Water-Supply and Irrigation Paper No. 163 Series O, Underground Waters, 59

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
CHARLES D. WALCOTT, DIRECTOR

BIBLIOGRAPHIC REVIEW AND INDEX

OF

UNDERGROUND-WATER LITERATURE

PUBLISHED IN THE UNITED STATES

IN 1905

BY

MYRON L. FULLER, FREDERICK G. CLAPP,
AND BERTRAND L. JOHNSON

WASHINGTON
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CONTENTS.

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By Myron L. Fuller, Frederick G. Clapp, and Bertrand L. Johnson.

INTRODUCTION.

To meet the urgent need which was felt for more definite information as to underground-water publications in the United States, plans for bibliographies of such literature were made, in 1903, on the organization of the division of hydrology. A bibliography of the publications of the United States Geological Survey, which has been the leading contributor to such literature, was prepared in accordance with these plans and published in 1905.

The scope of the present bibliography has been extended to cover all publications in the United States which seemed likely to contain important references to underground waters, technical and trade journals as well as the more strictly scientific contributions being reviewed. The reports of the Canadian Geological Survey are also included. The list of publications examined will be found on page 6. The attempt has been made to render this compilation as complete as possible, to which end not only have the papers dealing mainly with underground waters been reviewed but many general papers have been scanned for incidental references. There are 721 titles in the bibliography.

As in the case of the previous bibliography, two distinct classes of readers were kept in mind in preparing the index, the first including those who are interested in the underground-water resources of special regions and the second those who are interested in some particular type of ground water or in one or more of the many problems of ground-water occurrence. For the benefit of the first class, comprehensive entries are given under States and other political or natural divisions, while the numerous subject entries will appeal to readers of the second class. The aim has been to assemble the subject entries into comprehensive groups, each including all references to papers containing material bearing on the subject of the group. The State entries will be found the most complete, as they include many which it is impossible to classify satisfactorily.

The subject entries, as in the preceding bibliography, are grouped into series of what may be termed principal subject entries, but a large number of entries, including those which it was impracticable to classify, together with numerous cross references, are included with the view of increasing the usefulness of the index.

LIST OF PUBLICATIONS EXAMINED.

The publications examined in preparing this bibliography and index include such of the following as were published in 1905 and received at the Department libraries in Washington prior to March 1, 1906.

Alabama Geological Survey: Bulletin; Index to Mineral Resources
American Academy of Arts and Sciences: Proceedings.
American Academy of Natural Sciences: Proceedings.
American Chemical Journal.
American Chemical Society: Journal.
American Geographical Society: Bulletin.
American Institute of Mining Engineers: Bimonthly Bulletin.
American Journal of Science.
American Philosophical Socitey: Proceedings.
American Society of Civil Engineers: Proceedings and Transactions.
American Waterworks Association: Proceedings.
Appalachia.
Association of Civil Engineers of Cornell University: Transactions.
Association of Engineering Societies: Journal.
Boston Society of Natural History: Proceedings.
California Journal of Technology.
Canada Geological Survey: Summary Report for 1904.
Carnegie Institution of Washington: Yearbook.
Cassier's Magazine.
Census of the Philippine Islands for 1903.
Chemical Engineer.
Colorado Scientific Society: Proceedings.
Compressed Air.
Connecticut State Board of Health: Twenty-seventh Annual Report.
Daily Consular Reports.
Elisha Mitchell Scientific Society: Journal.
Engineering and Mining Journal.
Engineering Magazine.
Engineering News.
Engineering Record.
Engineering Society of Western Pennsylvania: Proceedings.
Engineers' Club of Philadelphia: Proceedings.
Experiment Station Record.
Forestry and Irrigation.
Franklin Institute: Journal.
Georgia Geological Survey: Bulletin.
Harvard College, Museum of Comparative Zoology: Bulletin.
Illinois Society of Engineers and Surveyors: Twentieth Annual Report.
Indiana, Department of Geology and Natural Resources: Annual Report.
Iowa Geological Survey: Annual Report for 1904.
Irrigation.
Irrigation Age.
Irrigation Aid.
Journal of Geography.
Journal of Physical Chemistry.
Kansas State Board of Health: Second Biennial Report.
Louisiana Geological Survey: Bulletins.
Michigan Geological Survey: Reports.
Mines and Minerals.
Mining and Scientific Press.
Mining Magazine.
Mining Reporter.
Missouri Geological Survey: Biennial Report.
Monthly Weather Review.
Municipal Engineering.
New England Waterworks Association: Journal.
New Jersey Geological Survey: Annual Report.
New Jersey State Board of Health: Report for 1904.
New York Academy of Sciences: Annals.
New York State Museum: Bulletins.

North Carolina Geological Survey: Bulletins, vol. 1.
North Carolina State Board of Health: Tenth Report.
Philippine Commission: Report for 1904.
Popular Science Monthly.
Proceedings of the Twelfth National Irrigation Congress, El Paso, Tex., 1904.
Progressive Age.
Science.
Scientific American.
Scientific American Supplement.
School of Mines Quarterly.
Smithsonian Institution: Annual Report.
Technical World Magazine.
Technology Quarterly.
United States Department of Agriculture: Annual Reports; Farmers' Bulletins; Secretary's Report; Twentieth Annual Report; Yearbook.
United States Department of Agriculture, Bureau of Chemistry: Bulletins; Circulars.
United States Department of Agriculture, Bureau of Soils: Bulletins; Field Operations for 1904.
United States Department of Agriculture, Office of Experiment Stations: Bulletins.
United States Geological Survey: Twenty-fifth and Twenty-sixth Annual Reports; Bulletins; Folios; Mineral Resources for 1904; Water-Supply and Irrigation Papers.
United States National Museum: Proceedings.
University of California: Bulletin of the Department of Geology.
Washington Academy of Science: Proceedings.
Water and Forest.
Western Society of Engineering: Journal.

BIBLIOGRAPHIC REVIEW.

A.

1 **Adams** (Frank). The distribution and use of water in the Modesto and Turlock irrigation districts, California.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 158, pp. 93–139, 3 pls., 1 fig.
Discusses rise of water table due to irrigation (pp. 126–129).

2 **Adams** (George I.). Summary of the water supply of the Ozark region in northern Arkansas.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 179–182, 1 fig.
Classifies the springs of the region on the basis of their relations to various limestone, sandstone, dolomite, and shale formations, and notes their extensive use for health resorts.

3 **Alexander** (A. B.). How tile drainage improves a soil.

Twentieth Ann. Rept. Ill. Soc. Eng. and Surv., pp. 66–68.
A discussion of the benefits obtained by underdrainage. Excess soil water may be due to rainfall or seepage from soils at higher levels. Discusses the relation of the level of the ground water table to plant life and the movements resulting in a saturated soil from alternate freezing and thawing.

4 **Allen** (Kenneth). The sanitary protection of water supplies.

Jour. Franklin Institute, vol. 160, pp. 297–323.
Mentions the epidemic caused by the pollution of the Broad street well in London in 1854; Frankland's experiments on the life of typhoid bacteria in deep-well waters; examination by Whipple of the depth of penetration of bacteria into the sands of Long Island; use of copper sulphate in the purification of a polluted spring water. States that artesian waters contain no bacteria.

5 **Anderson** (George E.). Well-boring machinery and pumps in China.

Daily Consular Repts. no. 2170, Dept. Com. and Labor, pp. 10–11.
Discusses need of wells, well-boring machinery, pumps, and underground-water supplies in Chinese cities.

6 **Arnold** (Ralph). Coal in Clallam County, Washington.

Bull. U. S. Geol. Survey no. 260, pp. 413–421.
Notes an abandoned 1,500-foot well (p. 415) and gives a well record (p. 418).

7 **Ashley** (George H.). Water resources of the Middlesboro-Harlan region of southeastern Kentucky.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 177–178.
Describes one flowing artesian well from the Lee conglomerate. Mentions abundance of good springs.

8 **Ashley** (George H.). Water resources of the Nicholas quadrangle, West Virginia.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 64–66.

Outlines the underground-water conditions, stating that shallow wells are largely used on the ridges, while springs are an important source of water on the slopes and in valleys. A few deep wells and a waterworks system are located at Richwood. The shallow wells are likely to go dry in summer, but the springs, although small, are more constant. The horizon of the Gauley coal is characterized by many springs. The conditions are considered favorable for artesian wells.

9 **Atkinson** (James P.). Shallow-well waters of Brooklyn.

Abstract: Science, new ser., vol. 21, p. 987.

Concludes that the wells are in serious danger of pollution by sewage.

10 **Ayrs** (O. L.), **Mooney** (Charles N.) and. Soil survey of the Greenville area, Tennessee-North Carolina.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 493–525, 1 map, 1 fig.

See Mooney (Charles N.) and Ayrs (O. L.).

B.

11 **Babb** (Cyrus C.) and **Hoyt** (John C.). Report of progress of stream measurements for the calendar year 1904: Part VII, Hudson Bay, Minnesota, Wapsipinicon, Iowa, Des Moines, and Missouri River drainages.

Water-Sup. and Irr. Paper no. 130, U. S. Geol. Survey, 204 pp.

Gives measurements of seepage (p. 102) and of Giant springs in Montana (p. 192).

12 **Bain** (H. Foster). Zinc and lead deposits of northwestern Illinois.

Bull. U. S. Geol. Survey no. 246, 56 pp., 5 pls., 3 figs.

Describes enlargement of joint cracks in limestone through solution by underground waters (pp. 31–32) and deposition of ores in the cavities (p. 33). Describes relation of ores to level and circulation of underground water (pp. 35–36, 46–50). Gives drill record (p. 42).

13 —— The fluorspar deposits of southern Illinois.

Bull. U. S. Geol. Survey no. 255, 70 pp.

Considers the relation of ores to underground waters (p. 42) and notes the presence of water channels in the ore bodies (p. 47). The conditions of ore deposition in relation to underground waters are also discussed (pp. 57, 62, 66).

14 —— Principal American fluorspar deposits.

Min. Magazine, vol. 12, pp. 115–119, 1 fig.

Kentucky-Illinois deposits believed to have been formed by heated waters more or less directly connected with igneous intrusions.

15 —— The progress of economic geology in 1905.

Min. Magazine, vol. 12, pp. 465–473, 2 figs.

A brief summary of recent works on the agency of meteoric and magmatic waters in ore genesis is given (pp. 468–469).

16 **Barber** (Emmet). Pumping water by compressed air.

Irrigation Age, vol. 21, pp. 9–10, 4 figs.

Describes the use of compressed air in pumping water from an artesian well 865 feet deep at Waukena, Cal. A natural flow of 600 gallons per minute was increased to 2,400 gallons per minute by the use of compressed air.

17 **Barbour** (F. A.). The sewage-disposal works at Saratoga, N. Y.

Jour. Assoc. Eng. Soc., vol. 34, pp. 33–59, 28 figs.

Gives depth of water table as 16 feet below the surface at the filter beds and states that most of the filtrate runs off through the ground without appreciably raising the water table (p. 50).

18 **Bayley** (W. S.). Maine.

Water-Sup. and Irr. Papers no. 114, U. S. Geol. Survey, pp. 41–56, 1 fig.

Mentions conditions necessary for wells (p. 42). Describes city supply of Castine derived from driven wells (pp. 43, 46–47). Describes distribution of dug, drilled, driven, and bored wells, and gives map of flowing and nearly flowing wells (pp. 47–49). Gives table of 27 communities obtaining public supply from springs (p. 46). Describes distribution of ordinary and commercial springs (pp. 48–50), and gives table of 47 commercial springs, with their yields, temperatures, and analyses (pp. 51–56).

19 **Beaumont Journal.** Some Texas canals and wells.

Irrigation Aid, vol. 1, no. 6, p. 9.

Gives a list of canals supplied by well water and used for irrigation.

20 **Bennett** (Frank) and **Ely** (Charles W.). Soil survey of Marshall County, Ind.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 689–706, 1 map, 1 fig.

Mentions occurrence of springs and flowing artesian wells in the drift (p. 693).

21 —— and **Griffin** (A. M.). Soil survey of the Orangeburg area, South Carolina.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 185–205, 1 map, 1 fig.

Mentions depth to water in various sections, and in artesian wells at Bowman and Branchville (p. 188).

22 **Bigelow** (Henry B.). The shoal-water deposits of the Bermuda Banks: Contributions from the Bermuda Biological Station for Research, No. 5.

Proc. Am. Acad. Arts and Sci., vol. 40, pp. 557–592, 4 maps.

The limestones of which the islands consist were consolidated from wind-blown sand by the action of percolating waters. Short descriptions of the caves, sinks, and subterranean channels in these limestones are given.

23 **Bigelow** (W. D.). Foods and food control, revised to July 1, 1905.

Bull. Bureau of Chem., U. S. Dept. Agr., no. 69 (revised), pts. 1 and 2, 1905, 200 pp.

States the laws of Connecticut (p. 96) and Indiana (p. 179) regarding pollution of spring and well water.

24 **Bingelmann** (M.). Ground water.

Jour. Agr. Prat., new ser., vol. 8, pp. 739–741, 5 figs.; pp. 771–773, 7 figs. Abstract: Exp. Sta. Record, vol. 17, no. 2, p. 118.

Discusses briefly the conditions which influence the percolation and level of ground water and the formation of springs.

25 **Blanchard** (C. J.). The to-morrow of Nevada.

Irrigation, vol. 3, no. 4, pp. 5–6, 3 figs.

Mentions the sinking of the mountain streams into the sands of the desert and notes the availability of the underflow of streams and artesian water for the irrigation of the arid lands.

26 **Blanchard** (C. J.). Reclamation work in southern California.

Sci. Am., vol. 92, pp. 499.

A general description of the underground water resources of the area is given. Notes the use of seepage water, artesian-well water, and water from tunnels in the mountains in irrigation. Describes artesian conditions in the valleys and plains. Notes decline of water level due to immense drain on the underground waters for irrigation and other purposes, and mentions the work of the United States Geological Survey in making observations on the fluctuations of ground-water levels in the area.

27 **Blatchley** (W. S.). The clays and clay industries of Indiana.

Twenty-ninth Ann. Rept. Indiana Dept. Geol. and Nat. Res., pp. 13–657, 32 pls., 10 figs.

Discusses origin of kaolin through agency of percolating water (pp. 56–57); gives records of many bore holes and wells, some flowing (pp. 102–501), and chemical analyses of spring and well water (pp. 185, 193, 349).

28 —— The petroleum industry in Indiana in 1904.

Twenty-ninth Ann. Rept. Indiana Dept. Geol. and Nat. Res., pp. 781–799.

Gives several brief records of oil wells (pp. 782–787).

29 **Boltwood** (Bertram B.). On the radio-active properties of the waters of the springs on the Hot Springs Reservation, Hot Springs, Ark.

Am. Jour. Sci., 4th ser., vol. 20, pp. 128–132.

Samples of water from 44 of the springs were examined for radio-active gases and solids. The tufa of some of the springs was also examined. Describes the results obtained, gives the location, total flow, temperatures, and total solids in the springs, and states that no connection can be established between these properties and the radio-active properties.

30 **Booth** (W. H.). Air-lift pumps.

Compressed Air, vol. 10, pp. 3403–3407, 3 figs. Also in Electrical Review (Eng.).

Mentions the existence of many artesian wells in the vicinity of London the water of which is used in the raising of water cress. The temperature of the water is given as 51°. Many of the wells do not flow now because of excessive use of the underground waters by waterworks.

31 **Booth** (William M.). Boiler waters and their treatment.

Chemical Engineer, vol. 1, pp. 279–287.

Notes the occurrence of sulphuric acid in the waters of coal mines (p. 282); states that the ground waters of central New York are high in chlorides (p. 285).

32 **Boutwell** (John Mason). Genesis of the ore deposits at Bingham, Utah.

Bimonthly Bull. Am. Inst. Min. Eng., pp. 1153–1192, 13 figs.

Notes a few good springs, but states that the main sources of supply are subterranean courses tapped by underground workings (p. 1155); the agency of mineralized underground waters in the formation of the deposits is discussed in detail.

33 —— Ore deposits of Bingham, Utah.

Eng. and Min. Jour., vol. 79, pp. 1176–1178, 3 figs.

Discusses the agency of underground waters in the genesis of these deposits.

34 —— Oil and asphalt prospects in the Salt Lake basin, Utah.

Bull. U. S. Geol. Survey no. 260, pp. 468–479.

Among subjects considered are mound springs emitting gas (p. 471), blows of gas and water from wells (p. 472), pitch springs (p. 474), salt water in wells (p. 477), thermal wells (p. 477), artesian waters (p. 478), and well records (pp. 471–472).

35 **Boutwell** (John Mason). Economic geology of the Bingham mining district, Utah.

Prof. Paper U. S. Geol. Survey no. 38, pp. 71–385, 34 pls., 10 figs.

Discusses physical and chemical characters of heated ore-bearing solutions (p. 176) and present mine waters (pp. 213–214), and summarizes the process of deposition (pp. 183, 210, 229). Discusses the relation of fissures to passage of mineral-laden solutions (pp. 199–201) and relation of water level to depth of superficial alteration (pp. 217–218, 225). Explains interference of ground water with placer working (pp. 377–378).

36 **Bowie** (Aug. J., jr.). Irrigation in southern Texas.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 158, pp. 347–507, 2 pls., 18 figs.

Describes briefly the water-bearing strata (pp. 354–355) and artesian districts (pp. 355–356) and a number of springs used for irrigation (pp. 356–357). Describes hydraulic-rig method of boring wells (pp. 357–358), strainers used in wells (pp. 358–362), and cost of well boring (pp. 362–364). Describes numerous flowing and nonflowing wells and springs used for irrigation, and methods and cost of pumping the nonflowing wells (pp. 378–474). Gives well records (pp. 381, 388, 394, 403, 459). Compares cost of artesian-well and pumped-well irrigation (pp. 488–490). Gives lists of flowing artesian wells (pp. 502–504) and pumped wells (pp. 505–506) in southern Texas.

37 **Bowman** (Isaiah). Disposal of oil-well wastes at Marion, Ind.

Water-Sup. and Irr. Paper no. 113, U. S. Geol. Survey, 1905, pp. 36–48.

Gives well records (pp. 38–39, 42). Describes the water-bearing conditions of the Niagara limestone (pp. 41–42), Hudson River limestone (p. 42) and Trenton limestone (pp. 42–43), and the contamination of the water-bearing beds by oil and brine from oil wells (pp. 43–48).

38 —— A classification of rivers based on water supply.

Jour. Geog., vol. 4, pp. 212–220.

Principally a translation by Mr. Bowman of a chapter in Woeikof's "Der Klimate der Erde," relating to the periodic rise and fall of streams. Contains a short discussion of the relation of ground water to the flow of streams.

39 **Bownocker** (J. A.). Salt deposits in northeastern Ohio.

Am. Geologist, vol. 35, pp. 370–376.

Mentions the occurrence of salt springs (p. 370) and gives a number of well records (pp. 371–376).

40 **Bowron** (William M.). The origin of Clinton red fossil ore in Lookout Mountain, Alabama.

Bimonthly Bull. Am. Inst. Min. Eng., no. 6, pp. 1245–1262, 3 figs.

Discusses the agency of underground waters in the formation of this ore.

41 **Branner** (John Casper). Stone reefs on the northeast coast of Brazil.

Bull. Geol. Soc. America, vol. 16, pp. 1–12.

Gives record of boring (p. 3) and ascribes cementation of the reefs to deposition of calcareous matter from percolating acid waters from the land at the point where they meet the salt waters of the ocean.

42 **Breneman** (A. A.). Mineral waters at the St. Louis Exposition.

Abstract: Science, new ser., vol. 21, pp. 819–820.

Mentions several features of the American and foreign exhibits, and compares them with the exhibits at Chicago in 1893.

43 **Brittain** (Joseph I.). Mineral springs of Baden-Baden (Germany).

Daily Consular Repts. no. 2193, Dept. Com. and Labor, p. 14.

Summarizes the number, depth, composition, and temperature of the springs and their economic value to Baden Baden as a health resort.

44 **Brooks** (Alfred Hulse). Placer mining in Alaska in 1904.

Bull. U. S. Geol. Survey no. 259, pp. 18–31.

Notes trouble in mines due to encountering water below frozen ground (pp. 27, 30).

45 **Brown** (R. Gilman). Some pumping data.

Eng. and Min. Jour., vol. 79, pp. 947–948.

Describes the unwatering of the Brunswick mine, Grass Valley, Cal., the flooding of which was caused by the cutting of a large flow of water on the 1,250-foot level.

46 **Brunton** (D. W.). Drainage of the Cripple Creek district [Colorado].

Eng. and Min. Jour., vol. 80, pp. 818–821, 5 figs.

Gives a definition of "ground water;" describes the permeability of the rocks, the amount of water removed to lower the water level 1 foot, the history of the previous tunnels, efficiency of tunnel drainage, depth at which tunnel should be driven, comparison of tunnel sites, etc.

47 **Brush** (Harlan W.). Simplon tunnel.

Daily Consular Repts. no. 2274, Dept. Com. and Labor, pp. 4–6.

Mentions hot springs of great volume encountered during work on the Simplon tunnel in Italy and Switzerland and consequent danger to operations (p. 5).

48 **Buckley** (Ernest Robertson). Biennial report of the State geologist transmitted by the board of managers of the Bureau of Geology and Mines to the Forty-third General Assembly.

Jefferson City, Mo., 50 pp., 1 map.

Summarizes the data obtained by the bureau relating to mineral springs (p. 48).

49 **Burchard** (Ernest F.). Iron ores in the Brookwood quadrangle, Alabama.

Bull. U. S. Geol. Survey no. 260, pp. 321–334.

Gives well record and describes spring (p. 327) and considers the possible action of water in ore formation (pp. 333–334).

49a **Burdick** (C. B.), **Maury** (Dabney H.), **Henderson** (C. R.) and. Report of the committee on waterworks.

Twentieth Ann. Rept. Illinois Soc. Eng. and Surv., pp. 132–139.

See Maury (Dabney H.), Burdick (C. B.), and Henderson (C. R.).

C.

50 **Caine** (Thomas A.) and **Lyman** (W. S.). Soil survey of the San Antonio area, Texas.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 447–473, 1 map, 1 fig.

Discusses irrigation and city water supply from artesian wells and springs, and the effect of the wells on the flow of the springs (pp. 467–468).

51 **Calkins** (Frank C.). Geology and water resources of a portion of east-central Washington.

Water-Sup. and Irr. Paper no. 118, U. S. Geol. Survey, 96 pp.

Discusses the topography and geology of the region in detail and describes the springs from alluvium, basalts, etc., where cut by canyons, and from fissures. One thermal spring is noted. The artesian conditions are considered by districts and the wells described. The deep waters are from the Ellensburg beds and the basalts and tuffs. The cost of drilling, the methods of testing and casing, artesian requisites, etc., are also discussed. Predictions as to supplies are given and the use of tunnels for the collection of surface supplies suggested.

52 **Cameron** (F. K.). The water of Utah Lake.

Jour. Am. Chem. Soc., vol. 27, pp. 113–116.

Describes the occurrence of numerous hot and cold springs in the bed of the lake which supply the greater part of the lake water. Gives several analyses of the lake water taken in the vicinity of some of the larger springs.

53 **Canfield** (R. B.). [Water problems of Santa Barbara, Cal.]

Water-Sup. and Irr. Paper no. 116, U. S. Geol. Survey, pp. 21–22 (reprint of portion of private report made in 1896).

Notes use of collecting tunnel and describes unsuccessful efforts to obtain large supplies from boring.

54 **Carr** (M. E.), **Hearn** (W. Edward) and. Soil survey of the Biloxi area, Mississippi.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 353–374. 1 map, 1 fig.

See Hearn (W. Edward) and Carr (M. E.).

55 **Catherinet** (Jules). Copper Mountain, British Columbia.

Eng. and Min. Jour., vol. 79, pp. 125–127, 6 figs.

Discusses the agency of underground waters in the formation of the copper deposits of this mountain.

56 **Chalon** (Paul F.). The genesis of metalliferous deposits and eruptive rocks.

Min. Magazine, vol. 12, pp. 507–510.

This article is an abstract of a memoir presented before the recent International Congress of Mining, Metallurgy, etc., at Liege. Discusses the depth to which waters can penetrate, the alteration of the rocks by this water, its agency in aqueo-igneous fusion, and the formation of ore deposits and eruptive rocks.

57 **Chandler** (A. E.), **Hinderlider** (M. C.), **Swendsen** (G. L.) and. Report of progress of stream measurements for the calendar year 1904. Part X, Colorado River and the Great Basin drainage.

Water-Sup. and Irr. Paper no. 133, U. S. Geol. Survey, 384 pp.

See Hinderlider (M. C.), Swendsen (G. L.), and Chandler (A. E.).

58 **Clapp** (Frederick Gardner). Water resources of the Curwensville, Patton, Ebensburg, and Barnesboro quadrangles, Pennsylvania.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 159–163.

Describes the iron, alum, and magnesia springs at Cresson, and gives analyses. Notes the abundance of good springs and describes several town supplies obtained from springs. Describes well waters used for public, private, and factory supplies. Notes one flowing artesian well and discusses the probability of obtaining further artesian supplies in the area.

59 **Cleland** (Herdman F.) The formation of natural bridges.

Am. Jour. Sci., 4th ser., vol. 20, pp. 119–124, 3 figs.

Suggests the following theory to account for the origin of the natural bridges at North Adams, Mass., Lexington, Va., Chattanooga, Tenn., in Utah, and in the Yellowstone National Park: "Before the formation of the bridge the stream which now flows under then flowed upon the surface of what is now the arch and probably plunged over a fall a short distance below the present site of the bridge. A portion of the water percolating through a joint plane or crack upstream discharged into the stream under the fall and gradually enlarged its passage by its solvent power. In the course of time this passage became sufficiently large to contain all of the water of the stream, and the bridge resulted."

60 **Coburn** (L. F.). Yreka waterworks system [California].

Municipal Engineering, vol. 29, pp. 437–438.

Notes the sinking of Yreka Creek in a bed of gravel about 2½ miles above Yreka and describes the building of a submerged concrete dam in the gravel at a narrow place in the creek. The water thus collected furnishes an abundant supply for the town of Yreka.

61 **Cole** (L. H.). The Centre Star mine, Rossland, B. C.
Min. and Sci. Press, vol. 90, p. 117, 1 fig.
Notes that the water in this mine is small in amount and noncorrosive.

62 **Coleman** (A. P.). Geology of the Sudbury district. [Ontario.]
Eng. and Min. Jour., vol. 79, pp. 189–190.
Criticizes Hiram W. Hixon's views of the aqueous origin of the Sudbury nickel ores.

63 **Colles** (George Wetmore). Mica and the mica industry; Pt. II, Geology.
Jour. Franklin Institute, vol. 160, pp. 275–294, 11 figs.
Contains a discussion of the agency of underground waters in the formation of the mica dikes. Notes also the alteration of the feldspathic contents of the dikes by percolating waters.

64 **Collins** (A. B.), **Wright** (A. E.) and. Irrigation near Garden, Kans., 1904.
Bull. Office Exp. Sta., U. S. Dept. Agr., no. 158, pp. 585–594.
See Wright (A. E.) and Collins (A. B.).

65 **Compressed Air.** [Water supply from wells at Los Angeles, Cal.]
Compressed Air, vol. 10, p. 3504.
A portion of the city supply is now furnished by 12 wells from 60 to 200 feet deep. The water is raised by compressed air.

66 —— The Simplon tunnel.
Compressed Air, vol. 10, pp. 3713–3717, 7 figs.
Contains a description of the springs encountered in constructing the Simplon tunnel in Switzerland and Italy, including location, temperature, and volume.

67 —— The Simplon tunnel.
Compressed Air, vol. 10, pp. 3811–3813, 1 fig.
Notes the encountering of hot springs in the Simplon tunnel in Switzerland and Italy and gives the volume and temperature of two of them.

68 **Cook** (Edward H.). La mina Santa Francisca, Mexico.
Min. Magazine, vol. 11, pp. 424–429, 5 figs.
Notes the impregnation of limestone by siliceous solutions (p. 425); gives an analysis of the ground water from the 450-foot level (p. 429); and discusses the agency of underground waters in the formation of the ore deposits (pp. 426–429).

69 **Cooper** (K. F.). An example of the legitimate use of water for domestic purposes.
Proc. Am. Soc. Civil Eng., vol. 31, pp. 475–478.
Describes the water-supply systems of the Lick Observatory on Mount Hamilton, California. The water for the domestic system is furnished by springs on the mountain side.

70 **Cooper** (W. F.). Water supply of the Lower Peninsula of Michigan.
Ann. Rept. Michigan Geol. Survey for 1903, pp. 47–109, 2 maps.
Describes the artesian-well areas, giving detailed descriptions, well records, and analyses, and states use for public and private supply; describes springs.

70a **Corstophine** (George S.), **Hatch** (Frederick H.) and. The origin of the Witwatersrand gold. [Transvaal.]
Eng. and Min. Jour., vol. 79, pp. 80–81.
See Hatch (Frederick H.) and Corstophine (George S.).

