State of Connecticut

FIFTEENTH BIENNIAL REPORT OF THE

COMMISSIONERS

OF THE

State Geological and Natural History Survey

1931--1932

Bulletin No. 52

HARTFORD

PUBLISHED BY THE STATE

1933

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State Geological and Natural History Survey

W. E. BRITTON, Ph. D., D. Sc., Superintendent

Bulletin No. 52

HARTFORD

Printed by the State Geological and Natural History Survey

1933

State Geological and Natural History Survey of Connecticut

COMMISSIONERS

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State Geological and Natural History Survey

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LETTER OF TRANSMITTAL

New Haven, Conn., February 1, 1933.

His Excellency, Wilbur L. Cross,
Governor of Connecticut,
Hartford, Connecticut.

Sir:

I have the honor to transmit to you herewith, in behalf of the Commissioners of the State Geological and Natural History Survey, as required by Statute, the fifteenth biennial report of the Superintendent, covering the two years ending December 31, 1932.

Respectfully submitted,

W.E. BRITTON,
Superintendent.

FIFTEENTH BIENNIAL REPORT OF THE GEOLOGICAL AND NATURAL HISTORY SURVEY OF CONNECTICUT

W. E. BRITTON, Ph. D., D. Sc., Superintendent

NOTES OF PROGRESS

Fair progress during 1931 and 1932, on projects already under way, may here be recorded. Somewhat fewer bulletins have been issued and fewer new projects started than in some of the preceding biennial periods. On account of financial conditions, it has been necessary to curtail expenditures during 1932. It is expected that a portion of the regular appropriation will not be expended but will be allowed to remain in the State Treasury. For the same reason the cost of publishing bulletins, which does not come out of the Survey appropriation, cannot well be borne by the state at the present time, and must be deferred until a more prosperous period.

In the last report (see Bulletin 50, page 2) mention was made of a collection of minerals identified and labeled by Dr. J. F. Schairer, and of characteristic rocks of the Western Highlands, gathered and labeled by Dr. W. M. Agar, that were turned over to the State Department of Education. During the summer of 1931, at my request samples of rock from the Eastern Highlands were gathered by Mr. D. J. Cederstrom under the direction of Professor Wilbur G. Foye, of Wesleyan University, and likewise turned over to the State Department of Education for use in school studies.

Professor Foye several years ago covered nearly all of the Eastern Highlands in personal field studies as a contribution to a revision of the geology of Connecticut. Some of the results of these studies remain unpublished, and on account of health Professor Foye is no longer able to carry on extensive field work, but he has kindly offered to write up the results of his findings for the Survey. Some of these papers may be published as separate bulletins, but whether published or not the information gleaned by Professor Foye will be in a form available to anyone who attempts to prepare a revision of the Geology of Connecticut.

Dr. William M. Agar, of Columbia University, has continued his field studies of the Western Highlands during the summers of 1931 and 1932. In 1931 he was assisted by Mr. A. M. Haring. On account of the extremely complicated structure in some of the rocks in Litchfield County

the studies are difficult and may require several seasons with the limited time at his disposal before Dr. Agar can complete them. I have urged him to continue until the work is finished, provided funds are available.

Mr. Fred H. Moore, a graduate student at Yale University, has been in the field for two summer seasons making a study of the limestones and lime industries of Connecticut. These studies are under the direction of Professor Chester R. Longwell of the Department of Geology, Yale University, and Mr. Moore's paper will probably serve as a thesis as partial fulfilment of the requirements for the doctorate. Mr. Moore and Dr. Agar have joined forces in working out the limitations of the limestone belt and each has been a help to the other in interpreting some of the complications of rock structure. Mr. Moore has accomplished most of the necessary field work, and now expects to finish it by spending a short time in the field next summer.

On the death of Professor George H. Lamson, December 4, 1931, I learned that his paper on the Reptiles of Connecticut had not been finished. He had been planning it and working at it for about two years. Of that portion concerning the snakes, a preliminary draft had been made, but the part relating to the turtles had not been written. The Survey was fortunate in being able to obtain the services of Dr. Raymond L. Ditmars, who is perhaps the leading American authority on this group, to supply the needed keys, descriptions and illustrations, to complete the manuscript.

