauer and Rohrer mine; L.; one sample: c. (193 c). Good's (Michael) ore-bank; L.; two samples: c. (19 c). Guilford mine; L.; one sample: c. (193 c). Hope mine (Mont Alto Iron Company); L.; one sample: c. (193 c). Jones' (Jennings) mine; L.; one sample: c. (192 c). Koser (Jacob) mine; L.; one sample: c. (193 d). Leib mine (J. S. Whitmer & Co); L.; one sample: c. (198 c). Lime Kiln mine; L.; one sample: c. (193 b). Lucy mine (Mont Alto Iron Company); L.; one sample: Fe,P. (191 c). McCleary's (Robert) mine; L.; one sample: c. (192 d). McFarland's (R. P.) mine; L.; one sample: c. (198 c). McHose mine; one sample: c. (193 d). McNeal mine (McCormick & Co); L.; one sample: L.; (193 a). Means mine; L.; one sample: c. (193 c). Mentzer (David) mine; L.; (192 c). Mont Alto Iron Company's mines; L.; five samples: c. (192 c, 193 a). Old Carrick Furnace mine; L.; two samples: c. (192 c). Old Mount Pleasant mine; L.; one sample: c. (192 b). Old Southampton mine; L.; one sample: c. (193 c). Pass Orchard mine; L.; one sample: c. (192 d). Pond mines, Nos. 1 and 2; L.; two samples: c. (193 b). Promise mine (Mont Alto Iron Company); L.; one sample: c. (193 c). Railroad mine; L.; one sample: c. (192 c). Richmond Furnace mine; L.; one sample: c. (198 c). Rock's (George) mine; L.; one sample: c. (192 d). Rock's (Jacob) mine; L.; one sample: c. (193 a). Ruby or Plas-

PENNSYLVANIA—Continued.

Franklin county—Continued.

ter mine; L.; one sample: c. (193 c). Ruth mine; L.; one sample: Fe,P. (191 c). Small (John) mine; L.; one sample: C. (192 f). Smith, Duncan and Avery's mine (see Webster mine); L.; one sample: c. (192 c). Stinger's (Squire) mine; L.; one sample: c. (192 d). Stouffer's (Jacob) mine; L.; one sample: c. (198 c). Webster mine (Smith, Duncan and Avery); L.; one sample: c. (192 d). Weinman's (George) mine; L.; one sample: c. (192 c). White Rock mine (Mont Alto Iron Company); L.; one sample: c. (193 c). Wiestling mine; L.; one sample: c. (193 d). Soapstone, statistics of the production of, in c. y. (845).

Fulton county. Devonian limonite ores of (201 c). Iron-ore mines: Awl (P.) & Bro.'s mine; L.; one sample: C. (201 c).

Greene county. Coal (bituminous), statistics of the production of in, c. y. (666-669).

Huntingdon county. Coal (bituminous), statistics of the production of, in, in c. y. (666-669). Glass-sand, statistics of the production of, in c. y. (840). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25d); statistics of the production of iron ore in c. y. (56-59). Clinton ores of (217 c); Devonian limonite ores of (200 d); Siluro-Cambrian limonite ores of (195 c). Iron-ore mines: Blacklog Gap (near Orbisonia) mine; F.; two samples: Fe,S,P,CaO,MgO,SiO_2 (218 b). Blacklog Gap (south side of) mine; F.; two samples: c. (218 a). Blacklog Mountain mine; L.; surface ore; one sample: Fe,Mn,S,P,SiO_2 (198 c). Diggin's (Jos.) mine; L.; one sample: Fe,S,P,SiO_2 (202 c). Douglass mine; L.; one sample: Fe,S,P,SiO_2 (200 f). Dull and Bradley's mine; F.; two samples: c. (218 f). Greenwood furnace (4 miles from) mine; F.; one sample: c. 218 d). Hick's mine; L.; one sample: Fe,S,P,SiO_2 (200 c). Lane mine; L.; one sample: Fe,S,P,SiO_2 (200 c). McAleavy's Fort mine; F.; two samples: Fe,S,P,CaO,MgO,SiO_2 (218 b). McCarthy's mine; L. and C.; one sample: c. (201 c). Mountain mine; L.; one sample: Fe,S,P,SiO_2 (200 f). Ramsey's (Alexander) property; L.; surface ore; one sample: Fe, Mn,S,P,SiO_2 (198 c). Sandy Ridge mine; L.; one sample: Fe,S,P,SiO_2 (200 f). Shade (Dr. J. A.) mine; L.; one sample: c (201 c). Stambach's (William) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (198 c). Taylor (Isaac) mine; L.; one sample: c. (201 c).

Indiana county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

Jefferson county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

Juniata county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 d); statistics of the production of iron ore in c. y. (56-59). Clinton ores of (216 d); Devonian limonite ores of (200 c). Iron ore mines: Aughey (Henry) mine; F.; one sample: Fe,S,P,SiO_2 (216 c). Aughey (Samuel) mine; F.; one sample: Fe,S,P,SiO_2 (216 c). Graham mine (Nos. 1, 2, and 3); F.; three samples: Fe,S,P,SiO_2 (216 c). Hirsh and Hiestand mine; F.; one sample: Fe,S,P,SiO_2 (216 c). Hankwell (Richard) mine; F.; one sample: Fe,S,P,SiO_2 (217 a). Hankwell (William) mine; F.; four samples: Fe,S,P,CaO,MnO,SiO_2,(217 a). Robinson (land of John), Licking Creek valley; F.; one sample: c (217 b).

McKean county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

Lackawanna county. Coal (anthracite), statistics of the production of, in c. y. (625-630).

Lancaster county. *Chromic iron, statistics of the production of, in c. y. (839).* Cobalt, statistics of the production of, in c. y. (840). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 d); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 b); Statistics of the production of iron ore in, in c. y. (56-59). Siluro-Cambrian limonite ores of (193 c). *Iron-ore mines: Chestnut Hill mines;* L.; five samples: c. (194 a). Nickel, statistics of the production of, in c. y. (843).

Lawrence county. Coal (bituminous), statistics of the production of, in c. y. (666-669). Hydraulic cement, statistics of the production of, in c. y. (841). *Iron ore: Amount of each kind of iron ore mined in the c. y.* (25 d); statistics of the production of iron ore in c. y. (56-59). Carbonate ores of Lower Productive Coal measures of (208 d). Iron-ore mines: Houck and Granniss's mine; C.; three samples: c. (209 a). Neshannock mine; C.; one sample: Fe,Mn,S,P,CaO,MgO. (205 c). New Castle mine; C.; *one sample: Fe,Mn,S,P,CaO,MgO. (205 c). Rose Point* mine; C.; two samples: c. (208 f). Ziegler's mine; C.; two samples: c. (209 b).

Lebanon county. Iron ore: Amount of each kind of iron ore mined in the c. y. (25 d); rank among counties producing over 100,000 tons of iron ore in c. y. (75 a); *statistics of the production of iron ore in, in c. y. (56-59);* magnetite mines of (226); Siluro-Cambrian limonite ores of (187 a): Iron-ore mines: Big Hill (Cornwall) mine; trap-dyke; described; sections (227). Bowman bank; L.; one sample: C. (187 b). Bucher's bank; L.; one sample: C. (187 b). Cornwall mine described; map and sections; M.; seven samples: Fe,P. (227 b, 566 c); output of iron ore, 1883, 1884 (34 b); product of iron ore in c. y. and its value and the number of employés (75 d). Elizabeth mine described (228 c). Grassy Hill mine described (227 b). Groh bank; L.; one sample: c. (187 b). Moyer's bank; L.; one sample: c. (187 b). Middle Hill (Cornwall) mine; plicated schists; described; sketch of (227 f). Strickler's mine; L.; one sample: c. (187 d). Yingst's bank; L.; one sample: c. (187 b).

Lehigh county. Hydraulic cement, statistics of the production of, in c. y. (841). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 d); rank among counties producing over 100,000 tons of iron ore in c. y. (75 a); statistics of the production of iron ore in, in c. y. (56-59); Siluro-Cambrian limonite ores of (182 a, 183 d, 184, 185). Iron-ore mines: Barber & Co.'s mine; L.; one sample; Fe,Mn,S,P,SiO_2 (182 a). Bastian's (Elwin) mine; L.; one sample; Fe,Mn,S,P,SiO_2 (182 b). Biery's (Jonas) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (184 d). Blank's mine; L.; one sample: Fe,Mn,S,P,SiO_2 (182 a). Bortz's (Alwyn) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (182 b). Bortz's & Koch's mine; L.; one sample: Fe, Mn,S,P,SiO_2 (182 c). Boyer's (Hiram) mine; L.; one sample: Fe,Mn,S, P,SiO_2 (184 d). Breinig's (Francis) mine; L.: one sample: Fe,Mn,S,P, SiO_2 (182 b). Breinig's (Thomas) mine; L.; one sample; Fe,Mn,S,P,SiO_2 (182). Brown's (P.) mine; L.; two samples: Fe,Mn,S,P,SiO_2 (183 f). Dancy's (Elias) mine; L.; one sample; Fe,Mn,S,P,SiO_2 (184 c). Fisher's (Francis) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (182 c). Fogel's (William B.) mine; L.; one sample; Fe,Mn,S,P,SiO_2 (182 b). Gackenbach's mine; L.; one sample: Fe,Mn,S,P,SiO_2 (182 c). Glick's (Charles) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (184 c). Grammis' (Jonas) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (182 c). Guth's (Calvin) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (184 d). Guth's mine; L.; one sample; Fe,Mn, S,P,SiO_2 (182 b). Heninger (John) mine; L.; one sample; Fe,Mn,S,P, SiO_2 (184 d). Hensinger (heirs) mine; L.; one sample: Fe,Mn,S,P, SiO_2 (182 a). Ironton Railroad Company's mine; L.; one sample: Fe, Mn,S,P,SiO_2; one c. (183 f, 184 b). Jobst's (H. & F.) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (184 c). Kaiser's (Harry) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (182 a). Keck & Ritter's mine; L.: one sample; Fe, Mn,S,P,SiO_2 (184 c). Kohm's (Solomon) mine; L.; one sample: Fe,Mn, S,P,SiO_2 (184 c). Kline's (Henry) mine; L.; one sample: Fe,Mn,S,P, SiO_2 (184 c). Kline's (James) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (184 d). Kline's (Jesse) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (184 c). Kraemlich & Lichtenwalner's mine; L.; one sample: Fe,Mn,S,P,SiO_2 (182 c). Kreischmann's mines; L.; two samples: Fe,Mn,S,P,SiO_2 (182 a), Kurtz's (widow) mine; L.; one sample: c.; *(185 d). Laro's (Jesse) mine;* L.; one sample: Fe,Mn,S,P,SiO_2 (182 c). Lauer's (Milton) mine; L.; one sample; Fe,Mn,S,P,SiO_2 (182 b). Levan's (Daniel) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (184 d). Lichtenwalner's mine; L.; one sample: Fe, Mn,S,P,SiO_2 (182 b, 182 c). Ludwig's New mine; L.; one sample: c. (183 c). *Ludwig's Old mine; L.; one sample: Fe,Mn,S,P,SiO_2 (182 a). Maple* Grove Hill mine; one sample: Fe,Mn,S P,SiO_2 (182 a). Marck's mine; L.; one sample: Fe,Mn,S,P,SiO_2 (182 a). Miller's (Charles) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (182 c). Mory's (G. & W.) mine; L.; one sample: one C.; (185 d). Mory's (Morgan) mine; one sample: L.; one C. (185 c). Moser's (Oliver) mine; L.; *one sample: Fe,Mn,S,P,SiO_2 (182 b).* Ritter's (J.) mine; L.; two samples; Fe,Mn,S,P,SiO (183 f). Romig's (Reuben) mine; one sample: Fe,Mn,S,P,SiO_2 (182 a). Roth's (John) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (184 c). Ruch & Brother's mine; L.; one sample; Fe,Mn,S,P,SiO_2 (184 d). Schneider's (David) mine; L.; one sample: c. (185 d). *Scholl (J. D.) & Co.'s mine; L.; one sample: Fe,* Mn,S,P,SiO_2 (182 c). Schwartz's mine; L.; one sample: Fe,Mn,S,P,SiO_2 (184 c). Seam's (Conrad) mine; L.; one sample: c. (185 c). Shankweiler mine; L.; one sample; Fe,Mn,S,P,SiO_2 (182 a). Shelver's mine; L.; one sample: Fe,Mn,S,P,SiO_2 (184 f). Sieger's (Samuel) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (184 c). *Smith's (J. & D.) mine; L.; one sample: Fe,Mn,* Mn,S,P,SiO_2 (182 c). Stein's (Henry) mine; L.; one sample: Fe,Mn,S,P, SiO_2 (182 c). Steininger's (Jacob) mine; L.; one sample; Fe,Mn,S,P, SiO_2 (182 c). Swartz & Fogel's mine; L.; one sample: Fe,Mn,S,P,SiO_2 (182 b). Thomas Iron Co.'s mine; L.; one sample; Fe,Mn,S,P,SiO_2 *(182 a). Trexler & Kline's mine; L.; one sample: Fe,Mn,S,P,SiO_2* (184 c). Weaver's (Benjamin) mine; L.; one sample; Fe,Mn,S,P,SiO_2 (184 d). Werner & Reinhart's mine; L.; two samples: Fe,Mn,S,P,SiO_2 (182 b) Wiand's mine; L.; one sample; Fe,Mn,S,P,SiO_2 (182 a). Whitley's (Nathan) mine; L.; one sample: Fe,Mn,S,P,SiO_2 (182 b). Lead and zinc, *statistics of the production of, in c. y. (804-805).*