71 **Corthell** (E. L.). Discussion of paper entitled, "The reclamation of river deltas and salt marshes," by F. LeBaron.
Trans. Am. Soc. Civil Eng., vol. 54, pp. 83–87.
Gives records of several artesian wells in the vicinity of New Orleans, La.

72 **Courtis** (W. M.). Potassium salts.

Mineral Resources U. S. for 1904, U. S. Geol. Survey, 16 pp.

Contains a list of saline springs in the United States and partial analyses of the spring water showing potassium, sodium, and magnesium. States that "along the line of the fault on the rim of the Bighorn Basin, Wyoming, the waters are rich in potassium salts, running from 5 to 11 per cent of the total residue."

73 **Cox** (W. G.). Artesian-water supply.

Agr. Gaz. N. S. Wales, vol. 16, pp. 253–257, fig. 1. Abstract: Exp. Sta. Record, vol. 17, no. 2, p. 193.

Discusses the theoretical and practical use of artesian wells for water power in New South Wales and Queensland.

74 **Crane** (W. R.). The Quapaw zinc district [Indian Territory].

Eng. and Min. Jour., vol. 80, pp. 488–490, 3 figs.

Contains a short discussion of the agency of underground waters in the formation of the deposits.

75 —— Coal mining in Arkansas.

Eng. and Min. Jour., vol 80, pp. 774–777, 3 figs.

The mines are usually wet and the water is often acid, but good water for boilers is usually available (p. 776).

76 **Cravetti** (A. L.). Water and irrigation in the province of San Luis, Argentine Republic.

An. Min. Agr. Argentina, Sec. Agr. (Agron), vol. 1, no. 5, pp. 85–119, 6 figs. Abstract: Exp. Sta. Record, vol. 16, p. 1136.

Summarizes information regarding subterranean waters and their use for irrigation, etc.

77 **Crider** (A. F.). Cement resources of northeast Mississippi.

Bull. U. S. Geol. Survey no. 260, pp. 510–521.

Gives well sections (pp. 511, 516–517) and describes artesian flows (p. 517).

78 **Crosby** (William Otis). The limestone-granite contact deposits of Washington Camp, Arizona.

Bimonthly Bull. Am. Inst. Min. Eng., no. 6, pp. 1216–1238.

Contains a discussion of magmatic water in general and the improbability of its assistance in the development of the garnet contact zone at Washington Camp (pp. 1229–1232); suggests the concentration of metallic contents of the limestone by the circulation of the normal ground water stimulated by intense and long-continued igneous and metamorphic agencies (p. 1234); ascribes the occurrence of native arsenic at this place to thermal waters rising along a fault line (p. 1237).

79 —— Massachusetts and Rhode Island.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 68–75.

Describes briefly the occurrence of water and possibilities of artesian supply in Cambrian quartzite in the Berkshire Valley, in Triassic strata of the Connecticut Valley, in igneous and metamorphic rocks of the highlands, and in drift deposits (pp. 70–73). Enumerates the principal mineral springs in the two States (pp. 73–75). Gives list of publications (p. 75).

80 —— Water supply from the delta type of sand plain.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 161–178.

In connection with the location of dikes for the Metropolitan reservoir at Clinton, Mass., many hundred borings were made in the sand plains. The paper describes the evidence presented by these borings as to the water table, the artesian waters, the deposition of iron, the oxidation of the drift at considerable depths, and the phenomena of "lost water," or that taken up from the well by unsaturated beds.

81 **Culbertson** (Harvey). Irrigation investigations in western Texas.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 158, pp. 319–340, 4 figs.

Describes wells (some flowing artesian) (pp. 321, 323–325), and springs (pp. 323, 327–328) used for irrigation. Describes use of windmills for pumping water from wells (pp. 338–339).

82 **Cushing** (H. P.). Geology of the vicinity of Little Falls, Herkimer County [New York].

Bull. N. Y. State Mus. no. 77, 95 pp., 15 pls., 14 figs., 1 map.

Interprets geology on the basis of churn-drilled wells (pp. 53–56).

D.

83 **Dale** (T. Nelson). Water resources of the Fort Ticonderoga quadrangle, Vermont and New York.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 126–129.

Mentions the abundance of good springs, and refers to a well known as "the frozen well" on account of its extremely low temperature (p. 127).

84 **Darlington** (E. B.). Irrigation investigations, upper Snake River, Idaho.

Irrigation Age, vol. 20, pp. 204–207, 1 fig.

Notes large loss from irrigation canals by seepage and the reappearance of this water in springs and creeks. Abundance of water can be obtained from shallow wells near Rexburg (p. 206).

85 **Darton** (Nelson Horatio). Zuni salt deposits, New Mexico.

Bull. U. S. Geol. Survey no. 260, pp. 565–566.

Ascribes the supply of the salt lake to springs from the Red Beds.

86 —— Description of the Sundance quadrangle [Wyoming-South Dakota].

Geologic Atlas U. S., folio 127, U. S. Geol. Survey, 12 pp., 5 maps, 1 col. sect., 1 illus. sheet, 3 figs.

Discusses the water-bearing conditions of the Dakota and Lakota sandstones, Pahasapa limestone, Deadwood sandstone, Minnelusa formation, and Minnekahta limestone, and describes the relations of these beds to the occurrence of well and spring water (p. 12). Gives analysis of well water (p. 12). Shows the artesian-water conditions by means of a special colored map.

87 —— Preliminary report on the geology and underground water resources of the central Great Plains.

Prof. Paper U. S. Geol. Survey no. 32, 433 pp., 72 pls., 18 figs.

Describes the various water horizons and discusses in detail the artesian wells and artesian conditions in South Dakota, Nebraska, Kansas, eastern Colorado, and eastern Wyoming, giving numerous records. Describes salt springs and wells (pp. 389–392).

88 —— Delaware.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 111–113.

Enumerates various water horizons in Cretaceous and Tertiary strata, gives a partial list of deep wells, and states future prospects for wells. Notes the principal publications.

89 —— Preliminary list of deep borings in the United States, second edition, with additions.

Water-Sup. and Irr. Paper no. 149, U. S. Geol. Survey, 175 pp.

Contains lists of deep wells reported to the Survey or described in scientific publications. They are classified by States, counties, and towns, the depths, diameter, yield, height of water, temperature, and other miscellaneous data being presented in tables for each State and references being given to published records. Bibliographies of publications relating to deep borings are also included.

90 **Darton** (Nelson Horatio). The Zuni salt lake [Arizona].

Jour. Geol., vol. 13, pp. 185–193.

Quotes C. L. Herrick on suppossed derivation of salt from solution of salt in underlying strata (pp. 185–186). The salt is brought up by springs (pp. 187, 193). Suggests solution of salt beds by hot volcanic solutions as cause of sinking, producing the crater (pp. 190, 192).

91 —— and **Fuller** (Myron Leslie). Maryland.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 114–123, 2 pls.

Describes the distribution of springs and gives a list of those of commercial value (p. 115). Describes the distribution of wells in the Allegheny Plateau, the Appalachian Mountains, Piedmont Plateau, and Coastal Plain, and tabulates well statistics (pp. 116–118). Describes water horizons in the Coastal Plain formations (pp. 118–120), and discusses more fully the water horizons and well prospects of the Baltimore district (pp. 121–123). Lists the principal publications.

92 —— and **Fuller** (Myron Leslie). District of Columbia.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 124–126, 1 pl.

Describes occurrence of water in the crystalline rocks and in the Potomac formation. Notes several mineral springs, and several publications on the underground water of the District.

93 —— and **Fuller** (Myron Leslie). Virginia.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 127–135, 1 pl.

Describes various water horizons in the Cretaceous and Tertiary formations and gives sections (pp. 128–129). Gives table of deep wells and statistics (pp. 130–131). Describes underground water conditions in the Piedmont Plateau, Appalachian Mountain belt, and Cumberland Plateau (pp. 132–133). Lists the commercial springs (pp. 133–134) and publications on underground waters of the State (pp. 134–135).

94 —— and **O'Harra** (C. C.). Description of the Aladdin quadrangle [Wyoming-South Dakota-Montana].

Geologic Atlas U. S., folio 128, U. S. Geol. Survey, 8 pp., 4 maps, 1 col. sect., 1 fig.

Describes the water-bearing formations, including the Dakota-Lakota sandstone, Minnelusa formation, Pahasapa limestone, and Deadwood sandstone (p. 8), and notes the conditions relative to wells. The artesian-water conditions are shown by a special colored map.

95 **David** (T. W. E.), **Pittman** (E. F.) and. Irrigation geologically considered with special reference to the artesian area of New South Wales.

Jour. and Proc. Roy. Soc. N. S. Wales, Eng. sect., vol. 37, pp. ciii–cliii, 2 pls. Abstract: Exp. Sta. Record, vol. 17, no. 2, p. 193.

See Pittman (E. F.) and David (T. W. E.).

96 **Davis** (F. S.). An undeveloped country.

Min. and Sci. Press, vol. 90, pp. 204–205, 4 figs.

Describes a spring in Lower California.

97 **Davis** (William Morris). "A journey across Turkestan."

Explorations in Turkestan, with an account of the basin of eastern Persia and Sistan.

Carnegie Institution of Washington, pp. 23–119, 67 figs.

Springs furnish a portion of the water supply of Baku (p. 29); a boring 2,000 feet deep at Askhabad failed to find water (p. 44). Notices a large spring in Firuza basin used for irrigation (p. 48). Notes seepage of water from terrace gravels into river (p. 103).

98 —— The Wasatch, Canyon, and House ranges, Utah.

Bull. Mus. Comp. Zool., Harvard Coll., Geological Series, vol. 8, pp. 15–56, 3 pls.

Describes a flowing well at Deseret (p. 35). Notes the obtaining of good water at Antelope and Indian Springs (p. 36). Mentions the ocurrence of springs in the House Range (p. 40).

99 **Davis** (William Morris). The geographical cycle in an arid climate.
Jour. Geol., vol. 13, pp. 381–407.
Mentions ground-water conditions in arid regions (p. 382) and considers underdrainage of deserts by sandstone in its possible relation to wind erosion (p. 392).

100 **Day** (David T.). Summary of the mineral production of the United States in 1904.
Mineral Resources U. S. for 1904, U. S. Geol. Survey, pp. 9–36.
Gives the production and value of mineral waters in the United States for 1904 (p. 21); comparison of the production and value for 1903 and 1904 (pp. 22–23); production and value of mineral waters each year from 1880 to 1904 (pp. 24–36).

101 **de Laval** (Carl George P.). Pumping on the Comstock. [Nevada.]
Eng. and Min. Jour., vol. 79, pp. 516–518, 7 figs.
Describes the encountering of water in the various mines on the lode and the quantity, temperature, etc., thereof.

102 —— Pumping the Comstock lode mines. [Nevada.]
Eng. Rec., vol. 51, pp. 360–361, 1 fig.
Describes the occurrences of hot water in these mines and the pumping machinery being used in the unwatering of the lode.

103 —— Pumping the Comstock lode mines. [Nevada.]
Mines and Minerals, vol. 26, pp. 78–79, 2 figs.
Describes the encountering of hot water in the mines on this lode.

104 —— Pumping the Comstock lode mines. [Nevada.]
Sci. Am. Supp., vol. 59, pp. 24484–24486, 9 figs.
Describes the encountering of hot water in the mines on this lode.

105 **Douglass** (Earl). Source of the placer gold in Alder Gulch, Montana.
Mines and Minerals, vol. 25, pp. 353–355, 3 figs.
Notes the possible agency of heated underground waters in the deposition of the gold occurring in the gravels.

105a **Drake** (J. A.), **Mangum** (A. W.) and. Soil survey of the Russell area, Kansas.
Field Operations of the Bureau of Soils, 1903, U. S. Dept. Agr., pp. 911–926, 1 fig., 1 map.
See Mangum (A. W.) and Drake (J. A.).

106 **Draper** (M. D.). The Goldfield district, Nevada.
Min. and Sci. Press, vol. 90, pp. 150–152, 10 figs.
Contains a discussion of the agency of solfataric waters in the formation of the deposits.

107 **Dravo** (F. R.). Concrete lining for mine shafts.
Proc. Eng. Soc. West. Pa., vol. 21, pp. 319–330, 2 figs.
Discusses the occurrence of springs, seepage water, etc., in mines, with especial reference to the use of concrete for shaft lining.

108 **Drummond** (Goyne). Reconnaissance of proposed ceded strip of Shoshone Indian Reservation, Wyoming.
Irrigation, vol. 2, no. 4, pp. 5–6.
Notes the sinking of Meadow Creek into a cave near the mouth of Little Wind River Canyon.

E.

109 **Eckel** (Edwin C.). The Clinton hematite.
Eng. and Min. Jour., vol. 79, pp. 897–898, 2 figs.
Quotes C. H. Smyth as to the agency of water in the formation of the iron ore.

110 **Eckel** (Edwin C.). Cement materials and industry of the United States.

Bull. U. S. Geol. Survey no. 243, 395 pp., 15 pls., 1 fig.

Discusses the percentage of water in freshly quarried limestone, clay, shale, and marl (pp. 44–45).

111 —— Limonite deposits of eastern New York and western New England.

Bull. U. S. Geol. Survey no. 260, pp. 335–342.

Notes part taken by water in ore deposition (p. 342).

112 **Elliott** (C. G.). Report on drainage investigations, 1904.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 158, pp. 643–743, 4 pls., 52 figs.

Discusses rise of ground water due to irrigation, and detection of rise by means of test wells (pp. 645–652). Notes porosity and cavernous nature of coral rock in Florida Everglades, as indicated by wells (p. 716).

113 **Ellis** (Edwin E.). Zinc and lead mines near Dodgeville, Wis.

Bull. U. S. Geol. Survey no. 260, pp. 311–315.

Notes the relation of ore to ground-water level and considers the conditions of deposition (pp. 314–315).

114 **Ells** (R. W.). Nicola coal basin, British Columbia.

Sum. Rept. Geol. Survey Canada, 1904, pp. 42–121, 1 pl., 2 figs., 2 maps.

Gives records of borings (pp. 70–74).

115 **Ely** (Charles W.), **Bennett** (Frank) and. Soil survey of Marshall County, Indiana.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 689–706, 1 map, 1 fig.

See Bennett (Frank) and Ely (Charles W.).

116 —— and **Griffin** (A. M.). Soil survey of Dodge County, Ga.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 231–246, 1 map, 1 fig.

Mentions the occurrence of sink holes (p. 235).

117 **Emmons** (Samuel Franklin). Copper in the Red Beds of the Colorado Plateau region.

Bull. U. S. Geol. Survey no. 260, pp. 221–232.

Contains brief references to the part of water in ore deposition.

118 —— The Cactus copper mine, Utah.

Bull. U. S. Geol. Survey no. 260, pp. 242–248.

Describes town water supply from Wawah springs, sixteen in number (p. 244).

119 —— Theories of ore deposition historically considered. (Presidential address, Geol. Soc. Am., 1903.)

Ann. Rept. Smithsonian Inst. for year ending June 30, 1904, pp. 309–336. Sci. Amer. Supp., vol. 60, no. 1563, pp. 25046–25047; no. 1564, pp. 25062–25064; no. 1565, pp. 25078–25079.

In reviewing the various theories of ore deposition, mentions the relations of deposition to circulation of underground waters, and water level, and the controversy regarding ascending and descending solutions, magmatic and meteoric waters, etc.

120 **Engineering and Mining Journal.** Geology at Simplon.

Eng. and Min. Jour., vol. 79, p. 180.

Notes the encountering in the Simplon tunnel in Switzerland and Italy of waters much hotter than had been predicted by geologists.

121 —— Water in the Egyptian Desert.

Eng. and Min. Jour., vol. 79, p. 812.

Notes the existence of a flowing-well area a few miles north of Kharga in which flows were obtained a few feet below the surface.

122 **Engineering and Mining Journal.** Banket in Rhodesia.
Eng. and Min. Jour., vol. 79, pp. 1236–1237.
Quotes H. D. Griffiths on the agency of underground waters in the enrichment of this gold-bearing conglomerate.

123 —— Gold in banket.
Eng. and Min. Jour., vol. 79, pp. 1241–1242.
Quotes the views of Schoch, Griffiths, Hatch, and Corstorphine as to the agency of underground waters in the enrichment of the gold-bearing conglomerates of the world.

124 —— A large pumping plant in Tasmania.
Eng. and Min. Jour., vol. 80, pp. 155–157, 4 figs.
Notes the encountering of large quantities of water in the Tasmania gold mine.

125 —— Gasolene pumps for irrigation.
Eng. and Min. Jour., vol. 80, p. 296.
Describes the effect of pumping on the water level in two 16-inch 45-foot wells at Garden, Kans.

126 —— Shaft sinking for salt. [Detroit, Mich.]
Eng. and Min. Jour., vol. 80, pp. 972–973, 1 fig.
Describes the encountering of large quantities of strong sulphur water.

127 —— The Simplon tunnel.
Eng. and Min. Jour., vol. 80, p. 1009.
Contains a description of the thermal springs encountered in the construction of the Simplon tunnel between Switzerland and Italy.

128 **Engineering News.** Vertical and lateral penetration of sewage bacteria into chalk soil.
Eng. News, vol. 53, pp. 116–117.
Describes experiments made near Amesbury, England.

129 —— Septic tanks and intermittent sand filters at Saratoga Springs, N. Y.
Eng. News, vol. 53, pp. 118–122.
Notes that the filtrate from the beds passes off through the ground without appreciably raising the water table (p. 122).

130 —— [The Simplon tunnel between Switzerland and Italy.]
Eng. News, vol. 53, pp. 229–230.
Describes the many springs of hot water encountered in the construction of this tunnel.

131 —— The Pennsylvania Railroad tunnel under Capitol Hill, Washington, D. C.
Eng. News, vol. 54, pp. 267–270.
Notes the penetration of quicksand carrying large quantities of water and describes the method used in draining the same (p. 267).

132 —— [Successful use of a divining rod.]
Eng. News, vol. 54, p. 386.
Notice of communication from Mr. G. Franzius, of the German Harbor Construction Bureau, in which is described the use of the divining rod in the location of wells at the Imperial Navy-Yard at Kiel. The geological conditions, the divining rod, and the tests made are briefly described.

133 **Engineering Record.** Air-lift pumping plant of the Redlands Water Company [California].
Eng. Rec., vol. 51, p. 8, 2 figs.; Compressed Air, vol. 10, pp. 3394–3396.
Contains a description of the wells furnishing the supply and the tests made to determine the effect of pumping on the ground-water level.

134 **Engineering Record.** Difficulty with the ground-water drains of a building.

Eng. Rec., vol. 51, p. 17.

Describes the inability of the underdrain of the New York Stock Exchange Building to handle ground water collecting below the cellar level. The drains were clogged by deposition from saturated drainage water. An analysis of the water is given.

135 —— Sewage disposal at Saratoga Springs, N. Y.

Eng. Rec., vol. 51, pp. 82–86, 6 figs.

Gives the level of the water table at the site of the sewage disposal plant as about 16 feet below the level of the original surface.

136 —— Legal restrictions on the use of underground-water supplies in New York.

Eng. Rec., vol. 51, pp. 177–178.

Complete description of the case of Frederick Reisert *v.* City of New York, and references to similar cases. The city operated a driven-well plant which influenced the value of cultivated ground by drying up a small surface stream and the city was therefore held responsible for damages.

137 —— A private irrigation system in Texas.

Eng. Rec., vol. 51, pp. 190–191, 5 figs.

Detailed description of the works is given. The principal source of supply is a spring with an unvarying flow of 70,000 gallons per minute.

138 —— The Simplon tunnel.

Eng. Rec., vol. 51, pp. 230–231.

Notes the encountering of large quantities of hot water in the construction of the tunnel between Switzerland and Italy.

139 —— Deep artesian wells in South Australia.

Eng. Rec., vol. 51, p. 332.

Notes the sinking of a 4,420-foot well with a flow of 600,000 gallons daily at a temperature of 204° F. Gives the total flow and cost of deep wells put down by the South Australian Government.

140. —— Measuring underflow.

Eng. Rec., vol. 51, p. 344.

Notes the use of Prof. C. S. Slichter's method of measuring underflow by Homer Hamlin at Los Angeles and in the San Francisco Valley. Several suggestions concerning the methods are made.

141 —— Irrigation in Texas.

Eng. Rec., vol. 51, pp. 60–61 of the Current News Supplement.

Describes the use of springs and artesian and surface wells in irrigation in Texas.

142 —— Difficulties with a pump well.

Eng. Rec., vol. 51, p. 384, 6 figs.

Describes the construction of a pump well and the sinking of several artesian wells at the Absecon pumping station of the Atlantic City, N. J., waterworks. The handling of a large volume of percolating water under high pressure was the chief difficulty.

143 —— [Damage from percolation.]

Eng. Rec., vol. 51, p. 412.

Notice of decision by appellate division of New York supreme court in Schwarzenbach *v.* Electric Water Power Company of Oneonta, 92 N. Y Sup., 187. The court ruled that percolation from the reservoir so as to flood the land of the plaintiff was unlawful, and that Schwarzenbach was entitled to damages.

144 —— The Asyut barrage across the Nile.

Eng. Rec., vol. 51, pp. 428–430, 2 figs.

Describes the occurrence of innumerable small springs in the bed of the foundation trench, the trouble caused by them, and the method used in sealing up the ventholes.

145 **Engineering Record.** [Artesian-well pumps at Memphis.]
Eng. Rec., vol. 51, p. 460.
Short notice of the use of special pumps for 64 wells at Memphis, Tenn.

146 —— Experimental work with wells at Battle Creek [Mich.].
Eng. Rec., vol 51, p. 502.
Describes the sinking of wells, the materials passed through, the flow, analyses of the water, and the effect of pumping on the level of the water table at Battle Creek, Mich. The Marshall sandstone is mentioned as containing water-bearing strata.

147 —— The First street tunnel, Washington [D. C.].
Eng. Rec., vol. 51, pp. 566–567, 8 figs.
Describes the encountering of water-bearing quicksand and the method of tunneling through it.

148 —— An unusual water main.
Eng. Rec., vol. 51, p. 581.
Describes the laying of a water main through beds of quicksand in Little Falls. N. Y. Dams were built every 300 feet, the water pumped out of the section, and the pipe laid, after which work was commenced on the next section.

149 —— Fire protection at the Worthington works.
Eng. Rec., vol. 51, pp. 684–685, 1 fig.
Describes the wells furnishing the water supply and the raising of the water by the air lift. [Harrison, N. J.]

150 —— Water supply by compressed air, Los Angeles, Cal.
Eng. Rec., vol. 52, p. 43 of the Current News Supplement.
Describes the water supply of Los Angeles from deep wells by means of compressed air.

151 —— Permeability experiments, North Dike, Wachusett reservoir. [Mass.]
Eng. Rec., vol. 52, p. 64.
Notes variations in the water table in the dike due to varying rainfall and seasonal changes; results show the dike to be nearly impermeable.

152 —— The waterworks at Raton, N. Mex.
Eng. Rec., vol. 52, p. 72.
The water supply is largely from springs; describes the building of trenches across the site of the dam to cut off the ground-water flow.

153 —— Sanitation in Manila.
Eng. Rec., vol. 52, pp. 76–79.
Notes the large amount of ground water which will infiltrate into the sewer pipes because of the laying of the latter at a considerable distance below sea level in a soil thoroughly saturated with water (p. 78).

154 —— Sliding hillsides.
Eng. Rec., vol. 52, p. 133.
Vibration, etc., of the railroad bridge upon which a water main is laid causes frequent leakage of the water, which results in the production of landslides.

155 —— [Developing underground water.]
Eng. Rec., vol. 52, p. 181.
Notes a decision of the California supreme court, 77 Pac. Rept. 1113, regarding the relation between owners of filtration tunnels and the owners of water flowing in a stream.

156 —— Improvements of the Elgin waterworks.
Eng. Rec., vol. 52, pp. 188–189.
Describes the deep-well water supply from the St. Peter and Madison sandstones at Elgin, Ill.

157 **Engineering Record.** Port Washington waterworks under air pressure.
Eng. Rec., vol. 52, pp. 205–206, 2 figs.
Describes the supplying of Port Washington, N. Y., with water from three 8-inch wells in gravel.

158 —— [A rock slide.]
Eng. Rec., vol. 52, p. 225.
Description of a slide in one of the quarries of the Lehigh Portland Cement Company, caused by the penetration of water along the contact of the limestone and cement rock.

159 —— Mechanical filters of the Brooklyn, N. Y., waterworks.
Eng. Rec., vol. 52, pp. 236–239, 4 figs.
Contains a description of the well and spring supply of Brooklyn.

160 —— An unusual system of wells.
Eng. Rec., vol. 52, p. 266.
Describes the waterworks system at Hastings, England. The water is obtained from three wells, 9 feet in diameter, two of the wells being 270 feet deep and the other 210 feet.

161 —— [Underground-water development in southern California.]
Eng. Rec., vol. 52, p. 266.
Notes the overdevelopment of the underground-water supply of this region.

162 —— Blowing wells.
Eng. Rec., vol. 52, p. 380.
Notes the investigation of this subject by the United States Geological Survey, and gives a brief explanation of the cause of the phenomenon.

163 —— The diminished yield of underground waters in southern California.
Eng. Rec., vol. 52, pp. 405–407.
Describes the geohydrologic conditions existing in this area and concludes that present diminished yield of underground water is due to an overdevelopment of the underground-water supply.

164 —— [Seepage from irrigation canals.]
Eng. Rec., vol. 52, p. 416.
Short discussion of the case of Howell *v.* Big Horn Basin Colonization Company, in Wyoming, in which the Wyoming supreme court decided that "seepage from irrigation canals is not only a waste of water, but may also result in the payment of damages for injury to property."

165 —— Sinking machinery foundations in quicksand without excavation.
Eng. Rec., vol. 52, p. 526.
Describes the method used in sinking through a bed of quicksand at Schenectady, N. Y., which prevented any subterranean flow from under adjacent footings.

166 —— The sewage pumping station at the Hampton Institute, Hampton, Va.
Eng. Rec., vol. 52, pp. 566–568, 4 figs.
Describes the relation between the sewage system and the high groundwater level at this place.

167 —— Difficult sewer construction in Minneapolis [Minn.].
Eng. Rec., vol. 52, pp. 639–640, 4 figs.
Describes the encountering of water-bearing quicksands and the methods used in working through them. Notes seepage of water into tunnel from the dumping ground.

168 —— The effect of seepage from ditches on stream flow.
Eng. Rec., vol. 52, p. 663.
Concludes that the use of water from the Platte River has reduced the size of the spring floods. Improvement in the flow of the stream is due to return seepage.

169 **Engineering Record.** Waterworks of Saugatuck, Mich.

Eng. Rec., vol. 52, pp. 665-666.

Detailed description of the water supply of this village, which is obtained from four wells driven along the bank of the Kalamazoo River.

170 —— [Artesian well.]

Eng. Rec., vol. 52, p. 725.

Describes the equipment of an artesian well 10 inches in diameter and 756 feet deep, belonging to the Fond du Lac Water Company, Wisconsin.

171 **Engineering Review.** Factory fire protection and water supply.

Eng. Review, vol. 15, no. 8, pp. 5-8, 7 figs.

Gives the location, depth, and material passed through of the wells furnishing the water supply at the Henry R. Worthington Hydraulic Works, Harrison, N. J. The water comes from a bed of gravel at a depth of about 400 feet.

172 **English Mechanic and World of Science.** A land of gold and marble.

Sci. Am. Supp., vol. 60, pp. 25034-25035.

Describes the limestone caverns and underground streams in New South Wales.

173 **Ensign** (O. H.). Power engineering applied to irrigation problem.

Water-Sup. and Irr. Paper no. 146, U. S. Geol. Survey, pp. 37-42.

Includes a statement concerning the practice of pumping from driven wells (p. 41).

F.

174 **Fairchild** (Herman Le Roy). Pleistocene features in the Syracuse region.

Am. Geologist, vol. 36, pp. 135-141.

Mentions occurrence of brines in drift in New York.

175 **Fenneman** (N. M.). The Florence, Colo., oil field.

Bull. U. S. Geol. Survey no. 260, pp. 436-440.

Notes occurrence of crevice encountered by an oil well which required two wagonloads of gravel to fill (p. 438), and discusses the number and limits of cracks and the occurrence of water in oil wells (p. 439).

176 —— Oil fields of the Texas-Louisiana Gulf Coast.

Bull. U. S. Geol. Survey no. 260, pp. 459-467.

Mentions the occurrence of salt water in oil wells of Texas (p. 460), tar springs and others emitting gas in Texas (pp. 462-463), and salt and sour waters (p. 464).

177 **Findley** (O. P.). Plant of the Cananea Consolidated Copper Company, Cananea, Sonora, Mexico.

Min. and Sci. Press, vol. 91, pp. 342-343, 4 figs.

The water supply comes from a well sunk to bed rock, with a subterranean gallery which taps an underground stream capable of furnishing 3,000,000 gallons per day.

178 **Finkle** (F. C.). Pumping underground water in southern California.