Mr. William J. Clench, Assistant Curator of Mollusks, Museum of Comparative Zoology, Cambridge, Mass., has been engaged to prepare a report on the Mollusks of Connecticut. It is expected that it will appear in two parts, the first treating the land and fresh water forms and the second the marine forms. Mr. Clench has already made some progress on this project.

Mr. Arthur P. Jacot, a citizen of Connecticut and now a graduate student of Cornell University, who is engaged in a study of the mite fauna of cedar swamps, asked that I let him prepare for the Survey a paper on the Collembola, a group with which he is familiar and many forms of which occur with the mites in swamps. The matter was finally arranged whereby he will include the whole Order Thysanura, the most primitive order of insects. Mr. Jacot has begun work on this project.

Mr. George G. Goodwin, of the American Museum of Natural History, New York City, completed and submitted his manuscript, with illustrations, on The Mammals of Connecticut, in April, 1931. It is regretted that on account

of financial conditions, it could not be published promptly, as no publications are now available to naturalists and teachers, giving the information contained in this paper. A request for authorization to publish was made in June, 1932, but on account of the need for economy the Superintendent was instructed to defer publication. It should be published at the earliest possible date, for surely there will be a demand for it.

Progress has been made in the preparation of a popular bulletin on The Galls of Connecticut, by W. E. Britton and B. H. Walden. Many photographs have been made and about half of the text has been written. New material is gathered each season, so the longer its publication is deferred, the more nearly complete it will be. Nevertheless, the manuscript could be made ready for publication in a short time.

Excellent progress may be reported on the rather extensive work on the Diptera of Connecticut, projected some four years ago, and the manuscripts of three families have already been completed and submitted. Mr. Charles W. Johnson, Curator of Invertebrates, Boston Society of Natural History, prepared two of these papers, and had promised to prepare another but his death July 19, 1932, before he had done so will make it necessary to find another specialist. Several other papers are nearly completed and manuscripts may be expected at any time.

Mr. Leonard M. Tarr, formerly local forecast official at New Haven, is preparing a report on the weather and climate of Connecticut, and the manuscript may be expected sometime in 1933.

The request for an appropriation for a new topographical survey made in 1927, 1929, and 1931, the General Assembly has not seen fit to grant. The request will probably be repeated at each session until favorable action is received.

RECENT BULLETINS

At the time the Fourteenth Biennial Report of the Commissioners was written, Bulletin No. 49 was in press, although issued shortly afterward. This and two other bulletins, Nos. 50 and 51, have been published during the biennium and may be described briefly as follows:

Bulletin No. 49. Public and Semi-Public Lands of Connecticut, by Philip Laurance Buttrick, M. F., formerly secretary of the Connecticut Forest and Park Association, 151 pages, 6 figures and 13 maps, 1930. This bulletin contains a full discussion of the reasons and methods of procedure in setting aside lands for public use, and likewise for semi-

public lands. It also discusses the future needs of Connecticut, particularly in forests and parks, as based upon the probable increase in population. Tables I-XXXVIII give statistics of parks, forests, and other public and semi-public lands, and such areas are shown on a map (scale 1-250,000) folded in an envelope inside the back cover. This bulletin was initiated by the State Forest and Park Association and the manuscript was prepared in that office. It should be of interest to many state commissions and institutions as well as to private individuals. Although this bulletin bears the date 1930, it was received from the printers and distributed early in 1931.

Bulletin No. 50. Fourteenth Biennial Report of the Commissioners of the State Geological and Natural History Survey, 1929-1930, 26 pages, 1931. This report contains notes of progress; stones and minerals for educational work; plans for a new topographical survey; organization and policy; meeting of the commissioners; recent bulletins; unpublished manuscripts on hand; researches now in progress; other needed investigations; list of bulletins and bound volumes; work done in co-operation with the United States Geological Survey with list of publications; classification and distribution of Survey publications; legislation establishing the Survey; financial statement, and appropriations.

