

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

REPORT
OF
PROGRESS OF STREAM MEASUREMENTS
FOR
THE CALENDAR YEAR 1903

PREPARED UNDER THE DIRECTION OF F. H. NEWELL
BY
JOHN C. HOYT

PART III.—Western Mississippi River and Western Gulf of Mexico Drainage



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PUBLICATIONS OF UNITED STATES GEOLOGICAL SURVEY.

The 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 the United States, folios and separate sheets thereof; (8) Geologic Atlas of 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.

The Professional Papers, Bulletins, and Water-Supply Papers treat of a variety of subjects, and the total number issued is large. They have therefore been classified into the following series: A, Economic geology; B, Descriptive geology; C, Systematic geology and paleontology; D, Petrography and mineralogy; E, Chemistry and physics; F, Geography; G, Miscellaneous; H, Forestry; I, Irrigation; J, Water storage; K, Pumping water; L, Quality of water; M, General hydrographic investigations; N, Water power; O, Underground waters; P, Hydrographic progress reports.

The following Water-Supply Papers are out of stock, and can no longer be supplied: Nos. 1-16, 19, 20, 22, 29-34, 36, 39, 40, 43, 46, 57-65, 75. Complete lists of papers relating to water supply and allied subjects follow. (PP=Professional Paper; B=Bulletin; WS=Water-Supply Paper.)

SERIES I—IRRIGATION.

- WS 2. Irrigation near Phoenix, Ariz., by A. P. Davis. 1897. 98 pp., 31 pls. and maps.
 - WS 5. Irrigation practice on the Great Plains, by E. B. Cowgill. 1897. 39 pp., 11 pls.
 - WS 9. Irrigation near Greeley, Colo., by David Boyd. 1897. 90 pp., 21 pls.
 - WS 10. Irrigation in Mesilla Valley, New Mexico, by F. C. Barker. 1898. 51 pp., 11 pls.
 - WS 13. Irrigation systems in Texas, by W. F. Hutson. 1898. 68 pp., 10 pls.
 - WS 17. Irrigation near Bakersfield, Cal., by C. E. Grunsky. 1898. 96 pp., 16 pls.
 - WS 18. Irrigation near Fresno, Cal., by C. E. Grunsky. 1898. 94 pp., 14 pls.
 - WS 19. Irrigation near Merced, Cal., by C. E. Grunsky. 1899. 59 pp., 11 pls.
 - WS 23. Water-right problems of Bighorn Mountains, by Elwood Mead. 1899. 62 pp., 7 pls.
 - WS 32. Water resources of Porto Rico, by H. M. Wilson. 1899. 48 pp., 17 pls. and maps.
 - WS 43. Conveyance of water in irrigation canals, flumes, and pipes, by Samuel Fortier. 1901. 86 pp., 15 pls.
 - WS 70. Geology and water resources of the Patrick and Goshen Hole quadrangles, Wyoming, by G. I. Adams. 1902. 50 pp., 11 pls.
 - WS 71. Irrigation systems of Texas, by T. U. Taylor. 1902. 137 pp., 9 pls.
 - WS 74. Water resources of the State of Colorado, by A. L. Fellows. 1902. 151 pp., 14 pls.
 - WS 87. Irrigation in India (second edition), by H. M. Wilson. 1903. 238 pp., 27 pls.
 - WS 93. Proceedings of first conference of engineers of the reclamation service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1904. 361 pp.
- The following papers also relate especially to irrigation: Irrigation in India, by H. M. Wilson, in Twelfth Annual, Pt. II; two papers on irrigation engineering, by H. M. Wilson, in Thirteenth Annual, Pt. III.

SERIES J—WATER STORAGE.