Water-Sup. and Irr. Paper no. 146, U. S. Geol. Survey, pp. 56-72.

Describes the underground reservoir in gravel (p. 57) and its replenishment from mountain streams and return waters from irrigation (p. 58). The extent of the supply (p. 59), its decline due to pumping (pp. 60-61), and the proposed replenishment by decreasing draft and constructing regulating works to secure distribution and absorption of waters of mountain streams are considered (pp. 61-63). Other points treated are laws relating to underground water (pp. 59-60) and pumping methods (pp. 63-72).

179 **Fischer** (Theobold). Morocco.

Ann. Rept. Smithsonian Inst. for year ending June 30, 1904, pp. 355–372. Trans. from Geographische Zeitschrift, Leipzig, February 12, 1903.

Mentions rarity of springs on the lower plain, and necessity for resorting to bored wells. Refers to salinity and unpalatableness of the water (p. 363).

180 **Fitzgerald** (William G.). A lost river.

Technical World Magazine, vol. 4, pp. 74–78, 3 figs.

Describes the great limestone cavern through which the river Lesse in Belgium passes in its subterranean course.

181 **Fleming** (Burton P.). Seepage investigations in the valley of the Laramie River.

Bull. Wyoming Exp. Sta. no. 61, 32 pp., 3 figs,

Discusses the causes, extent, and prevention of loss of water from canals by seepage, and reports the results of seepage measurements on Laramie River, Sand Creek, and a number of irrigation canals in Wyoming.

182 —— Irrigation work on the North Platte River.

Bull. Wyoming Exp. Sta. no. 66, 24 pp., 4 figs.

Gives measurements of seepage losses from canals in Wyoming and Nebraska (pp. 18–23).

183 **Fletcher** (R.). Disposal of household wastes at summer resorts, encampments, and farmhouses. Pure water supply and other sanitary conditions.

New Hampshire Sanit. Bull., July Supp., 23 pp., 8 figs. Abstract: Exp. Sta. Record, vol. 17, no. 4, p. 409.

Gives information regarding the construction of wells and their protection from contamination.

183a **Fogel** (Estelle D.), **Pammel** (L. H.) and. Some railroad water supplies.

Proc. Iowa Acad. Sci. for 1904, vol. 12, pp. 151–155.

See Pammel (L. H.) and Fogel (Estelle D.).

184 **Ford** (A. G.). Miscellaneous water analyses.

Bull. Oklahoma Agr. Exp. Sta. no. 67, 18 pp.

Gives chemical analyses of water from 95 wells and 13 springs, and states best locations for wells relative to houses, etc.

185 **Forestry and Irrigation.** Irrigation in Texas.

Forestry and Irrigation, vol. 11, pp. 230–231.

Describes the irrigation of portions of the State by water from surface and artesian wells.

186 —— The upbuilding of Nevada.

Forestry and Irrigation, vol. 11, pp. 270–274, 3 figs.

Mentions the sinking of mountain streams in the sands of the desert.

187 **Fortier** (S.). Irrigation in Santa Clara Valley, California.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 158, pp. 77–91.

Mentions use of wells for irrigation in this valley and describes methods of applying water.

188 **Franke** (Robert P.). Geology of the Cochise mining district, Arizona.

Min. Reporter, vol. 51, p. 503, 1 fig.

Notes that the descending waters have leached great portions of the beds.

189 **Fuller** (Myron Leslie). Artesian flows from unconfined sandy strata.

Eng. News, vol. 53, pp. 329–330, 2 figs.

Describes examples on Long Island, New York, and in Michigan, and offers an explanation of the cause.

190 **Fuller** (Myron Leslie). The measurement of low aresian heads.

Eng. News, vol. 53, p. 593, 1 fig.

Describes a small gage for taking artesian-well pressures.

191 —— Some results of Geological Survey work in the location of underground waters.

Eng. News, vol. 54, p. 517.

A letter to the editor of the Engineering News, in which Mr. Fuller notes the fulfilling of predictions made by Mr. W. H. Norton as to the underground waters at Waterloo, Iowa.

192 —— Geology of Fishers Island, New York.

Bull. Geol. Soc. America, vol. 16, pp. 367–390.

Gives well record and describes lateral transmission of water through joints of crystalline rocks from mainland, 7 miles distant (p. 372).

193 —— Objects, development, and results of the work of collecting well records and samples.

Bull. U. S. Geol. Survey no. 264, pp. 12–39.

Discusses the importance and benefit of well records, and describes the organization of the division of hydrology and the methods of collecting samples and records. Among the points incidentally considered are the occurrence of oil, gas, and water (p. 12), factors affecting well drilling (p. 13), use of records (p. 14), problems of depth, character of materials, water supplies, casing, limits of depth, location of oil and gas shows, head, and use of water for industrial, irrigation, medicinal and bathing purposes, and at resorts (pp. 15–20).

194 —— Introduction.

Contributions to the hydrology of eastern United States, 1904; Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 9–16.

Summarizes papers included in the report.

195 —— Triassic rocks of the Connecticut Valley as a source of water supply.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 95–112, 8 figs.

Discusses the occurrence of water in Triassic conglomerates, sandstones, shales, and traps; and the influence of structure, jointing, and faulting on the waters. Discusses the testing of wells, keeping of accurate records, and the proper depth of wells. Gives analyses.

196 —— Notes on the hydrology of Cuba.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 183–199.

Describes the various town and city supplies obtained from ordinary and artesian wells, underground streams, and springs (pp. 187–193). Describes wells sunk by U. S. War Department (pp. 196–199), and gives record (p. 192) and analysis (p. 198). Discusses abundance of springs and mentions submarine springs (pp. 193–194). Describes subterranean streams and their relation to limestone caves (p. 194). Discusses mineral waters and gives analyses (pp. 194–196).

197 —— Occurrence of underground waters.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 18–40, 4 pls., 14 figs.

Describes sources of ground water, relation to rainfall, permeability and storage capacity of rocks, occurrence and amount of water, types of water-bearing formations, temperature of underground waters, and their recovery by seepage, springs, and by wells. Gives a short chapter on artesian flows, enumerating the essential conditions. Describes briefly the underground-water conditions of eastern United States, including types of rock and rock-water provinces.

198 —— New Hampshire.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 57–59.

Summarizes data regarding wells and springs, and enumerates 8 commercial springs.

199 **Fuller** (Myron Leslie). Pennsylvania.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 104–110, 1 fig.

Describes distribution of wells in the drift, stream deposits, crystalline rocks, Triassic, Cambrian, Silurian, Devonian, and Carboniferous rocks, and Coastal Plain deposits. Enumerates mineral springs, and gives principal publications on underground waters of the State.

200 —— North Carolina.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 136–139, 1 fig.

Describes briefly the artesian conditions of the Coastal Plain and the occurrence of water in the Potomac formation, and gives list of wells. Describes briefly the occurrence of water in the Piedmont Plateau and Appalachian Mountain belt. Lists the principal mineral springs and publications on underground waters of the State.

201 —— Florida.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 159–163, 1 fig.

Describes underground-water conditions of the highland area and the artesian areas of the west and east coasts. Mentions driven wells in the sand area. Notes several mineral springs and publications on water conditions of the State.

202 —— Lower Michigan.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 242–247, 2 figs.

Compiles data regarding the underground-water resources of the Lower Peninsula of Michigan. Lists the principal publications and notes important mineral springs.

203 —— West Virginia.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 271–272.

Summarizes the conditions bearing on underground-water supplies in the Appalachian Mountain belt and the Cumberland Plateau. Lists the principal mineral springs of the State.

204 —— Bibliographic review and index of papers relating to underground waters published by the United States Geological Survey, 1879–1904.

Water-Sup. Paper no. 120, U. S. Geol. Survey, 128 pp.

Lists all references to underground waters, springs, well records, and drilling methods, and gives detailed classified subject index.

205 —— Hydrologic work in eastern United States and publications on ground waters.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 9–29.

Describes the organization of the division of hydrology and gives an account of the work of the eastern section in 1904. The special work included the collection of well records and samples, the preparation of bibliographies and hydrologic tables, and a study of the relation of the law to underground waters. About 50 geologists were employed during the year, work being conducted in Maine, New Hampshire, Massachusetts, New York, New Jersey, Maryland, Virginia, West Virginia, Georgia, Alabama, Mississippi, Tennessee, Kentucky, Arkansas, Louisiana, Missouri, Iowa, Minnesota, Wisconsin, and Michigan. The paper contains a summary of the other papers in the report and gives a list of survey publications relating to underground waters.

206 —— Two unusual types of artesian flow.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 40–45.

Describes flows from uniform unconfined sands taking place in virtue of lamellar arrangement of elongated sand grains on Long Island, New York, and in Michigan. The lateral transmission of water through joints in stratified rocks for long distances independently of structure in southeastern Michigan is also described. The confinement necessary for the flow is afforded by the clayey drift overlying the more porous rock.

207 **Fuller** (Myron Leslie). Construction of so-called fountain and geyser springs.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 46–50.

Differentiates confined and unconfined springs, and gives methods by which the former can be converted into a "fountain," and both into intermittent or geyser springs.

208 —— A convenient gage for determining low artesian heads.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 51–52.

Describes a 2-inch nickel gage which, by means of a rubber flange, can be instantly applied to pipes up to 2 inches in diameter and will read pressures up to 50 pounds.

209 —— A ground-water problem in southeastern Michigan.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 129–147.

Discusses the failure of wells along Huron River. The water occurs in the jointed upper portion of the Dundee limestone and Monroe and Sylvania sandstones, in which it is confined by overlying glacial clays. The loss of head and flow are described and the causes, including the effect of adjacent deep wells, quarrying operations, deforestation, ditching, frost, and deficiency of rainfall are considered. Deforestation and ditching are the most far-reaching causes, but an early frost which froze the ground and prevented the absorption of late autumn rains of the previous year, in connection with low rainfall, was the more immediate cause.

210 —— Notes on certain large springs of the Ozark region, Missouri and Arkansas.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 207–210.

Outlines the geologic conditions and describes and gives discharge of Greer, Van Buren, Fanchon, Alley, Blue, Mesamer, and Boiling springs of Missouri and the Mammoth spring of Arkansas.

211 —— Failure of wells along the lower Huron River, Michigan, in 1904.

Ann. Rept. Michigan Geol. Survey for 1904, pp. 7–29, pl. 1, figs. 1 and 2.

Describes the relations and conditions of the wells, and ascribes their decline to the deforesting and ditching of the region and an early frost followed by a dry summer. Advocates the passing of laws regulating deep or artesian wells.

212 —— Cause and period of earthquakes in the New Madrid area, Missouri and Arkansas.

Abstract: Science, new. ser., vol. 21, pp. 349–350.

Notes settling of the surface in this area due to undermining by ground waters under artesian pressure.

213 —— Artificial fountain and geyser springs.

Sci. Am., vol. 93, p. 67, 4 figs.

Discusses the geological conditions resulting in the formation of springs and the artificial construction of fountain and geyser springs.

214 —— **Darton** (N. H.) and. Maryland.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 114–123, 2 pls.

See Darton (N. H.) and Fuller (Myron Leslie).

215 —— **Darton** (N. H.) and. District of Columbia.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 124–126, 1 pl.

See Darton (N. H.) and Fuller (Myron Leslie).

216 —— **Darton** (N. H.) and. Virginia.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 127–135, 1 pl.

See Darton (N. H.) and Fuller (Myron Leslie).

217 **Fullerton** (Aubrey). A new mammoth cave.

Technical World Magazine, vol. 4, pp. 206–208, 6 figs.

Describes an immense cave in the limestone of Cougar Mountain, in the Selkirks of British Columbia, and the streams flowing in it.

G.

218 **Gale** (Hoyt S.). Water resources of the Cowee and Pisgah quadrangles, North Carolina.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 174–176.

Describes the abundance of good springs, with a few chalybeate and sulphur springs. Describes the association of carbonate springs with hornblendic gneiss and of chalybeate waters with pyrite deposits along faults. Mentions the rarity of wells in the area.

219 **Garry** (G. H.), **Spurr** (J. E.) and. Preliminary report on ore deposits in the Georgetown, Colo., mining district.

Bull. U. S. Geol. Survey no. 260, pp. 99–120.

See Spurr (J. E.) and Garry (G. H.).

220 **Geib** (W. J.), **Rice** (Thomas D.) and. Soil survey of the Gainesville area, Florida.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 269–289, 1 map, 1 fig.

See Rice (Thomas D.) and Geib (W. J.).

221 —— **Rice** (Thomas D.) and. Soil survey of Warren County, Kentucky.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 527–541, 1 map, 1 fig.

See Rice (Thomas D.) and Geib (W. J.).

222 **George** (H. C.). A freak oil field.

Eng. and Min. Jour., vol. 80, pp. 876–877.

Describes the "Grasshopper oil field" of Warren, Pa. The oil occurs as a scum on the surface water in the glacial deposits. Notes the rising and falling of the water level in the wells with the water of the river.

223 **Gerhard** (William Paul). The water supply of country buildings, Part I.

Cassier's Magazine, vol. 27, pp. 482–498, 14 figs.

Detailed discussion of wells, springs, and collecting galleries as sources of supply. Some of the figures show method of arranging well batteries.

224 **Getman** (F. L.). The new artesian water supply of Ithaca, N. Y.

Eng. News, vol. 53, pp. 412–414, 4 figs.

Describes the local geology, sinking of wells, details of equipment, and cost of construction.

225 **Gieseler** (E. A.). A new form of filter gallery at Nancy, France.

Eng. Rec., vol. 51, pp. 148–149, 5 figs.

Describes the construction of a filter gallery parallel to the river Moselle, designed to collect the subsoil water.

226 **Glenn** (L. C.). South Carolina.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 140–152, 1 pl.

Describes briefly the distribution of springs and enumerates those of commercial value (pp. 141–142). Discusses distribution of open and deep wells, and their relations (pp. 142–144, 151–152). States the water conditions in the crystalline rocks, the Potomac formation, the marine Cretaceous beds, Eocene, Miocene, Lafayette, and Columbia deposits (pp. 146–149). Gives table of deep wells with statistics (pp. 149–151). Lists the principal publications on underground water of the State (p. 152).

227 —— Tennessee and Kentucky.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 198–208.

Decribes the underground-water resources of the valley of East Tennessee, the Cumberland Plateau, the Highland and Lexington Plains, and the Gulf Coastal Plain. Lists the important mineral springs and the principal publications on underground waters of the two States.

228 **Goodell** (Edwin B.). A review of the laws forbidding pollution of inland waters in the United States, second edition.

Water-Sup. and Irr. Paper no. 152, U. S. Geol. Survey, 149 pp.

Many of the enactments include laws against the pollution of wells and springs, as well as surface streams.

228a **Gould** (Charles Newton). Geology and water resources of Oklahoma.

Water-Sup. and Irr. Paper no. 148, U. S. Geol. Survey, 173 pp., 22 pls., 32 figs.

Describes gypsum caves (pp. 52, 98), sink holes (p. 74), brine springs (pp. 41, 100–104), sulphur springs (pp. 104–105), and the occurrence of salt water in wells (pp. 106–107). Describes the artesian conditions, by counties (pp. 109–133). Gives detailed statistics regarding a number of deep wells (pp. 105–106) and records (pl. XXII), and describes the occurrence of underground water in granite, porphyry, the Arbuckle limestone, Whitehorn sandstone, Greer formation, Quartermaster formation, conglomerate, and in red beds and alluvium (pp. 95–100). Describes underflow of streams (p. 90). Classifies and describes the springs of the Territory (pp. 94–105), and discusses the use of springs for public supply (p. 99) and irrigation (pp. 139–140). Discusses the use of well waters for irrigation (pp. 140–141). Gives an appendix containing many analyses of wells (pp. 143–149) and springs (p. 153) and statistics regarding location, size, depth, method of pumping, quality of water, discharge, and geological relations of 261 wells.

229 **Grant** (U. S.). Water resources of the Mineral Point quadrangle, Wisconsin.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 67–73.

Gives a geologic section and discusses underground-water conditions. Good springs occur at the outcrop of the Galena and Platteville limestones and the St. Peter sandstone, while drilled wells obtain good supplies from the Galena limestone and St. Peter and Potsdam sandstones.

230 **Gregory** (H. E.). Connecticut.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 76–81, 1 fig.

Describes underground-water conditions in the limestone area, Triassic sandstone area, and the crystalline areas. Notes the relation of faults to water supply. Discusses springs and wells obtaining water in the drift. Enumerates mineral springs and gives list of publications.

231 **Gregory** (John H.). The Scioto River storage dam at Columbus, Ohio.

Eng. Rec., vol. 52, pp. 302–305, 4 figs.

Describes the well and filtering gallery or conduit system now in use at Columbus.

232 **Gregory** (J. W.). Rio Tinto, Spain.

Eng. and Min. Jour., vol. 79, pp. 370–372, 4 figs.

Contains a discussion of the agency of underground waters in the formation of the copper deposits at this place.

233 —— The ore deposits of Mount Lyell. [California.]

Min. and Sci. Press, vol. 91, (pp. 75–76, 90–91).

These two articles are devoted mainly to a discussion of the agency of water in the genesis of these deposits.

234 **Griffin** (A. M.), **Bennett** (Frank) and. Soil survey of the Orangeburg area, South Carolina.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 185–205, 1 map, 1 fig.

See Bennett (Frank) and Griffin (A. M.).

235 —— **Ely** (Charles W.) and. Soil survey of Dodge County, Ga.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 231–246, 1 map, 1 fig.

See Ely (Charles W.) and Griffin (A. M.).

236 **Griffin** (A. M.), **Hearn** (W. Edward) and. Soil survey of the Alma area, Michigan.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 639–664, 1 map, 1 fig.

See Hearn (W. Edward) and Griffin (A. M.).

237 **Griswold** (Lewis), **Rice** (Thomas D.) and. Soil survey of Acalia Parish, Louisiana.

Field Operations of the Bureau of Soils, 1903, U. S. Dept. Agr., pp. 461–485, 1 fig., 1 map.

See Rice (Thomas D.) and Griswold (Lewis).

238 **Gunther** (Charles Godfrey). The gold deposits of Plomo, San Luis Park, Colorado.

Econ. Geol., vol. 1, pp. 143–154.

Considers part played by circulating ground waters in deposition of ores along fissures and faults (p. 153).

239 —— An interesting fault system [California].

Eng. and Min. Jour., vol. 80, p. 1013, 1 fig.

Contains a description of the manner in which the ore-bearing solutions passed along the faults.

240 **Gilbert** (Grove Karl). Plans for obtaining subterranean temperatures.

Year Book no. 3, 1904, Carnegie Institution of Washington, pp. 259–260.

Gives estimate of cost of drilling to various depths and makes recommendations.

241 —— Value and feasibility of a determination of subterranean temperature gradient by means of a deep boring.

Year Book no. 3, 1904, Carnegie Institution of Washington, pp. 261–267. Abstract, p. 120.

Considers need for such a determination, conditions to be satisfied in the selection of a site for a boring, and concludes that the Lithonia district, Georgia, is preferable.

242 **Goding** (F. W.). Queensland artesian wells.

Daily Consular Repts. no. 2166, Dept. Com. and Labor, pp. 6–7.

Gives statistics regarding average depth, flow, temperature, etc., of the 960 wells in the State.

243 **Greeley** (W. B.). The effect of forest cover upon stream flow.

Forestry and Irrigation, vol. 11, pp. 163–168, 309–315, 4 figs.

Discusses the absorption of rainfall by the soils, the effect of underground seepage on stream flow; and, in the second article (pp. 309–315), describes an investigation of certain areas in New York.

H.

244 **Hale** (Harrison). Analyses: Waters from Oklahoma and Indian Territories.

Bull. Bradley Geol. Field Sta. Drury Coll., vol. 1, pt. 2, pp. 100–102.

Gives the results of examination of a considerable number of well waters to determine suitability for boiler purposes.

245 **Hall** (B. M.). Rio Grande project.

Water-Sup. and Irr. Paper no. 146, U. S. Geol. Survey, pp. 75–78.

Notes insufficiency of underflow and inapplicability of submerged dams (pp. 76–77).

246 —— Past and present plans for irrigation of the Rio Grande Valley.

The official proceedings of the Twelfth National Irrigation Congress, at El Paso, Tex., November 15–18, 1904, pp. 213–221.

Discusses underflow of the Rio Grande Valley as a source of supply for wells (pp. 216–218).

247 **Hall** (Charles M.) and **Willard** (Daniel E.). Description of Casselton and Fargo quadrangles. [North Dakota and Minnesota.]

Geologic Atlas U. S., folio 117, U. S. Geol. Survey, 7 pp.

Gives well logs and statistical data (pp. 5-6), describes springs and drift and artesian wells (p. 4), and the source (probably from Dakota sandstone) and character of the deep waters. An artesian well section showing drift and Cretaceous horizons (p. 2) and maps showing flowing and nonflowing areas in drift and older formations, head, depth of wells, etc., are also given.

248 **Hall** (Christopher Webber). Minnesota.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 226–232, 1 fig.

Describes the underground-water resources of the Cambrian, Ordovician, Cretaceous, and Quaternary rocks of the State. Describes the artesian basins and gives a map showing their distribution. Notes the principal mineral springs, and describes the distribution of springs in general. Lists the principal publications referring to underground waters of the State.

249 **Hall** (M. R.) and **Hoyt** (John C.). Report of progress of stream measurements for the calendar year 1904: Part IV, Santee, Savannah, Ogeechee, and Altamaha rivers and eastern Gulf of Mexico drainages.

Water-Sup. and Irr. Paper no. 128, U. S. Geol. Survey, 168 pp.

Gives description and discharge of Blue (p. 120) and Cave (p. 175) springs, Georgia.

250 —— **Johnson** (E., jr.), and **Hoyt** (John C.). Report of progress of stream measurements for the calendar year 1904: Part V, Eastern Mississippi River drainage.

Water-Sup. and Irr. Paper no. 128, U. S. Geol. Survey, 168 pp.

Describes and gives discharge of Big Springs, Alabama (p. 152).

251 **Halse** (Edward). The occurrence of pebbles, concretions, and conglomerate in metalliferous veins.

Bimonthly Bull. Am. Inst. Min. Eng. no. 4, pp. 719–742, 13 figs.

Contains a description of the agency of waters percolating along fracture planes in the decomposition of rocks and giving rise to concentric structures which subsequently become rounded by attrition, and are finally cemented together by the aid of mineralized thermal solutions.

252 **Hamlin** (Homer). Underflow tests in the drainage basin of Los Angeles River.

Water-Sup. and Irr. Paper no. 112, U. S. Geol. Survey, 55 pp.

Discusses the occurrence of ground waters, nature of water table, and fluctuations and movements of the water body (pp. 9–11). Describes underflow tests including location of wells, methods of driving and drilling, machinery and materials, well points, underflow meter, charging of wells, measurement of velocity, etc. (pp. 11–29), and gives summary (p. 53). Porosity, packing, and capacity of sediments are considered (pp. 29–31), and records of actual tests given in detail (pp. 33–53). Many local well records are given by diagram.

253 **Hammond** (G. A.). Diamond-drill methods.

Water-Sup. and Irr. Paper no. 146, U. S. Geol. Survey, pp 78–80.

Describes apparatus and methods of work under different conditions.

254 **Haney** (J. G.). Irrigation experiments at Fort Hays, Kans., 1903 and 1904.

Bull. Office Exp. Sta., U. S. Dept. Agr., no 158, pp. 567–583.

Describes experiments in using wells for irrigation; discusses methods of drilling and pumping and cost of wells, and relations to geology.

255 **Hanna** (F. W.). The irregular flow of rivers in humid prairie States.

Eng. News, vol. 54, pp. 118–119.

Pasturage, drainage, and cultivation has resulted in an increase of the amount of rainfall running off from the surface and a decrease in the amount of ground water which escapes into the streams, and, therefore, causing great irregularity in the flow of the rivers.

256 **Harris** (Gilbert D.). Underground waters of southern Louisiana.

Bull. Louisiana Geol. Survey no. 1, pp. 1–77, 7 pls., 12 figs.

Discusses the origin of the artesian and deep-well waters, gives detailed well statistics, discusses variation in flow and pressure head, methods of well drilling and pumping, and gives records and analyses.

257 **Harrison** (Virginius). Mineral waters.

Bull. Virginia Hosp., vol. 1, no. 3, pp. 41–45.

Discusses briefly the origin of mineral waters and the origin of thermal springs; gives Crook's classification according to composition, and outlines their therapeutic uses.

258 **Harroun** (Philip E.). The waterworks of Porterville, California.

Trans. Am. Soc. Civil Eng., vol. 54, pp. 235–279, pls. 19 and 20, 5 figs.

Describes the wells furnishing the water supply as to size, depth, location, materials passed through, etc. Describes leakage of oil from fuel-oil storage tank, resulting in contamination of the ground water and consequent pollution of the city's supply. In the discussion attached to this article H. F. Dunham discusses the pollution of well waters and Mr. Harroun describes the Herron perforator for perforating well casings in place.

259 **Hatch** (Frederick H.) and **Corstorphine** (George S.). The origin of the Witwatersrand gold. [Transvaal.]

Eng. and Min. Jour., vol. 79, pp. 80–81.

Discusses the agency of underground water in formation of the auriferous deposits.

260 **Hatcher** (J. B.), **Stanton** (Timothy W.) and. Geology and paleontology of the Judith River beds.

Bull. U. S. Geol. Survey no. 257, pp. 1–66.

See Stanton (Timothy W.) and Hatcher (J. B.).

261 **Haworth** (Erasmus), **Schrader** (F. C.) and. Oil and gas of the Independence quadrangle, Kansas.

Bull. U. S. Geol. Survey no. 260, pp. 446–458.

See Schrader (F. C.) and Haworth (Erasmus).

262 **Hayes** (C. Willard). Contributions to economic geology, 1904; introduction.

Bull. U. S. Geol. Survey no. 260, pp. 11–18.

Gives list of folios containing discussions of underground and artesian waters, mineral springs, etc.

263 **Hazelhurst** (J. N.). Sanitary engineering in the South and the labor question.

Eng. News, vol. 54, pp. 294–295; Municipal Engineering, vol. 29, pp. 249–252.

Notes the difficulty of construction of sewage-discharge works at New Orleans due to the complete saturation of the ground at all points beneath the surface; considerable attention is given to the subject of infiltration of ground water into the sewer pipes and the danger of overcharging the same by excessive infiltration of ground water.

264 **Headden** (William P.). The Doughty Springs, a group of radium-bearing springs on the North Fork of Gunnison River, Delta County, Colorado.

Proc. Colorado Sci. Soc., vol. 8, pp. 1–30, 6 pls.

A very complete description of the location, geology, deposits, flow, composition of the water (many analyses being given), temperatures, etc., of these springs. Describes the deposition of barium sulphate from the spring water. Describes the tests made to show the presence of radium in the deposits of the springs, and reproduces several photographs showing the action upon photographic plates of the sinter deposited by the springs.

265 —— Mineralogical notes, no. II.

Proc. Colorado Sci. Soc., vol. 8, pp. 55–70.

Discusses the origin of the aluminum sulphate occurring in the Alum Spring, Delta County, Colo., and gives analyses of deposits of alunogen occurring in the vicinity of the springs (pp. 62–66). Gives a description and analysis of a hydrated basic aluminic sulphate deposited by the action of alkaline spring waters upon spring waters carrying aluminic sulphate in solution at Doughty Springs, Delta County, Colo. (pp. 66–67).

266 **Hearn** (W. Edward) and **Carr** (M. E.). Soil survey of the Biloxi area, Mississippi.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 353–374, 1 map, 1 fig.

Mentions flowing artesian wells in the area (pp. 358–359).

267 —— and **Griffin** (A. M.). Soil survey of the Alma area, Michigan.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 639–664, 1 map, 1 fig.

Mentions occurrence of artesian and ordinary wells, and depths to water (p. 644).

267a **Henderson** (C. R.), **Maury** (Dabney H.), **Burdick** (C. B.), and. Report of the committee on waterworks.

Twentieth Ann. Rept. Illinois Soc. Eng. and Surv., pp. 132–139.

See Maury (Dabney H.), Burdick (C. B.), and Henderson (C. R.).

268 **Hill** (John W.). The Torresdale conduit [Philadelphia, Pa.].

Jour. Franklin Institute, vol. 159, pp. 241–297, pls. 1–30. Also in Proc. Eng. Club of Phila., vol. 22, pp. 129–189.

Describes the encountering of water in diamond-drill borings and in rock and gravel excavations along the line of the conduit; discusses the level of ground water, the leakage of ground water into the sewer, the head and leakage of ground water in the case of the Jersey City conduit and several conduits in New York State; discusses briefly the analyses of the rock and ground waters encountered (no analyses given).

269 **Hill** (Robert T.). El Oro district, Mexico.

Eng. and Min. Jour., vol. 79, pp. 410–413, 11 figs.

Contains a discussion of the agency of mineral-bearing solutions in the formation of the deposits.

270 —— Source of volcanic water.

Eng. and Min. Jour., vol. 80, pp. 13–14, 4 columns.