Bulletin No. 51. The Minerals of Connecticut, by John Frank Schairer, Ph. D., Physical Chemist at the Geophysical Laboratory of the Carnegie Institution of Washington, D. C., 121 pages, 14 figures, 1931. This bulletin contains a popular discussion of the origin of rocks and minerals, describes in general the physical and chemical properties of minerals including crystallography, gives specific physical characteristics, chemical composition, occurrence and uses of about 100 minerals, arranged alphabetically, cites mineral localities in Connecticut and mentions some of the leading quarries, and has bibliography and index. This bulletin supplies a real demand not heretofore satisfied and there are many requests for it. Although an edition of 4,000 copies was published, it is expected to be exhausted in a few years.

UNPUBLISHED MANUSCRIPTS ON HAND

Mammals of Connecticut, by George Grant Goodwin, Assistant Curator of Mammals, American Museum of Natural History, New York City. This manuscript was submitted in April, 1931, and contains 404 typed pages and the equivalent of 49 plates. Practically all of the illustrations

are new. Mr. Goodwin camped in Connecticut at various places and collected several small mammals not before recorded from the state. This paper includes all of the land mammals and also the seals, whales and sharks that occasionally appear in the coastal waters of Connecticut.

Reptiles of Connecticut, by the late George H. Lamson, Professor of Zoology and Entomology, Connecticut Agricultural College. At Professor Lamson's untimely death, December 4, 1931, the manuscript was left unfinished but has since been completed by Dr. Raymond L. Ditmars, who has gone over the notes and manuscript and supplied the portion lacking. The finished paper contains 50 typed pages, 12 plates, and will serve as a guide to the identification of the several species occurring in Connecticut. It also gives information regarding food, habits and economic importance. When published it will certainly meet a popular demand.

Higher Crustaceans of Connecticut, by the late Professor A. E. Verrill. This manuscript was submitted several years ago and contains about 600 typed pages and nearly 100 pages of illustrations. Since Professor Verrill's death, the paper has been submitted to specialists who seem to agree that it should be revised before publication. A rather large figure was mentioned as the cost of revision, so no action has been taken. It is hoped, however, that this paper may soon be revised and published for the benefit of the people of Connecticut.

Stegocephalian Amphibia of the Triassic, by Roy L. Moodie. Though few, if any, fossil Amphibia have actually been found in Connecticut, material is much more abundant from adjacent territory, and it is fair to assume that they occurred in Connecticut. Mr. Moodie, an authority on the subject, has submitted a brief paper of about 44 typed pages, 10 figures and 14 plates, which will be of interest chiefly to geologists and paleontologists.

Additions to the Check-List of the Insects of Connecticut, by W. E. Britton, with the assistance of members of the Department of Entomology at the Agricultural Experiment Station. This manuscript now contains about 150 typed pages and is constantly being revised and enlarged. At an early date it should be issued by the Survey as the First Supplement to the Check-List of the Insects of Connecticut (Bulletin No. 31) though numbered as a separate bulletin.

Clays of Central Connecticut, by G. T. Wickwire. This is a report of the re-examination of the larger areas in the central portion of Connecticut where brick clays occur,

and contains estimates of the probable quantities of brick clays in these areas and the number of years that the supplies will last at the present rate of exploitation. It is now 27 years since Doctor Loughlin's more comprehensive report was published as Bulletin No. 4 of this Survey. Mr. Wickwire's paper contains 28 typed pages.

RESEARCHES NOW IN PROGRESS

Connecticut Weather and Climate. Mr. Leonard M. Tarr, formerly local forecast official of the New Haven office of the United States Weather Bureau, has been at work on a paper on the weather and climate of Connecticut, projected several years ago. This paper will discuss the amount and distribution of rainfall, temperatures, storms, sunny and cloudy days, humidity, direction and velocity of air currents, all of which contribute toward what we know as the climate of Connecticut. Mr. Tarr now expects to complete the manuscript at an early date and when published, it should prove interesting to all residents of Connecticut.

Metamorphic Rocks of Connecticut. The bedrock geology of eastern Connecticut has now been covered, chiefly by Professor W. G. Foye, of Wesleyan University, who is now preparing a report of his studies for the Survey. Dr. W. M. Agar, of Columbia University, is now at work on similar studies of the western portion of the state, and has devoted his summer vacation periods to this work for several years. These studies are very difficult, and it is uncertain how many seasons may be required to cover the remaining portions of the state. Already the results obtained will change the geological map of Bulletin No. 7. When this work has been completed, it will be possible to use the results, together with those of Doctor Flint, in preparing a new or revised bulletin on the geology of Connecticut. Bulletin No. 6 has long been out of print but the demand for it still continues.