- WS 33. Storage of water on Gila River, Arizona, by J. B. Lippincott. 1900. 98 pp., 33 pls.
- WS 40. The Austin dam, by Thomas U. Taylor. 1900. 51 pp., 16 pls.
- WS 45. Water storage on Cache Creek, California, by A. E. Chandler. 1901. 48 pp., 10 pls.
- WS 46. Physical characteristics of Kern River, California, by F. H. Ohlsted, and reconnaissance of Yuba River, California, by Marsden Manson. 1901. 57 pp., 8 pls.
- WS 58. Storage of water on Kings River, California, by J. B. Lippincott. 1902. 100 pp., 32 pls.
- WS 68. Water storage in Truckee Basin, California-Nevada, by L. H. Taylor. 1902. 90 pp., 8 pls.
- WS 73. Water storage on Salt River, Arizona, by A. P. Davis. 1902. 54 pp., 25 pls.
- WS 86. Storage reservoirs on Stony Creek, California, by Burt Cole. 1903. 62 pp., 16 pls.
- WS 89. Water resources of Salinas Valley, California, by Homer Hamlin. 1904. 91 pp., 12 pls.
- WS 93. Proceedings of first conference of engineers of the reclamation service, with accompanying papers, compiled by F. H. Newell, chief engineer. 1904. 361 pp.

The following paper also should be noted under this heading: Reservoirs for irrigation, by J. D. Schnyler, in Eighteenth Annual, Pt. IV.

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SERIES O—UNDERGROUND WATERS.

- WS 4. A reconnaissance in southeastern Washington, by I. C. Russell. 1897. 96 pp., 7 pls.
 WS 6. Underground waters of southwestern Kansas, by Erasmus Haworth. 1897. 65 pp., 12 pls.
 WS 7. Seepage waters of northern Utah, by Samuel Fortier. 1897. 50 pp., 3 pls.
 WS 12. Underground waters of southeastern Nebraska, by N. H. Darton. 1898. 56 pp., 21 pls.
 WS 21. Wells of northern Indiana, by Frank Leverett. 1899. 82 pp., 2 pls.
 WS 26. Wells of southern Indiana (continuation of No. 21), by Frank Leverett. 1899. 64 pp.
 WS 30. Water resources of the Lower Peninsula of Michigan, by A. C. Lane. 1899. 97 pp., 7 pls.
 WS 31. Lower Michigan mineral waters, by A. C. Lane. 1899. 97 pp., 4 pls.
 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.
 WS 54. Geology and water resources of Nez Perces County, Idaho, Pt. II, by I. C. Russell. 1901. 87-141 pp.
 WS 55. Geology and water resources of a portion of Yakima County, Wash., by G. O. Smith. 1901. 68 pp., 7 pls.
 WS 57. Preliminary list of deep borings in the United States, Pt. I, by N. H. Darton. 1902. 60 pp.
 WS 59. Development and application of water in southern California, Pt. I, by J. B. Lippincott. 1902. 95 pp., 11 pls.
 WS 60. Development and application of water in southern California, Pt. II, by J. B. Lippincott. 1902. 96-140 pp.
 WS 61. Preliminary list of deep borings in the United States, Pt. II, by N. H. Darton. 1902. 67 pp.
 WS 67. The motions of underground waters, by C. S. Slichter. 1902. 106 pp., 8 pls.
 B 199. Geology and water resources of the Snake River Plains of Idaho, by I. C. Russell. 1902. 192 pp., 33 pls.
 WS 77. Water resources of Molokai, Hawaiian Islands, by Wahl. 1902. 62 pp., 4 pls.
 WS 78. Preliminary report on artesian basins in southwestern Idaho and southeastern Oregon, by I. C. Russell. 1903. 53 pp., 2 pls.
 PP 17. Preliminary report on the geology and water resources of Nebraska, west of the one hundred and third meridian, by N. H. Darton. 1903. 69 pp., 43 pls.
 WS 80. Geology and water resources of part of the lower James River Valley, South Dakota, by J. E. Todd and C. M. Hall. 1904. 45 pp., 23 pls.

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.

SERIES P—HYDROGRAPHIC PROGRESS REPORTS.

Progress reports may be found in the following publications: For 1888-89, Tenth Annual, Pt. II; for 1889-90, Eleventh Annual, Pt. II; for 1890-91, Twelfth Annual, Pt. II; for 1891-92, Thirteenth Annual, Pt. III; for 1893-94, Bulletin No. 131; for 1895, Bulletin No. 140; for 1896, Eighteenth Annual, Pt. IV, WS 11; for 1897, Nineteenth Annual, Pt. IV, WS 15, 16; for 1898, Twentieth Annual, Pt. IV, WS 27, 28; for 1899, Twenty-first Annual, Pt. IV, WS 35-38; for 1900, Twenty-second Annual, Pt. IV, WS 47-52; for 1901, WS 65, 66, 75; for 1902, WS 82-85; for 1903, WS 97-100.