Discusses two theories: (1) That the volcanoes are fed by infiltration of surface waters, and (2) that the water is derived from the gases of the earth's interior.

271 —— Pelé and the evolution of the Windward Archipelago.

Bull. Geol. Soc. America, vol. 16, pp. 243–288.

Mentions the occurrence of warm springs (p. 248), and notes the part of water in ore deposition (p. 278); describes the products of eruptions and the discharge of water vapor (pp. 250, 271); considers the part of water in producing eruptions (pp. 280, 281, 287); ascribes an origin of the water of vulcanism from interior gases (p. 284), and quotes Geikie (p. 286) and Suess (p. 288) on the magmatic origin of waters of hot springs and volcanoes.

272 **Hinderlider** (M. C.) and **Hoyt** (John C.). Report of progress of stream measurements for the calendar year 1904: Part VIII, Platte, Kansas, Meramec, Arkansas, and Red River drainages.

Water-Sup. and Irr. Paper no. 131, U. S. Geol. Survey, 203 pp.

Describes and gives discharge of Greer (p. 178) and Meramec springs (p. 123) in Missouri.

273 —— **Swendsen** (G. L.), and **Chandler** (A. E.). Report of progress of stream measurements for the calendar year 1904: Part X, Colorado River and the Great Basin drainages.

Water-Sup. and Irr. Paper no. 133, U. S. Geol. Survey, 384 pp.

Gives discharge of Big Springs, Utah (p. 364), Heitmans and Monfrena springs, Nevada (p. 358), and describes seepage investigations in Arizona (p. 48).

274 **Hitchcock** (A. S.). Alfalfa growing.

Farmers' Bull. no. 215, U. S. Dept. Agr., 39 pp., 8 figs.

Describes irrigation of alfalfa by artesian wells, streams, etc., (pp. 20–22).

275 **Hitchcock** (C. H.). Fresh-water springs in the ocean.

Pop. Sci. Monthly, vol. 67, pp. 673–683, 3 figs.

Describes the underground waters of the Hawaiian Islands, Cuba, and Florida, and the occurrence of fresh-water springs in the ocean off the coast of these places.

276 **Hixon** (Hiram W.). Geology of the Sudbury district.

Eng. and Min. Jour., vol. 79, pp. 334–335, 1 fig.

Letter to the editor in reply to article of A. P. Coleman. Defends his statements that the nickel ores of this district were deposited from underground waters.

277 —— Volcanoes and earthquakes.

Eng. and Min. Jour., vol. 79, p. 1245.

The author ascribes these phenomena to the escape of the water of combination held in the igneous core of the earth.

278 —— The Sudbury district.

Eng. and Min. Jour., vol. 80, pp. 116–117.

Discusses the agency of heated thermal waters from igneous magmas in the formation of ore deposits, and quotes C. V. Corless to show the origin of the Sudbury deposits to be due to deposition from mineralizing solutions.

279 **Hobbs** (William Herbert). Origin of the channels surrounding Manhattan Island, New York.

Bull. Geol. Soc. America, vol. 16, pp. 151–182.

Gives several sections based on borings.

280 —— The configuration of the rock floor of Greater New York.

Bull. U. S. Geol. Survey no. 270, 96 pp., 5 pls., 6 figs.

Compiles 1,424 records of wells and borings, giving depths to bed rock and occasionally more complete records.

281 **Hollister** (George B.). Waters of a gravel-filled valley near Tully, N. Y.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 179–184.

Describes the occurrence and composition of the ground waters of a deep valley deposit of glacial gravels, and gives analyses of spring waters. The deposits are typical of their kind, and occur at many points in New York and New England. The discharge and tufa deposits of the springs are also described.

282 **Holmes** (J. Garnett) and **Neill** (N. P.). Soil survey of the Greeley area, Colorado.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 951–993, 1 map, 1 fig.

Discusses briefly the relation of underground and seepage waters to irrigation (pp. 983–984).

283 —— and others. Soil survey of the Yuma area, Arizona-California.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 1025–1047, 2 maps, 1 fig.

Discusses briefly the occurrence of underground and seepage waters and their effect on alkali (p. 1043).

284 —— and others. Soil survey of the San Bernardino Valley, California.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 1115–1151, 1 map, 1 fig.

Describes the geologic occurrence of artesian water and "pumped water" in gravel (pp. 1122–1123), and use for irrigation (pp. 1142–1143). Discusses seepage waters and injurious effect on agricultural conditions (pp. 1141–1142).

285 **Horton** (Robert E.). The drainage of ponds into drilled wells.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 30–39.

Describes the drainage of ponds and swamps in kettle holes, etc., of the drift regions of Michigan into drilled wells, and discusses the underground conditions, methods, cost, and capacity of the wells, and gives examples of their successful application.

286 —— Importance of general hydrographic data concerning basins of streams gaged.

Water-Sup. and Irr. Paper no. 146, U. S. Geol. Survey, pp. 87–89.

Points out necessity of knowledge of soils and rocks and their absorptive capacities.

287 **Hove** (A. M.). The Pecos Valley [Texas and New Mexico].

Forestry and Irrigation, vol. 11, pp. 433–435, 2 figs.

Mentions the use of artesian-well water in irrigation, and a photograph given shows an artesian well in New Mexico with a flow of 3,000 gallons a minute.

288 **Hovey** (Edmond Otis). The western Sierra Madre Mountains.

Science, new ser., vol. 21, pp. 585–587.

Mentions shallow wells which obtain water from underground water courses for copper smelters at Douglas, Ariz. (p. 586.).

289 **Hovey** (Horace C.). Strange mazes and chasms in Mammoth Cave.

Sci. Am. Supp., vol. 60, pp. 24680–24681, 2 figs.

Description of explorations made in 1859, 1863, and 1905 in Mammoth Cave, Kentucky.

290 **Howarth** (O. H.). Vein structure.

Mines and Minerals, vol. 25, pp. 369–371, 5 figs.

Discusses the agency of underground water in the formation of veins.

291 **Hoyt** (John C.), **Babb** (Cyrus C.) and. Report of progress of stream measurements for the calendar year 1904; Part VII, Hudson Bay, Minnesota, Wapsipinicon, Iowa, Des Moines, and Missouri River drainages.

Water-Sup. and Irr. Paper no. 130, U. S. Geol. Survey, 204 pp.

See Babb (Cyrus C.) and Hoyt (John C.).

292 **Hoyt** (John C.), **Hall** (M. R.) and. Report of progress of stream measurements for the calendar year 1904; Part IV, Santee, Savannah, Ogeechee, and Altamaha rivers and Eastern Gulf of Mexico drainages.

Water-Sup. and Irr. Paper no. 127, U. S. Geol. Survey, 192 pp.
See Hall (M. R.) and Hoyt (John C.).

293 —— **Hall** (M. R.), **Johnson** (E., jr.) and. Report of progress of stream measurements for the calendar year 1904; Part V, Eastern Mississippi River drainage.

Water-Sup. and Irr. Paper no. 128, U. S. Geol. Survey, 168 pp.
See Hall (M. R.), Johnson (E., jr.), and Hoyt (John C.).

294 —— **Hinderlider** (M. C.) and. Report of progress of stream measurements for the calendar year 1904; Part VIII, Platte, Kansas, Meramec, Arkansas, and Red River drainages.

Water-Sup. and Irr. Paper no. 131, U. S. Geol. Survey, 203 pp.
See Hinderlider (M. C.) and Hoyt (John C.).

295 —— **Taylor** (T. U.) and. Report of progress of stream measurements for the calendar year 1904; Part IX, Western Gulf of Mexico and Rio Grande drainages.

Water-Sup. and Irr. Paper no. 132, U. S. Geol. Survey, 132 pp.
See Taylor (T. U.) and Hoyt (John C.).

296 —— and **Wood** (B. D.). Index to the hydrographic progress reports of the United States Geological Survey, 1888–1903.

Water-Sup. and Irr. Paper no. 119, U. S. Geol. Survey, 253 pp.
This is a place index, and although the discharges of a number of springs are given they can be found only when name of spring is known.

297 **Hulbert** (H. B.). The Island of Quelpart [Asia].

Bull. Am. Geog. Soc., vol. 37, pp. 396–408, 1 fig.
Mentions the occurrence of a mountain spring known as the "Bushel well," and gives a legend relating to it.

298 **Huntington** (Ellsworth). The depression of Sistan, in eastern Persia.

Bull. Am. Geog. Soc., vol. 37, pp. 271–281, 2 figs.
Notes the location of wells in dry stream beds where the water was only a few feet below the surface (p. 276).

299 —— The mountains and kibitkas of Tian Shan [Asia].

Bull. Am. Geog. Soc., vol. 37, pp. 513–530, 2 figs.
Describes the occurrence of springs and ascribes their origin to water under artesian pressure in glacial gravels. A figure is given to show the conditions.

300 —— A geologic and physiographic reconnaissance in central Turkestan.

Explorations in Turkestan, with an account of the basin of eastern Persia and Sistan—Carnegie Institution of Washington, pp. 157–216, 29 figs.
Notes numerous large springs from gravel in Bokhara (pp. 180–181). Describes springs near Shor Kul and explains the artesian conditions giving rise to these springs (pp. 210–213).

301 —— The basin of eastern Persia and Sistan.

Explorations in Turkestan, with an account of the basin of eastern Persia and Sistan—Carnegie Institution of Washington, pp. 217–317, 25 figs.
Notes the use of springs and subterranean drainage tunnels in the irrigation of eastern Persia (pp. 226, 304, 305). Mentions absorption of water of streams by gravels (pp. 247, 249, 252, 276). Quotes Holdich, who ascribes the waterless conditions of portions of southern Baluchistan to a gradual exhaustion of the subterranean supply (p. 303). Quotes Sykes to show that in the higher mountains of this corner of Persia water can usually be found by digging in the water courses (p. 304). Notes existence of brackish water in wells in the desert at a depth of 5 feet (pp. 304, 305). Legends relating to the drying up of the springs are given (pp. 312–314).

I.

302 **Ingalls** (O. L.). Present and prospective sanitation of Manila.

Trans. Assoc. Civil Eng. of Cornell Univ., pp. 105–112.

Gives the ground-water infiltration into the sewers of Manila as 1,250,000 gallons per square mile per day. Notes that all sewers are laid at a considerable distance below sea level in soil saturated with water.

303 **Irrigation.** Bonita Valley [Colorado].

Irrigation, vol. 2, pp. 3–4, 1 fig.

Notes the existence of numerous wells 10–70 feet deep in the valley furnishing water for domestic use the year round.

304 —— Roswell artesian basin.

Irrigation, vol. 2, no. 5, p. 5.

Describes the location, character of rocks, artesian-water horizons, source of supply, depth of wells, pressure, and decrease in flow of the Roswell artesian basin, in the Pecos Valley, New Mexico.

305 —— [Irrigation by artesian flow].

Irrigation, vol. 2, no. 5, p. 17.

Notes the use of the underflow for irrigation in Colorado.

306 —— Idaho's bounteous water supply.

Irrigation, vol. 3, no. 5, pp. 5–6, 1 fig.

Describes the numerous springs issuing from water-bearing beds outcropping in the Snake River Canyon. Notes the existence of hot, fissure springs on the Snake River plains. Mentions the use of the spring water for irrigation.

307 —— Wyoming farmers are prosperous.

Irrigation, vol. 3, no. 5, pp. 13–14.

Mentions a flowing well 1,000 feet deep near Laramie, Wyo., and notes the existence of many wells in this section, the water of which is used for stock and domestic and irrigation purposes.

308 —— How land is prepared for irrigation and water applied for crops.

Irrigation, vol. 4, no. 2, pp. 3–5, 3 figs.

Notes the use of spring water in irrigation in Scott County, Nebr. (p. 5).

309 **Irrigation Age.** [Artesian water in the Pecos Valley, New Mexico.]

Irrigation Age, vol. 20, p. 88.

Notes the existence of an inexhaustible supply of water underlying the desert land in this vicinity.

310 —— Artesian wells.

Irrigation Age, vol. 20, p. 174.

Describes the obtaining of flowing wells and their use in the irrigation of the Snake River lands, Idaho.

311 —— South Dakota irrigation.

Irrigation Age, vol. 20, p. 216.

Describes results attained by irrigation from an artesian well with a flow of 550 gallons per minute.

312 —— Measuring the flow in underground streams.

Irrigation Age, vol. 20, p. 233, 2 figs.

Describes electrical method of Prof. C. S. Slichter.

313 —— A neglected opportunity in arid reclamation.

Irrigation Age, vol. 21, p. 16.

Describes the disappearance of numerous streams in Idaho in passing over gravel deposits, and states that the diversion of canals from these streams would result in an appreciable saving of water.

314 **Irrigation Age.** Preparing land for irrigation and methods of applying water.

Irrigation Age, vol. 21, pp. 24–26.

Describes the use of springs in irrigation in Scott County, Nebr.

315 —— Lake View ranch [Frio Co., Texas].

Irrigation Aid, vol. 2, no. 4, pp. 10–11, 15.

Describes a well which furnishes water for irrigation, and describes pumping tests made upon it.

316 —— San Marcos [Texas].

Irrigation Aid, vol. 2, no. 6, pp. 2–12, 9 figs.

Contains a description of the flowing well at the United States Fish Culture station at this place.

317 **Irrigation Aid.** Ho Ra Company's pumping plants.

Irrigation Aid, vol. 1, no. 5, p. 16.

Describes one of the wells of this company and the effect of pumping upon the level of the water in the well.

318 —— Irrigating from wells near Cotulla [Texas].

Irrigation Aid, vol. 1, no. 5, p. 23.

Describes a well 225 feet deep, the water of which is used for irrigation.

319 —— Pumping at Centerpoint [Texas].

Irrigation Aid, vol. 1, no. 5, p. 23.

Describes a well 225 feet deep, the water from which is used for irrigation.

320 —— In the Devine country [Texas].

Irrigation Aid, vol. 2, no. 2, pp. 4–7.

Describes several wells in this section, the water of which is used for irrigation.

321 —— Kingsville [Texas].

Irrigation Aid, vol. 2, no. 3, pp. 5–7, 17–19, 1 fig.

Describes several flowing wells in this region.

322 —— Falfurrias [Texas].

Irrigation Aid, vol. 2, no. 4, pp. 4–7.

Describes several flowing wells which furnish water for irrigation.

323 —— Artesia [Texas].

Irrigation Aid, vol. 2, no. 5, pp. 4–6.

Describes several flowing wells which furnish water for irrigation purposes.

324 —— Wells.

Irrigation Aid, vol. 2, no. 5, pp. 21–22.

A brief description of dug, driven, and drilled or bored wells.

325 —— Lake View ranch [Frio Co., Texas].

Irrigation Aid, vol. 2, no. 6, pp. 12–15.

Describes a well which furnishes water for irrigation, and describes pumping tests upon it. Notes that water can be obtained in the vicinity of Dilley at a depth of 40–60 feet.

326 —— Red River project [Oklahoma].

Irrigation Aid, vol. 3, no. 4, pp. 18–19.

Mentions three salt springs which flow into Elm Fork, a branch of the North Fork of Red River.

327 **Irving** (John Duer). Ore deposits of the Ouray district, Colorado.

Bull. U. S. Geol. Survey no. 260, pp. 50–77.

Considers part of ground water in ore deposition (pp. 65, 69–71, 75).

328 **Irving** (John Duer). The ore deposits of the Ouray quadrangle, Colorado.

Abstract: Science, new ser., vol. 21, pp. 916–917.

Gives theory of origin due to ascension of alkaline waters and replacement of quartzite along fissures.

J.

329 **Jackson** (Daniel D.). The normal distribution of chlorine in the natural waters of New York and New England.

Water-Sup. and Irr. Paper no. 144, U. S. Geol. Survey, 31 pp.

Notes the influence of geologic deposits on chlorine in inland States (p. 10), and furnishes chlorine maps and tables showing source of waters examined (lakes, streams, ponds, and wells) for each of the New England States and New York.

330 **Jaggar** (Thomas A., jr.) and **Palache** (Charles). Description of the Bradshaw Mountains quadrangle [Arizona].

Geologic Atlas U. S., folio 126, U. S. Geol. Survey, 11 pp., 4 maps, 1 illus. sheet.

Describes deposits of travertine and onyx breccia formed by hot springs (p. 3). Notes the use of mine water and springs for mine operations (p. 11).

331 **James** (George D.). Notes on Death Valley and the Panamint.

Eng. and Min. Jour., vol. 80, pp. 914–918, 7 figs., 1 map.

Furnishes map showing the location of the springs in this district. Notes the absorption of water by sands and gravels and its subsequent reappearance in wells and springs, and states that the water from the springs is good.

332 **Janin** (George). The Montreal waterworks [Quebec].

Municipal Engineering, vol. 29, pp. 278–280.

Notes the supplying of the city about 1800 by springs from Mount Royal.

332a **Jensen** (Charles A.) and **Mackie** (W. W.). Soil survey of the Baker City area, Oregon.

Field Operations of the Bureau of Soils, 1903, U. S. Dept. Agr., pp. 1151–1170, 1 fig., 4 maps.

Discusses the influence of irrigation in raising the ground-water level and in rendering the soil in many localities highly alkaline. Methods of drainage for alkaline tracts are proposed.

333 —— and **Strahorn** (A. T.). Soil survey of the Bear River area, Utah.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 995–1023, 3 maps, 1 fig.

Discusses the occurrence of underground and seepage waters (pp. 1013-1014), furnishes map showing depths to water table (map 46), and discusses its relations to alkali in the soil (pp. 1014–1018). Mentions occurrence of springs and flowing artesian wells, and notes their usual composition (p. 1018).

334 —— **Lapham** (Macy H.) and. Soil survey of the Bakersfield area, California.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 1089–1114, 3 maps, 1 fig.

See Lapham (Macy H.) and Jensen (Charles A.).

335 **Johnson** (Douglas Wilson). Relation of the law to underground waters.

Water-Sup. and Irr. Paper no. 122, U. S. Geol. Survey, 55 pp.

Discusses the common-law rulings concerning underground waters moving by general percolation or definite channels, and quotes decisions concerning the same; legislative acts passed by the various State legislatures for the purpose of regulating the use or pollution of underground waters are also given.

336 **Johnson** (E., jr.), **Hall** (M. R.), and **Hoyt** (John C.). Report of progress of stream measurements for the calendar year 1904: Part V, Eastern Mississippi River Drainage.

Water-Sup. and Irr. Paper no. 128, U. S. Geol. Survey, 168 pp.

See Hall (M. R.), Johnson (E. jr.), and Hoyt (John C.).

337 **Johnson** (L. C.). Mississippi.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 170–178, 1 fig.

Describes water-bearing strata in the Carboniferous, Cretaceous, Tertiary, and Pleistocene formations. Gives a list of mineral springs and of publications relating to underground waters of the State.

338 **Johnson** (R. D. O.). The diamond drill in Missouri.

Eng. and Min. Jour., vol. 80, pp. 243–245.

Describes the encountering of channels, sometimes water bearing, in which the water fed to the bit fails to come to the surface. The methods of getting by these openings are discussed.

339 —— Lead mining in southeastern Missouri.

Eng. and Min. Jour., vol. 80, pp. 481–482.

Contains descriptions of the quantity of water encountered in the shafts of this district.

340 **Jones** (Helen Lukens). The water system of Pasadena.

The official proceedings of the Twelfth National Irrigation Congress at El Paso, Tex., November 15–18, 1904, pp. 137–138.

Discusses the water supply of Pasadena, Cal., derived entirely from pumping wells, and states methods of economy in use of water.

341 **Jones** (Jessie). Corrosion of brass and bronze by mine water.

Metal Industry, vol. 3, pp. 9, 171; Mining Reporter, vol. 52, pp. 623–624; Chemical Engineer, vol. 2, pp. 358–361.

Contains analyses of the water in the mines of the Lehigh and Wilkesbarre Coal Company, near Audenried, Carbon County, Pa., and descriptions of tests made to determine the effect of these waters upon brass and bronze.

342 **Jones** (John T.). Unwatering the Hamilton mine. [Michigan.]

Eng. and Min. Jour., vol. 80, pp. 867–868.

Describes the encountering of a water cavern while drilling in one of the shafts, the immense head on the water, the drainage of water from higher level of a near-by mine, the subsequent filling of both mines by the water, and the steps taken to exhaust the contents of the cavity, after which the flow of water was normal.

343 **Journal of Geography.** The Monarch Geyser. [New Zealand.]

Jour. Geog., vol. 4, p. 143.

Brief description of the geyser Waimangu, near Roturna, New Zealand. This geyser made its appearance two years ago and is about half an acre in extent.

K.

344 **Kansas,** State Board of Health of.

Second Biennial Report or the Nineteenth and Twentieth Annual reports, from January 1, 1903, to December 31, 1904, 182 pp.

Discusses the contamination of well water at Holton by sewage (pp. 70–71).

345 **Kearney** (Thomas H.). Agriculture without irrigation in the Sahara Desert.

Bull. Bureau of Plant Industry, U. S. Dept. Agr., no. 86, 27 pp., 5 pls., 1 fig., 1 map.

Notes the occurrence of thousands of shallow wells in the Souf country. Describes method of raising water by means of bucket and pole; mentions occurrence of magnesium water in some regions, and gives analysis (pp. 16–17).

346 **Kearney** (Thomas H.) and **Means** (Thomas H.). Agricultural explorations in Algeria.

Bull. Bureau of Plant Industry, U. S. Dept. Agr., no. 80, 98 pp., 4 pls.

Refers to unsuccessful attempts to find artesian water in the High Plateau region (p. 16). Mentions large subterranean streams in the sands of the Sahara region and their utilization in the creation of oases (pp. 18, 36). Describes the original method of sinking wells in the Oved Rirh region of the Sahara by means of wooden casing, and danger to diggers owing to sudden rise of water (pp. 36–37). Gives history of artesian boring in the Oved Rirh region and great value of the flowing wells (p. 37). Gives composition of the water (pp. 37–38) and states injury to soil by deposition of soluble salts in it.

347 **Keith** (Arthur). Description of the Mount Mitchell quadrangle [North Carolina-Tennessee].

Geologic Atlas U. S., folio 124, U. S. Geol. Survey, 9 pp., 4 maps, 1 col. sect. sheet.

Mentions deposition of pegmatite from mineralized waters (p. 3), decomposition of rock by waters circulating along schistose planes (p. 3), and alteration of dunite to serpentine by infiltrating waters (p. 4). Refers to the abundance of springs (p. 9).

348 —— Economic geology of the Bingham mining district, Utah. Part 1, Areal geology.

Prof. Paper U. S. Geol. Survey no. 38, pp. 27–70.

Describes alteration of limestone through action of underground waters circulating along fissures (pp. 66–69).

349 **Keith** (N. S.). New methods in the metallurgical treatment of copper ores.

Jour. Franklin Institute, vol. 160, pp. 147–155.

Notes the existence of cupriferous sandstones in New Brunswick, Connecticut, New York, New Jersey, and Pennsylvania, the quartz grains of which are cemented together by silica from thermal waters carrying silica in solution. The silica in solution is suggested as due to the solvent action of the thermal waters on the sand itself while lying on a horizontal plane.

350 **Kellerman** (Karl F.), **Moore** (George T.) and. Copper as an algicide and disinfectant in water supplies.

Bull. Bureau of Plant Industry, U. S. Dept. Agr., no. 76, 55 pp.

See Moore (George T.) and Kellerman (Karl F.).

351 **Kemp** (James Furman). The copper deposits at San Jose, Tamaulipas, Mexico.

Bimonthly Bull., Am. Inst. Min. Eng., no. 4, pp. 885–910, 3 figs.

In discussing the genesis of these deposits the writer considers the part played in their formation by underground waters.

352 —— Secondary enrichment in ore deposits of copper.

Econ. Geol., vol. 1, pp. 11–33.

Contains a number of references to the part played by ascending magmatic waters and by descending meteoric waters in the deposition or enrichment of copper ores.

353 **Kerr** (Mark B.). Formation of ore bodies on intersections.

Min. and Sci. Press, vol. 90, pp. 253–254, 4 figs., and vol. 90, p. 241.

Describes the agency of underground waters in the formation of the deposits.

354 **Keyes** (Charles Rollin). Geology and underground-water conditions of the Joranda del Muerto, New Mexico.

Water-Sup. and Irr. Paper no. 123, U. S. Geol. Survey, 42 pp.

Describes geologic conditions in detail and discusses the occurrence of underground waters, which are obtained from the base of the Red Beds, from the Cretaceous sandstones, and from the surface gravels. Analyses of the water are given (p. 36), the wells described (p. 37), the artesian prospects discussed (p. 38), and the possibility of irrigation from well waters considered (p. 39).

355 **Kindle** (Edward M.). Salt and other resources of the Watkins Glen district, New York.
Bull. U. S. Geol. Survey no. 260, pp. 567–572.
Gives two well records (pp. 568–569).

356 —— Water resources of the Catatonk area, New York.
Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 53–57.
Discusses the underground-water conditions in the drift and Devonian shales, and describes the artesian wells at Ithaca and Slaterville and the sulphur and other mineral springs at a considerable number of localities. The water is supposed to come from the Genesee formation, the sulphur probably coming from decomposing pyrite.

357 **King** (Charles R.). The Simplon tunnel.
Eng. and Min. Jour., vol. 79, p. 856.
Contains descriptions of the underground waters encountered in the construction of the tunnel between Switzerland and Italy.

358 —— The completion of the Simplon tunnel. [Between Switzerland and Italy.]
Sci. Am., vol. 92, p. 226, 8 figs.
This article is devoted almost entirely to a description of the springs encountered. Photographs of several are given.

359 —— The completion of the Simplon tunnel.
Sci. Am. Supp., vol. 59, pp. 24430–24432, 16 figs; also on pp. 24452–24455, 9 figs.
A very complete description of the hot springs encountered, their temperature, volume, pressure, location, etc., forms the greater part of these articles.

360 **King** (F. H.). Some results of investigations in soil management.
Yearbook U. S. Dept. Agr., 1903, pp. 159–174.
Discusses porosity and capillarity of soils, effect of plowing, loss of water by evaporation, etc.

361 **Kingsville Spokesman.** Artesian belt [Texas].
Irrigation Aid, vol. 3, no. 1, p. 18.
Describes the underground-water conditions of southwestern Texas.

362 **Kinney** (Bryce A.). Annual report of the State natural-gas supervisor.
Twenty-ninth Ann. Rept. Indiana Dept. Geol. and Nat. Res., pp. 757–770.
Gives several brief records of gas wells (pp. 764–766).

363 **Knapp** (George N.). New Jersey.
Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 93–103, 1 pl.
Describes underground-water conditions in the Appalachian province, crystalline highlands province, Piedmont province, and Coastal Plain province. Gives geologic sections of water-bearing strata (pl. VI). Summarizes well statistics in the Coastal Plain (pp. 98–101); summarizes water resources, distribution of wells, and enumerates mineral springs (p. 102), and lists the principal publications (p. 103).

364 **Knapp** (I. N.). Drilling wells in soft and unconsolidated formations.
Stevens Institute Indicator, January, 1905, 20 pp., 11 figs.
Notes the existence in southern California of vast porous reservoirs of sand, gravel, etc., holding immense quantities of underground water. In the development of these immense supplies the "stovepipe" method described in this paper was developed.

365 **Knight** (Nicholas). Notes on the softening of Iowa well waters.
Chemical Engineer, vol. 2, pp. 89–95, 1 fig.
Describes investigations of the softening of hard water from a well in the Niagara magnesian limestone at Mount Vernon, Iowa. Several analyses are given.

366 **Kraus** (Edward H.). On the origin of the caves of the island of Put-in-Bay, Lake Erie.

Am. Geologist, vol. 35, pp. 167–171.

Notes part played by solution of gypsum in the formation of the caves (pp. 170–171).

367 —— Occurrence and distribution of celestite-bearing rocks.

Am. Jour. Sci., 4th ser., vol. 19, pp. 286–293, 5 figs.

Gives a description of the "Crystal" or "Strontium" cave on the island of Put-in-Bay, Lake Erie. Notes the porous nature of the celestite-bearing rocks of New York and Michigan, and discusses the agency of percolating saline waters in the solution of the celestite. Large, well-developed crystals of celestite occur in cracks and cavities due to deposition from celestite-bearing solutions.

368 **Kümmel** (Henry B.). A report upon some molding sands of New Jersey.

Ann. Rept. New Jersey Geol. Survey for 1904, pp. 187–246, 1 fig.

Discusses factors determining porosity and permeability of sands (pp. 199–204).

369 —— Additional well records.

Ann. Rept. New Jersey Geol. Survey for 1904, pp. 263–271.

Gives descriptions, records, class, and yield of about 30 wells.

L.

370 **Ladd** (E. F.). Water for domestic purposes in North Dakota.

Bull. North Dakota Govt. Agr. Exp. Sta. no. 66, pp. 557–571.

Mentions requirements of safe well water as regards composition, and gives many analyses from various kinds of wells.

371 **La Forge** (Laurence). Water resources of central and southwestern highlands of New Jersey.