Common and Conspicuous Plant Galls of Connecticut. For many years the Department of Entomology of the Agricultural Experiment Station has been acquiring and photographing plant galls. Most of this material has been collected by members of the Department, and a portion is now in manuscript form. When completed it will be published as a popular bulletin. The Commissioners have already authorized such a bulletin if it can be freely illustrated and put out in a larger edition, of, say 10,000 copies, so that it may have a wider popular distribution in Connecticut. Such a bulletin would have a considerable educational value for use in schools.

The Diptera or Two-winged Flies of Connecticut. With the assistance of Dr. R. B. Friend, Assistant Entomologist of the Agricultural Experiment Station, the Superintendent of the Survey has projected a rather ambitious work on the Diptera similar to that on the Hemiptera, Bulletin No. 34, and to be a part of the same series, Guide to the Insects of Connecticut. Like the Hemiptera, it must be the joint work of a large number of specialists, each treating the family or group in which he is a specialist. As much collecting and study must be done, considerable time must necessarily elapse—probably five years at least—before the paper can be finished. Some of the assignments have already been made, and certain families could be written up in a short time, but it will be difficult to work up some of the families and groups or even get anyone to attempt it. Once finished, however, such a work on the Diptera would prove exceedingly useful. The manuscripts of three families have already been submitted.

The Limestones and Lime Industries of Connecticut. Mr. Fred H. Moore, a graduate student in the Department of Geology, Yale University, is engaged in making a study of the limestones and lime industries. He has spent two summers in field studies in close co-operation with Doctor Agar and the field work is nearly finished. Mr. Moore is now engaged in preparing maps and writing his report which will probably be offered in partial requirement for the doctorate at Yale. This report should be of great value not only as a contribution to our knowledge of the geology of the state, but also to the entire agricultural industry on account of the use of ground limestone as applied to the soil. The results of Mr. Moore's studies will change somewhat the boundaries of the limestone belt as shown by the geological map in Bulletin No. 7.

The Land and Fresh Water Mollusks of Connecticut. Mr. William J. Clench, of the Museum of Comparative Zoology, Cambridge, Mass., has been engaged by the Survey to prepare a paper with illustrations on the mollusks. It will probably be best to cover the subject in two reports, one dealing with the land and fresh water forms, and the other with the marine forms.

The Thysanura of Connecticut. Mr. Arthur P. Jacot, a resident of Connecticut and now a graduate student of Cornell University, has been engaged to prepare a paper for the Survey on the Thysanura, the lowest Order of insects. The members of this group are nearly all of small size, and although a few species are of economic importance, most of them subsist on decaying vegetable matter. Mr. Jacot has made a good beginning on this project.

Rusts of Connecticut. Drs. G. P. Clinton, Botanist of the Connecticut Agricultural Experiment Station, and W. R. Hunt, author of Bulletin No. 36, are planning to prepare another paper on the rusts that will supplement Bulletin No. 36, and will contain keys and illustrations to the genera, and also list the species occurring in the state.

The Acarina or Mites of Connecticut. For several years, Dr. Philip Garman has collected and studied the mites occurring in Connecticut, many of which are of economic importance. Some species annoy or live upon animals, and some injure plants. Already Doctor Garman has discovered in Connecticut several European species not before known to occur in the United States. As little is known about these minute animals, it will probably be several years before a comprehensive treatise can be prepared on the subject, but it is hoped that a preliminary report may be submitted at an early date.

OTHER NEEDED INVESTIGATIONS

In addition to the investigations enumerated above, in geology, there may be need of studies of quartz, feldspar, sandstones, sand and gravel, all of considerable economic importance in Connecticut.

In zoology, there is need of bulletins on the fishes and Amphibia of the state; also on the sponges, zoophytes, annulata, and spiders. Smaller groups of birds of great economic importance might well be given detailed treatment in Survey bulletins. There still remain many orders of insects not covered in Survey publications.

In botany, there are several groups of fungi which should be studied and reports issued regarding them. Some of these are the downy mildews, and the fungi occurring on shade and forest trees. There should also be a publication dealing with the native trees and shrubs of Connecticut.