Luzerne county. Coal (anthracite), statistics of the production of, in c. y. (625-630).

PENNSYLVANIA—Continued.

Lycoming county. Coal (bituminous), statistics of the production of, in c. y. (666-669). Iron ore: Amount of each kind of iron ore mined in the c. y. (25 d); Chemung fossil ores in (221 b); Clinton ores of (213 c); statistics of the production of iron ore in c. y. (56-59). Iron-ore mines: Furnace Run mine; F.; one sample: c. (221 d). Hayes mine; F.; one sample: c. (221 d). McGowan (Stewart's Run) mine; F.; one sample: c. (221 d). Quiggleville mine; F.; one sample: c. (221 d). Young's (J.) mine; F.; three samples: c. (213 c).

Mahoning county. Iron-ore mine: Henry (John) mine; C. (blackland); two samples: Fe,P. (238 c, 564 d).

Mercer county. Coal (bituminous), statistics of the production of, in c. y. (666-669). Iron ore: Amount of each kind of iron ore mined in the c. y. (25 c); statistics of the production of iron ore in c. y. (56-59).

Mifflin county. Glass-sand, statistics of the production of, in c. y. (840). Iron ore: Amount of each kind of iron ore mined in c. y. (25 c). Carbonate ore of the Marcellus formation (203a); Clinton ores (215a); statistics of the production of iron ore in c. y. (56-59). Iron-ore mines: Dull's (J. J.) mine; F.; one sample: c. (210 d). Ferguson Valley mine; F.; two samples: Fe,S,P,SiO_2 (215 c). Kinzer's (John) mine: F.; one sample: Fe,S,P,SiO_2 (215 c). Lewistown Section mine: c.; one sample; c. (203 d). Mann (J. H.) Logan Gap (near) mine; F.; two samples: Fe,S,P,CaO,MgO, SiO_2 (216 a). Matilda Furnace mine; F.; one sample: Fe,S,P,SiO_2 (215 f). McCormick's (Robert) mine; C.; one sample: Fe,S,P,SiO_2 (203 c). McKee's (George) mine; F.; two samples: Fe,S,P,SiO_2 (215 a). McVeytown Gap, Ross mine; L.; one sample: Fe,S,P,SiO_2 (200 d). Ross mine; C.; two samples: Fe,S,P,SiO_2 (203 b).

Montgomery county. Copper, statistics of the production of, in c. y. (798-799). Iron ore: Amount of each kind of iron ore mined in the c. y. (25 c); statistics of the production of iron ore in c. y. (56-59). Siluro-Cambrian limonite ores of (193 c). Iron-ore mines: Boyertown (Gable, Warwick, Phœnix, California) mines; M.; six samples: Fe,P. (229 d, 566 c). Soapstone, statistics of the production of, in c. y. (845).

Montour county. Iron ore: Amount of each kind of iron ore mined in the c. y. (25 c); statistics of the production of iron ore, in c. y. (5 b, 56). Clinton ores of (213 c).

Northampton county. Iron ore: Amount of each kind of iron ore mined in, in c. y. (25 c); rank among counties producing over 100,000 tons of iron ore in c. y. (75 a); statistics of the production of iron ore, in c. y. (51-59). Limonite ores of (181 c). Siluro-Cambrian ores of (202 c). Iron-ore mines: Wharton mine; L.; two samples: c. (181 f).

Northumberland county. Coal (anthracite), statistics of the production of, in c. y. (625-630). Iron ore: Amount of each kind of iron ore mined in the c. y. (25 c); statistics of the production of, in c. y. (51-59).

Perry county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 c); statistics of the production of iron ore in c. y. (56-59) Character of the limonite in the Marcellus shales in (15 b). Chemung fossil ores in (220 d). Clinton ores of (217 c). Devonian limonite ores of (199 c). Iron-ore mines: Cumbler (property) mine; F.; one sample: Fe,S,P,SiO_2 (220 c). Limestone Ridge Mining Company; L.; two samples: C. (200 c). Mush (B. G., and Co.) mine; F.; three samples: C. (217 c). Peterman's (George) mine; F.; four samples: C. (221 a). Rinesmith's mine; L.; one sample: C. (199 d). Washer mine; L.; three samples: C. (199 f, 200 b).

Schuylkill county. Coal (anthracite), statistics of the production of, in c. y. (625-630).

Snyder county. Iron ore: Amount of each kind of iron ore mined in the c. y. (25 c); statistics of the production of iron ore, in c. y. (56-59). Clinton ores of (214 a); principal ore-beds of the Clinton group in (13 c, 14). "Sand-vein ore" of, character of the (13 c). Iron-ore mines: Bickle's (Andrew) mine; F.; one sample: Fe,S,P,SiO_2 (214 f). Bloomsburg (Iron Company's) mine; F.; two samples: Fe,S,P,SiO_2 (214 c). Conrad (Dr. J. D.) mine; F.; four samples: Fe,S,P,SiO_2 (214 a). Cruikshank & Bros.'s mine; F.; one sample: Fe,S,P,CaO,MgO,SiO_2 (214 f). Earnest's (John) mine; F.; two samples: Fe,S,P,SiO_2 (214 d). Smithgrove (southeast of) mine; F.; one sample: Fe,S,P,SiO_2 (214 f). Swengle and Dunning mine; F.; one sample: Fe,S,P,SiO_2 (214 c).

Somerset county. Coal (bituminous), statistics of the production of, in c. y. (666-669); carbonate ores of Lower Productive Coal Measures of (200 b). Iron-ore mine: Clark (G. W.) mine; C.; one sample: c. (209 d).

Sullivan county. Carbonate ores of the Pocono Formation of (203 f).

Susquehanna county. Coal (anthracite), statistics of the production of, in c. y. (625-630).

Tioga county. Coal (bituminous), statistics of the production of, in c. y. (666-669). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 c); statistics of the production of iron ore in c. y. (56-59). Chemung fossil ores in (220 a). Iron-ore mines: Lower or Third (1 mile northwest of Mansfield) mine; F. one sample: Fe,S,P,CaO,Mg,SiO_2

PENNSYLVANIA—Continued.

Tioga county—Continued.

(220 b). Middle or Second (on Bixby's hill) mine; F.; one sample: Fe,S,P,CaO,SiO_2 (220 c). Ogden's Corners (1 mile southeast of); F.; four samples: Fe,S,P,SiO_2 (220 c). Upper or Mansfield mine; F.; three samples: Fe,S,P,CaO,MgO, SiO_2 (220 b).

Union county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 c); statistics of the production of iron ore in c. y. (56-59). Clinton ores of (213 c). Iron-ore mines: Union Furnace Company's mine; F.; one sample: Fe,S,P,CaO,MgO,SiO_2 (213 f).

Venango county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

Warren county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

Washington county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

Westmoreland county. Coal (bituminous), statistics of the production of, in c. y. (666-669); carbonate ores of Lower Productive Coal Measures of (209 b). Iron-ore mines: Bedford Pike mine; C.; one sample: Fe,S,P,SiO_2 (210 b). Jacob's Creek mine; C.; three samples: Fe,S,P,CaO,MgO,SiO_2 (209 f, 210 b).

York county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 c); rank among counties producing less than 100,000 tons and over 50,000 tons of iron ore (75 b); statistics of the production of iron ore in c. y. (56-59). Siluro-Cambrian limonite ores of (194 b); hematite ores of (180 d). Iron-ore mines: Bauman (Henry L.) mine; L.; two samples: c. (194 d). Bell mine, near Dillsburg; described (233 c). Bollinger's mine; L.; one sample: c. (194 d). Dillsburg mines described (233 c); M.; three samples: Fe,P. (566 d). Longnecker mine, near Dillsburg, described (233 c); H. Mine ore-bank; H.; two samples: c. (180 f). Underwood mine, near Dillsburg, described (233 c).

Penokie iron-field (9 c).

Phosphorus ratio. Defined (xxiii); amount of each kind of ore produced in each, state in c. y., with a sufficiently low phosphorus ratio to be classed as Bessemer (30 c); amount of ore produced in the United States in c. y. with a phosphorus ratio under 0.05 (31 d); amount of ore produced in the United States in c. y. with a phosphorus ratio greater than 1.00 (31 c, 32 b); a partial classification of the ores mined in the Lake Superior region in the c. y. by (9); a partial classification of the iron ore mined in the c. y. by phosphorus ratios, by kinds and by states (29 d, 30 a).