Water-Sup. and Irr. Paper no 110, U. S. Geol. Survey, pp. 141–155.

Describes the Schooley Mountain mineral spring and gives analysis (p. 148). Enumerates towns having springs and wells as public supply and mentions good quality of the water (p. 151).

372 **Laird** (George A.). The gold mines of the San Pedro district, Cerro de San Pedro, State of San Luis Potosi, Mexico.

Bimonthly Bull. Am. Inst. Min. Eng., no. 1, January, 1905, pp. 69–89, 5 tables, 1 map.

Concludes that the deposits were originally formed and the upper portions subsequently enriched by the action of underground water.

373 **Lakes** (Arthur). Organic remains in ore deposits.

Eng. and Min. Jour., vol. 79, pp. 1226–1227.

Discusses the agency of mineral-bearing solutions in the preservation of organic remains and the influence of organic remains in the precipitation of minerals from solutions.

374 —— Igneous rocks in ore deposition.

Eng. and Min. Jour., vol. 80, p. 196.

Contains a discussion of the agency of igneous rocks in the formation of openings along which ore-bearing solutions could pass.

375 —— Oil-impregnated volcanic dikes in Colorado.

Mines and Minerals, vol. 25, p. 394, 3 figs.

Notes the occurrence of springs of water issuing at the sides of the dikes.

376 —— Sketch of the economic resources of the foothills of the Front Range of Colorado.

Min. Reporter, vol. 51, pp. 522–524, 1 fig.

Contains a brief statement of the artesian-water resources of the area.

377 **Lakes** (Arthur). The hot and mineral springs of Routt County and Middle Park, Colorado.

Min. Reporter, vol. 52, pp. 438–439, 2 figs.

The springs issue from between the Dakota sandstone and Colorado shales. Descriptions are given for several groups of springs.

378 **Lamb** (Richard). Discussion of paper entitled "The reclamation of river deltas and salt marshes."

Proc. Am. Soc. Civil Eng., vol. 31, pp. 204–207.

Quotes Lyell as to existence of vast springs in the Dismal Swamp, and describes the drainage of the swamp by digging wells through clays forming the bed of the swamp into the quicksands beneath.

379 **Landes** (Henry). Preliminary report on the underground waters of Washington.

Water-Sup. and Irr. Paper no. 111, U. S. Geol. Survey, 85 pp. 1 map.

Describes the wells, springs, and geologic occurrence of the waters by counties, the use of spring and well water for municipal and private supply, health resorts, and irrigation. Gives a number of analyses, and discusses the compositions. Gives 16 pages of tables relative to representative wells, springs, and municipal supplies.

380 **Lane** (Alfred C.). Transmission of heat into the earth.

Ann. Rept. Michigan Geol. Survey for 1903, pp. 195–237, 6 figs.

Mentions method of deriving depth of well from temperature of its water (p. 195).

381 —— Deep borings for oil and gas.

Ann. Rept. Michigan Geol. Survey for 1903, pp. 273–294, 1 fig.

Gives a number of records, discusses the divining-rod delusion as applied to water (pp. 276–279), and mentions occurrences of salt water.

382 —— Sixth annual report of the State geologist to the board of the Geological Survey for the year 1904.

Ann. Rept. Michigan Geol. Survey for 1904, pp. 113–168, 1 pl.

Describes the occurrence of salt water in an oil well near Allegan, Mich. (pp. 164–165).

383 **Lapham** (Macy H.). Soil survey of the San Jose area, California.

Field Operations of the Bureau of Soils, 1903, U. S. Dept. Agr., pp. 1183–1217, 1 fig., 1 map.

Defines artesian water, water table, etc.; describes irrigation by flowing and nonflowing artesian wells; mentions artesian strata; describes pumping plants, relation of capillarity to rock texture, and relation of seepage to height of water table and occurrence of alkali (pp. 1204–1211).

384 —— and **Jensen** (Charles A.). Soil survey of the Bakersfield area, California.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 1089–1114, 3 maps, 1 fig.

Describes occurrences of underground and seepage waters, and relation to alkali in the soil (pp. 1107–1108). Discusses briefly the distribution of artesian wells, pumping plants, and use of the water for domestic purposes (pp. 1106–1107).

385 —— and **Neill** (N. P.). Soil survey of the Solomonsville area, Arizona.

Field Operations of the Bureau of Soils, 1903, U. S. Dept. Agr., pp. 1045–1070, 1 fig., 1 map.

Mentions average depth of wells and of water table; describes injurious effects of alkali in waters, inferiority of deep-well water, gives analysis, and injurious effect of seepage (pp. 1062–1064).

386 **Lapham** (Macy H.), **Root** (Aldert S.), and **Mackie** (W. W.). Soil survey of the Sacramento area, California.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 1049–1087, 1 map, 1 fig.

Describes irrigation from pumped wells in portions of the area (p. 1081).

387 **Lee** (Willis Thomas). Underground waters of Salt River Valley, Arizona.

Water-Sup. and Irr. Paper no. 136, U. S. Geol. Survey, 196 pp.

This paper starts with descriptions of deep and seepage wells, including volume, cost, interference, materials penetrated, pumping tests, use for irrigation, and analyses of the waters, and gives tables showing location, character, depth, diameter, head, volume, permanency, etc., of wells. These are followed by chapters on geology and physiography, after which the economics of the supplies are considered. The character of the water table is shown by a contour map. The fluctuations of the latter and the underflow of Salt River and the valley in general are discussed in detail. Much of the water is in bowlder beds representing buried stream channels. Other features discussed are the chemistry of the waters, the occurrence, origin, and effect of salt on vegetation, the measurement of underflow by the Slichter underflow meter, the available water, and the cost of pumping. The discussion of the origin of caliche, a calcareous crust formed in the sediments some distance below the surface, is of much interest.

388 **Leffmann** (Henry). The microscopic structure of building stones.

Proc. Eng. Club of Philadelphia, vol. 22, pp. 327–346, 12 figs.

Describes the cementation of sediments by infiltrating solutions (p. 337).

389 **Leighton** (Marshal Ora). Sanitary regulations governing construction camps.

Water-Sup. and Irr. Paper no 146, U. S. Geol. Survey, pp. 90–93.

Points out precautions to be taken in use of wells (p. 93).

390 —— Field assay of water.

Water-Sup. and Irr. Paper no. 151, U. S. Geol. Survey, 77 pp.

Describes a field outfit for the rapid analysis of surface and underground waters in the field.

391 **Leith** (Charles Kenneth). A summary of Lake Superior geology with special reference to recent studies of the iron-bearing series.

Bimonthly Bull. Am. Inst Min. Eng., no. 3, 1905, pp. 453–507, 1 map, 2 tables, 4 figs.

Contains a discussion of the agency of underground waters in the formation of iron-ore deposits.

392 —— Genesis of Lake Superior iron ores.

Econ. Geol., vol. 1, pp. 47–66.

This paper presents an important summary of the occurrence of water in fractured and brecciated rocks. The topics discussed include the convergence of waters through joints, fractures, brecciated zones, bedding planes, and structural troughs (pp. 55, 61). The irregular nature of the trunk channels of the underground waters (p. 56), the relation of circulation to impervious beds, and the resulting ponding and flow (p. 57), the lower limit of waters affecting ore deposition (p. 59), the relation of ore concentration to circulation of waters (p. 59), and the nature of mine waters (p. 62) are also considered.

393 **Leopold** (F. B.). Filtration of water in its relation to the health and prosperity of a municipality.

Proc. Am. Waterworks Assoc., pp. 276–296, 4 figs.

Describes epidemic caused by use of polluted well waters at Ithaca and Elmira, N. Y. A short description of the well-supply system of Columbus, Ohio, is quoted from the Engineering News of February 11, 1904. Notes epidemic at Mount Savage, Va., caused by polluted spring waters. An instance of the pollution of well waters in cities is also given.

394 **Leverett** (Frank). Illinois.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 248–257, 2 pls., 1 fig.

Describes the various water-bearing formations and their relations to artesian and other wells, and discusses their quality and use. Lists the important mineral springs and principal publications regarding underground waters of the State.

395 —— Indiana.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 258–264, 2 pls.

Describes the principal water-bearing formations and discusses favorable localities for wells, giving map. Describes general distribution of spring water and gives list of principal commercial springs. Lists the principal publications pertaining to underground waters of the State.

396 —— Ohio.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 265–270.

Describes the various water-bearing formations and discusses localities favorable for artesian wells. Lists the principal mineral springs and the publications relating to underground waters of the State.

396a **Levy** (E. C.), **Whipple** (George C.) and. The Kennebec Valley typhoid-fever epidemic of 1902–1903. [Maine.]

Jour. New England Waterworks Assoc., vol. 19, pp. 163–214, 7 figs.

See Whipple (George C.) and Levy (E. C.).

397 **Lewis** (Joseph Volney), **Pratt** (Joseph Hyde) and. Corundum and the peridotites of western North Carolina.

North Carolina Geol. Survey, vol. 1, 464 pp., 45 pls., 35 figs.

See Pratt (Joseph Hyde) and Lewis (Joseph Volney).

398 **Lewis** (L. L.) and **Nicholson** (J. F.). A study of a few representative sources of drinking water.

Bull. Oklahoma Agr. Exp. Sta. no. 66, pp. 12–19.

A brief bacteriological study of water from 14 wells at Stillwater, Okla., giving source of water and number of bacteria. Mentions dangers of contamination.

399 **Lindgren** (Waldemar). The occurrence of stibnite at Steamboat Springs, Nevada.

Bimonthly Bull. Am. Inst. Min. Eng. no. 2, 1905, pp. 275–278.

Describes these hot springs; gives analyses of the water and sinter deposited from one of the springs; describes the sinking of a shaft on the sinter flats a few hundred feet away and the encountering of hot water in a gravel bed and the discovery of stibnite crystals in the gravel.

400 —— Ore deposition and deep mining.

Econ. Geol., vol. 1, pp. 34–46.

Discusses the part played by water in ore deposition (p. 43), the enrichment of ores by descending waters (pp. 35, 37), and considers the conditions of precipitation (pp. 40, 44).

401 —— Chemistry of copper deposits.

Eng. and Min. Jour., vol. 79, p. 189.

This article is a letter to the editor in reply to a criticism by a correspondent of Mr. Lindgren's views on the chemistry of copper and sulphur as expressed in an article on the Clifton deposits in Arizona, which had previously appeared in the journal. The agency of underground waters in the formation of the copper deposits at Clifton is discussed.

402 —— Characteristics of gold-quartz veins in Victoria [Australia].

Eng. and Min. Jour., vol. 79, pp. 458–460, 1 fig.

Discusses the agency of mineralized waters in the formation of these veins.

403 **Lindgren** (Waldemar). Description of the Clifton quadrangle [Arizona].

Geologic Atlas U. S., folio 129, U. S. Geol. Survey, 13 pp., 4 maps, 3 figs., 1 col. sect.

Refers to the great volume of water mingled with Tertiary volcanic eruptions (p. 8). Mentions alteration of ore deposits in limestone by oxidizing waters (pp. 12, 13). Describes formation of quartz veins by aqueous solutions, and reviews theories (p. 13). Notes scarcity and great depth of ground water (p. 12). Describes the distribution of springs, including thermal and mineral springs, and gives analysis (p. 13).

404 —— and **Ransome** (F. L.). The geological resurvey of the Cripple Creek district, Colorado.

Bull. U. S. Geol. Survey no. 260, pp. 85–98.

Describes occurrence of water in fractured area surrounded by impervious rocks, the fractures holding the water as in a reservoir (pp. 96–97). Also notes the depth of oxidization (p. 94) and the occurrence of carbon dioxide, nitrogen, and oxygen, which are considered as exhalations from an igneous mass below.

405 —— The copper deposits of the Clifton-Morenci district, Arizona.

Prof. Paper U. S. Geol. Survey no. 43, 375 pp., 25 pls., 19 figs.

Describes the ground-water conditions in mines, noting the general absence of water (pp. 22, 212, 226, 232, 318, 333) and the occurrence of springs (p. 317). The part of water in ore deposition and metasomatic processes, including both common hydrometamorphism by circulating meteoric waters, hydrothermal metamorphism, and oxidation, are considered in great detail, and the chemical reactions discussed (pp. 123–194, 331 et seq.). The work of magmatic waters (p. 219) and the alteration by oxidizing waters are also treated at length (pp. 20–24, 197, 213, 333).

406 —— Mining the Australian deep leads.

Min. Magazine, vol. 11, pp. 139–143, 4 figs.

Describes the occurrence of water in the buried gravels; notes that long-continued pumping causes a funnel-shaped depression in the ground-water table.

407 **Lines** (Edwin F.). Well records.

Bull. U. S. Geol. Survey no. 264, pp. 41–106.

Gives summary records of over 350 oil, gas, and water wells, and detailed logs for a considerable number.

408 **Lippincott** (J. B.). Water problems of Santa Barbara, Cal.

Water-Sup. and Irr. Paper no. 116, U. S. Geol. Survey, 99 pp.

Notes discharge, etc., of deep city wells (pp. 11, 33) and describes collecting tunnel over 5,000 feet long, in which flow is regulated by bulkheads (p. 33). Figures of discharge (p. 33) and an analysis of the tunnel water (p. 37) are given. To secure further supply it is intended to continue tunnel through the mountain to a stream on the other side.

409 **Little** (Etta). Sanitary analysis of the water of Fulbright Spring.

Bull. Bradley Geol. Field Std. of Drury College, vol. 1, pt. 2, pp. 50–52.

Gives a new analysis of the water of one of the springs furnishing the public supply at Springfield, Mo., and a number of older ones of the supplies of other Missouri cities.

410 **Livingston** (Burton Edward). The relation of soils to natural vegetation in Roscommon and Crawford counties, Mich.

Ann. Rept. Michigan Geol. Survey for 1903, pp. 9–32, 1 pl.

Discusses relation of ground-water level to type of vegetation (pp. 23–24).

411 **Logan** (W. N.) and **Perkins** (W. R.). The underground waters of Mississippi.

Bull. Mississippi Agr. Exp. Sta. no. 89, 112 pp., 23 figs.

Designates various water-bearing horizons (p. 10), classifies underground waters by locality and composition (pp. 10–12), enumerates factors affecting purity (pp. 12–13), describes artesian water in general (p. 6), and discusses Mississippi artesian- and deep-well waters in detail by counties and towns (pp. 14–112), giving geological relations, well sections, and analyses; states whether flowing or nonflowing, potability, etc.

412 **Loveland** (G. A.). Increased flow of spring water in the autumn.

Monthly Weather Review, vol. 32, pp. 176–177.

Attributes increased flow in Nebraska in October and November to the slow percolation of the water from the heavy rainfall of May, June, and July, combined with the decreased evaporation due to lower temperature and the smaller demands of vegetation.

413 **Lyman** (Kate). Chemical analysis of the water of Fulbright Spring.

Bull. Bradley Geol. Field Sta. of Drury Coll., vol. 1, pt. 2, pp. 49–50.

An analysis of one of the springs furnishing the public supply at Springfield, Mo.

414 —— **Park** (Emma J.) and. The Springfield water supply: Description of springs and the geology of the district.

Bull. Bradley Geol. Field Sta. of Drury Coll., vol. 1, pt. 2, pp. 45–49.

See Park (Emma J.) and Lyman (Kate).

415 —— **Park** (Emma J.) and. The Hannibal formation in Greene County [Missouri].

Bull. Bradley Geol. Field Sta. of Drury Coll., vol. 1, pt. 2, pp. 79–90.

See Park (Emma J.) and Lyman (Kate).

416 **Lyman** (W. S.), **Caine** (Thomas A.) and. Soil survey of the San Antonio area, Texas.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 447–473, 1 map, 1 fig.

See Caine (Thomas A.) and Lyman (W. S.).

M.

417 **Macbride** (Thomas H.). Geology of Emmet, Palo Alto, and Pocahontas counties [Iowa].

Ann. Rept. Iowa Geol. Survey, 1904, vol. 15, pp. 229–259, 1 pl. 3 figs., 3 maps.

Gives well records (pp. 252, 254) and mentions shallow and deep wells and springs as sources of country and city supply (p. 259).

417a **McCalley** (Henry), **Smith** (Eugene Allen) and. Index to the mineral resources of Alabama.

Alabama Geol. Survey, 1904, 79 pp., map and 6 pls.

See Smith (Eugene Allen) and McCalley (Henry).

418 **Mackie** (W. W.), **Jensen** (Charles A.), and. Soil survey of the Baker City area, Oregon.

Field Operations of the Bureau of Soils, 1903, U. S. Dept. Agr., pp. 1151–1170, 1 fig., 4 maps.

See Jensen (Charles A.) and Mackie (W. W.).

419 —— **Root** (Aldert S.), **Lapham** (Macy H.) and. Soil survey of the Sacramento area, California.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 1049–1087, 1 map, 1 fig.

See Lapham (Macy H.), Root (Aldert S.), and Mackie (W. W.).

420 **Maguire** (Don). Oil and asphaltum on the shores of Great Salt Lake, Utah.

Min. and Sci. Press, vol. 90, p. 302, 2 figs.

Describes the saline and oil springs and notes the encountering of salt water carrying much sulphuric acid in a 2,700-foot boring.

421 **Mangum** (A. W.) and **Drake** (J. A.). Soil survey of the Russell area, Kansas.

Field Operations of the Bureau of Soils, 1903, U. S. Dept. Agr., pp. 911–926, 1 fig., 1 map.

Mentions the occurrence of springs along the outcrop of the base of the Dakota sandstone (p. 914).

422 **Mark** (Edward L.). The Bermuda Islands and the Bermuda Biological Station for Research.

Pop. Sci. Monthly, vol. 66, pp. 393–411, 12 figs.

Describes the caves, sinks, and subterranean passages in the limestone of the island.

423 **Marriott** (Hugh F.). Electrical devices for deep borehole surveying.

Eng. News, vol. 54, pp. 91–94.

Describes in detail the instruments and methods of use with numerous diagrams. Editorial review on p. 97.

424 **Martin** (George C.). The petroleum fields of the Pacific coast of Alaska, with an account of the Bering River coal deposits.

Bull. U. S. Geol. Survey no. 250, 64 pp. 7 pls., 3 figs.

Notes the occurrence of oil and gas springs and seeps (pp. 22, 27, 47, 55, 58), gives well records (pp. 23, 49. 55), mentions the occurrence of water in oil wells (pp. 24, 49, 55), describes blows of water and gas (p. 49), and the association of water with faulting (p. 55).

425 —— Notes on the petroleum fields of Alaska.

Bull. U. S. Geol. Survey no. 259, pp. 128–139.

Gives a number of well records (pp. 131, 133), notes difficulties due to water in oil wells (pp. 132, 133, 136), and describes water and oil seepages (pp. 132, 135, 138, 139), and gas and water blows (p. 134).

426 —— Water resources of the Accident and Grantsville quadrangles, Maryland.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 168–170.

Refers to the abundance of good springs, especially in the Greenbrier limestone, and notes the Deer Park spring as an example. States the probabilities of obtaining good artesian water in the region.

427 —— Water resources of the Frostburg and Flintstone quadrangles, Maryland and West Virginia.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 171–173.

Notes the abundance of good springs in the Greenbrier and Helderburg limestones and their use for town supplies. Notes one artesian well obtaining water in Carboniferous sandstones, and states the probability of getting water in the Oriskany and Tuscarora sandstones.

428 —— **Stose** (George W.) and. Water resources of the Pawpaw and Hancock quadrangles, West Virginia, Maryland, and Pennsylvania.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 58–63.

See Stose (George W.) and Martin (George C.).

429 **Martin** (J. O.) and **Sweet** (A. T.). Soil survey of the Kearney area, Nebraska.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 859–874, 1 pl., 1 map, 1 fig.

Describes briefly the occurrence of underground and seepage waters, and their relation to irrigation (p. 870).

430 **Mason** (Russell T.). Peru.

Eng. and Min. Jour., vol. 79, pp. 1091–1093, 1 fig.

Mentions the existence of hot springs depositing sinter at Huancavelica, Peru.

431 **Mason** (William P.). Sundry notes on deep-seated waters.

Proc. Am. Waterworks Assoc., 1905, pp. 297–301, 8 figs.

This article is an abstract of a paper read before the association by W. P. Mason. The terms ground water and deep-seated water are defined; two diagrams given show the conditions governing a flowing and a dry artesian well; the depletion of the deep water in the vicinity of London, England, due to excessive use is noted; the pressure, depth, etc., of the Woonsocket, S. Dak., artesian well, is given; relation between the Jacksonville artesian well and a sea spring off the east coast of Florida is noted; the spring-water supply of Orleans, France, and the deep-well supply of Copenhagen are mentioned; contamination of deep water is touched upon and examples noted; the term "contributing watershed" is defined and an ideal section given; a short discussion of the Sea Mills of Cephalonia concludes the article.

432 —— The water supply of Amsterdam, Holland.

Eng. News, vol. 53, pp. 437–438, 4 figs.

Describes the supplies obtained from the "sand dunes."

433 —— The Sea Mills of Cephalonia.

Eng. News, vol. 54, p. 352, 1 illustration.

Describes the mills at Cephalonia, the largest of the Ionian Islands; notes tests made to determine the course of the water. Suggests that the water "which sinks into the rocks at Cephalonia comes to the surface again in the form of steam at Stromboli, Vesuvius," etc. W. O. Crosby's explanation of the phenomenon is given. A view of the mill is given.

434 —— Relation of intensity of typhoid fever to character of water carriage.

Jour. New England Waterworks Assoc., vol. 19, pp. 412–421.

Describes typhoid epidemics caused by using polluted well water at Waterville, Me., and Philadelphia, Pa. In the discussion accompanying the article Dr. G. A. Soper described the epidemic due to the use of a polluted well water at Ithaca, N. Y.; Messrs. M. N. Baker and G. W. Wright described epidemics due to the use of polluted well waters.

435 —— Interpretation of a water examination.

Science, new ser., vol. 21, pp. 648–653.

States instances of serious pollution in wells and springs, and the difficulties of determining such pollution by analyses (pp. 650–652).

436 **Maury** (Dabney H.). The new well and hydraulic pumping plant at Peoria, Ill.

Eng. Rec., vol. 51, pp. 139–140, 3 figs.

Complete description of the location, sinking of the well, and the equipment of the plant is given.

437 —— New well and hydraulic pumping plant at Peoria, Ill.

Twentieth Ann. Rept. Illinois Soc. Eng. and Surv., pp. 110–118, 4 figs.

Gives references to descriptions of the old wells. Notes exploration of all available water-bearing gravels in the vicinity by test wells; gives the location, elevation at, method of sinking, and capacity of the new well; discusses tests made to show absence of river infiltration; notes flow of water from gravel beds to river, influence of stage of water in river on supply in gravel, and describes the influence of pumping on the underground supply.

438 —— **Burdick** (C. B.), and **Henderson** (C. R.). Report of the committee on waterworks.

Twentieth Ann. Rept. Illinois Soc. Eng. and Surv., pp. 132–139.

Notes the existence of 153 waterwork plants in Illinois deriving their supplies from underground sources (p. 133); mentions the installation of a plant at Freeport for the purpose of removing dissolved iron from deep well water (p. 135). In the discussion of this paper C. A. Prout states that Elgin derives its water from 4 wells, one of which is 2,000 and the others 1,300 feet deep (p. 139).

439 **McCallie** (S. W.). A preliminary report on the coal deposits of Georgia.

Bull. Georgia Geol. Survey no. 12, 121 pp., 14 pls., 60 figs.

Refers to chalybeate springs (pp. 48, 58), and mentions springs from subterranean caverns near Lookout Mountain (p. 18); mentions flooded mines (pp. 56, 68, 75, 81), and describes the interference of undulations in coal seams with the draining of mines (pp. 30, 36); mentions bore holes (p. 41), gives records (pp. 82, figs. 48–53b), discusses them (pp. 102, 104), and discusses briefly the value of records (pp. 102).

440 —— Experiment relating to problems of well contamination at Quitman, Ga.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 45–54, 1 fig.

Describes an attempt to dispose of a city's sewage by forcing it down a deep well into a cavernous limestone. To test the question of pollution a quantity of salt was put into a well and samples of all other wells and springs in the vicinity were taken and analyzed. The results showed that the salt reached the other wells.

441 —— Georgia.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 153–158, 1 fig.

Describes the underground water conditions in the Appalachian Mountain area, the Piedmont Plateau area, and the Coastal Plain area. Lists the principal mineral springs and the important publications regarding underground waters of the State.

442 **McCarthy** (Gerald). Report of Biologist.

Tenth Rept. North Carolina Board of Health, pp. 31–34.

States that 5 water companies in the State obtain their supply from deep wells, and urges the general abandonment of shallow wells for deep wells.

443 **Meachem** (F. G.). Underground temperatures.

Eng. and Min. Jour., vol. 79, p. 368.

Notes the influence of hot and cold springs and the heat produced by the alteration of rocks by percolating water on underground temperatures. Abstract of a paper read before South Staffordshire and East Worcestershire Institution of Mining Engineers.

444 **Mead** (Elwood). Irrigation in northern Italy, Part I.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 144, 100 pp., 17 pls., 14 figs.

Describes use and superiority of springs for marcite irrigation in Lombardy (pp. 9, 60, 64–66); and describes cause and effect of seepage from canals (pp. 48–53, 79).

445 —— Water rights on interstate streams: The Platte River and tributaries. Water rights within the States.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 157, pp. 96–116.

Discusses return seepage as an obstacle in justly dividing a stream between appropriators in Colorado and Nebraska (pp. 107–108).

446 —— The irrigation investigations in California of the Office of Experiment Stations.

Forestry and Irrigation, vol. 11, pp. 367–369.

Describes the use of underground water in irrigation in this section, the underground-water conditions, the lowering of the water table due partly to a succession of dry seasons, etc.

447 **Means** (Thomas H.). Alkali soils.

Water-Sup. and Irr. Paper no. 146, U. S. Geol. Survey, pp. 108–113.

Describes the movements of alkali in ground water through soil (pp. 111–112).

448 —— **Kearney** (Thomas H.) and. Agricultural explorations in Algeria.

Bull. Bureau of Plant Industry, U. S. Dept. Agr., no. 80, 98 pp., 4 pls.

See Kearney (Thomas H.) and Means (Thomas H.).

449 **Meeker** (F. N.), **Smith** (William G.) and. Soil survey of Sumter County, Alabama.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 317–342, 1 map, 1 fig.

See Smith (William G.) and Meeker (F. N.).

450 **Melluish** (J. G.). Drainage in western Iowa.

Twentieth Ann. Rept. Illinois Soc. Eng. and Surv., pp. 57–65, 2 ill.

Describes the reclaiming of wet lands by means of underground drainage obtained by sinking holes through the swamp bottom into a pervious bed (p. 61). Gives effective diameter of soil grains and rate of flow through soil in several counties (pp. 64–65).

451 **Mendenhall** (Walter C.). Studies of California ground waters.

Forestry and Irrigation, vol. 11, pp. 382–384.

A discussion of the underground-water conditions and resources of southern California. An artesian area in the Colorado Desert is described.

452 —— Development of underground waters in the eastern Coastal Plain region of southern California.

Water-Sup. and Irr. Paper no. 137, U. S. Geol. Survey, 140 pp.

Describes the general ground-water conditions, the source and sufficiency of supply, and the interference and cost of wells. Tables are given showing the owner, location, date of drilling, type, elevation of surface and water, depth, solids in solution, temperature, methods of lift, cost, and use of wells. The maps show distribution of wells, original and present areas of flows, depth to water, and location of pumping plants.

453 —— Development of underground waters in the central Coastal Plain region of southern California.

Water-Sup. and Irr. Paper no. 138, U. S. Geol. Survey, 162 pp.

Treats same topics as no. 452.

454 —— Development of underground waters in the western Coastal Plain region of southern California.

Water-Sup. and Irr. Paper no. 139, U. S. Geol. Survey, 105 pp.

Treats same topics as no. 452.

455 —— The hydrology of San Bernardino Valley, California.

Water-Sup. and Irr. Paper no. 142, U. S. Geol. Survey, 124 pp.

Discusses the development of irrigation, rainfall, effect of forests on water supplies, nature of the return waters, conditions governing the absorption of streams, and the composition (with analyses), flow, temperature, and decline of underground waters. The basin, which is about 8,000 feet deep, is filled with alluvial deposits in which there are many water horizons. Some stratigraphic records and tables, giving the owner, location, depth, composition, temperature, cost, use, etc., of wells, are included. Maps showing wells, artesian areas, etc., are also given.

456 —— Underground waters of southern California.

Water-Sup. and Irr. Paper no. 146, U. S. Geol. Survey, pp. 113–121.

Describes the development of artesian wells for use in irrigation (pp. 114–116), origin of the ground water and its mode of occurrence (pp. 116–117), distribution and character of the supply (pp. 117–118), and the reduction and fluctuation of supply and their causes (pp. 120–121). Desirable precautions in use of water are also pointed out (p. 120).

457 —— The underground waters of southern California.

The official proceedings of the Twelfth National Irrigation Congress at El Paso, Tex., November 15–18, 1904, pp. 150–158.