PUBLICATIONS

The Survey has now published 51 bulletins containing 7,804 pages, 462 plates, 762 figures and 20 maps not counting the list of bulletins in the back of each publication. Of this number, 13 bulletins, Nos. 1, 9, 12, 17, 21, 25, 27, 28, 32, 35, 38, 45, and 50, totaling 300 pages, are administrative reports and contain little or no scientific matter. Altogether, 38 bulletins containing scientific matter have been published, with a total of 7,504 pages. Seventeen bulletins.

Nos. 4, 6, 7, 8, 13, 18, 23, 24, 29, 30, 33, 40, 41, 44, 46, 47, and 51 deal with geology and contain 2,234 pages, 169 plates, 319 figures, and 7 maps, many small maps being numbered as figures. Eleven bulletins, Nos. 3, 5, 10, 11, 14, 15, 36, 37, 42, 43 and 48 deal with botany and contain 1,739 pages, 156 plates and 55 figures. Nine bulletins, Nos. 2, 16, 19, 20, 22, 26, 31, 34 and 39, deal with zoology and contain 3,380 pages, 129 plates and 380 figures. Five of the zoology bulletins, Nos. 16, 22, 31, 34, and 39, are devoted to insects and contain 2,528 pages, 63 plates and 267 figures. One bulletin, No. 49, does not belong in geology, botany or zoology and it is here placed under geography. It contains 151 pages, 6 figures, and 13 maps.

The following list gives the number, title, author, number of pages and illustrations of each bulletin which the Survey has published up to this time:

BULLETINS

Any of the following bulletins that are not out of print will be sent postpaid on receipt of the price.

1. First Biennial Report of the Commissioners of the State Geological and Natural History Survey, 1903-1904; 18 pp., 23 cm., 1904. (Out of print).

2. A Preliminary Report on the Protozoa of the Fresh Waters of Connecticut: by Herbert William Conn, Ph.D.; 69 pp., 34 pls., 23 cm., 1905. (Out of print).

3. A Preliminary Report on the Hymeniales of Connecticut. by Edward Albert White, B.S.; 81 pp., 40 pls., 23 cm., 1905. (Out of print).

4. The Clays and Clay Industries of Connecticut: by Gerald Francis Loughlin, S.B.; 121 pp., 13 pls., 23 cm., 1905. .35

5. The Ustilagineae, or Smuts, of Connecticut: by George Perkins Clinton, S.D.; 45 pp., 55 figs., 23 cm., 1905. .20

6. Manual of the Geology of Connecticut: by William North Rice, Ph.D., LL.D., and Herbert Ernest Gregory, Ph.D.; 273 pp., 31 pls., 22 figs. (10 maps), 23 cm., 1906. (Out of print).

7. Preliminary Geological Map of Connecticut: by Herbert Ernest Gregory, Ph.D., and Henry Hollister Robinson, Ph.D.; 39 pp., 2 maps (1 in pocket), 23 cm., 1907. (Out of print).

8. Bibliography of Connecticut Geology: by Herbert Ernest Gregory, Ph.D.; 123 pp., 23 cm., 1907. .20

9. Second Biennial Report of the Commissioners of the State Geological and Natural History Survey, 1905-1906; 23 pp., 23 cm., 1906. .10

10. A Preliminary Report on the Algae of the Fresh Waters of Connecticut: by Herbert William Conn, Ph.D., and Lucia Washburn (Hazen) Webster, M.S.; 78 pp., 44 pls., 23 cm., 1908. .40

11. The Bryophytes of Connecticut: by Alexander William Evans, Ph.D., and George Elwood Nichols, B. A.; 203 pp., 23 cm., 1908. (Out of print).

12. Third Biennial Report of the Commissioners of the State Geological and Natural History Survey, 1907-1908; 30 pp., 23 cm., 1908. (Out of print).

13. The Lithology of Connecticut, by Joseph Barrell, Ph.D., and Gerald Francis Loughlin, Ph.D.; 207 pp., 6 tables, 23 cm., 1910. (Out of print).