Pocono formation, carbonate ores of, in Pennsylvania (203 f).

Pod structure of iron ores in New Jersey (14 a).

Potsdam sandstone hematites in Virginia (10 c).

Pottsville conglomerate, carbonate ores of, in Pennsylvania (205 a).

Prime, Frederick, jr. On Potsdam age of certain shales in Botetourt county, Virginia (278 c); on the occurrence of limonite ore in Pennsylvania (11 a).

Proctor, J. R., on the ore-beds of the western coal-field, Kentucky (16 a).

Psilomelane ?, Bartow county, Georgia (381).

Pumpelly, Raphael, geographical and geological distribution of the iron ores of the United States (see contents for synopsis of this chapter) (3-36).

Putnam, Bayard T. Notes on the samples of iron ores collected in Connecticut and Massachusetts by (83 a); notes on the samples of iron ore collected in Michigan and northern Wisconsin by (421-455); notes on the samples of iron ore collected in New Jersey by (145-175); notes on the samples of iron ores collected in New York by (89-144); notes on the iron ores of Pennsylvania compiled by (179-221); on the center of total production of iron ore in the United States in 1880 (37); notes on the samples of iron ore collected west of the 100th meridian (469-505).

Pyrite (for sulphuric acid). Statistics of the production of, by states and counties (844); by states (852, 853).

Q.

Quartz and feldspar. Statistics of the production of, by states and counties (844); by states (852, 853).

R.

Raymond, R. W. Description of carbonate ore deposits in Columbia county, New York, referred to (136 a); on the thickness of the spathic iron-ore deposits on the Hudson river (12 f).

Report of the Austrian Commission to the Centennial Exposition called "Die Köhlen und Eisenerz-Lagerstätten Nordamerikas," by Professor Hans Höfer, references to (223 c).

RHODE ISLAND.

Coal (anthracite), statistics of the production of, in c. y. (625-630, 650-651). Iron ores, partial analyses of (566, 567).

Newport county. Coal (anthracite), statistics of the production of, in c. y. (625-630).

Providence county. Iron Hill mine; M.; one sample: Fe,P,S,TiO_2 (566 c).

Rocky mountains (see Montana).

Rogers, W. B.. Geological position of the Wythe county, Virginia, limonite, according to (11 b); iron-ore beds on the James river considered to be Huronian by (6 f); on Canadian age of rocks of Cripple creek and New River ore belt in Virginia (273 c); on "Iron Ores of the Metamorphic or Gneissic Rocks" of Pennsylvania, quotations from (223 c); on Potsdam age of certain shales in Botetourt county, Virginia (278 c).

Royalties paid on each kind of iron ore mined in each state in c. y. (32 c); on iron ore in England (32 c).

Russia. Pounds of iron consumed per head of population (34 c); production of iron ore in, in 1880 (33 c).

S.

Safford, Professor J. M. On geological horizon of east Tennessee iron ores (351 b); on "Hard, solid ore" in Tennessee (346 d).

Schmidt, A., on the alteration of specular ore in Missouri (12 c).

Scotland, royalty paid on iron ore and coal in (32 c).

Scythe-stones. Statistics of the production of, by states and counties (845); by states (852-853).

Shaler, N. S. Mica mines of New England (832-836).

Shepard, C. N., description of spathic ore in Litchfield county, Connecticut, by, referred to (83 b).

Shoemakers' sandstone. Statistics of the production of, by states and counties (845); by states (852-853).

Siderite in Vermont (86).

Siluro-Cambrian, see Silurian, Lower.

Silurian, Lower. Limonite deposits, occurrence of (10 c), yield of, in 1880 (11 d); preponderating iron ore of the (22 b).

Silurian, Lower. Amount of each kind of iron ore mined in each state in the c. y. (21 b); amount of iron ore mined in the United States in the c. y. (22 c); amount of Bessemer ore mined in the United States in the c. y., and its per cent. of total Bessemer ore product (81 c).

Silurian, Lower. Carbonate ores of Pennsylvania (202 d). Hematite in Missouri (407-420); in New York (141-144); in Pennsylvania (180 d); in Virginia (277 d). Limonite in Alabama (383-398, 400); in Connecticut (83-86); in Georgia (367-378); in Maryland (254-259); in Massachusetts (86, 87); in Missouri (403 b); in New Jersey (176, 177); in Pennsylvania (181 c); in Tennessee (331-346); in Vermont (80, 81); in Virginia (273 c, 286). Magnetite in Maryland (257 c); in Pennsylvania (223-234).

Silurian, Upper, preponderating iron ore of the (22 b).

Silurian, Upper. Amount of each kind of iron ore mined in each state in c. y. (21 b); amount of iron ore mined in the United States in the c. y. (22 c).

Silurian, Upper. Fossil ore in Alabama (392-398); in Georgia (378); in Maryland (260 a); in New York (137-141); in Pennsylvania (213-219); in Tennessee (348-350, 351-357). Limonite in Virginia (288 c).

Silver. Imports and exports of ores in c. y. (829); produced in c. y. (828).

Smelting works, grand totals for, east of the 100th meridian (827-828). (See Industries of the Base Metals.)

Smith, E. A. Division of the Alabama limonites by; on age of Alabama iron ores (367 a, 383 b).

Smock, J. C., on magnetite in New Jersey gneisses (5 f).

Soapstone. Statistics of the production of, by states and counties, 845; by states (852-853).

South America and islands, pounds of iron consumed per head of population (34 c).

SOUTH CAROLINA.

Asbestos, statistics of the production of, in c. y. (839, 846-847).

Kaolin, statistics of the production of, in c. y. (842, 848-849).

Aiken county. Kaolin, statistics of the production of, in c. y. (842).

Pickins county. Asbestos, statistics of the production of, in c. y. (839). Iron ores, partial analyses of (566, 567).

York county. Huronian magnetic ore of (319 b). Iron-ore mines: Brockley mine; Huronian?; described; sketch map (319 d); one sample: Fe,P. (319 d, 566 c). Black-ore mine, near Broad river; Huronian; described (320 a); M.; one sample: not analyzed (320 b). Lee mine; Huronian?; described (319 b); one sample: Fe,P. (319 b, 566 c). Plantation mine; Huronian?; described (319 c); M. and H.; one sample: Fe,P. (319 c, 566 f). Red-ore mine, near Broad river; Huronian (320 a); M.; one sample: Fe,P. (320 a, 566 c). Silver Mountain mine; Huronian; described (320 c); M.; one sample: Fe,P,Si. (320 c, 566 f). Stewart mine; Huronian? (319 b).

Spain. Production of iron ore in 1870-1884 (33 d); production of iron ore in 1882 (33 a).

Sub-carboniferous iron ores in the United States (15 c). Limonite: Amount of, mined in each state in the c. y. (21 b); amount mined in the United States in the c. y. (22 c); in Alabama (401); in Kentucky (289, 290); in Tennessee (357-364).

Swank, J. M., statistics of iron returns in 1882-1884, by (33 d).

Sweden and Norway, pounds of iron consumed per head of population (34 c).

Sweden, production of iron ore in, in 1881 (33 c).

T.

Table 1. Condensed statement of mineral production of regular mining industries for the United States (xxviii). 2. Averages applicable to mineral products, from regular establishments, from census of 1870 and 1880, in the United States (xxviii). 3. Percentages of gain in the factors of the mining industries (regular establishments) since the census of 1870, in the United States (xxviii). 4. Productions of the non-precious mineral industries (regular establishments only), by substances and by states (xxx). 5. Coal and iron-ore product, by industrial fields east of the 100th meridian (xxxii). 6. Iron ore mined in the c. y., by geological horizons, by states, and by kinds (21 b); explanation of (22 a). 7. Iron ore mined in the c. y., by states, and by kinds (23 a). 8. Iron ore mined in the c. y. by states and counties and by kinds (23 c). 9. Iron ore mined in the c. y., (a) by kinds of ore and its per cent. of metallic iron, and (b) by kinds of ore and the amount of its contained iron (26, 27). 10. Iron ore mined in the c. y., by its per cent. of metallic iron, by kinds, and by states (27, 28). 10 a. Metallic iron in the ore mined in the c. y., by states, kinds of ore, and its per cent. in metallic iron (28); explanation of 10 and 10a (29 a). 11. A partial classification of the iron ore mined in the c. y., by phosphorus ratios, by kinds, and by states (29 c); explanation of (30 d, 31 a). 12. Bessemer ore mined in the c. y., by kinds and by states (30 c). 13. Royalties, by kinds of ore and by states (32 c). 14. Statistics of the production of iron ore, by states and counties (40-63). 15. Statistics of the production of iron ore, by states (64-67). 16. Production of iron ore in c. y., by states (condensed table) (68-69); remarks on (70 a). 17. Production of iron ore in c. y., general average, by states (70-71); remarks on the table (73 a). 18. Changes in the iron ore mining industry in the United States during the decade ending June 1, 1880, expressed in percentages on the returns of the census of 1870 (73 d); remarks on the table (73 c). 19. List of iron-ore producing states in order of the production of 1880 (74 d). 20. The rank of the 16 states reported in the census of 1870, as producers of iron ore (74 c); remarks on the table (74 c). 21. List of counties of the first class producing over 100,000 tons (75 a); remarks on the table (75 b). 22. List of counties of the second class producing less than 100,000 tons and over 50,000 tons (75 b); remarks on the table (75 c). 23. List of iron mines that produced over 50,000 tons of ore in c. y. (75 b); remarks on (75 d). 24. For phosphorus and phosphoric acid (511 d). 25. Partial analyses of iron ores (520-581). 26. Complete analyses of iron ores (583-601). 27. Production of anthracite coal, by states and counties (625 a). 28. Production of anthracite coal, by states (634-635). 29. Production of bituminous coal east of the 100th meridian, by states and counties (642-673). 30. Production of coal east of the 100th meridian, by states (674-675). 31. Production of semi-anthracite coal (675). 32. Production of bituminous coal and lignite west of the 100th meridian, by states and counties (676-678). 33. Production of bituminous coal and lignite west of the 100th meridian, by states (679). 34. Production of bituminous coal, by states, east of the 100th meridian (681-682). 35. *General average, bituminous* coal (683). 36. Production of bituminous coal during c. y. ending May 31, 1880, compared with the one ending May 31, 1870, for mines east of the 100th meridian (684). 37. List of counties of the first class east of the 100th meridian, *i. e.*, producing over 500,000 tons per annum (684). 38. List of counties of the second class east of the 100th meridian, *i. e.*, producing over 250,000 tons per annum (685 a). 39. Rank of the states east of the 100th meridian producing bituminous coal in the c. y. ending June 1, 1880 (685 c). 40. Rank of states east of the 100th meridian, as producers of bituminous coal, according to the census of 1870 (685 c). 41. Production of bituminous coal and lignite west of the 100th meridian (686 a). 42. Production of coal in the United States for the year ending June 1, 1880, by coal-fields (686 c). 43. 187 Ohio coal mines classified on the basis of power used (687). 44. 100 Indiana coal mines classified on the basis of power used (687). 45. Analyses of representative samples of *Washington territory coals and lignites (761-762). 46. Analyses of* commercial samples from the coal-fields of Washington territory (769-771). 47. Proximate analyses of the coals and lignites of the northwest (776-789). 48. Elementary composition of some of the western coals and lignites, dried, ashless, and free from sulphur. 49. Production of copper east of the 100th meridian (798-799). 50. Production of copper west of the 100th meridian (800). 51. Production of lead and zinc ore east of the 100th meridian, by counties (804-805). 52. Production of lead and zinc ore east of the 100th meridian, by states (806). 53. Lead-smelting works, by states (810). 54. Lead-smelting works, by states, etc. (811, 812, 816, 817). 55. To produce one ton of lead, by states and regions (819). 56. Relation of product to lead ore consumed, by states (820). 57. Machinery employed in the reduction of lead ores, by states (820 c, 821 a).