Describes the artesian areas, their geologic relations, great value, shrinkage in area, problems, etc.

458 **Mesmer** (Louis). Soil survey of the Los Angeles area, California.
Field Operations of the Bureau of Soils, 1903, U. S. Dept. Agr., pp. 1263–1306, 1 fig., 2 maps.
Describes irrigation from flowing and pumping artesian wells (p. 1293).

459 **Merrill** (Frederick J. H.). Bromine.
Mineral Resources U. S. for 1904, U. S. Geol. Survey, pp. 1029–1030.
Notes the occurrence of bromine in the brines of Michigan, Ohio, Pennsylvania, and New York.

460 **Miller** (Thomas D.). Texas oil fields.
Progressive Age, vol. 23, pp. 398–403, 1 fig.
Quotes R. T. Hill on agency of hot saline waters in the formation of the oil and gas-pools of Texas and Louisiana; describes the encountering of oil in sinking an artesian well now flowing warm water at Corsicana, Tex.

461 **Mills** (W. M.). A physiographic and ecological study of the Winona Lake region.
Twenty-eighth Ann. Rept. Indiana Dept. Geol. and Nat. Res., pp. 377–396, Pls. VII–VIII, figs. 1–4.
Rich vegetation favored by springs (p. 384). Mentions post-Glacial conglomerate possibly cemented by spring water (p. 395).

462 **Mines and Minerals.** A 300-foot air-lift well plant at the Scranton Cold Storage House [Penn.].
Mines and Minerals, vol. 25, p. 494.
Describes an 835-foot well at this place.

463 **Mining and Scientific Press.** The Bassick mine, Querida, Colo.
Min. and Sci. Press, vol. 90, pp. 4–5, 1 fig.
Assigns the mineralization of the ore shoots to the action of thermal mineral springs along a line of fracture.

464 —— Unwatering the Comstock.
Min. and Sci. Press, vol. 90, pp. 65, 73–74, 1 fig.
Describes the filling of the lower levels by rising hot water and the work now being done to unwater the mines.

465 —— The Simplon tunnel.
Min. and Sci. Press, vol. 90, p. 119.
Mentions the encountering of large volumes of hot water in the construction of the tunnel.

466 —— Coolgardie, Australia, pumping system.
Min. and Sci. Press, vol. 90, pp. 120–122, 11 figs.
Contains a description of the use of well and saline mine waters for water supply during the early days of this gold field.

467 —— Artesian water.
Min. and Sci. Press, vol. 90, p. 168, 6 figs.
Discusses geological conditions essential to the securing of artesian water, and quotes I. C. Russell on the subject of legal restrictions on the waste of subsurface waters.

468 —— Water supply by compressed air.
Min. and Sci. Press, vol. 90, pp. 168–169.
Contains a description of the location, depth, etc., of the wells furnishing the additional water supply of Los Angeles, Cal.

469 —— The Simplon tunnel [between Switzerland and Italy].
Min. and Sci. Press, vol. 90, pp. 185–186, 7 figs.
Contains a description of the hot and cold springs encountered in drilling the tunnel.

470 **Mining and Scientific Press.** [Springs.]
Min. and Sci. Press, vol. 90, p. 231.
Discussion of the origin of springs.

471 —— [Ground-water level at Goldfield, Nev.].
Min. and Sci. Press, vol. 90, p. 348.
Notes the lack of water at Goldfield and the dependence on ground water, the level of which is found at 65–205 feet below the surface.

472 —— Value of geological knowledge.
Min. and Sci. Press, vol. 90, pp. 370–371, 1 fig.
Notes the varying amounts of underground water encountered in the different formations in sinking a shaft at the Illinois mine, Wisconsin.

473 —— Prospecting for desert mines.
Min. and Sci. Press, vol 90, p. 371, 1 fig.
Describes several springs in San Bernardino County, Cal.

474 —— Discovery and development of the Homestake mines of South Dakota.
Min. and Sci. Press, vol. 90, p. 404. 2 figs.
Describes the use in the Homestake mines of a stream of water issuing from a tunnel about 4 miles north of the works.

475 —— [Active mud volcano.]
Min. and Sci. Press, vol. 91, p. 119.
Notice of the breaking out of an active mud volcano early in August in the Black Rock Desert, Humboldt County, Nev.

476 —— At what depth do gold mines quit?
Min. and Sci. Press, vol. 91, p. 255.
Discusses the agency of descending mineral-bearing solutions in the secondary enrichment of gold veins.

477 —— [Theories of ore deposition.]
Min. and Sci. Press, vol. 91, p. 270.
Brief comparison of the lateral secretion and ascension theories.

478 —— The drainage of Cripple Creek mines.
Min. and Sci. Press, vol 91, p. 291, 1 fig.
Describes heavy inflow of water into the shafts and the present and proposed drainage tunnels. A figure is given showing the relation of the various shafts and tunnels to the present water level.

479 —— [Springs in the desert region of southwestern United States.]
Min. and Sci. Press, vol. 91, p. 293.
Describes several springs in California.

480 —— Divining rod as a water finder.
Min. and Sci. Press, vol. 91, p. 314.
Reprint from the Engineering News relating to the successful use of a divining rod at the Imperial Navy-Yard, Kiel, Germany.

481 —— What is a fissure vein?
Min. and Sci. Press, vol. 91, p. 392.
Discusses the alteration of rocks in veins by percolating mineral waters, the temperatures of mine waters, and the direction of flow of underground waters.

482 —— The Simplon tunnel.
Min. and Sci. Press, vol. 91, p. 399, 1 fig.
Describes the thermal springs encountered in the construction of the tunnel between Switzerland and Italy.

483 **Mining and Scientific Press.** [Mine water at Leadville, Colo.]
Min. and Sci. Press, vol. 91, p. 417.
Describes the trouble with mine water at Leadville, Colo.

484 **Mining Magazine.** Some questions regarding ore genesis.
Min. Magazine, vol. 12, pp. 399–400.
Discussion of the agency of water, volcanic and meteoric, in the formation of ore deposits.

485 **Mining Reporter.** The drainage of the Cripple Creek district [Colo.].
Min. Reporter, vol. 51, p. 280.
States that the lower depths of the Cripple Creek basin hold more water than the upper portions and gives the evidence on which this statement is based.

486 —— [Blowing wells.]
Min. Reporter, vol. 52, p. 285.
Brief description of blowing wells and explanation of their cause.

487 —— Drainage of the Cripple Creek district.
Min. Reporter, vol. 52, pp. 392–393, 2 figs.
Discusses the underground-water conditions in this district. Gives a map showing the relation of the present water level to the different mines.

488 —— The divining rod superseded.
Min. Reporter, vol. 52, p. 514.
Mentions the use of an electric or magnetic device in the location of ore bodies.

489 —— The Simplon tunnel.
Min. Reporter, vol. 52, pp. 595–596.
Notes the encountering of hot springs at 45° Centigrade in the construction of the tunnel between Switzerland and Italy.

490 **Minor** (J. C.). The so-called constipating effect of the hot water of Hot Springs, Ark.
Med. Mirror, St. Louis, vol. 16, no. 1, pp. 3–5.
Endeavors to disprove erroneous ideas concerning proportion of sulphur and injurious effects of this water.

491 **Minor** (John C., jr.). The production and modern uses of carbonic acid.
Chemical Engineer, vol. 1, pp. 212–218.
A paper read before the New York Section of the American Chemical Society, December 29, 1904. Contains a description of the wells at Saratoga Springs, N. Y., that are used for the production of this gas and describes the method used in separating the gas from the water.

492 **Mitchell** (George A.). Irrigation in the East.
The official proceedings of the Twelfth National Irrigation Congress at El Paso, Tex., November 15–18, 1904, pp. 346–348.
Mentions irrigation from flowing artesian wells near Atlantic City, N. J., and water supply from pumping 14 driven wells at Vineland, N. J.

493 **Monaghan** (J. F.). Windmills for South Africa.
Daily Consular Repts. no. 2210, Dept. Com. and Labor, p. 4.
Mentions necessity for sinking wells, owing to continued dry seasons.

494 **Moncrieff** (C. Scott). Irrigation.
Science, new ser., vol. 22, pp. 577–590.
Refers to irrigation by artesian wells in California, Algeria, and Queensland (p. 579), and by ordinary wells in India and elsewhere (p. 580).

495 **Monete** (Leon). The construction of the Simplon tunnel [between Switzerland and Italy].

Eng. Magazine, vol. 29, pp. 169–184, 29 figs.

Description of the springs of hot and cold water encountered in the construction of the tunnel is given. Photographs are given of two of these springs.

496 **Mooney** (Charles N.) and **Ayrs** (O. L.). Soil survey of the Greeneville area, Tennessee-North Carolina.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 493–525, 1 map, 1 fig.

Refers to occurrence of sink holes and effect on drainage (p. 498).

497 **Moore** (George T.). The use of copper sulphate as an algicide.

Jour. New England Waterworks Assoc., vol 19, pp. 474–481.

Notes the use of a thermal spring in Virginia, temperature given as 70° the year round, in the growing of water cress (pp. 475–476).

498 —— and **Kellerman** (Karl F.). Copper as an algicide and disinfectant in water supplies.

Bull. Bureau of Plant Industry, U. S. Dept. Agr., no. 76, 55 pp.

Describes injury of ground water stored in an open reservoir at Newtown, Pa., through growth of algæ, and disinfection of the water by use of copper sulphate (pp. 26–27).

498a **Moore** (Richard B.), **Schlundt** (Herman) and. Radio-activity of some deep-well and mineral waters.

Jour. Physical Chemistry, vol. 9, pp. 320–332.

See Schlundt (Herman) and Moore (Richard B.).

499 **Morgan** (Percy). The Hauraki gold fields, New Zealand.

Eng. and Min. Jour., vol. 79, pp. 861–862.

Contains discussion of the agency of underground water in the origin of the deposits.

500 **Morrison** (Charles E.). The importance of potable water supplies to mining communities.

Eng. and Min. Jour., vol. 80, pp. 1057–1058.

Includes a discussion of the availability of springs and wells in mining districts. Cites a case in Mexico in which a spring supply caused an epidemic due to the impregnation of the spring water by arsenic from the mining of a silver-lead ore carrying considerable arsenic.

501 **Moulthrop** (George E.). Annual address [of the president of the Montana Society of Engineers].

Jour. Assoc. Eng. Soc., vol. 35, pp. 141–163.

Notes the decision of March 3, 1903, of the Secretary of the Interior relating to the use of the reclamation fund in sinking artesian wells.

502 **Municipal Engineering.** Investigations of water supplies.

Municipal Engineering, vol. 28, pp. 23–24.

Contains a description of the subterranean gallery, deep- and driven-well system furnishing the water supply for the city of Indianapolis.

503 —— Removal of iron from ground water.

Municipal Engineering, vol. 28, pp. 472–477, 8 figs.

The water supply of Richmond, Mo., is taken from a group of 4 or 5 wells sunk to bed rock in the Missouri River bottom lands. The water contains 12 or more parts per million of iron. This article is devoted to a description of the method of aeration and filtration of this well water.

504 **Murphy** (E. C.). Drought in Ohio River drainage basin.

Water-Sup. and Irr. Paper no. 147, U. S. Geol. Survey, pp. 173–182.

Describes failure of springs and wells in Pennsylvania, West Virginia, and Kentucky, and the shortage of public supplies.

N.

505 **Neill** (N. P.), **Holmes** (J. Garnett) and. Soil survey of the Greeley area, Colorado.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 951–993, 1 map, 1 fig.

See Holmes (J. Garnett) and Neill (N. P.).

505a —— **Lapham** (Macy H.) and. Soil survey of the Solomonsville area, Arizona.

Field Operations of the Bureau of Soils, 1903, U. S. Dept. Agr., pp. 1045–1070, 1 fig., 1 map.

See Lapham (Macy H.) and Neill (N. P.).

506 **Newell** (Frederick Haynes). Proceedings of the second conference of engineers of the Reclamation Service; Organization; Report of Conference.

Water-Sup. and Irr. Paper no. 146, U. S. Geol. Survey, pp. 7–19.

Gives personnel of division of hydrology (pp. 7, 11) and notes papers on underground waters by W. C. Mendenhall and C. S. Slichter (p. 13).

507 **Nichols** (Francis H.). Notes from diary in China.

Bull. Am. Geog. Soc., vol. 37, pp. 339–356, 1 fig.

Describes the salt and gas wells of Tze Liu (pp. 349–350).

508 **Nicholson** (J. F.), **Lewis** (L. L.) and. A study of a few representative sources of drinking water.

Bull. Oklahoma Agr. Exp. Sta. no. 66, pp. 12–19.

See Lewis (L. L.) and Nicholson (J. F.).

509 **Noble** (T. A.), **Ross** (D. W.), **Whistler** (J. T.) and. Report of progress of stream measurements for the calendar year 1904: Part XII, Columbia River and Puget Sound Drainage.

Water-Sup. and Irr. Paper no. 135, U. S. Geol. Survey, 300 pp.

See Ross (D. W.), Whistler (J. T.), and Noble (T. A.).

510 **North Carolina**, Board of Health of. Tenth report, 1903–1904.

State laws of North Carolina relative to pollution of wells and springs (p. 79).

511 **Norton** (William Harmon). Iowa.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 220–225, 2 figs.

Describes the shallow and artesian water supplies of the various districts of the State, including the Cambrian, Ordovician, Silurian, Devonian, Carboniferous, and Cretaceous rocks. Lists the mineral springs of the State and notes the principal publications on underground waters.

512 —— Water supplies at Waterloo, Iowa.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 148–155.

The investigation was undertaken to discover underground supplies, the surface waters having caused a typhoid epidemic. The geology and water horizons, including the St. Peter sandstone, Oneota limestone, Jordan sandstone, etc., are described and predictions made as to the depth, quantity, quality, head, etc., to be expected in a deep well. (The prediction has since been verified in every particular by the well sunk as a result of Professor Norton's recommendations. M. L. F.)

O.

513 **O'Harra** (C. C.), **Darton** (N. H.) and. Description of the Aladdin quadrangle [Wyoming-South Dakota-Montana].

Geologic Atlas U. S., folio 128, U. S. Geol. Survey, 8 pp., 4 maps, 1 col. sect., 1 fig.

See Darton (N. H.) and O'Harra (C. C.).

514 **Oliphant** (F. H.). Petroleum.

Mineral Resources U. S. for 1904, U. S. Geol. Survey, pp. 675–759.

Describes the occurrence of salt water in the oil wells of Louisiana (p. 708), Texas (pp. 712, 713, 714), Russia (p. 733), Germany (p. 742), and China (p. 757).

515 —— Natural gas.

Mineral Resources U. S. for 1904, U. S. Geol. Survey, pp. 761–788.

Describes the occurrence of water in the gas wells of Indiana (p. 772) and Texas (p. 785). Notes that many of the artesian wells along the Gulf coast give off considerable natural gas with the artesian water (p. 785).

P.

516 **Pagliucci** (Frank D.). The quicksilver deposits of Huitzuco [Mexico].

Eng. and Min. Jour., vol. 79, pp. 417–418, 2 figs.

The workings follow an old hot-spring conduit or geyser pipe. The relation of the quicksilver deposits to this conduit are discussed.

516a **Palache** (Charles), **Jaggar** (Thomas A., jr.) and. Description of the Bradshaw Mountains quadrangle [Arizona].

Geologic Atlas U. S., folio 126, U. S. Geol. Survey, 11 pp., 4 maps, 1 illus. sheet.

See Jaggar (Thomas A., jr.) and Palache (Charles).

517 **Palmer** (Charles S.). The replacement of quartz by pyrite.

Eng. and Min. Jour., vol. 79, p. 169.

Discusses the agency of hot alkaline waters in the replacement of quartz by pyrite.

518 **Pammel** (L. H.) and **Fogel** (Estelle D.). Some railroad water supplies.

Proc. Iowa Acad. Sci. for 1904, vol. 12, pp. 151–155.

Gives the location and depth of wells and temperatures and sanitary analyses of the waters of wells in the drift and St. Peter sandstone of Iowa.

519 **Park** (Emma J.) and **Lyman** (Kate). The Springfield water supply: Description of springs and the geology of the district.

Bull. Bradley Geol. Field Sta. of Drury Coll., vol. 1, pt. 2, pp. 45–49.

Describes in some detail the springs used for public supply at Springfield, Mo. The water issues from the contact of the Upper and Lower Burlington limestones, but part may come from the St. Peters sandstone along a near-by fault. The sinks and caverns of the region are mentioned and the question of pollution of the limestone waters considered.

520 —— The Hannibal formation in Greene County [Missouri].

Bull. Bradley Geol. Field Sta. of Drury Coll., vol. 1, pt. 2, pp. 79–90.

Describes springs from contact of Lower Burlington and Chouteau limestones, the water coming from large solution passages or caves (p. 81). The composition of the well and spring waters from the Hannibal formation are considered and analyses of the water given (p. 87–88).

521 **Park** (James). Ore deposits in relation to thermal activity.

Eng. and Min. Jour., vol. 79, pp. 606–607; continued on pp. 700–701.

These articles are abstracts from "Mining geology," by Prof. James Park, in the Australian Mining Standard, January 26, 1905. Describes in considerable detail the relations of hot springs and fumaroles to ore deposits.

522 —— Metasomatic replacement.

Eng. and Min. Jour., vol. 79, p. 799.

This article is an abstract from "Mining geology," by Prof. James Park, in the Australian Mining Standard, January 26, 1905. Discussion of mineral solutions in metasomatic replacement given in considerable detail.

523 **Park** (James). Contact metamorphic deposits.

Eng. and Min. Jour., vol. 79, pp. 896.

Contains discussions of the agency of underground water in contact metamorphism. This article is an abstract from "Mining geology," by Prof. James Park, in the Australian Mining Standard, February 16, 1905.

524 —— The formation of veins.

Eng. and Min. Jour., vol. 79, pp. 941–942.

This article is an abstract from "Mining geology," by Prof. James Park, in the Australian Mining Standard, February 23, 1905. The agency of underground waters in the formation of veins is discussed.

525 —— Theories of vein formation.

Eng. and Min. Jour., vol. 79, pp. 993–994.

Discusses the eruptive after-action, lateral-secretion, and ascension theories. This article is an abstract from "Mining geology," by Prof. James Park, in the Australian Mining Standard, February 16, 1905.

526 —— Absorption of metals by silica and clays in relation to ore deposition.

Eng. and Min. Jour., vol. 79, p. 1242.

Discusses the power of clays, etc., of extracting metals from mineralized underground waters.

527 [**Peale,** A. C.] Mineral waters.

Mineral Resources U. S. for 1904, U. S. Geol. Survey, pp. 1185–1208.

Both production and value show a large gain over 1903. The production is given as 67,718,500 gallons and the value as $10,398,450. A list of the commercial springs is given. A list of the mineral waters on exhibition at the Louisiana Purchase Exposition is given. Tables showing the imports of mineral waters from 1867 to 1904 and exports from 1875 to 1883 are also given.

528 **Peary** (Robert E.). Address delivered at the annual meeting of the American Geographical Society, January 24, 1905.

Bull. Am. Geog. Soc., vol. 37, pp. 129–143.

Notes the sinking of artesian wells in the Algerian Sahara, and briefly discusses the underground-water conditions and the use of the water in irrigation (p. 137).

530 **Pendell** (George). Pumping plants and irrigation at El Paso, Tex.

Irrigation Aid, vol. 1, no. 6, p. 8.

Mentions several wells from which water is used for irrigation.

531 **Perkins** (F. C.). Latest electrical equipment of the Karawanken tunnel [Austria-Hungary].

Min. and Sci. Press, vol. 91, p. 275.

Notes the encountering of a considerable amount of water in the excavation of the tunnel.

532 **Perkins** (George H.). Vermont.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 60–67, 1 fig.

Discusses public supplies from springs and gives table (pp. 60–62); discusses common and mineral springs and gives analyses and list of commercial springs (pp. 62–64). Describes distribution of ordinary, deep, and artesian wells and gives map (pp. 64–65). Emphasizes the abundance of water (pp. 66–67). Gives list of publications (p. 67).

533 **Perkins** (W. R.), **Logan** (W. N.), and. The underground waters of Mississippi.

Bull. Mississippi Agr. Exp. Sta. no. 89, 112 pp., 23 figs.

See Logan (W. N.) and Perkins (W. R.).

534 **Philips** (William Battle). The quicksilver deposits of Brewster County, Tex.

Econ. Geol., vol. 1 pp. 155–162.

Describes caverns in the Upper Cretaceous and their contained cinnabar deposits (p. 158).

535 **Pittman** (E. F.) and **David** (T. W. E.). Irrigation geologically considered with special reference to the artesian area of New South Wales.

Jour. and Proc. Roy. Soc., N. S. Wales, eng. sect., vol. 37, pp. ciii–cliii, 2 pls. Abstract: Exp. Sta. Record, vol. 17, no. 2, p. 193.

Summarizes present state of knowledge and gives list of papers bearing on the subject.

536 **Porter** (Rufus K.). Timber tunneling in quicksand.

Jour. Assoc. Eng. Soc., vol. 35, pp. 61–76, 11 figs.

Describes the methods used in driving a timber tunnel in quicksand at Newton, Mass., 10 feet below the ground-water level. Contains descriptions of the water encountered and how it was disposed of.

537 —— Driving a tunnel in quicksand.

Mines and Minerals, vol. 26, pp. 219–221, 10 figs.

Describes the method used in driving a tunnel in quicksand at Newton, Mass., where the level of ground water was 10 feet above grade.

538 **Potter** (Alexander). Breakage in sewer conduits; its cause, effect, and prevention.

Jour. Assoc. Eng. Soc., vol. 35, pp. 190–213.

Discusses the admission of ground water into sewers through defective pipes. Notes that in one case such inflow caused a lowering of the ground-water table.

539 **Pratt** (Joseph Hyde) and **Lewis** (Joseph Volney). Corundum and the peridotites of western North Carolina.

North Carolina Geol. Survey, vol. 1, 464 pp., 45 pls., 35 figs.

Mentions relation of peridotite weathering to percolation of water (p. 65); describes leaching effect of infiltrating waters (p. 113), relations of serpentinization to zone of hydration (pp. 118–121), of chloritization to infiltrating solutions (p. 123); mentions hypothesis for formation and alteration of corundum through agency of percolating and permeating waters (pp. 270, 340, 341, 347).

540 **Pressey** (Henry A.). Water powers of the southern Appalachian region.

Forestry and Irrigation, vol. 11, pp. 498–512, 5 figs.

Mentions the existence of many springs on the mountains and discusses the relation of forests to springs and stream flow.

541 **Pumpelly** (Raphael W.). "Physiographic observations between the Syr Darya and Lake Kara Kul, on the Pamir, in 1903."

Explorations in Turkestan with an account of the basin of eastern Persia and Sistan—Carnegie Institution of Washington, 1905, pp. 123–155, 38 figs, 2 maps.

Notes absorption of water of mountain streams in the sands of the Kara Kul desert (p. 132).

542 **Purdue** (A. H.). Northern Arkansas.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 188–197, 1 pl., 2 figs.

Describes the underground-water conditions in the Boone chert area, in the Boston Mountains area, in the Paleozoic area, and in the Tertiary region, discussing conditions for wells. Enumerates the mineral springs and the principal publications bearing on underground waters in that part of the State.

543 **Purdue** (A. H.). Water resources of the Winslow quadrangle, Arkansas.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 84–87.

Describes the underground-water conditions and discusses the quantity and quality of the supplies of wells and springs in the Boone and Pitkin limestones, Hall sandstone, and Winslow sandstones and shales. One sulphur spring is described.

544 —— Water resources of the contact region between the Paleozoic and Mississippi embayment deposits in northern Arkansas.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 88–119.

Discusses the topography and geology of the region, and considers the underground-water supplies from the Ordovician beds, Boone formation, Batesville sandstone, Pitkin limestone, and Morrow formation of the high lands, and of the Tertiary and later horizons of the lowlands. The derivation of water from rainfall, the conditions of absorption from rivers, and the source from underlying Paleozoic rocks are considered. The water horizons are not continuous and flows are not to be expected. The composition of the water, methods of sinking wells, capacity, and sanitary location of wells are also discussed.

545 **Pynchon** (W. H. C.). Drilled wells of the Triassic area of the Connecticut Valley.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 65–94, 2 figs.

Describes a considerable number of wells, and the relation of the occurrence of water to the geology. Emphasizes the uniform water-bearing character of the sandstones, the high percentage of mineral matter, and the general absence of flowing wells. Gives analysis and many brief records.

R.

546 **Rafter** (George W.). Hydrology of the State of New York.

Bull. New York State Mus. no. 85, 902 pp., 45 pls., 74 figs., 5 maps.

Discusses relation of rainfall to run-off, including effect on level and fluctuation of water table (pp. 114–203), and relation of geologic structure to run-off (pp. 162–172). Mentions use of wells in New York City (pp. 676–679). Describes relations of open and driven wells on Long Island for the Borough of Brooklyn (pp. 681–693), and discusses the unfavorable conditions for such supplies elsewhere in the State (pp. 713–717). Describes supplies obtained from wells and springs in western New York (pp. 844–863).

547 **Ransome** (Frederick Leslie). The present standing of applied geology.

Econ. Geol., vol. 1, pp. 1–10.

Considers briefly the relative importance of meteoric and magmatic waters, and quotes Becker on artesian origin of the hot waters of the Comstock lode (p. 8).

548 —— **Lindgren** (Waldemar) and. The geologic resurvey of the Cripple Creek district, Colorado.

Bull. U. S. Geol. Survey no. 260, pp. 85–98.

See Lindgren (Waldemar) and Ransome (Frederick Leslie).

549 **Read** (Thomas Thornton). The phase rule and conceptions of igneous magmas. Their bearing on ore deposition.

Econ. Geol., vol. 1, pp. 101–118

Considers the relative importance of meteoric and magmatic waters (pp. 101–102) and the origin of the latter (pp. 101, 117).

550 —— Platinum and palladium in certain copper ores.

Eng. and Min. Jour., vol 79, pp. 985–986, 3 figs.

Contains a discussion of the agency of mineralized underground waters in the formation of chalcopyrite, covellite, and chalcocite.

551 **Reagan** (Albert B.). Some geological observations on the central part of the Rosebud Indian Reservation, South Dakota.

Am. Geologist, vol. 36, pp. 229–243.

Notes the occurrence of sinks and springs, and considers the composition of spring and well waters. A map of some of the sinks is given. The waters are from Cretaceous and Tertiary deposits (pp. 240–241).

552 **Reid** (John A.). Some underground waters and their work.

California Jour. Technology, vol. 5, pp. 117–121, 7 figs.

Discusses the agency of the thermal waters of the Comstock Lode, Nevada, in the decomposition of the country rock and the deposition of the ores. Several analyses of mine waters are given.

553 —— Structure and genesis of the Comstock Lode.

Min. and Sci. Press, vol. 91, p. 244.

An extended discussion of the agency of mineral solutions in the formation of the ore deposits of the Comstock Lode.

554 —— Some underground waters and their work.

Min. Reporter, vol. 51, pp. 642–644, 7 figs.

Gives analysis of several Nevada mine waters and discusses the alteration of rocks by heated mineral waters.

555 —— The structure and genesis of the Comstock Lode. [Nevada.]

Bull. Dept. Geol., Univ. Cal., vol. 4, no. 10, pp. 177–199.

Discusses the agency of underground waters in ore deposition; gives analyses and assays of the deep and vadose waters of the mines.

556 **Rice** (Thomas D.) and **Geib** (W. J.). Soil survey of the Gainesville area, Florida.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 269–289, 1 map, 1 fig.

Describes sink holes and limestone caverns (p. 274).

557 —— and **Geib** (W. J.). Soil survey of Warren County, Kentucky.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 527–541, 1 map, 1 fig.

Describes the occurrence of sink holes and their connection with limestone caverns (p. 530).

558 —— and **Griswold** (Lewis). Soil survey of Acadia Parish, Louisiana.

Field Operations of the Bureau of Soils, 1903, U. S. Dept. Agr., pp. 461–485, 1 fig., 1 map.

Describes irrigation from wells sunk to the Lafayette formation, and states that a few of the wells are flowing. Describes the geological occurrence of the water and the change from fresh water to salt water by continued pumping in time of drought (pp. 477–478).

558a **Richards** (Ellen H.) and **Woodman** (Alpheus G.). Air, water, and food from a sanitary standpoint.

New York and London, 1904, 262 pp., 13 figs., 1 map.

Gives analytical procedure for the sanitary examination of waters, and discusses particularly the interpretation of the analytical data obtained by the examination of well water.

559 **Richardson** (George B.). Salt, gypsum, and petroleum in trans-Pecos, Texas.

Bull. U. S. Geol. Survey no. 260, pp. 573–585.

Notes the relation of the ground-water level to salt deposits (p. 580), considers the occurrence of artesian water and wells (p. 581), gives well record (p. 583), and describes caves and channels in gypsum (p. 585).

560 **Richardson** (George B.). Native sulphur in El Paso County, Texas.