14. Catalogue of the Flowering Plants and Ferns of Connecticut Growing Without Cultivation: by a Committee of the Connecticut Botanical Society consisting of Charles Burr Graves, A.B., M.D., Edwin Hubert Eames, M.D., Charles Humphrey Bissell, Luman Andrews, Edgar Burton Harger, Ph.B., and Charles Alfred Weatherby, A.M.; 569 pp., 23 cm., 1910. .90

15. Second Report on the Hymeniales of Connecticut: by Edward Albert White, B.S.; 70 pp., 28 pls., 23 cm., 1910. .40

16. Guide to the Insects of Connecticut: prepared under the direction of Wilton Everett Britton, Ph.D. Part I. General Introduction: by Wilton Everett Britton, Ph.D. Part II. The Euplexoptera and Orthoptera of Connecticut: by Benjamin Hovey Walden, B.Agr.; 169 pp., 11 pls., 16 figs. (1 map), 23 cm., 1911. .40

17. Fourth Biennial Report of the Commissioners of the State Geological and Natural History Survey, 1909-1910; 31 pp., 23 cm., 1910. .10

18. Triassic Fishes of Connecticut: by Charles Rochester Eastman, Ph.D.; 78 pp., 11 pls., 8 figs., 23 cm., 1911. .30

19. Echinoderms of Connecticut: by Wesley Roswell Coe, Ph.D.; 152 pp., 32 pls., 29 figs., 23 cm., 1912. .50

20. The Birds of Connecticut: by John Hall Sage, M. S., and Louis Bennett Bishop, M. D., assisted by Walter Parks Bliss, M. A.; 370 pp., 23 cm., 1913. .60

21. Fifth Biennial Report of the Commissioners of the State Geological and Natural History Survey, 1911-1912; 27 pp., 23 cm., 1912. .10

22. Guide to the Insects of Connecticut, prepared under the direction of Wilton Everett Britton, Ph.D. Part III. The Hymenoptera, or Wasp-like Insects, of Connecticut: by Henry Lorenz Viereck, with the collaboration of Alexander Dyer MacGillivray, Ph. D., Charles Thomas Brues, M.S., William Morton Wheeler, Ph.D., and Sievert Allen Rohwer; 824 pp., 10 pls., 15 figs., 23 cm., 1916. 2.15

23. Central Connecticut in the Geologic Past: by Joseph Barrell, Ph.D.; 44 pp., 5 pls., 23 cm., 1915. .20

24. Triassic Life of the Connecticut Valley: by Richard Swann Lull, Ph.D.; 285 pp., 3 maps, 12 pls., 126 figs., 23 cm., 1915. .70

25. Sixth Biennial Report of the Commissioners of the State Geological and Natural History Survey, 1913-1914; 24 pp., 23 cm., 1915. .10

26. The Arthrostraca of Connecticut: by Beverly Waugh Kunkel, Ph.D.; 261 pp., 84 figs., 23 cm., 1918. .85

27. Seventh Biennial Report of the Commissioners of the State Geological and Natural History Survey, 1915-1916; 17 pp., 23 cm., 1917. .10

28. Eighth Biennial Report of the Commissioners of the State Geological and Natural History Survey, 1917-1918; 21 pp., 23 cm., 1919. (Out of print).

29. The Quaternary Geology of the New Haven Region, Connecticut: by Freeman Ward, Ph.D.; 80 pp., 9 pls., 17 figs., 23 cm., 1920. .60

30. Drainage Modifications, and Glaciation in the Danbury Region, Connecticut: by Ruth Sawyer Harvey, Ph.D; 59 pp., 5 pls., 10 figs., 23 cm., 1920. .55

31. Check List of the Insects of Connecticut: by Wilton Everett Britton, Ph.D.; 397 pp., 23 cm., 1920. 1.60

32. Ninth Biennial Report of the Commissioners of the State Geological and Natural History Survey, 1919-1920; 18 pp., 23 cm., 1920. .10

33 Geology of the Stonington Region, Connecticut: by Laura Hatch Martin, Ph.D.; 70 pp., 1 map, 8 figs., 23 cm., 1925. .60