Table 58. Comparative view of lead industry for the years 1850, 1860, 1870, and 1880 (821). 59. Zinc-smelting works (821, 822). 60. Percentages of metal obtained from the ores, by regions (823). 61. Average cost of materials, labor, etc., per ton of metal produced (824 b). 62. Representation of the furnace plant of the zinc smelters of the western states (824 d). 63. Mechanical plant employed in the reduction of zinc ores (824). 64. Copper-smelting works (825). 65. Leading statistics of materials, etc., based upon a product of 1 ton of copper (826). 66. Smelting and refining works east of the 100th meridian (826). 67. Grand total of smelting-works (827). 68. Imports and exports of ores of copper (828). 69. Imports and exports of ores of silver and gold (829). 70. Imports and exports of zinc (829). 71. Imports and exports of lead (830). 72. Imports and exports of copper (830 b). 73. Imports and exports of tin (830 c). 74. Imports and exports of bullion (830 d). 75. Statistics of the production of minor minerals, by states and counties (839-845). 76. Statistics of the production of minor minerals, by states (846-853). Table showing a partial classification of ores mined in the Lake Superior region in the c. y., according to phosphorus ratios (9); table showing the classification of the product of the Lake Superior mines in the c. y., by kinds of ore and its contents in metallic iron (8 f, 9 a).

Talc. Statistics of the production of, by states and counties (845); by states (852-853).

TENNESSEE.

Coal (bituminous), statistics of the production of, in c. y. (666-669, 674-675).

Copper ore, statistics of the production of, in c. y. (798-799).

Iron. Amount in ore mined in c. y. and its per cent. of total ore in United States' ore product (19 f); amount of iron in the different kinds and grades of ore mined in, in the c. y. (28 f); average per cent. of iron in ore mined in c. y. (19 f).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 f); to total amount of ore (74 c).

Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 f, 74 c); average value per ton (19 f); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 b); amount of each kind of ore mined in each county in the c. y. (25 f); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (28 b); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 c, 30 b); royalty paid on each kind of ore mined in, in c. y. (32 c).

Iron ore. Statistics of the production of iron ore in c. y. (56-59, 64-69); general averages of these statistics (70-71).

Iron ore. Bessemer, amount of each kind mined in c. y. (30 c); its per cent. of the Bessemer ore product of the United States (30 c).

Iron ores. Complete analyses of (596-599); partial analyses of (566-573).

Iron ores. Limonites, belts of (10 d); occurrence of the Clinton ores (13 d); character of the iron ore in the Devonian shales (15 b); residuary limonite (15 c).

Iron ores. Notes on the samples of iron ore collected in, by Bailey Willis (331-350); iron ore sample *map* of Tennessee and North Carolina (geologically colored) (Plate XXXV). LIMONITES.—Polk county (331); McMinn county (332); Monroe county (332); Blount county (334); Sevier county (335); Cocke county (336); Hamblen county (336); Greene county (337); Washington and Union counties (338); Carter and Johnson counties, *map* of, and parts of adjacent counties (340); Sullivan county (345). SPECULAR ORES (346). DYESTONE ORES.—*Map* of portions of Anderson, Campbell, and Scott counties, showing deposits of fossil ore; sampled (348).

Iron ores. Notes on the samples of iron ore collected in, by W. M. Chauvenet (351-365); *map* of Tennessee showing the iron region in (352). FOSSIL ORES.—*Map* of the valley of East Tennessee, showing ranges of fossil ores; James county (351); Bradley county (353); Rhea county (354); Meigs county (355); Roane county (357); *map* of the iron region of western Tennessee. LIMONITES.—Lawrence county (357); Wayne county (359 a); Decatur county (359); Perry county (359); Hickman county (360 c); Dickson county (360); Montgomery county (362); Stewart county (363).

Lead and zinc ore, statistics of the production of, in c. y. (804-805, 806).

Anderson county. Coal (bituminous), statistics of the production of, in c. y. (666-669). Iron-ore mines: Clear Branch mine; F.; one sample: Fe,P. (349 a, 570 d). Lone Mountain mine; F.; one sample; Fe,P. (349 a, 568 f).

Blount county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 f); statistics of the production of iron ore in c. y. (56-59); Lower Silurian limonite ores of (334 b). Iron-ore mines: Abram's Creek mine; Lower Silurian; described (334 c); L.; one sample: Fe,P. (334 d, 568 e). Cade's Cove mine (land of William Feezelle); Lower Silurian; described; (334 c); L.; one sample: Fe,P. (334 c, 568 e); Carpenter mine; Lower Silurian; described (335 a); L.; one sample: Fe,P,S. (335 a, 568 f). Flat

TENNESSEE—Continued.

Blount county—Continued.

o' the Mountain mine; Lower Silurian; described (334 d); L.; one sample: Fe,P,Mn. (334 d, 568 f). Kerr's (widow) mine; Lower Silurian; described (335 b); L.; one sample: Fe,P,S. (335 b, 568 f). Mount mine; L.; one sample: Fe,P. (568 f). Razer mine; Lower Silurian; described (334 d); L.; one sample: Fe,P. (334 d, 568 e). Seaton mine; Lower Silurian; described (335 a); L.; one sample: Fe,P,S. (335 a, 568 f). Wilson mine; Lower Silurian; described (335 a); L.; one sample: c.; one sample: Fe,P,S. (335 a, 568 f, 597).

Bradley county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 f); statistics of the production of iron ore in c. y. (56-59). Iron-ore mines: Hinch's mine; F.; one sample: Fe,P. (353 d, 566 f). Smith mine; F.; one sample: Fe,P. (353 c, 566 f).

Campbell county. Coal (bituminous), statistics of the production of, in c. y. (666-669); Scott, and Anderson counties, map of portion of (348). Iron-ore mine: Big Creek Gap mine; F.; one sample: Fe,P. (349 b, 570 d).

Carter county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 f); statistics of the production of iron ore in c. y. (56-59); and Johnson, and parts of adjacent counties, map of (340); and Johnson counties, Lower Silurian limonite and manganese ores of (339 d). Iron-ore mines: Bear Wallow mine; Lower Silurian (340 f). Blevins mine, Stony creek; Lower Silurian; described (345 b); one sample: Fe,P,Mn (344 d, 572 c). Cannon mine; Lower Silurian; described (345 b); H. (s); one sample: Fe,P. (345 b, 346 c, 347 a, 572 d). Carden's (Wesley) mine; Lower Silurian; described (341 d); L.; one sample: Fe,P. (341 d, 572 c). Cedar Hill mine; Lower Silurian; described (340 f); L.; one sample; Fe,P. (340 f, 341 b, 572 c). Duggers mine; Lower Silurian; described (345 b); L.; one sample: Fe,P. (345 b, 572 c). Ferguson mine; Lower Silurian; described (345 c); L.; one sample: Fe,P. (345 a, 572 c). Hodge mine; Lower Silurian; described (345 a); L.; one sample: c. (345 a, 572 c, 599). Hurley mine; Lower Silurian; described (345 b); L.; one sample: Fe,P. (345 b, 572 c). Lips mine; Lower Silurian; described (345 a); L.; one sample: Fe,P. (345 a, 572 c). Maxwell mine; Lower Silurian; described (345 b); H. (s); one sample; Fe,P. (345 b, 347 a, 572 c). Queen's Station mine; Lower Silurian; described (341 a); L.; one sample: c. (341 a, 572 c, 598). Red Shear mine; Lower Silurian; described (345 a); L.; one sample: Fe,P. (345 a, 572 d). Specular mine; Lower Silurian; described (345 a); L. and H. (s); one sample: C. (345 a, 572 c, 599). Taylor mine; Lower Silurian; described (344 f); L.; one sample: c. (344 f, 345 c, 572 c, 599).

Claiborne county. Lead and zinc, statistics of the production of, in c. y. (804-805).

Cocke county. Iron ores: Lower Silurian; limonite ores of (336 b). Iron ore mines: Mantooth's (James) (see Mine ridge) (570 f). Mine Ridge mine (see Mantooth); Lower Silurian; described (336 c); L.; one sample; Fe,P. (336 d, 570 f). Smith's mine (Major W. R.); H. (s); one sample, c. (347 c, 570 f, 597). Southern States Coal, Iron, and Land Company's mine (see Wolf creek); Lower Silurian; described (336 d); L.; one sample: Fe,P. (336 d, 570 f). Wolf Creek mine (336 d, 570 f).

Cumberland county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

Decatur county. Iron-ore mines: Brownsport furnace; one sample: Fe,P. (359 f, 360 a, 570 a). Decatur furnace; L.; one sample: Fe,P. (359 c, 568 f).

Dickson county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 f); statistics of the production of iron ore in, in c. y. (56-59). Iron-ore mines: Bell mine; L.; one sample: Fe,P. (361 c, 362 a, 570 b). Boston mine; L.; one sample: Fe,P. (361 f, 362 a, 570 c). Cumberland furnace banks (see Bell, Dry Hollow, Nye, Burton, Henry Drake, and Red Banks) (361 a, 262 b, 570 b). Henry Drake mine; L.; one sample: Fe,P. (361 f, 362 a, 570 b). Nye mine; L.; one sample: Fe,P. (361 f, 362 a, 570 b). Piney Furnace mine; L.; two samples: Fe,P. (360 f, 361 a, 570 b). Red mine; L.; one sample: Fe,P. (361 f, 362 a, 570 b). Worley furnace; L.; two samples: Fe,P. (361 b, 570 b).

Franklin county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

Greene county. Lower Silurian limonite ores of (337 a). Iron-ore mines: Camp Creek forge (George Babb's land); one sample: Fe,P. (337 c, 570 f). Greene Ridge mine; Lower Silurian; described (337 a); L.; two samples; Fe,P. (337 d, 570 f). Lamb mine; Lower Silurian; described (337 a); L.; one sample: Fe,P. (337 a, 570 f). Stephens mine; Lower Silurian; described (337 a); L.; one sample: Fe,Mn. (337 a, 570 f). Varner mine; Lower Silurian; described (337 a); L.; one sample: Fe,P. (337 a, 570 f).