Bull. U. S. Geol. Survey no. 260, pp. 589–592.

Describes the shallow mineralized waters (p. 590) and notes the deposition of gypsum by the evaporation of the ground waters (p. 590). Caves in gypsum are also mentioned (p. 591).

561 **Riemer** (W. H. V.). An experiment and an experience in sewage disposal.

Municipal Engineering, vol. 29, pp. 252–253.

Discusses the difficulties encountered in the management of the sewage plant due to the reduced amount of ground water entering the sewers.

562 **Rix** (Edward A.). Compressed air on the Pacific coast.

Mines and Minerals, vol. 25, pp. 465–472, 15 figs.

Notes the encountering of a large flow of water in the Brunswick mine, Grass Valley, California (p. 468); describes the use of compressed air in increasing the flow of an artesian well at Tulare (pp. 469–470); describes the pumping plant of the Los Angeles well system (p. 470).

563 **Roadhouse** (J. E.). Irrigation conditions in Imperial Valley, California.

Bull. Office of Exp. Sta., U. S. Dept. Agr., no. 158, pp. 175–194, 1 pl.

Describes seepage and its relation to loss of water from canals (pp. 186–189).

564 **Roberts** (L. H.). Watering the desert: A short history of the 300-mile pipe system supplying water to the Coolgardie gold fields and district in Australia.

Technical World Magazine, vol. 3, pp. 85–86, 3 figs.

Notes the encountering of salt water in mines.

565 **Root** (Aldert S.), **Mackie** (W. W.), **Lapham** (Macy H.), and. Soil survey of the Sacramento area, California.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 1049–1087, 1 map, 1 fig.

See Lapham (Macy H.), Root (Aldert S.), and Mackie (W. W.).

566 **Ross** (Berta). Hahatonka [Missouri].

Bull. Bradley Geol. Field Sta. of Drury Coll., vol. 1, pt. 2, pp. 68–71.

Describes Hahatonka and other springs, sinks, caves, underground channels, and natural bridge, together with cave deposits. The proposal to utilize the spring for power is noted, the result of damming on the underground drainage, and the possible opening of new outlets considered.

567 **Ross** (D. W.), **Whistler** (J. T.), and **Noble** (T. A.). Report of progress of Stream measurements for the calendar year 1904: Part XII, Columbia River and Puget Sound drainage.

Water-Sup. and Irr. Paper no. 135, U. S. Geol. Survey, 300 pp.

Gives discharge of the following Idaho springs (pp. 271–273) and considers the use of several for irrigation: Bear, Big, Blue, Caldwell, East Bald Cabin, West Bald Cabin, Garner, Golf, Green, Grizzly, Hawley, Rock, Sherwood, Thompson, Thurman, and Whitman.

568 **Rowe** (Jesse Perry). Montana gypsum deposits.

Am. Geologist, vol. 35, pp. 104–113.

Notes the presence of calcium sulphate and the deposition of gypsum by springs in Montana.

569 **Russell** (Israel C.). Preliminary report on the geology and water resources of central Oregon.

Bull. U. S. Geol. Survey no. 252, 138 pp., 24 pls., 4 figs.

Mentions large springs in river beds (pp. 18–19); describes indurating effect of silica waters (p. 32); describes conditions relative to artesian areas and wells (pp. 56–122); describes thermal and normal springs (pp. 41, 55–96), drilled wells (p. 41), deep driven wells (p. 84), horizontal wells (pp. 66, 79), and gives well records (pp. 42, 84).

570 **Russell** (Israel C.). A geological reconnaissance along the north shore of Lakes Huron and Michigan.

Ann. Rept. Michigan Geol. Survey, 1904, pp. 33–114, 11 pls., 1 fig., 3 maps.

Describes knob and kettle topography due to solution of gypsum beds (p. 44) and formation of breccia by settling of overlying beds (p. 45).

571 —— The influence of caverns on topography.

Science, new ser., vol. 21, pp. 30–32.

Describes hills left in relief owing to subterranean drainage, and gives examples at Luray, Va., at Mackinac Island, Michigan, and at Gibraltar.

572 **Rutherford** (Rutledge). Rice Cultivation in America.

Technical World Magazine, vol. 4, pp. 234–240, 7 figs.

Describes the use of artesian-well water in the irrigation of rice fields of southern United States.

S.

573 **San Antonio Gazette.** Irrigation in artesian belt.

Irrigation Aid, vol. 3, no. 1, pp. 9–12.

Gives a description of the wells, springs, and underground-water conditions in southwestern Texas.

574 **Sanchez** (Alfred M.). Soil survey of the Provo area, Utah.

Field Operations of the Bureau of Soils, 1903, U. S. Dept. Agr., pp. 1121–1150, 1 fig., 3 maps.

Gives a map (Map 65) showing the depth to the water table and discusses depths and relation to alkali and seepage (pp. 1138–1141). Mentions irrigation by flowing wells (p. 1134).

575 **Savage** (T. E.). Geology of Benton County [Iowa].

Ann. Rept. Iowa Geol. Survey, 1904, vol. 15, pp. 127–225, 14 figs., 1 map.

Mentions shallow wells, springs, flowing artesian wells, and well water for town and farm use (p. 224).

576 **Schardt** (H.) [in Engineering Magazine]. The geology of the Simplon tunnel [between Switzerland and Italy].

Min. Reporter, vol. 52, p. 314.

Contains a description of the springs encountered in the construction of the tunnel.

577 **Scherer** (George H.). Geology of the Hahatonka district, Camden County. [Missouri].

Bull. Bradley Geol. Field Sta. of Drury Coll., vol. 1, pt. 2, pp. 58–67.

Considers part of hot ground waters accompanying pegmatite intrusion in formation of chert (p. 60), describes springs and wells of the Decaturville "dome" (pp. 62–63), discusses availability of springs for water power (p. 63), and gives well records and analyses (pp. 63–67).

578 **Schlundt** (Herman) and **Moore** (Richard B.). Radio-activity of some deep-well and mineral waters.

Jour. Physical Chemistry, vol. 9, pp. 320–332.

Describes methods and gives results of experiments on the radio-active properties of deep-well and spring waters in the limestone near Columbia, Mo. The location, depth, and method of pumping the wells are given.

579 **Schoch** (Edward R.). The genesis of the Tarkwa Banket. [Gold Coast, Africa.]

Eng. and Min. Jour., vol. 79, pp. 1235–1236.

Discusses the agency of mineral-bearing solutions in the formation of these deposits.

580 **Schrader** (F. C.) and **Haworth** (Erasmus). Oil and gas of the Independence quadrangle, Kansas.

Bull. U. S. Geol. Survey no. 260, pp. 446–458.

Gives summary of drilling in 1904.

581 **Schultz** (Alfred R.). Wisconsin district.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 233–241, 2 figs.

Describes the underground-water resources of the State and the occurrence of water in the Potsdam sandstone, Lower Magnesian limestone, St. Peter sandstone, Galena-Trenton limestone, Niagara limestone, and drift deposits. Describes the occurrence of springs and mineral waters and lists the important mineral springs. Notes several publications on underground waters.

582 **Schwarz** (T. E.). Features of the occurrence of ore at Red Mountain, Ouray County, Colorado.

Bimonthly Bull. Am. Inst. Min. Eng. no. 2, pp. 267–274, 3 figs.

Ascribes the origin of the Yankee Girl ore body to secondary enrichment by descending acid solutions, and quotes W. H. Weed as explaining the occurrence of enargite in the Butte mines as a secondary product deposited by ascending alkaline solutions.

583 **Science.** [Review of notes on the spring waters of Massachusetts, published in " Contributions to the Hydrology of eastern United States, 1903 "].

Science, new ser., vol. 21, pp. 279–280.

Notes economic value and distribution of springs and cooperation of drillers.

584 —— [Notes on the work of the division of hydrology of the U. S. Geological Survey].

Science, new ser., vol. 21, pp. 319–320.

Compares this division with similar divisions in other countries, and notes the establishment of such bureaus in Brazil and Peru.

585 —— [Investigation of "blowing " or " breathing " wells].

Science, new ser., vol. 22, pp. 415–416.

Refers to breathing wells in Nebraska and Louisiana, and attributes their peculiarity changes in atmospheric pressure or temperature.

586 —— [Ground water in crystalline rocks in Connecticut].

Science, new ser., vol. 22, p. 476.

States that the water is frequently under artesian pressure, and bears a definite relation to the drift.

587 **Scientific American.** The dangers and difficulties of tunnel boring.

Compressed Air, vol. 10, pp. 3633–3634.

Mentions the encountering of hot springs in the Simplon tunnel between Switzerland and Italy.

588 —— An explanation of ice caves.

Sci. Am. vol. 92, p. 479.

Describes results recently obtained from experiments by Schwalbe.

589 **Scientific American Supplement.** Composition of gases from mineral springs, helium, etc., and radio-activity.

Sci. Am. Supp., vol. 59, pp. 24294–24295.

Describes the results obtained from a study of the radio-active gases of several European springs.

590 —— [Removal of iron from subterranean water.]

Sci. Am. Supp., vol. 60, p. 24875.

Describes the removal of iron from the subterranean water supply of Berlin, Germany. The water is taken from 25 wells on the shore of Lake Tegel.

591 **Shamel** (Charles H.). The American law relating to minerals.

School of Mines Quarterly, Columbia Univ., vol. 27, pp. 1–27.

Discusses the law relating to underground waters. Many citations are given (pp. 17–19, 22).

592 **Shepard** (Edward M.). Spring system of the Decaturville Dome, Camden County, Mo.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 113–125, 4 figs.

Describes a line of springs surrounding the Dome and the radiation of their channels from the center of the Dome. Describes many springs, sink holes, and artesian wells. Gives water analysis.

593 —— Missouri.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 209–219, 3 figs.

Describes the underground-water resources of the Northwestern Plateau district, North-central Plain district, the Ozark-St. Francis Dome, and the Southeastern lowlands, describing in detail numerous springs, wells, and water-bearing formations. Lists the important mineral springs and publications relating to underground waters of the State.

594 ——The New Madrid earthquake.

Jour. Geol., vol. 13, pp. 45–62.

This paper is a discussion of the New Madrid earthquake and the relation of some of its phenomena to artesian conditions. Among the subjects considered are the extrusion of water or mud by the quake (pp. 46, 47, 57, 58), artesian wells at Memphis Tenn., Jackson, Miss., and at points in Kentucky, Missouri, and Arkansas (p. 53), springs and discharged sands (pp. 54, 56), relation of earthquake to artesian conditions (pp. 59, 61, 62), and the effect of recent earthquakes on wells (p. 59) and springs (p. 60).

595 **Sherman** (Charles W.). Waterworks statistics for the year 1904, in form adopted by the New England Waterworks Association.

Jour. New England Waterworks Assoc., vol. 19, pp. 241–263.

Gives references to previous compilations of statistics (pp. 241–243). Many towns are listed which derive their supply from wells and springs.

596 **Shnable** (E. R.). A criticism of timber specifications and a suggested method of recording earth borings.

Eng. News, vol. 53, p. 20.

Presents two forms of recording borings and suggests the keeping of time consumed in passing through each strata.

597 **Siebenthal** (C. E.). Structural features of the Joplin district [Missouri].

Econ. Geol., vol. 1 pp. 119–128.

Discusses the formation of caverns by solution and the development of underground-drainage systems, and suggests the settling of the roofs of the caverns as the cause of some of the faulting (pp. 127–128).

598 **Skinner** (S. A.). Some observations on the use of alkaline waters for laundry purposes.

Jour. Am. Chem. Soc., vol. 27, pp. 165–167.

Describes the use of a strongly alkaline artesian water in a steam laundry and the difficulties encountered. An analysis of the water is given. A large amount of free ammonia is noted, and it is stated that "Wanklyn and Chapman, in their treatise on water analysis, are authority for the statement that such a condition is sometimes met with in deep waters that are organically pure."

599 **Slichter** (Charles S.). Description of underflow meter used in measuring the velocity and direction of movement of underground water.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 17–31, 4 pls., 8 figs.

Describes a method of measurement by means of test wells and an electrical device by which the velocity of a certain salt in the water is measured.

600 —— The California or "Stovepipe" method of well construction.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 32–36, 3 figs.

Mentions a system of perforating the casings at horizons where water is known to occur.

601 —— Approximate methods of measuring the yield of flowing wells.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 37–42, 2 figs.

Describes and gives tables for a method of calculation by measuring the height or lateral projection of a jet of water.

602 —— Field measurements of the rate of movement of underground waters.

Water-Sup. and Irr. Paper no. 140, U. S. Geol. Survey, 122 pp.

Discusses the capacity of sand to transmit water and describes laboratory experiments on the flow in sands and gravels. The use of the underflow meter is considered in detail and the results of measurements of underflows in California and New York given. Attention is paid to the specific capacity of wells as shown by tests, to the tests of typical pumping plants in Texas and New Mexico, and to the California or "stovepipe" method of well construction.

603 —— Observations on the ground waters of Rio Grande Valley.

Water-Sup. and Irr. Paper no. 141, U. S. Geol. Survey, 83 pp.

Describes the underflow conditions near El Paso, Tex., illustrates various methods of drilling, considers the methods, results, and cost of pumping and the resultant lowering of the water table, and gives a number of analyses of the ground waters.

604 —— The underflow of the Arkansas River.

Abstract: Science, new ser., vol. 21, p. 957.

Discusses variation in rate of underflow, and connection of the movement with the river.

605 **Smith** (Erastus G.). The Mississippi River as the source of water supply for the inhabitants of the Mississippi Valley.

Jour. New England Waterworks Assoc., vol. 19, pp. 215–231.

Notes the calcareous nature of the glacial drift in the Mississippi Valley and the resulting hard river and surface well waters in this section (pp. 217–218).

606 **Smith** (Eugene Allen). Alabama.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 164–170, 1 pl.

Describes the occurrence of underground water in the Cambrian and Carboniferous rocks, and artesian conditions in the various Cretaceous and Tertiary formations, illustrating artesian areas by a map. Notes the occurrence of brine wells. Gives list of mineral springs and of publications on underground waters of the State.

607 —— and **McCalley** (Henry). Index to the mineral resources of Alabama.

Alabama Geol. Survey, 1904, 79 pp., map and 6 pls.

Refers to relation of water level to character of gold ores (p. 54); mentions occurrence of salt water under artesian pressure in gas wells and "seeps," and use of the salt (pp. 71–72), and enumerates commercial mineral springs and artesian wells, stating the class of water (pp. 72–73).

608 **Smith** (George Otis). Water resources of the Portsmouth-York region, New Hampshire and Maine.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 120–128.

Describes the occurrence of water in the drift of the valleys and in the joints of schists, slates, quartzites, etc. The wells are generally successful and some flow. The confinement is ascribed to the constriction of the joints and a partial cementation near the surface. Dikes are to be avoided in sinking wells.

609 —— Water supply from glacial gravels near Augusta, Me.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 156–160.

Gives the results of an investigation of certain ponds and springs which it was proposed to utilize for water supply. It was found that the ponds occupied a sort of gravel basin draining underground through the springs and no additional supply would be obtained by using both over that obtained from the springs alone.

610 —— Artesian development in Washington, Atanum-Moxee Valley.

Irrigation, vol. 3, no. 5, pp. 6–7, 1 fig.

Discusses the artesian conditions existing in the Atanum-Moxee Valley.

611 —— Artesian water in crystalline rocks.

Abstract: Science, new ser., vol. 21, pp. 224–225.

Discusses the confinement of water due to cementation of the rock fissures near the surface, and consequent flowing and nonflowing artesian wells near York, Me.

612 **Smith** (Herbert E.). Report on investigation of river pollution and water supplies.

Twenty-seventh Ann. Rept. State Board of Health of Connecticut, 1904, pp. 217–231.

Summarizes work of analyzing well and spring water, and gives many sanitary analyses.

613 **Smith** (William G.) and **Meeker** (F. N.). Soil survey of Sumter County, Alabama.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 317–342, 1 map, 1 fig.

Summarizes distribution of artesian wells in the county (p. 321).

614 **Smith** (William Sidney Tangier). Lead, zinc, and fluorspar deposits of western Kentucky: Part II, Ore deposits and mines.

Prof. Paper U. S. Geol. Survey no. 36, pp. 107–218, 8 pls., 31 figs.

Advocates origin of the deposits through agency of ore-bearing solutions ascending along fault planes (pp. 150–154). Mentions sink holes and ore deposition along faults (pp. 172, 178) and unequal penetration of limestone by ore-bearing solutions (p. 178).

615 —— Water resources of the Joplin district, Missouri-Kansas.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 74–83.

In addition to the discussion of general underground-water conditions, the paper describes the numerous large springs, some of which occur on fault lines, and the deep borings for ore or water, one of which is 2,005 feet deep. Analyses of spring and well waters are given. The waters are often contaminated by mine waters.

616 **Smyth** (C. H., jr.). Replacement of quartz by pyrite and corrosion of quartz pebbles.

Am. Jour. Sci., 4th ser., vol. 19, pp. 277–285, 1 fig., 1 plate.

Discusses the agency of hot alkaline mineralized solutions in the replacement by pyrite of the quartz pebbles of the Oneida conglomerate in central New York.

617 **Smyth** (H. L.). The origin and classification of placers
Eng. and Min. Jour., vol. 79, pp. 1045–1046.
Discusses the agency of underground waters in the decay of rocks and the alteration of ore deposits.

618 **Snow** (T. W.). Water softening for boiler use.
Jour. West. Soc. Eng., vol. 10, pp. 745–759, 9 figs.
Gives two analyses of well water at Bismarck, Mo. (pp. 748–749).

619 **Spencer** (Arthur Coe). The magmatic origin of vein-forming waters in southeastern Alaska.
Bimonthly Bull. Am. Inst. Eng. no. 5, pp. 971–978.
Discusses magmatic waters in general; includes many references to similar papers; ascribes the veins of southeastern Alaska to the agency of magmatic waters, and quotes Lindgren on a similar origin of the California gold-quartz veins.

620 —— The Treadwell ore deposits, Douglas Island.
Bull. U. S. Geol. Survey no. 259, pp. 69–87.
Mentions the part taken by water in vein alteration (p. 84) and considers the source of the waters (p. 86).

621 **Spoon** (W. L.). Building sand-clay roads in Southern States.
Yearbook U. S. Dept. Agr., 1903, 259–266, 2 pls., 3 figs.
Discusses conditions of saturation and drainage of roads due to different proportions of clay and sand (pp. 260–261).

622 **Spurr** (Josiah Edward). Genetic relations of the western Nevada ores.
Bimonthly Bull. Am. Inst. Min. Eng. no. 5, pp. 939–969.
Discusses the agency of mineralized underground waters in the formation of the ore deposits.

623 —— Enrichment in fissure veins.
Eng. and Min. Jour., vol. 80, pp. 597–598.
Discusses the agency of ascending and descending solutions in the enrichment.

624 —— Tonopah mining district [Nevada].
Jour. Franklin Institute, vol. 160, no. 1, pp. 1–20, 10 figs., 1 map.
Discusses the agency of circulating mineralized underground waters in the formation of the veins and ore deposits; describes the channels followed by the mineralized solutions and the alteration and silicification of the country rock; notes the irregularity of surface oxidation due to the fact of there being no regular ground water.

625 —— The ores of Goldfield, Nev.
Bull. U. S. Geol. Survey no. 260, pp. 132–139.
Notes deposition of ores by hot spring action (pp. 134–139).

626 —— Developments at Tonopah, Nev., during 1904.
Bull. U. S. Geol. Survey no. 260, pp. 140–149.
Describes the use of well and shaft for collecting water for town supply and considers the character of the water zone (p. 141). The part of water in vein formation and alteration is also noted (p. 146).

627 —— Geology of the Tonopah mining district, Nevada.
Prof. Paper U. S. Geol. Survey no. 42, 295 pp., 24 pls., 78 figs.
Discusses alteration of andesite by thermal waters (pp. 207–252) and formation of mineral veins along circulation channels (p. 83). Discusses the probable nature and composition of the mineralizing waters (pp. 85, 104, 227, 235–237, 250, 253–260) and changes in composition owing to mineral deposition (pp. 235–237). Describes water zones (p. 107) and irregular distribution of water encountered in mines (p. 105) in connection with porosity and absorption (p. 107). Discusses the origin of hot and cold springs (pp. 254–260), and describes solfataras and fumaroles (pp. 260–261). Describes investigations regarding increase of temperature with depth (pp. 263–266). Notes the formation of gypsum by oxidizing waters (p. 94).

628 **Spurr** (Josiah Edward) and **Garry** (G. H.). Preliminary report on ore deposits in the Georgetown, Colorado, mining district.

Bull. U. S. Geol. Survey no. 260, pp. 99–120.

Refers briefly to the part of water in ore deposition (pp. 113–115) and to the depth of oxidation.

629 **Stanton** (Timothy W.) and **Hatcher** (J. B.). Geology and paleontology of the Judith River beds.

Bull. U. S. Geol. Survey no. 257, pp. 1–66.

Quotes Grinnell and Dana on action of water in producing landslips in Montana (p. 34).

630 **Steiner** (Charles R.). Impregnation of sand and gravel deposits with cement.

Eng. News, vol. 53, p. 447.

Suggests the above as a means of raising the water table in inclosed valleys.

631 **Stevens** (H. L.). Municipal improvements in Sorsogon, P. I.

Eng. News, vol. 531, pp. 581.

Describes measures taken by the city to protect the spring furnishing its water supply.

632 **Stone** (Ralph W.). Mineral resources of the Elders Ridge quadrangle, Pennsylvania.

Bull. U. S. Geol. Survey no. 256, 86 pp., 12 pls., 4 figs.

Gives 22 well records (Pls. X, XI, p. 57); states abundance of springs and wells (p. 79), and mentions public supply taken from wells (p. 79).

633 —— Description of Waynesburg quadrangle [Pennsylvania].

Geologic Atlas U. S., folio 121, U. S. Geol. Survey, 12 pp.

Gives deep well records (pp. 5, 11), and discusses briefly the springs, wells, and water supplies of the quadrangle.

634 —— Description of Elders Ridge quadrangle [Pennsylvania].

Geologic Atlas U. S., folio 123, U. S. Geol. Survey, 10 pp.

Describes the occurrence of springs and of the underground waters of the Mahoning and Pittsburg sandstones, and considers the sources of public supplies.

635 —— Water resources of the Elders Ridge quadrangle, Pennsylvania.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 164–165.

Describes village supplies obtained by wells in sand and gravel; notes abundance of springs, and the water-bearing nature of the Mahoning and Pittsburg sandstones.

636 —— Water resources of the Waynesburg quadrangle, Pennsylvania.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 166–167.

Describes town and village supplies obtained from shallow wells in rock and gravel, and one deep well used by a cold-storage company; mentions the comparative abundance of springs, and notes the water-bearing nature of the Upper Washington limestone and the Waynesburg sandstone.

637 **Storms** (W. H.). A noted pyrite deposit. [Deadwood, S. Dak.]

Min. and Sci. Press, vol. 91, pp. 290–291.

The mine water is strongly acid and highly impregnated with copper salts.

638 **Stose** (George W.). Water resources of the Chambersburg and Mercersburg quadrangles, Pennsylvania.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 156–158.

Describes many springs from limestone and sandstone beds furnishing water supplies for public and private use and health resorts.

639 **Stose** (George W.) and **Martin** (George C.). Water resources of the Pawpaw and Hancock quadrangles, West Virginia, Maryland, and Pennsylvania.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 58–63.

Considers briefly the underground-water conditions in the area and gives detailed description of Berkeley Springs, including their history, geologic conditions, development, uses, composition, and temperature (p. 730). The water is considered as coming from a depth of 1,000 to 1,300 feet. An analysis of the water is given.

640 **Stout** (O. V. P.). Pumping plants in Colorado, Nebraska, and Kansas.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 158, pp. 595–608.

Describes many wells, methods, and cost of pumping, and use of water for irrigation.

641 —— Irrigation and alkali.

The official proceedings of the Twelfth National Irrigation Congress at El Paso, Tex., November 15–18, 1904, pp. 311–317.

Discusses rise of water table due to irrigation, and consequent injury to soils in alkali regions.

642 **Strahorn** (A. T.), **Jensen** (Charles A.) and. Soil survey of the Bear River area, Utah.

Field Operations of the Bureau of Soils, 1904, U. S. Dept. Agr., pp. 995–1023, 3 maps, 1 fig.

See Jensen (Charles A.) and Strahorn (A. T.).

643 **Stretch** (R. H.). Formation of iron pyrite in gravels.

Eng. and Min. Jour., vol. 79, pp. 238–239.

Ascribes the origin of the pyrite to deposition from circulating iron-bearing waters.

644 **Student.** Ore deposits.

Eng. and Min. Jour., vol. 79, p. 335.

Discusses the agency of underground water in the formation of ore deposits.

645 **Sweet** (A. T.), **Martin** (J. O.) and. Soil survey of the Kearney area, Nebraska.

Field Operations of the Bureau of Soils, 1904, U S. Dept. Agr., pp. 859–874, 1 pl., 1 map, 1 fig.

See Martin (J. O.) and Sweet (A. T.).

646 **Swendsen** (G. L.), **Hinderlider** (M. C.), and **Chandler** (A. E.). Report of progress of stream measurements for the calendar year 1904: Part X, Colorado River and the Great Basin Drainage.

Water Sup. and Irr. Paper no. 133, U. S. Geol. Survey, 384 pp.

See Hinderlider (M. C.), Swendsen (G. L.), and Chandler (A. E.).

T.

647 **Taff** (Joseph A.). Description of the Tahlequah quadrangle [Indian Territory and Arkansas].

Geologic Atlas U. S., folio 122, U. S. Geol. Survey, 7 pp.

Notes occurrence of water in underground channels, joints, faults, etc., of Boone and Morrow formations, and describes sulphur and saline springs and a red spring deposit (p. 7).

648 **Taft** (H. H.). Notes on southern Nevada and Inyo County, California.

Bimonthly Bull. Am. Inst. Min. Eng. no 6, pp. 1279–1298.

Describes springs in the Amargosa Desert (pp. 1284–1285); deposition of silica from springs and the silicification of the country rock in the Bullfrog mining district (pp. 1287–1288); the agency of underground waters in the deposition of the ores and the silicification of the country rock in the Goldfield district (pp. 1288–1289), and the agency of underground waters in the formation of hummocks in Death Valley (p. 1294).

649 **Taft** (H. H.). Notes on southern Nevada and Inyo County, California. II.

Min. and Sci. Press, vol. 91, p. 429.

Describes some thermal mineral springs in the Amargosa Desert and discusses the agency of water in the formation of the ore deposits of the Bullfrog and Goldfield mining districts.

650 —— Notes on southern Nevada and Inyo County, California. III.

Min. and Sci. Press, vol. 91, pp. 447–448.

Describes the agency of underground water in the so-called "self-rising ground" in Death Valley.

651 **Tait** (C. E.). Pumping plants in Texas.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 158, pp. 341–346, 1 fig.

Describes various wells used for irrigation, and methods and cost of pumping.

652 —— Rice irrigation on the prairie land of Arkansas.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 158, pp. 545–565, 5 figs.

Describes experiments on use of wells in rice irrigation, giving methods of sinking and pumping wells, cost, etc.

653 **Talbot** (A. N.). Corrections necessary in accurate determinations of flow from vertical well casings.

Abstract of notes: Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 43–44, 2 figs.

Describes certain corrections which must be applied to figures in the field tables of J. E. Todd and Charles S. Slichter when refined measurements of flows from vertical well casings are desired.

654 **Tamura** (S. Tetsu). An account of recent meteorological and geo-physical researches in Japan.

Monthly Weather Review, vol. 33, pp. 302–305.

Reviews papers by Dr. K. Honda (Proc. Tokyo Physico-Mathematical Society, vol. 2, no. 6, 1903, and no. 9, 1904, and Publications of the Earthquake Investigation Committee, no. 18, 1904), explaining daily periodic changes in the level of artesian wells in Japan, and concluding that the fluctuations are due largely to tides acting on a subterranean air reservoir (pp. 303–304).

655 **Tarbell** (Arthur). Story of the Simplon tunnel.

Technical World Magazine, vol. 3, pp. 206–211, 6 figs.

Describes the hot springs encountered in the construction of the tunnel between Switzerland and Italy.

656 **Tarr** (Ralph S.). Water resources of the Watkins Glen quadrangle, New York.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 134–140.

Discusses the question of obtaining water supplies from wells sunk in the deep gravel-filled valleys. Describes the conditions revealed by wells sunk for the new supply at Ithaca, and gives sanitary analyses (pp. 136–140).

657 **Taylor** (Frank B.). Water resources of the Taconic quadrangle, New York, Massachusetts, and Vermont.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 130–133.

Describes a mineral spring, giving chemical, sanitary, and gas analyses, and considers its probable deep-seated origin in connection with a prominent fault. Mentions the relations of the Dalton artesian wells to a fault crack (pp. 132–133).

658 **Taylor** (Thomas U.). Irrigation in Texas.

Irrigation Aid, vol. 2, no. 3, p. 8.