Correspondence should be addressed to

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SERIES K—PUMPING WATER.

- WS 1. Pumping water for irrigation, by H. M. Wilson. 1896. 57 pp., 9 pls.
- WS 8. Windmills for irrigation, by E. C. Murphy. 1897. 49 pp., 8 pls.
- WS 14. New tests of certain pumps and water lifts used in irrigation, by O. P. Hood. 1898. 91 pp., 1 pl.
- WS 20. Experiments with windmills, by T. O. Perry. 1899. 97 pp., 12 pls.
- WS 29. Wells and windmills in Nebraska, by E. H. Barbour. 1899. 85 pp., 27 pls.
- WS 41. The windmill; its efficiency and economic use, Pt. I, by E. C. Murphy. 1901. 72 pp., 14 pls.
- WS 42. The windmill, Pt. II (continuation of No. 41). 1901. 73-147 pp., 15-16 pls.
- WS 91. Natural features and economic development of Sandusky, Maumee, Muskingum, and Miami drainage areas in Ohio, by B. H. Flynn and M. S. Flynn. 1904. 130 pp.

SERIES L—QUALITY OF WATER.

- WS 3. Sewage irrigation, by G. W. Rafter. 1897. 100 pp., 4 pls.
- WS 22. Sewage irrigation, Pt. II, by G. W. Rafter. 1899. 100 pp., 7 pls.
- WS 72. Sewage pollution in the metropolitan area near New York City and its effect on inland water resources, by M. O. Leighton. 1902. 75 pp., 8 pls.
- WS 76. Observations on the flow of rivers in the vicinity of New York City, by H. A. Pressey. 1903. 108 pp., 13 pls.
- WS 79. Normal and polluted waters in northeastern United States, by M. O. Leighton. 1903. 192 pp.

SERIES M—GENERAL HYDROGRAPHIC INVESTIGATIONS.

- WS 56. Methods of stream measurement. 1901. 51 pp., 12 pls.
- WS 64. Accuracy of stream measurements, by E. C. Murphy. 1902. 93 pp., 4 pls.
- WS 76. Observations on the flow of rivers in the vicinity of New York City, by H. A. Pressey. 1903. 108 pp., 13 pls.
- WS 80. The relation of rainfall to run-off, by G. W. Rafter. 1903. 104 pp.
- WS 81. California hydrography, by J. B. Lippincott. 1903. 428 pp., 1 pl.
- WS 88. The Passaic flood of 1902, by G. B. Hollister and M. O. Leighton. 1903. 56 pp., 16 pls.
- WS 91. Natural features and economic development of Sandusky, Maumee, Muskingum, and Miami drainage areas in Ohio, by B. H. Flynn and M. S. Flynn. 1904. 130 pp.
- WS 92. The Passaic flood of 1903, by M. O. Leighton. 1904. 48 pp., 7 pls.
- WS 94. Hydrographic manual of the United States Geological Survey, prepared by E. C. Murphy, J. C. Hoyt, and G. B. Hollister. 1904. 76 pp., 3 pls.
- WS 95. Accuracy of stream measurements (second edition), by E. C. Murphy. 1904. 169 pp., 6 pls.
- WS 96. Destructive floods in the United States in 1903, by E. C. Murphy. 1904. 81 pp., 13 pls.

SERIES N—WATER POWER.

- WS 24. Water resources of the State of New York, Pt. I, by G. W. Rafter. 1899. 92 pp., 13 pls.
- WS 25. Water resources of the State of New York, Pt. II, by G. W. Rafter. 1899. 100-200 pp., 12 pls.
- WS 44. Profiles of rivers, by Henry Gannett. 1901. 100 pp., 11 pls.
- WS 62. Hydrography of the Southern Appalachian Mountain region, Pt. I, by H. A. Pressey. 1902. 95 pp., 25 pls.
- WS 63. Hydrography of the Southern Appalachian Mountain region, Pt. II, by H. A. Pressey. 1902. 96-190 pp., 26-44 pls.
- WS 69. Water powers of the State of Maine, by H. A. Pressey. 1902. 124 pp., 14 pls.

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