Grundy county. Coal (bituminous), statistics of the production of, in c. y. (666-669). Iron ore, amount of each kind of iron ore mined in, in the c. y. (25 f).

TENNESSEE—Continued.

Hamblen county. Iron ore: Statistics of the production of, in c. y. (56-59). Lower Silurian limonite ores of (336 c). Iron-ore mines: Vineyard mine; Lower Silurian; described (336 c); L.; one sample: Fe,P. (336 f, 570 c). Williams mine; Lower Silurian; described (336 c); L.; one sample: Fe,P. (336 f, 570 c).

Hamilton county. Coal (bituminous), statistics of the production of, in c. y. (666-669). Iron ore mines: Chattanooga (1½ mile south of); F.; two samples: Fe,P. (354 c, 568 a). Coker mine (Clift and Sawyers); Clinton; described; section (353 c); F.; two samples: Fe,P. (353 f, 354 a, 568 a). Lowe's mine; F.; two samples: Fe,P. (568 a).

Hickman county. Iron-ore mines: Ætna mine; L.; one sample: Fe,P. (360 d, 570 a). Old Mill Creek furnace; L.; one sample: Fe,P. (360 c, 570 b).

James county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 f); statistics of the production of iron ore in, in c. y. (56-59). Iron-ore mines: Burns' mine; F.; one sample: Fe,P. (566 f). Green's mine; F.; three samples: Fe,P. (353 a, 566 f). Ragon's mine; described; section (351 f, 353); F.; one sample: Fe,P. (566 f).

Jefferson county. Lead and zinc ore, statistics of the production of, in c. y. (804-805).

Johnson county. Iron ore: Amount of each kind of ore mined in, in the c. y. (25 f). Iron ore: Statistics of the production of iron ore, in c. y. (56-59). And Carter and parts of adjacent counties; map (340). And Carter counties; Lower Silurian limonite ores of (339 d). Iron-ore mines: Baker mine; Lower Silurian; described (343 f); L.; one sample: c. (343 b, 572 c, 598). Blevin's (Armstead) mine; Lower Silurian; described (344 d). Blevin's (Arm-tead) mine; L.; one sample: Fe,P. (345 b, 572 c). Brown's forge (see Songa Hollow mine) (342 f, 572 c). Butler's mine; Lower Silurian; described (343 f); L.; one sample: Fe,P. (344 a, 572 c). Cove mine; Lower Silurian; described (343 f); L.; one sample: Fe,P. (343 b, 572 c). Cross Mountain mine; H.(s).; one sample: Fe,P. (572 c). Donnelly's mine; Lower Silurian; described (343 f); L.; one sample: Fe,P. (343 f, 572 c). Dugger (John) mine; Lower Silurian; described (343 b). Far Mountain mine; Lower Silurian; described (342 d); L.; one sample: Fe,P. (342 d, 572 d). *Ground-Hog mine; Lower Silurian* (342 d). King mine; Lower Silurian; described (344 d); one sample: Fe,P,Mn. (344 d, 572 f). Laurel Fork mine; Lower Silurian; described (344 d); L.; one sample: Fe,P. (344 b, 572 c). Mast mine; Lower Silurian; described (343 a); L.; one sample: Fe,P. (343 a, 572 c). Near Mountain mine; Lower Silurian; described (342 d); L.; one sample: Fe,P. (342 d, 572 d). Rankine's mine; Lower Silurian; described (342 c); L.; one sample: Fe,P. (342 c, 572 d). Road Hollow mine; Lower Silurian; described (343 b). Stout's mine; Lower Silurian: described (342 c): Silver mine; Lower Silurian; described (344 d). Songa Hollow (Brown's forge) mine; Lower Silurian; described (342 f); L.; one sample: Fe,P. (342 f, 572 c). Stout's mine; L.; one sample: Fe,P. (342 c, 572 d). Taylor's mine; Lower Silurian; L.; one sample: Fe,P. (343 b 572 c). Tompkins mine; Lower Silurian; described (342 d); L.; one sample: Fe,P. (342 d, 572 d). Wash Place mine; Lower Silurian; described (341 f); L.; *one sample: c. (341 f, 342 a, 572 d, 598).*

Knox county. Iron-ore mine: Peters and Mowry; one sample: Fe,P. (350 f, 568 f). Lead and zinc, statistics of the production of, in c. y. (804-805).

Lawrence county. Iron ore: Amount of each kind of iron ore mined in, in c. y. (25 f); statistics of the production of iron ore in c. y. (56-59). Iron-ore mines: Davis mine (see Napier's furnace); L.; one sample: Fe,P. (358 a, 568 c). Lawrenceburg (6 miles southwest of); L.; one sample: Fe,P. (357 f, 568 c). Napier's furnace (see Davis and Pinion mines (358 a, 568 c). Pinion mine (see Napier's furnace; Lower Silurian; described; sketch of a pot of limonite from (358 a); L.; two samples: one, Fe,P., one c. (358 a, 368 c, 596).

Marion county. Coal (bituminous), statistics of the production of, in c. y. (666-669).

McMinn county. Iron ores: Lower Silurian limonite ores of (332 c). Iron-ore mines: Burke's (Sheriff William) mine; H. (s); one sample: Fe,P. *(346, 347, 568 d). Cates' (Charles) mine; Lower Silurian; described (332 d);* L.; one sample: Fe,P,S (332 d, 568 d). Hill's mine; Clinton (332 c); F.; one sample: Fe,P. (350 d, 568 d). Patty's (R. G.) mine; Lower Silurian; described (332 d); L.; one sample: Fe,P,S. (332 c, 568 d). Stonedye mine; Archæan (332 c); one sample: Fe,P. (346 f, 347 a, 568 c).

Meigs county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 f); statistics of the production of, in c. y. (56-59). Iron-ore mine: Kendrick's mine; F.; one sample: Fe,P. (355 d, 568 b).

Monroe county. Lower Silurian limonite ores of (332 f). Iron-ore mines: Anderson's mine; Lower Silurian; L.; one sample: Fe,P,Mn. (334 a, 568 c). Curd's mine, near Jalapa; Lower Silurian; described (333 a); L.; one sample: Fe,P. (333 a, 568 c). Donnelly's mine; Lower Silurian; described (333 c); L.; one sample: Fe,P,Mn. (333 c, 568 c). Griffith's (Je-

TENNESSEE—Continued.

Monroe county—Continued.

rome) mine; Lower Silurian; described (332 f); L.; one sample: Fe,P. (332 f, 333 a, 568 c). Hale mine; Lower Silurian; described (333 b); L.; one sample: c. (333 b, 568 c, 597). Tellico mine; Lower Silurian; described (333 c); L.; one sample: Fe,P,Mn (333 f, 568 c).

Montgomery county. Iron-ore mines: Bryan's mine; L.; one sample: Fe,P. (362 c, 570 d). Poplar Springs mine; L.; one sample: Fe,P. (363 a, 570 d). Steel's mine; L.; one sample: Fe,P. (362 d, 570 d). Vernon furnace; L.; one sample: Fe,P. (362 c, 570 d).

Perry county. Iron-ore mines: Cedar Grove furnace; L.; one sample: Fe,P. (360 b).

Polk county. Iron ore, Lower Silurian limonite ores of (331 d). Copper, statistics of the production of, in c. y. (798-799). Iron-ore mines: Ducktown mine; Archæan; described (331 c); L.; two samples: Fe,P,Cu (331 d, 568 d). Gee Creek Gap mine; Lower Silurian; described (332 b); L.; two samples: Fe,P. (332 b, 568 d). Loudon mine; Archæan; described (331 f); L.; one sample: Fe,P,Cu (331 c, 568 d).

Rhea county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (25 f); *statistics of the production of iron ore in c. y. (56-59).* Iron-ore mines: Hill and Tarwater mine; Clinton; described; section; plan (354 c); F.; three samples: one c. (354 d, 355 a, 568 c, 596).

Roane county. Coal (bituminous), statistics of the production of, in c. y. (666-669). Iron ore: Amount of each kind of iron ore mined in, in c. y. (25 f); statistics of the production of iron ore in c. y. (56-59). Iron-ore mines: Brown's mine; F.; two samples: Fe,P. (355 c, 568 b). Oakdale Furnace mine (see Solomon's mine). Piatt's mine; Clinton; described; section (356 b); F.; two samples: Fe,P. (356 c, 568 b). Roberts (J. D.) mine (see Welcker, B. F.) (356 a, 568 b). Solomon's (Oakdale furnace) mine; F.; two samples: Fe,P. (357 a, 568 b). Welcker's (B. F.) property (see J. D. Roberts); F.; two samples: Fe,P. (356 a, 568 b).

Scott county. David's, Widow mine; Clinton; described; section (349 d 350 a); F.; one sample: Fe,P. (349 c, 570 c). Stanfield's (Lewis) mine; F.; three samples: Fe,P. (349 c, 570 c).

Sevier county. Lower Silurian limonite ores of (335 f). Iron-ore mines: Love's Furnace mine; Lower Silurian; described (335 f, 336 a); L. and M.; two samples: Fe,P. (335 f, 336 a, 570 c). Newman's mine; Lower Silurian; described (335 f); L.; one sample: Fe,P. (335 f, 336 b, 570 b).

Stewart county. Iron ore: Amount of each kind of iron ore mined in the c. y. (25 f); statistics of the production of iron ore in c. y. (56-59). Iron-ore mines: Banagan and Shurlock mine; L.; one sample: Fe,P. (364 f, 570 c). Bear Springs furnace; L.; one sample: Fe,P. (364 c, 570 c). Bellwood mine; L.; two samples: Fe,P. (364 a, 570 c). Clark Furnace mines; L.; one sample: Fe,P. (364 d, 570 c). East Bellwood mine; L.; one sample: Fe,P. (364 b, 570 c). Fig and Bayley mine; L.; one sample: Fe,P. (364 f, 570 c). Graveyard mine; L.; one sample: Fe,P. (364 b, 570 c). La Grange mine; L.; one sample: c.; one sample: Fe,P. (364 c, 365 a, 570 c, 597). Mound mine; L.; one sample: Fe,P.; one sample: c. (363 d, 570 c, 597). Outlaw (E. C.); L.; one sample: C. (363 c, 570 d). *Pipe mine (Clark furnace); L. (pipe); one sample: Fe,P. (364 c, 570 c).* Race mine; L.; one sample: Fe,P. (364 b, 570 c). Rough and Ready furnace; L.; one sample: Fe,P. (363 b, 570 c). Sheridan mine; L.; one sample: c.; one sample: Fe,P. (364 c, 365 a, 570 c, 597). West Bellwood mine; L.; one sample: Fe,P. (364 b, 570 c).

Sullivan county. Iron-ore mines: Crockett mine; H. (s); one sample: Fe,P,S. (345 f, 572 f). Sharp mine; M.; one sample: c. (346 a, 572 f, 598).