Describes the use of water from springs and artesian wells in irrigation.

659 **Taylor** (Thomas U.). Modern rice irrigation.

The official proceedings of the Twelfth National Irrigation Congress at El Paso, Tex., November 15–18, 1904, pp. 330–336.

Describes briefly a shallow-well plant used for irrigating in Texas (pp. 334–335).

660 —— and **Hoyt** (John C.). Report of progress of stream measurements for the calendar year 1904: Part IX, Western Gulf of Mexico and Rio Grande drainages.

Water-Sup. and Irr. Paper no. 132, U. S. Geol. Survey, 132 pp.

Describes or gives discharge of Barton, Kickapoo, Lipan, Mormon, and two Santa Rosa springs, Texas (pp. 43–45, 122, 127).

661 **Teele** (R. P.). Water rights on interstate streams: The Platte River and tributaries. Results of investigation.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 157, pp. 9–95, 4 pls., 3 figs.

Discusses return seepage to the river in Colorado and Nebraska after the application of its water to land for irrigation, and gives results of experiments to determine amounts (p. 47–58, 72).

662 —— Review of the irrigation work of the year.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 158, 1905, pp. 19–75, 1 fig.

Discusses loss of canal water through seepage (pp. 23, 35–38); return seepage to streams from irrigated lands in Colorado, Wyoming, and Nebraska (pp. 38–50); costs, depths, and methods of pumping artesian wells used for irrigation in Texas (pp. 55–56), Arkansas (p. 57), Kansas (p. 57), and Colorado (pp. 58–59). Describes use of windmills for pumping wells (pp. 61–63). Describes experiment on use of well for irrigation in Arkansas (p. 72).

663 **Tilton** (John L.). A problem in municipal waterworks for a small city.

Proc. Iowa Acad. Sci., 1904, vol. 12, pp. 143–150.

A general discussion of the underground-water conditions in the vicinity of Indianola, Iowa, including quantity available, quality, etc.

664 **Tower** (Walter S.). The geography of American cities.

Bull. Am. Geol. Soc., vol. 37, pp. 577–588.

Mentions several mineral springs about which resorts have grown up. Hot Springs, Arkansas; Hot Springs, Virginia; Cambridge Springs, Pennsylvania, and Poland Springs, Maine, are noted.

665 **Trask** (F. E.). The irrigation system of Ontario, Cal.—Its development and cost.

Proc. Am. Soc. Civil Eng., vol. 31, pp. 264–270, pls. 29–32.

Describes the tunnels, artesian wells, and saturated gravel beds which furnish the greater portion of the water supply.

666 —— Proposed utilization of upland flood waters to increase available underground waters.

Eng. News, vol. 53, p. 42.

Suggests that the flood discharges of the canyons of southern California be diverted from place to place over porous sands and gravels.

U.

667 **Udden** (Jon Andreas). Geology of Clinton County.

Ann. Rept. Iowa Geol. Survey, 1904, vol. 15, pp. 371–431, 2 pls., 1 fig.

Gives numerous well records (pp. 382–415); mentions use of well water for Clinton, Iowa (pp. 381–385, 429), and enumerates the Niagara limestone and St. Peters sandstone as water-bearing horizons (p. 429).

668 **Ulrich** (Edward Oscar). Lead, zinc, and fluorspar deposits of western Kentucky: Part I—Geology and general relations.

Prof. Paper U. S. Geol. Survey no. 36, pp. 1–105, 7 pls.

Mentions solution of limestone by underground water (p. 19), and passage of descending water and formation of sink holes along joint planes (p. 74).

669 **U. S. Bureau of the Census.** Census of the Philippine Islands, taken under the direction of the Philippine Commission in the year 1903, 4 vols., v. 1., geography, history, and population.

619 pp., 74 pls., 7 maps, 13 figs.

Describes geologic relations, composition, and uses of mineral springs, and their distribution in lines parallel with axes of folding (pp. 192–194). Describes numerous hot springs (pp. 216–244) and solfataras (pp. 202–246).

V.

670 **Veatch** (Arthur C.). General plan and details of work [of collecting well samples].

Bull. U. S. Geol. Survey no. 264, pp. 28–39.

Describes the blanks and forms used in collecting well samples and the method of shipping them by mail in franked bags.

671 —— Louisiana and southern Arkansas.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 179–187, 3 figs.

Describes water-bearing strata in the various Tertiary, Cretaceous, and Quaternary formations. Mentions several mineral springs in Louisiana, and lists the principal publications on underground waters of the area.

672 —— The underground waters of northern Louisiana and southern Arkansas.

Bull. Louisiana Geol. Survey no. 1, pp. 82–91.

Describes the principal water-bearing horizons and geologic occurrence of artesian water in this region.

673 —— The question of origin of the natural mounds of Louisiana, Arkansas, and Texas.

Abstract: Science, new ser., vol. 21, pp. 310–311.

Discusses the spring and gas vent theory of origin.

674 **Vermeule** (C. C.). East Orange wells at White Oak Ridge, Millburn township, Essex County.

Ann. Rept. New Jersey Geol. Survey, 1904, pp. 255–263, 2 figs.

Gives distribution, yield, analysis, records, and geological section of city wells.

675 **Vernon** (J. J.). Irrigation investigations at New Mexico Experiment Station, Mesilla Park, 1904.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 158, pp. 303–317.

Discusses cost of irrigation with well water (pp. 311–316), and describes experiments to compare cost of irrigation by well and by river waters (pp. 308–311). Gives table of temperatures of well waters (pp. 316–317).

676 —— Development of the underflow.

Irrigation Age, vol. 20, p. 86.

Describes the results obtained by a 48-foot well put down at the Mesilla Park Agricultural Experiment Station, New Mexico.

677 —— Pumping for irrigation in New Mexico.

The official proceedings of the Twelfth National Irrigation Congress, at El Paso, Tex., November 15–18, 1904, pp. 351–355.

Mentions irrigation from pumping shallow wells in British India and deep wells in California, and states possibilities elsewhere (p. 351).

678 **Voorhees** (Edward B.). Irrigation in market-garden districts in the vicinity of eastern cities.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 148, 17 pp., 3 pls.

Describes irrigation by pumping springs on Long Island, New York (p. 10), at Belmont, Mass. (p. 13), from wells at Arlington, Mass. (p. 12), driven wells at Watertown, Mass. (p. 13), and from driven wells at Vineyard, N. J. (pp. 14, 16).

W.

679 **Walcott** (Charles Doolittle). Twenty-fifth annual report of the Director of the United States Geological Survey [1903–1904].

Twenty-fifth Ann. Rept. U. S. Geol. Survey, 388 pp.

Gives the mineral-water production for 1903 as 51,186,746 gallons, valued at $8,073,096. Describes the organization and work of the eastern and western sections of the division of hydrology, and notes work of the division of hydro-economics on the composition of underground waters. A number of underground-water investigations are also mentioned in connection with the account of the work of the Reclamation Service. The general work of the division of hydrology included investigations of the underground waters in nearly every State in the Union, those in the eastern portion being under the direction of M. L. Fuller, and those in the western under N. H. Darton. About 75 geologists were engaged in underground-water investigations during the year, the work of each being outlined in the report. In addition to the general studies the following special investigations are mentioned: Hot springs in the Yellowstone National Park, by W. H. Weed; algous growth in hot springs, by W. A. Setchell; physics of geysers, by William Hallock; relations of underground waters to the law, by D. W. Johnson, and experimental investigation and measurement of underflow, by C. S. Slichter. Lists of underground-water publications are also included.

680 —— Twenty-sixth annual report of the Director of the United States Geological Survey [1904–1905].

Twenty-sixth Ann. Rept. U. S. Geol. Survey, 322 pp.

Gives the mineral-water production for 1904 as 67,718,500 gallons, valued at $10,398,450 (p. 95). Gives the allotments for hydrologic investigations (p. 23), notes cooperative arrangements with several States (pp. 179–180), joint works with geologic branch (p. 181), and investigations for Reclamation Service (p. 202); describes in detail the work of eastern and western sections of the division of hydrology (pp. 178–210), giving lists of underground-water publications. The general work of the division of hydrology included investigations in nearly every State in the Union, those in the eastern portion being in charge of M. L. Fuller and those in the western in charge of N. H. Darton. About 75 geologists were engaged in field or office work during the year, the work of each being described in the report. In addition to the general studies, the following special work is described: Studies of thermal springs of Georgia and Yellowstone National Park, by H. H. Weed; experiments on and measurement of underground currents, by C. S. Slichter; fluctuations of wells, by A. C. Veatch; relation of underground waters to the law, by D. W. Johnson; bibliography of underground waters, collection of well records and samples, and work of division of hydro-economics on the composition of underground waters. In connection with the work of the Reclamation Service, underflow investigations in Kansas (p. 266), ground waters in Carson Valley, Nevada (p. 270), and salt spring in Oklahoma (p. 286), are described.

681 **Waller** (O. L.). Equities of the senior irrigator.

Irrigation Age, vol. 20, pp. 331–334.

Describes the excessive losses from irrigation ditches by seepage through coarse gravel subsoils in the Yakima Valley, Washington.

682 **Waring** (G. A.). The pegmatite veins of Pala, San Diego County [Calif.].

Am. Geologist, vol. 35, pp. 356–376.

Mentions mineral springs and gives composition (p. 365), and notes the alteration of pegmatite by ground waters (p. 369).

683 **Water and Forest.** Vested rights in water protected.

Water and Forest, vol. 5, no. 1, p. 6.

Discussion of the case of Newport et al. *v.* The Temescal Water Company, tried in a superior court of California. The plaintiff's contention was that the company had no right to use the underground water of the Perris Valley, because it worked to their (the plaintiff's) detriment. The evidence is reviewed. Judgment was given for the defendant company.

684 **Watson** (Thomas L.). A preliminary report on the bauxite deposits of Georgia.

Bull. Georgia Geol. Survey no. 11, 169 pp., 12 pls., 3 figs. and map.

Discusses agency of heated waters in formation of bauxite (pp. 15, 20–22, 123–125), theory of Hayes in regard to origin due to action of waters (pp. 20–22, 123–125, 129). Mentions percentage of water in composition of various minerals (pp. 37–54, 84–85), and gives probable chemical reactions (pp. 123–125, 129). Mentions water in quarries and veins (pp. 62, 66, 83, 108).

685 **Weed** (Walter Harvey). Absorption in ore deposition.

Eng. and Min. Jour., vol. 79, p. 364.

Discusses the power possessed by clays, etc., of extracting metals from mineral-bearing solutions seeping in from fissures.

686 —— Notes on the gold veins near Great Falls, Maryland.

Bull. U. S. Geol. Survey no. 260, pp. 128–131.

Notes relations of water level to the mines.

687 —— Economic value of hot-spring deposits.

Bull. U. S. Geol. Survey no. 260, pp. 598–604.

Notes the use of springs in general for bathing, heating, as source of carbon dioxide, borax, and other chemicals, and for medicinal purposes. The use of artesian wells for heating in Idaho and Montana is also mentioned. Among the spring deposits noted are tufa geyserite, cinnabar (in Nevada and California), copper (Java), tin (Malay Peninsula), stibnite, etc. (Steamboat Springs, Nevada), manganese oxide, limonite, realgar, orpiment, etc. (Yellowstone National Park), and limonite and travertine (Montana) (pp. 600–601). Describes Anaconda Hot Springs, Montana (p. 600), the gypsum veins and waters at Hunters Hot Springs, Montana (p. 601), and the use of the water in baths. The fissure origin of the springs is shown, their yield stated, and analyses given (pp. 602–604).

688 —— Notes on certain hot springs of the southern United States.

Water-Sup. and Irr. Paper no. 145, U. S. Geol. Survey, pp. 185–206.

Discusses the occurrence and geologic relations of hot springs in the United States and describes in detail the Warm Springs from the quartzites at Pine Mountain, Georgia, and the Hot Springs of Arkansas. The discussion of the latter is unusually complete and includes a consideration of the geology, topography, history, composition, tufa deposits, discharge, source of heat, permanency, etc., of the springs. Analyses of the Georgia and Arkansas waters and of the tufa deposits of the latter locality are given.

689 **Weeks** (Fred Boughton), New York.

Water-Sup. and Irr. Paper no. 114, U. S. Geol. Survey, pp. 82–92, 1 pl.

Describes underground waters in pre-Cambrian rocks, in Cambrian limestones and slates, in Ordovician limestones and slates, in Silurian sandstones and shales, in Devonian limestones, shales, and sandstones, in Triassic sandstone, and in Cretaceous beds and drift. Tabulates the production, character, and use of the mineral springs of the State. Gives bibliography.

690 **Weidman** (S.). Iron ores of Wisconsin.

Eng. and Min. Jour., vol. 79, pp. 610–612, 2 figs.

This article is an abstract from a paper which appeared in the Wisconsin Engineer, vol. 9, by Dr. S. Weidman. Discusses the occurrence of ground water in the crystalline and sedimentary rocks of the Baraboo district.

691 **West** (H. E.). Mining in Nicaragua.

Min. Magazine, vol. 11, pp. 509–514, 2 figs.

Notes the occurrence of hot water in the mines at Santa Francisca and San Luis, and suggests that the deposits are of solfataric origin.

692 **Whipple** (George C.). The water supplies of the New York Metropolitan District with special reference to their purification.

Jour. New England Waterworks Assoc., vol. 19, pp. 451–473, 12 figs.

Considerable space is devoted to the description of the underground-water resources of this region and the methods of development. The quality of the ground water, its relation to certain filter plants, etc., is also given.

693 —— [Purification of well water.]

Jour. New England Waterworks Assoc., vol. 19, pp. 549–551.

Describes the use of copper sulphate in the purification of well water in New Hampshire.

694 —— and **Levy** (E. C.). The Kennebec Valley typhoid-fever epidemic of 1902–1903. [Maine.]

Jour. New England Waterworks Assoc., vol. 19, pp. 163–214, 7 figs.

Notes the use of a spring-water supply known as the Devine water in Augusta (p. 168), and the Hallowell spring water at Togus (p. 185); discusses the relations of springs and wells to the epidemic (pp. 173–175, 176, 181, 195, 201).

695 **Whistler** (J. T.), **Ross** (D. W.), and **Noble** (T. A.). Report of progress of stream measurements for the calendar year 1904: Part XII, Columbia River and Puget Sound drainage.

Water-Sup. and Irr. Paper no. 135, U. S. Geol. Survey, 300 pp.

See Ross (D. W.), Whistler (J. T.), and Noble (T. A.).

696 **Whitby** (J. E.). Shall we all die of thirst?

Sci. Am. Supp., vol. 60, no. 1542, p. 24707.

Makes a statement that water springs and water beds are slowly drying up.

697 **Whitney** (Francis L.). The new artesian water supply at Ithaca, N. Y.

Water-Sup. and Irr. Paper no. 110, U. S. Geol. Survey, pp. 55–64, 1 pl., 1 fig.

Describes deep wells sunk in gravels, sands, and clays in the valley of Cayuga Inlet above Ithaca, and discusses the source and geologic occurrence of the supply. Gives well records and analyses.

698 **Whitney** (Milton). Report of the Chief of the Bureau of Soils.

Ann. Rept. for the year ending June 30, 1904, U. S. Dept. Agr., pp. 241–269.

Mentions irrigation by pumping artesian wells in California (p. 245), injurious effect of subirrigation in Colorado (p. 246), and irrigation by artesian wells and springs in Texas (p. 255). Summarizes injury of alkali lands through rise of seepage water due to irrigation, and work of reclamation of alkali lands by underdrainage in Utah, California, Washington, Arizona, and Montana (pp. 257–261).

699 **Wickson** (E. J.). Irrigation in fruit growing.

Irrigation Aid, vol. 2, no. 3, pp. 12–13.

Devotes one column to a discussion of the development of the underflow of streams for use in irrigation.

700 **Wiel** (Samuel C.). Water rights in California.

Min. and Sci. Press, vol. 90, pp. 6–8, 25–26.

Contains many references to cases dealing with legal questions regarding underground waters.

701 **Wilder** (F. A.). The lignite of North Dakota and its relation to irrigation.

Water-Sup. and Irr. Paper no. 117, U. S. Geol. Survey, 59 pp.

Mentions several springs giving rise to creeks (p. 31).

702 **Wile** (William H., jr.). The Escalante Desert [Utah].

Irrigation Age, vol. 21, pp. 17–20.

Notes the existence of vast quantities of alkali water underlying this desert.

703 **Wiley** (A. J.). Masonry dam for the Granite Springs reservoir, Cheyenne, Wyo.

Eng. Rec., vol. 51, pp. 698–701, 7 figs.

Contains a description of a submerged dam 6 miles above the city intersecting the underflow of Crow Creek, and of a system of infiltration galleries beneath the bed of the creek above the dam. Notes seepage through the new masonry dam erected for the storage of flood flows.

704 **Wiley** (H. W.). Experiments in the culture of sugar cane and its manufacture into table sirup.

Bull. Bureau of Chem., U. S. Dept. Agr., no. 93, 78 pp., 5 pls., 6 figs.

States production and quality of water from well at Waycross, Ga. (p. 46).

705 **Willard** (Daniel E.), **Hall** (Charles M.) and. Description of Casselton and Fargo quadrangles [North Dakota and Minnesota].

Geologic Atlas U. S., folio 117, U. S. Geol. Survey, 7 pp.

See Hall (Charles M.) and Willard (Daniel E.).

706 **Williams** (Ira A.). Geology of Jasper County.

Ann. Rept. Iowa Geol. Survey, 1904, vol. 15, pp. 279–367, 12 figs., 2 maps.

Estimates proportion of rainfall absorbed by rock and soil (p. 295); gives well records (pp. 306–363); discusses distribution of springs and flowing wells (pp. 360–363); gives chemical and sanitary analyses of water from gravel (p. 362) and from St. Louis and Maquoketa beds (p. 361); describes various mineral waters, some carbonated; gives analysis of calcic-saline-chalybeate water (pp. 363–365); and summarizes therapeutic value of mineral waters in general (pp. 365–366).

707 **Willis** (Bailey). Geological researches in eastern Asia.

Yearbook Carnegie Institution of Washington, no. 3, 1904, pp. 275–291.

Mentions an artesian-water investigation made by him at Peking, and suggests possibility of supplying the city from this source (p. 290).

708 **Wilson** (James). Report of the Secretary of Agriculture 1905, 132 pp.

Summarizes work of reclaiming alkali lands by underdrainage in Utah, Montana, Washington, and California (pp. 79–80).

709 —— Report of the Secretary.

Yearbook U. S. Dept. Agr., 1904, pp. 9–118.

Mentions storage of water by forests (p. lvi). Describes work of reclaiming alkali lands by underdrainage, and injurious effect of irrigation through raising the ground-water level and water-logging wide areas (pp. lxxii–lxxiv). Describes irrigation by pumping and mentions kinds of pumps (p. cvii).

710 **Winchell** (N. H.). Deep wells as a source of water supply for Minneapolis.

Am. Geologist, vol. 35, pp. 266–291.

Discusses artesian conditions in the drift and rock basins and gives maps of basins and wells. The St. Peter sandstone, Shakopee fissured limestone, and New Richmond, Jordan, and Hinckley sandstones constitute the water horizons, all but the last two yielding good water. The rate and cost of drilling, capacity of wells, composition of water, and supplies of St. Paul and Winnipeg are also considered. States that term "artesian" is used locally for any deep well, but recommends restricting it to flows.

711 **Winchell** (N. H.). The Willamette meteorite.

Am. Geologist, vol. 36, pp. 250–257.

In a footnote the author mentions the occurrence of corroded limestone, which he ascribes to the action of sublacustrine springs, in Thunder Bay, Lake Huron, Michigan (p. 255).

712 **Winslow** (C. E. A.). A winter visit to some sewage-disposal plants in Ohio, Wisconsin, and Illinois.

Jour. Assoc. Eng. Soc., vol. 34, pp. 335–361, 10 figs.

In the discussion accompanying this article, Mr. X. H. Goodnough notes the increased leakage of ground water into sewers in the early spring (pp. 352–353).

713 **Witt** (Otto N.). The origin of coal and of carbonated spring waters.

Sci. Am. Supp., vol. 60, p. 24791.

Discusses the theory that water and carbon dioxide of certain springs is due to the internal combustion of buried organic matter.

714 **Wittmann** (Ernest). The geological and topographical features of the city of Monterey, Nuevo Leon, Mexico, and its vicinity.

Am. Geologist, vol. 35, pp. 171–179.

Notes the occurrence and movement of water in gravels, the motion being sometimes visible in shallow wells (p. 174). Mentions a 2,100-foot well which failed to get water. Describes rise of hot sulphur water along fissure from an estimated depth of 3,000 feet, the rise being ascribed to "pressure exercised by the expansion of the heated water itself" (p. 176).

715 **Wood** (B. D.), **Hoyt** (John C.) and. Index to the hydrographic progress reports of the United States Geological Survey, 1888–1903.

Water-Sup. and Irr. Paper no. 119, U. S. Geol. Survey, 253 pp.

See Hoyt (John C.) and Wood (B. D.).

716 **Woodbridge** (Dwight E.). The Mesabi iron-ore range. (X.) [Minnesota.]

Eng. and Min. Jour., vol. 79, pp. 698–700, 2 figs.

This part (the tenth) contains a discussion of the agency of underground waters in the formation of the deposits.

717 **Woodman** (Alpheus G.), **Richards** (Ellen H.) and. Air, water, and food from a sanitary standpoint.

New York and London, 1904, 262 pp., 13 figs., 1 map.

See Richards (Ellen H.) and Woodman (Alpheus G.).

718 **Woodward** (S. M.). Cost of pumping for irrigation.

Bull. Univ. of Ariz. Agric. Exp. Sta. no. 49, pp. 457–469.

Describes pumping plants at several dug and drilled wells, and gives results of investigations regarding cost.

719 **Wright** (A. E.) and **Collins** (A. B.). Irrigation near Garden, Kans., 1904.

Bull. Office Exp. Sta., U. S. Dept. Agr., no. 158, pp. 585–594.

Describes methods of obtaining irrigating waters by means of wells into the "underflow," and describes methods of pumping by windmills.

720 **Wright** (Fred Eugene). Report of progress in the Porcupines.

Ann. Rept. Michigan Geol. Survey, 1903, pp. 33–44.

Describes occurrence of springs in connection with faulting (pp. 39, 40); mentions disappearance of streams below ground (p. 41), and their origin in mountain springs (p. 43).

Y.

721 **Yale** (Charles G.). Borax.

Mineral Resources U. S. for 1904, U. S. Geol. Survey, pp. 1017–1028.

Notes the location of an artesian well near Borax Lake, Lake County, Cal. The artesian water so diluted the waters of the lake that the manufacture of borax from the lake water became unprofitable (p. 1017).

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[The numbers refer to entries in the bibliographic review.]

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CLASSIFICATION OF THE PUBLICATIONS OF THE UNITED STATES GEOLOGICAL SURVEY.

[Water-Supply Paper No. 163.]

The serial publications of the United States Geological Survey consist of (1) Annual Reports, (2) Monographs, (3) Professional Papers, (4) Bulletins, (5) Mineral Resources, (6) Water-Supply and Irrigation Papers, (7) Topographic Atlas of United States—folios and separate sheets thereof, (8) Geologic Atlas of the United States—folios thereof. The classes numbered 2, 7, and 8 are sold at cost of publication; the others are distributed free. A circular giving complete lists may be had on application.

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WS 6. Underground waters of southwestern Kansas, by Erasmus Haworth. 1897. 65 pp., 12 pls. (Out of stock.)

WS 7. Seepage waters of northern Utah, by Samuel Fortier. 1897. 50 pp., 3 pls. (Out of stock.)

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WS 31. Lower Michigan mineral waters, by A. C. Lane. 1899. 97 pp., 4 pls. (Out of stock.)

WS 34. Geology and water resources of a portion of southeastern South Dakota, by J. E. Todd. 1900. 34 pp., 19 pls.

WS 53. Geology and water resources of Nez Perces County, Idaho, Pt. I, by I. C. Russell. 1901. 86 pp., 10 pls. (Out of stock.)

WS 54. Geology and water resources of Nez Perces County, Idaho, Pt. II, by I. C. Russell. 1901. 87–141 pp. (Out of stock.)

WS 55. Geology and water resources of a portion of Yakima County, Wash., by G. O. Smith. 1901 68 pp., 7 pls. (Out of stock.)
WS 57. Preliminary list of deep borings in the United States, Pt. I, by N. H. Darton. 1902. 60 pp. (Out of stock.)
WS 59. Development and application of water in southern California, Pt. I, by J. B. Lippincott. 1902. 95 pp., 11 pls. (Out of stock.)
WS 60. Development and application of water in southern California, Pt. II, by J. B. Lippincott. 1902. 96–140 pp. (Out of stack.)
WS 61. Preliminary list of deep borings in the United States, Pt. II, by N. H. Darton. 1902. 67 pp. (Out of stock.)
WS 67. The motions of underground waters, by C. S. Slichter. 1902. 106 pp., 8 pls. (Out of stock.)
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WS 90. Geology and water resources of a part of the lower James River Valley, South Dakota, by J. E. Todd and C. M. Hall. 1904. 47 pp., 23 pls.
WS 101. Underground waters of southern Louisiana, by G. D. Harris, with discussions of their uses for water supplies and for rice irrigation, by M. L. Fuller. 1904. 98 pp., 11 pls.
WS 102. Contributions to the hydrology of eastern United States, 1903, by M. L. Fuller. 1904. 522 pp.
WS 104. Underground waters of Gila Valley, Arizona, by W. T. Lee. 1904. 71 pp., 5 pls.
WS 110. Contributions to the hydrology of eastern United States, 1904; M. L. Fuller, geologist in charge. 1904. 211 pp., 5 pls.
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WS 120. Bibliographic review and index of papers relating to underground waters, published by the United States Geological Survey, 1879–1904, by M. L. Fuller. 1905. 128 pp.
WS 122. Relation of the law to underground waters, by D. W. Johnson. 1905. 55 pp.
WS 123. Geology and underground water conditions of the Jornada del Muerto, New Mexico, by C. R. Keyes. 1905. 42 pp., 9 pls.
WS 136. Underground waters of the Salt River Valley, by W. T. Lee. 1905. 194 pp., 24 pls.
B 264. Record of deep-well drilling for 1904, by M. L. Fuller, E. F. Lines, and A. C. Veatch. 1905. 106 pp.
PP 44. Underground water resources of Long Island, New York, by A. C. Veatch and others. 1905. 394 pp., 34 pls.
WS 137. Development of underground waters in the eastern coastal plain region of southern California, by W. C. Mendenhall. 1905. 140 pp., 7 pls.
WS 138. Development of underground waters in the central coastal plain region of southern California, by W. C. Mendenhall. 1905. 162 pp., 5 pls.
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WS 145. Contributions to the hydrology of eastern United States; M. L. Fuller, geologist in charge. 1905. 220 pp., 6 pls.
WS 148. Geology and water resources of Oklahoma, by C. N. Gould. 1905. 178 pp., 22 pls.
WS 149. Preliminary list of deep borings in the United States, second edition, with additions, by N. H. Darton. 1905. 175 pp.
PP 46. Geology and underground water resources of northern Louisiana and southern Arkansas, by A. C. Veatch. 1906.
WS 153. The underflow in Arkansas Valley in western Kansas, by C. S. Slichter. 1906.

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WS 155. Fluctuations of the water level in wells, with special reference to Long Island, New York, by A. C. Veatch. 1906.
WS 157. Underground water in the valleys of Utah Lake and Jordan River, Utah, by G. B. Richardson.
WS 158. Preliminary report on the geology and underground waters of the Roswell artesian area, New Mexico, by C. A. Fisher. 1906. 29 pp., 9 pls.
PP 52. Geology and underground waters of the Arkansas Valley in eastern Colorado, by N. H. Darton. 1906.
WS 159. Summary of the underground water resources of Mississippi, by A. F. Crider and L. C. Johnson. 1906.
PP 53. Geology and water resources of the Bighorn Basin, Wyoming, by C. A. Fisher. 1906.
WS 160. Underground-water papers, 1906, by M. L. Fuller. 1906.
WS 163. Bibliographic review and index of underground-water literature published in the United States in 1905, by M. L. Fuller, F. G. Clapp, and B. L. Johnson. 1906. 130 pp.

The following papers also relate to this subject: Underground waters of Arkansas Valley in eastern Colorado, by G. K. Gilbert, in Seventeenth Annual, Pt. II; Preliminary report on artesian waters of a portion of the Dakotas, by N. H. Darton, in Seventeenth Annual, Pt. II; Water resources of Illinois, by Frank Leverett, in Seventeenth Annual, Pt. II; Water resources of Indiana and Ohio, by Frank Leverett, in Eighteenth Annual, Pt. IV; New developments in well boring and irrigation in eastern South Dakota, by N. H. Darton, in Eighteenth Annual, Pt. IV; Rock waters of Ohio, by Edward Orton, in Nineteenth Annual, Pt. IV; Artesian-well prospects in the Atlantic coastal plain region, by N. H. Darton, Bulletin No. 138.

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