Unicoi county. Iron ore: Lower Silurian limonite of (338 a). Iron-ore mines: Big mine; L.; one sample: Fe,P. (572 b). Blue Springs mine; Lower Silurian; described (339 a); L.; one sample: Fe,P. (339 a, 572 b). Casper mine; Lower Silurian; described (338 f); L.; one sample: Fe,P. (338 f, 339 a, 572 f). Embreeville Furnace (Cold short) mine; Lower Silurian; L.; one sample: Fe,P. (338 d, 572 b). Hamum's (Dr.) mine; L.; one sample: Fe,P. (572 b). Keener mine; L.; one sample: Fe,P. (572 b).

Union county. Lead and zinc ore, statistics of the production of, in c. y. (804, 805).

Washington county. Iron ore: Lower Silurian limonite of (338 a). Iron-ore mines: Bompass Cove (lead) mine; Lower Silurian described (338 a). Bompass Cove (main bank) mine; Lower Silurian; described (338 a). Hufline's mine; Lower Silurian; described (339 c); L.; one sample: Fe,P. (339 c, 572 a). Lead mine (Bompass cove); Lower Silurian; described (338 a); L.; one sample: Fe,P. (338 c, 572 b). Main bank; L.; one sample; Fe,P. (338 c, 572 b).

Wayne county. Iron-ore mines: Marion furnace mines (see Red mine and White mine). Red mine; L.; one sample: c. (see Marion furnace) (359 c, 568 c, 597). Wayne Furnace mine; L.; one sample: Fe,P. (359 a, 568 c). White mine (see Marion furnace); L.; one sample: Fe,P. (359 b, 568 c).

TENNESSEE—Continued.

White county. Coal (bituminous), statistics of the production of, in c. y. (666–669).

Tertiary bog-ores in eastern counties of North Carolina (302 b); in Nash county, North Carolina (302 d).

TEXAS.

Iron. Amount in ore mined in the c. y. and its per cent. of total iron in the United States ore product (19 f); amount of iron in the different kinds and grades of ore mined in, in the c. y. (28 f); average per cent. of iron ore mined in c. y. (19 f).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 f); to total amount of ore (74 e).

Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 f, 74 e); average value per ton (19 f); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 b); amount of each kind of ore mined in each county in the c. y. (26 a); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (28 b); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 e, 30 b).

Iron ore. Statistics of the production of iron ore in c. y. (56–59, 64–69).

Marion county. Iron ore: Amount of each kind of iron ore mined in the c. y. (26 a); statistics of the production of iron ore in, in c. y. (56–59).

Tin, imports and exports of (830).

Titaniferous magnetite, Lower Laurentian, in Forsyth, Guilford, and Rockingham counties, N. C. (308 c); in New Jersey (147 a); in New York (106 f, 108 a); in the Rocky mountains (472 c).

Triassic blackband and ball-ore of Moore county (N. C.); hematite of Chatham and Moore counties (N. C.), (303 e, 305 a); limonites of Moore county (N. C.), (306 e).

Tuomey, M., description of the fossil ores of Cherokee county, Ala., by (383 d).

U.

UTAH.

Coal (bituminous), statistics of the production of, in c. y. (676–678).

Iron ores, partial analyses of (572–575).

Iron ores in Utah. Notes on the samples of iron ore collected in, by Bayard T. Putnam (486–496); magnetite in Iron county (486 d); map of the claims (487); mines near Frisco (490 a). Limonite in the East Tintic mountains (490 c); Iron ore near Ogden (491 f); hematite near Willard (492 b).

Beaver county. Iron-ore deposits: Bowen's mine (Wah-Wah mountains); M.; one sample: Fe,P. (489 f, 572 f). Cave mine; L.; one sample: FeP. (490 d, 572 f). Frisco Mining and Smelting Company's mine; M.; one sample: Fe,P. (490 d, 572 f). Lake Superior mine; M.; one sample: Fe,P. (490 b, 572 f). Money's mine; M.; one sample: Fe,P. (489 f, 572 f). Vulcan mine; L.; one sample: Fe,P. (490 a, 572 f). Wah-Wah Mountain mine (see Bowen's mine); H.; one sample: Fe,P. 489 e, 572 f). Vulcan mine; L.; one sample: Fe, P. (488 a, 572 f).

Box Elder county. Willard mine; H. (s); one sample: Fe,P. (492 b, 574 d).

Iron county. Coal (bituminous), statistics of the production of, in c. y. (676–678). Iron-ore deposits: Adelaide mine; H.; one sample: Fe,P. (488 d, 574 b). Black Magnetic mine; M.; one sample: Fe,P. (488 d, 574 b). Blowout Mountain mine; M.; two samples: Fe,P. (488 f, 574 b). Duncan mine; L.; one sample: Fe,P. (489 a, 572 b). Excelsior and Chesapeake mine; M.; one sample: Fe,P. (488 f, 574 b). Great Western mine; M.; one sample: Fe,P. (488 a, 574 b). Marshall mine; M.; one sample: Fe, P. (485 f, 574 a). Mountain Peak mine; M.; one sample: Fe,P. (488 e, 574 b). Oak Springs mine; M.; one sample: Fe,P. (488 e, 574 b). Southern Cross mine; M.; one sample: Fe,P. (488 e, 574 b). Wanderer mine; M.; one sample: Fe,P. (488 e, 574 b). War Eagle mine; M.; one sample: Fe,P. (488 a, 574 a).

Juab county. Iron-ore deposits: Dragon (southern extension of); H.; one sample: Fe,P. (491 f, 574 c).

San Pete county. Coal (bituminous), statistics of the production of, in c. y. (676–678).

Summit county. Coal (bituminous), statistics of the production of, in c. y. (676–678).

Utah county. Iron-ore deposits: Billing's mine; H.; one sample; Fe,P. (491 f, 574 c). Black Stallion mine; H.; one sample: Fe,P. (491 d, 574 c). Hematite mine; H.; one sample: Fe,P. (491 f, 574 c). Queen of the West mine; H.; one sample: Fe,P. (491 f, 574 c). Sailor Boy mine; H.; one sample: Fe,P. (491 f, 574 c).

Weber county. Iron-ore deposits: Cold Creek mine; H.; one sample: Fe,P. (492 b, 574 c). Vulcan mine; H.; one sample: Fe,P. (490 a, 574 c).

V.

Vanuxem, L. On the relations of the ore formation in Jefferson and Saint Lawrence counties, New York (142 b); on the ore deposits in Oneida county, New York, referred to (136 d).

Vermilion lake, Minnesota, production of iron mines, 1883–1884 (34 b). Report of a trip to, by Bailey Willis (457–466).

VERMONT.

Copper ore. Statistics of the production of, in c. y. (798–799).

Iron. Amount in ore mined in c. y., and its per cent. of total iron in the United States' iron-ore product (19 f); amount of iron in the different kinds and grades of ore mined in, in the c. y. (28 f); average per cent. of iron in ore mined in c. y. (19 f).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 f); to total amount of ore (74 e).

Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 f, 74 e); average value per ton (19 f); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 b); amount of each kind of ore mined in each county in the c. y. (26 a); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (28 b); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 e, 30 c).

Iron ore. Statistics of the production of iron ore in c. y. (60–63, 64–69); general average of these statistics (70–71).

Iron ore. Partial analyses of (574–575); complete analyses of (599).

Iron ore. Notes on the samples of iron ore collected in, by Edward R. Benton (80–82); iron-ore sample *map* of Vermont and part of New Hampshire (81).

Ocher. Statistics of the production of, in c. y. (844, 850, 851).

Scythe-stones. Statistics of the production of, in c. y (845, 852–853)

Soapstone. Statistics of the production of, in c. y. (845, 852–853).

Whetstone. Statistics of the production of, in c. y. (845, 852–853).

Addison county. Iron-ore mines: Leicester mine mentioned (80 e); L.; one sample: Fe,P,Mn (574 d). Monkton mine mentioned (80 e); L.; one sample: Fe,P,Mn (574 d).

Bennington county. Iron ore mines: Godfrey mine mentioned; L.; one sample: Fe,P. (81 a, 574 e).

Franklin county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 a); statistics of the production of iron ore in c. y. (60–63).

Orange county. Copper ore, statistics of the production of, in c. y. (798–799).

Orleans county. Whetstone, statistics of the production of, in c. y. (845).

Rutland county. Ocher, statistics of the production of, in c. y. (844). Iron-ore mines: Bethel or Pittsfield mine mentioned; M.; two samples: Fe,P. (82 d, 574 e). Brandon mine mentioned (80 d); L.; one sample: Fe,P,Mn (574 d). Chipman mine mentioned; L.; one sample: Fe,P. (81 f, 574 e). Forestdale or Blake mine mentioned; L. and H.; one sample: Fe,P,Mn (80 d; 574 d). Granger or Pittsford pit mentioned; L.; one sample: Fe,P. (80 f, 574 d).

Washington county. Scythe-stones, statistics of the production of, in, in c. y. (845).

Windsor county. Iron-ore deposits in (81 f). Iron-ore mine: Tyson furnace described; one sample: c. (82 a, 574 e, 599). Scythe-stones, statistics of the production of, in c. y. (845). Soapstone, statistics of the production of in c. y. (845).

Windham county. Soapstone, statistics of the production of, in c. y. (845).

VIRGINIA:

Coal (anthracite), statistics of the production of, in c. y. (625–630, 650–651).

Barytes, statistics of the production of, in c. y. (839, 846–847).

Coal (bituminous), statistics of the production of, in c. y. (670–673, 674–675).

Hydraulic cement, statistics of the production of, in c. y. (841, 848–849).

Iron. Amount in ore mined in c. y. and its per cent. of total iron in the United States' ore product (19 f); amount of iron in the different kinds and grades of ore mined in the c. y. (28 f); average per cent. of iron in ore mined in c. y. (19 f).

Iron ore. Order of state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 f); to total amount of ore (74 e).

Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 f, 74 e); average value per ton (19 f); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 c); amount of each kind of ore mined in each county in the c. y. (26 b); amount of each kind and grade of ore, according to its contents of iron, produced in c. y. (28 c); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 e, 30 c); royalty paid on each kind of ore mined in, in c. y. (32 c).

VIRGINIA—Continued.

Iron ore. Statistics of the production of, in c. y. (60-63, 64-69).

Iron ore. Bessemer, amount of each kind mined in c. y. (30 c); its per cent. of the Bessemer ore product of the United States (30 c).

Iron ores. *Complete analyses of (599-601); partial analyses of (574-579).*

Iron ores. Archæan iron ores, character of (6 f); hematite deposits in the Potsdam sandstone in (10 b); occurrence of the Clinton ores in (13 c); Oriskany ores in (15 a); character of the iron ore in the Devonian shales of (15 b); occurrence of nodular carbonates of iron in (15 c); impure iron ore in the Catskill formation in (15 c).

Iron ores. Notes on the samples of iron-ore collected in, by Edward R. Benton (261-288); Iron-ore sample *map* of Virginia (geologically colored) (Plate XXX); *map* of Virginia and West Virginia showing the area represented by Plate XXX (262); east of the Blue Ridge, Albemarle county (263 c); James River ore belt (264 a); southwestern Virginia, Cripple creek, and New River belt (273 f); James River basin (277); Purgatory and Mays mountain (278); Brushy mountain (279); Rich Patch mountain (281); Pott's creek (283); Warm Springs mountain, section along base of (284); Peters mountain (284); Shenandoah valley (286); Massanuttan *mountain (287); North mountain (288); Great North mountain (288).*

Lead and zinc ore, statistics of the production of, in c. y. (804-805, 806).

Manganese, statistics of the production of, in c. y. (842, 850-851).

Ocher, statistics of the production of, in c. y. (844, 850, 851).

Albemarle county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 a); statistics of the production of iron ore in, in c. y. (60-63). Iron-ore mines: North Garden mine; M. and L.; one sample: Fe,P,Ti, Mn (263 c, 576 d).

Alleghany county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 a); statistics of the production of iron ore in c. y. (60-63). Iron-ore mines: Clifton Forge mine; H.; one sample: Fe,P. (280 f, 578 b). Dickey mine; L.; one sample: Fe,P. (284 c, 578 c). Dolly Ann mines; Oriskany; described; section (284); L.; one sample: Fe,P. (284 a, 578 d). Gay and Lewis mine; L.; one sample: Fe,P. (284 f, 578 c). Given's (A) mine; L.; one sample: Fe,P. (283 d, 578 c). Huddleson mine; L.; one *sample: Fe,P. (285 a, 578 a). Longdale mine; Oriskany; described;* section (279 d, 280); L.; two samples: Fe,P.; one sample: c. (279 c, 578 b, 601). Lowmoor iron mines; Upper Silurian; described; sketch-map (281 c, 282); L.; two samples: c. (281 e, 578 c, 601). Sadler or Stack mine; L.; two samples: Fe,P. (285 d, 578 c). Smith-McAlister mine; L.; one sample: Fe,P. (284 d, 578 c). Trice mine; L.; one sample: Fe,P. (285 c, 578 c). Will's mine; L.; one sample: Fe,P. (284 d, 578 d).

Amherst county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 b); statistics of the production of iron ore in c. y. (60-63). Iron-ore mines: Adams, Scott and Company's mine No. 11 (James river); Archæan (Huronian?); described; section (265 c). Adams, Scott and Co. (No. 10½) mine; H.(s); four samples: Fe,P. (265 d, 266 a, 574 f, 576 a). Brown hematite mine; L.; one sample: Fe,P. (265 c, 576 b). Dover Company's (No. 6) mine; H.; one sample: Fe,P. (267 c, 574 f). Dover Company's mine No. 11, near Riverville; Archæan (Huronian?); described; sections (266 b); H. (s); two samples: c. (266 b, 267 a, 574 f, 599). "First Vein" (east of Old Furnace vein); H. (s) with M.; one sample; Fe,P. (264 f, 576 b). Maud vein, Stampleton mine; Archæan (Huronian?); described; sections (268 b); H. (s); five samples: Fe,P. (268 b, 269 a, 574 f), Naylor and Co. (No. 6½) mine; H. (s); two samples: Fe,P. (267 f, 268 a, 574 f). "Second Vein" (east of "Old Furnace Vein"); M.; one sample: Fe,P. (265 b, 576 b). Slippery Gut mine; L.; one sample: Fe,P. (264 c, 576 b).

Appomattox county. Iron-ore mines: Chestnut Mountain mine; H. (s); one sample: Fe,P. (269 c, 578 c). Cross-cut (Archer's Creek) mine; H. and L.; five samples: Fe,P. (269 f, 270 a, 576 c) Red Belt mine; L.; one sample: Fe,P. (269 d, 576 c). Stonewall mine; L.; one sample: Fe,P. (269 b, 578 c).

Augusta county. Coal (anthracite), statistics of the production of, in c. y. (625-630). Iron ore: Amount of each kind of iron ore mined in, in c. y. (26 b); statistics of the production of iron ore in c. y. (60-63). Iron-ore mines: Buffalo Gap mine; L.; one sample: Fe,P. (288 b, 578 d). Grace or Ferrol mine; L. and H.; two samples: Fe,P. (288 a, 578 d). Kennedy mine; L.; one sample: Fe,P. (286 a, 578 d). Mount Torrey or Virginia mine; L.; one sample: Fe,P. (286 b, 578 d). Manganese, statistics of the production of, in c. y. (842).

Bedford county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 b); statistics of the production of iron ore in c. y. (60-63).

Botetourt county. Coal (bituminous), statistics of the production of, in c. y. (670-673). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 b); statistics of the production of iron ore in c. y. (60-63). Iron-ore mines: Arcadia iron mine; Lower Silurian; described; sections (278 a). Arcadia (iron property) mine; L.; one sample: Fe,P. (278 e, 576 f). Arcadia (property) mine; H.; two samples: Fe,P. (277 f, 278 a, 576 f). Callie mines (old and new bank); L.; two samples: Fe,P. (281 b, 578 b). *Carnes mine; L.; one sample: Fe,P. (279 a, 578 a). Hickory* Hollow, or Salisbury mine; L.; three samples: Fe,P. (279 b, 578 b). May's mine; L.; one sample: Fe,P. (279 a, 578 b). Retreat mine; L.; one sample: Fe,P. (278 f, 576 f). Spengler mine; L.; one sample: Fe,P. (279 a, 578 a). Wood's (property) mine: H.; one sample: Fe,P. (277 e, 576 f).

Campbell county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 b); statistics of the production of iron ore in c. y. (60-63). Iron-ore mines: Archer's Creek mine; L. and H.; five samples: Fe,P. (269 f, 576 c). Otter River mine; L.; one sample: Fe,P. (270 c, 576 c). Oxford (near) mine; L.; one sample: Fe,P. (270 c, 576 c). Railroad mine; L.; one sample: Fe,P. (269 c, 576 c). Magnanese, statistics of the production of, in c. y. (842).

Chesterfield county. Coal (bituminous), statistics of the production of, in c. y. (670-673). Ocher, statistics of the production of, in c. y. (844).

Franklin county. Iron-ore mines: Rocky Mount mine; Archæan (Huronian?); described: sketch-map (271 f, 272); M.; one sample: Fe,P.; one sample: c (271 f, 273 a, 576 d, 559).

Louisa county. Iron ore: Amount of each kind of iron ore mined in, in c. y. (26 b); statistics of the production of iron ore in c. y. (60-63).

Montgomery county. Coal (bituminous), statistics of the production of, in c. y. (670-673).

Nelson county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 b); statistics of the production of iron ore in c. y. (60-63). Iron-ore mine: Greenway mine; H.(s); one sample: Fe,P. (264 a, 576 b).

Page county. Ocher, statistics of the production of, in c. y. (844).

Pittsylvania county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 b); statistics of the production of iron ore in c. y. (60-63). Iron-ore mine: Pittsville mine; Archæan (Huronian?); described; sketch-map (270 c, 271); M.; three samples: Fe, P. (270 c, 271 a, 576 c). Barytes, statistics of the production of, in c. y. (830).

Pulaski county. Coal (anthracite), statistics of the production of, in c. y. (625-630). Iron-ore mines: Johnson mine; L.; two samples: Fe,P. (275 f, 576 d f). Rich Hill mine; L.; one sample: Fe,P. (276 c, 576 f).

Rockingham county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 b); statistics of the production of iron ore, in c. y. (60-63). Iron-ore mines: Fox Mountain (Shenandoah Iron Works) mine; L.; four samples: Fe,P. (287 a, 578 d). Miller mine; L.; one sample: Fe,P. (286 c, 578 d). Raines and Weaver mine; L.; one sample: Fe,P. (286 d, 578 c). Raines mine; L.; one sample: Fe,P. (286 f, 578 c). Ocher, statistics of the production of, in c. y. (844).

Rockbr'dge county. Hydraulic cement, statistics of the production of, in c. y. (841).

Shenandoah county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 b); statistics of the production of iron ore, in c. y. (60-63). Iron-ore mines: Hollow Bank (Liberty furnace) mine; L.; one sample: Fe,P. (288 c, 578 c). Old Bank (Liberty furnace) mine; L.; one sample: Fe,P. (288 d, 578 c). Three-Top Mountain mine; L.; one sample: Fe,P. (287 c, 578 c). West Bank (Van Buren furnace); L.; one sample: Fe,P. (288 f, 578 c). Manganese, statistics of the production of, in c y. (842).

Smyth county. Iron-ore mines: Panic or White Rock mine; L. and H.; one sample: Fe,P.; one sample: c. (276 d, 576 f, 600).

Wythe county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 b); statistics of the production of iron ore in c. y. (60-63). Character of the limonite deposits in (11 b); origin of the limonite deposits in (11 b). Iron-ore mines: Carter mine; L.; one sample: Fe,P. (275 a, 576 d). Chadwell Farm mine; L.; two samples: Fe,P. (274 c, 576 c). Glade mine; L.; one sample: Fe,P. (277 a, 576 c). Hurst mine; Lower Silurian; described; section showing formation of limonite in limestone (275 b). Hurst mine; L.; one sample: Fe,P. (275 b, 576 d). Johnson mine; L.; one sample: c. (275 f, 576 d, 600). Noble mine; L.; one sample: Fe,P. (274 f, 576 f). Ravenscliffe mine; L.; two samples: c. (273 f, 274 a, 576 c, 600). Sampson's (Cripple Creek) mine; L.; two samples: Fe,P. (274 d, 576 c). Sayers and Oglesby mine; L.; two samples: Fe,P. (274 c, 576 c). Semi-Magnetic mine; H. and M.; one sample: Fe,P. (277 b, 576 d). Speedwell mine; L.; one sample: Fe,P. (273 c, 576 c). Walton mine; L.; one sample: Fe,P. (274 f, 576 c). Lead and zinc ore, statistics of the production of, in c. y. (804, 805-806).

W.

WASHINGTON TERRITORY.

Report on the coal-fields of, by Bailey Willis (759-771).

Coal-fields: general geology of (759); thickness of strata (757 d); section of Puget Sound basin (757 c); Coal Measures near head of Yakima river

WASHINGTON TERRITORY—Continued.
Coal-fields, etc.—Continued.
(761 b); section of, and comparison with Coal Measures west of Cascade range (761 c); analyses of representative samples of coals and lignites (761 d, 762 a); general character of coals and lignites (762 d); influence of intrusive dikes on (763 d); influence of flexures on (763 e); Wilkeson coal-field (763 f); Green River coal-field (767 a); detailed cross-sections of coal-beds of Wilkeson and Green River coal fields (768 b); analyses of commercial samples from coal-fields of (769–771); analyses of coals and lignites of (772–781, 788–789); elementary composition of coals (790).
Green River coal-field: its position and boundaries (767 a); topography (767 c); geology (767 d); character of coal (768 b); detailed cross-section of (768 b); analyses of commercial samples of coal (769–771); analyses of coals and lignites (772–779); elementary composition of (790).
Wilkeson coal-field: its position and boundaries (763 f); topography (764 b); structural geology (765 d); Busy Brook section (766 d); character of coal (766 e); detailed cross-section of (768 b); analyses of commercial samples of coal (769–771); analyses of coals and lignites (772–779); elementary composition of coals (790).
Iron ores (497 c); partial analyses of (578–579).
Jefferson county. Iron-ore mines: Puget Sound Iron Company's mine; bog; two samples: Fe,P,S,Si,H_2O (497 e, 498 a, 578 f).
WEST of the 100th meridian. Iron ore: Notes on the samples of iron ore collected by Bayard T. Putnam (469); *map* showing deposits of iron ore west of the 100th meridian sampled (468); sketch of the blast-furnaces of the region (469–472); iron ores of Colorado; *map* of a portion of Colorado showing position of iron-ore deposits sampled (473); magnetite in Archæan (472); magnetite in Carboniferous (?) limestones (477); hematite (480); limonite (482); carbonate ore and its derivatives (484); iron ore in Wyoming; magnetite on the Chugwater (485); hematite at Rawlins (485 f); carbonate at Evanston (486 b); iron ore in Dakota (486 b); iron ores in Utah; limonite in the East Tintic mountains (490 e); hematite near Willard (492 b); iron ore in Montana and Idaho (492 d); iron ore in Nevada (492 e); iron ore in California (493 b); iron ore in Washington territory (497 e); iron ore in British Columbia (498 e); iron ore in Arizona (499 e); iron ore in New Mexico (499 e).
WEST VIRGINIA.
Coal (bituminous), statistics of the production of, in c. y. (670–673, 674–675).
Hydraulic cement, statistics of the production of, in c. y. (841, 848–849).
Iron ore. Amount in ore mined in c. y. and its per cent. of total iron in the United States' ore-product (19 f); amount of iron in the different kinds and grades of ore mined in, in the c. y. (28 f); average per cent. of iron in ore mined in c. y. (19 f).
Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 f); to total amount of ore (74 e).
Iron ore. Amount and value of the c. y.'s product and their per cent. of the amount and value of the United States' product (19 f, 74 e); average value per ton (19 f); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (28 e); amount of each kind of ore mined in each county in the c. y. (26 e); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (28 e); amount of each kind and grade of ore, according to its phosphorus iron ratio, produced in, in c. y. (29 e, 30 e); royalty paid on each kind of ore mined in c. y. (32 e).
Iron ore. Statistics of the production of, in c. y. (60–63, 64–69); general averages of these statistics (70–71).
Iron ore. Occurrence of the Clinton ores in (13 e); character of blackband ore in (10 a).
Iron ores. Partial analyses of (578–581).
Barbour county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Boone county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Braxton county. Coal (bituminous), statistics of the production of, in c. y. (670–673) Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 e); statistics of the production of iron ore in c. y. (60–63).
Brooke county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Doddridge county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Fayette county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Gilmer county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
WEST VIRGINIA—Continued.
Grant county. Coal (bituminous), statistics of the production of, in c. y. (670–673). Iron-ore mines: Lewis mine; F.; one sample: Fe,P. (580 c). Michael's mine; F.; one sample: Fe,P. (580 c).
Hampshire county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 b); statistics of the production of iron ore in c. y. (60–63). Iron-ore mines: Bloomary Furnace mine; L. and F.; three samples: Fe,P. (580 b).
Hancock county. Coal (bituminous), statistics of the production of, in c. y (670–673).
Hardy county. Iron ore: Amount of each kind of ore mined in, in the c. y. (26 e); statistics of the production of iron ore in c. y. (60–63). Iron-ore mine: Half Moon mine; L.; one sample: Fe,P. (580 c).
Harrison county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Jefferson county. Hydraulic cement, statistics of the production of, in c. y. (841).
Kanawha county. Coal (bituminous), statistics of the production of, in c. y. (670–673). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 e); statistics of the production of iron ore in c. y. (60–63).
Lewis county. Coal (bituminous), statistics of the production of, in c. y (670–673).
Marion county. Coal (bituminous), statistics of the production of, in c. y (670–673).
Marshall county. Coal (bituminous), statistics of the production of, in c. y (670–673).
Mason county. Coal (bituminous), statistics of the production of, in c. y (670–673).
Mineral county. Coal (bituminous), statistics of the production of, in c. y (670–673). Iron-ore mines: Martin's mine; L.; one sample: Fe,P. (580 b). Olcar mine; H.; one sample: Fe,P. (580 b).
Monongalia county. Coal (bituminous), statistics of the production of, in c. y. (670–673). Iron-ore mines: Cole's Run mine; C.; one sample: Fe,P. (578 f, 580 b). Hope mine; C.; one sample: Fe,P. (580 a). Ice's Ferry mine; C.; one sample: Fe,P. (580 b). Johnson's mine; C.; two samples: Fe,P. (578 f). Spring Hill or Wadsworth mine; C.; one sample: Fe,P. (578 f).
Morgan county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 e); statistics of the production of, in c. y. (60–63).
Ohio county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Pleasant county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Preston county. Coal (bituminous), statistics of the production of, in c. y. (670–673). Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 e); statistics of the production of iron ore, in c. y. (60–63).
Putnam county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Randolph county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Ritchie county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Roane county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Taylor county. Coal (bituminous), statistics of the production of, in c. y. (670–673). Iron ore: Amount of each kind of ore mined in, in the c. y. (26 e); statistics of the production of iron ore, in c. y. (60–63).
Wetzel county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Wood county. Coal (bituminous), statistics of the production of, in c. y. (670–673).
Wendt, A. F. Extract from paper on the Iron mines in Putnam co., by (98 e); plan of the Tilly Foster referred to (103 e).
Willis (Bailey). Notes on the samples of iron ore collected in Georgia (367–368); notes on the samples of iron ore collected in east Tennessee (331–350); notes on samples of iron ore collected in North Carolina (361–329); notes on the samples of iron ore collected in Ohio (235–243); notes on the samples of manganese ore collected in Georgia (379–382); report on certain magnetites in eastern Pennsylvania (223–234); report on a trip to the upper Mississippi and Vermilion lake (457–467); report on the coal-fields of Washington territory (759).
Whetstone. Statistics of, by states and counties (845); by states (852–853).
Whitfield (R. P.). Remarks on the fossils collected in Montana (712, 713).
Wolff (J. E.), on the Crazy mountains, Montana (701 f).
World's output of iron ore in 1882 (34 e); production of iron from 1882 to 1885 (33 b).
WISCONSIN.
Copper. Statistics of the production of, in c. y. (798–799).

WISCONSIN—Continued.

Hydraulic cement. Statistics of the production of, in c. y. (841, 848-849).

Iron. Amount in ore mined in c. y. and its per cent. of total iron in the United States' ore product (19 f); amount of iron in different kinds and grades of ore mined in c. y. (28 f): average per cent. of iron in ore mined in c. y. (19 f).

Iron ore. Order of the state according to amount of iron in ore mined in c. y.; to average per cent. of iron in ore; to average spot value of ore; to total value of ore (19 f); to total amount of ore (74 e).

Iron ore. Amount and value of c. y.'s product and their per cent. of the amount and value of the United States' product (19 f, 74 e); average value per ton (19 f); amount of each kind of ore mined in each geological horizon in the c. y. (21 b); amount of each kind of ore mined in the c. y. (23 c); amount of each kind of ore mined in each county in the c. y. (26 d); amount of each kind and grade of ore, according to its contents of iron, produced in, in c. y. (28 c); amount of each kind and grade of ore, according to its phosphorus-iron ratio, produced in, in c. y. (29 c, 30 c).

Iron ore. Statistics of the production of iron ore in c. y. (60-63, 64-69); general averages of these statistics (70-71).

Iron ore. Partial analyses of (580-581); complete analyses of (601).

Iron ores. Occurrence of the Clinton ores (13 c).

Iron ore. Notes on the samples collected in (453-455).

Lead and zinc ore. Statistics of the production of, in c. y. (804, 805-806).

Lead. Lead smelting-works, statistics of, in, in c. y. (810); machinery employed in the reduction of lead ores (820); relation of product to lead ores consumed (820).

Dodge county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 d); statistics of the production of iron ore in c. y. (60-63); thickness of the Clinton ore deposit in (13 c). Iron-ore mines: Northwestern Iron Company's mine; F.; two samples: Fe,P. (580 d). Rock Ore mine; F.; one sample: Fe, P. (580 d).

Grant county. Lead and zinc ore: Statistics of the production of, in c. y. (804-805).

Iowa county. Copper, statistics of the production of, in c. y. (798-799). Lead and zinc ore, statistics of the production of, in c. y. (804-806).

Jackson county. Iron-ore mines: Black River Falls mine; H. (s); two samples: Fe,P. (580 c). Paddy's Rest Creek mine; H.; one sample: Fe,P. (580 c).

WISCONSIN—Continued.

La Fayette county. Lead and zinc ore, statistics of the production of, in c. y. (804-805).

Marinette county. Iron-ore mines: Commonwealth mine; H. (s); two samples: c.; one sample: Fe,P. (453 d, 454, 534 e, 601). Eagle mine (Florence); two samples: Fe,P. (534 f, 454 f).

Milwaukee county. Hydraulic cement, statistics of the production of, in c. y. (841).

Sauk county. Iron ore: Amount of each kind of iron ore mined in, in the c. y. (26 d).

WYOMING.

Coal. Analysis of Evanston (788, 789).

Iron ores. Partial analyses of (580, 581).

Iron ores. Notes on the samples of iron ore collected in, by Bayard T. Putnam (485); magnetite on the Chugwater (458 a); hematite at Rawlins (485 f); carbonate at Evanston (486 b).

Carbon county. Iron-ore mines: Friend mine; H.; one sample: Fe,P. (485 f, 580 d). Shaw mine; H.; one sample: Fe,P. (485 f, 580 d).

Laramie county. Iron-ore mine: Iron Mountain mine; M.: one sample: c.; one sample: Fe,Ti (485 b).

Z.

Zinc. Average cost of materials, labor, etc., per ton of metal produced in c. y. (824); consumed in manufactures in c. y. (828); imports and exports of, in c. y. (829); percentage of the total product obtained in each locality in c. y., (824); representation of the furnace plant of the smelters of the western states in c. y. (824); percentage of, obtained from the ores in c. y., by regions (823 f); smelting, percentage of capital employed in, in the various states in c. y. (824); percentages of total product of, obtained in each locality in c. y. (824); smelting, derivation of coal for, in c. y. (822); smelting, wages obtained by skilled and unskilled labor in the various localities in c. y. (825); smelting works statistics in c. y. (821-822); smelting works, days' wages obtained, in c. y. (825); supplies obtained in c. y. (822).

Zinc ores consumed in c. y. (822, 823); mechanical plant employed in the reduction of zinc ores in c. y. (820); values of ores in c. y. (822).

Zinc and lead ores. Statistics of the production of, east of the 100th meridian, by counties, in c. y. (804-805); statistics of the production of, east of the 100th meridian, by states, in c. y. (806).