34. Guide to the Insects of Connecticut, prepared under the direction of Wilton Everett Britton, Ph.D. Part IV. The Hemiptera or Sucking Insects of Connecticut: by Wilton Everett Britton, Ph.D., with collaboration of James Francis Abbott, Ph.D., Arthur Challen Baker, Ph.D., Harry Gardner Barber, A. M., William Thompson Davis, Dwight Moore DeLong, Ph.D., William Delbert Funkhouser, Ph.D., Harry Hazelton Knight, Ph.D., Asa Chandler Maxson, Herbert Osborn, D.Sc., Howard Madison Parshley, Sc.D., Edith Marion Patch, Ph.D., Louis Agassiz Stearns, M.Sc., Jose' Rollin de la Torre-Bueno, F.E.S., Edward Payson Van Duzee, Harley Frost Wilson, M.S.; 807 pp., 20 pls., 169 figs., 23 cm., 1923. 2.15

35. Tenth and Eleventh Biennial Reports of the Commissioners of the State Geological and Natural History Survey, 1921-1924; 17 pp., 23 cm., 1924. .10

36. The Uredinales or Rusts of Connecticut and Other New England States: by Willis Roberts Hunt, Ph.D.; 198 pp., 2 figs., 23 cm., 1926. 1.00

37. Catalogue of the Lichens of Connecticut: by Alexander William Evans, Ph.D., and Rose Meyrowitz, M.S.; 56 pp., 23 cm., 1926. .60

38. Twelfth Biennial Report of the Commissioners of the State Geological and Natural History Survey, 1925-1926; 23 pp., 1 pl., 23 cm., 1927. .10

39. The Odonata or Dragonflies of Connecticut: by Philip Garman, Ph.D.; 331 pp., 22 pls., 67 figs., 23 cm., 1927. 2.00

40. The Geology of the Shepaug Aqueduct Tunnel, Litchfield County, Connecticut: by William Macdonough Agar, Ph.D., with a chapter by Robert A. Cairns; 38 pp., 8 pls., 2 maps, 3 figs., 23 cm., 1927. .50

41. Guide to the Geology of Middletown, Connecticut, and Vicinity: by William North Rice, Ph.D., LL.D., and Wilbur Garland Foye, Ph.D.; 137 pp., 3 pls., 33 figs., 23 cm., 1927. 1.00

42. The Algae of Connecticut: by Clarence John Hylander, Ph.D., 245 pp., 28 pls., 23 cm., 1928. 1.50

43. The Life Forms of Connecticut Plants and Their Significance in Relation to Climate: by Beulah Ennis, Ph.D.; 100 pp., 20 pls., 23 cm., 1928. .75

44. Report on the Water Resources of Connecticut. by Roscoe Henry Suttie, C.E.; 168 pp., 7 figs., 23 cm., 1928. 1.00

45. Thirteenth Biennial Report of the Commissioners of the State Geological and Natural History Survey, 1927-1928; 32 pp., 23 cm., 1929. .10

46. The Physical History of the Connecticut Shoreline; by Henry Staats Sharp, Ph.D.; 97 pp., 8 pls. 28 figs., 23 cm., 1929. .75

47. The Glacial Geology of Connecticut: by Richard Foster Flint, Ph.D.. 294 pp., 64 pls., 42 figs., 1 map (in pocket), 23 cm., 1929. 2.00

48. Additions to the Flora of Connecticut (First Supplement to Bulletin No. 14): by a Committee of the Connecticut Botanical Society consisting of Edgar Burton Harger, Ph.B., Charles Burr Graves, A.B., M.D., Edwin Hubert Eames, M.D., Charles Alfred Weatherby, A.M., Richard William Woodward, A.B., and George Henry Bartlett, Ph.B.; 94 pp., 23 cm., 1930. .75

49. Public and Semi-Public Lands of Connecticut: by Philip Laurance Buttrick, M.F.; 151 pp., 13 maps, 6 figs., 23 cm., 1930. 1.00

50. Fourteenth Biennial Report of the Commissioners of the State Geological and Natural History Survey, 1929-1930; 26 pp., 23 cm., 1931. .10

51. The Minerals of Connecticut: by John Frank Schairer, Ph.D, 121 pp., 14 figs., 23 cm., 1931. .75

BOUND VOLUMES

A few hundred copies of each bulletin of the foregoing list have been reserved for binding, and these have been assembled and bound in the following order:

Volume	Contains Bulletins	Price Prepaid
I	1-5	Out of print
II	6-12	Out of print
III	13-15	$2.75
IV	16-21	2.50
V	22	2.75
VI	23-32	4.15
VII	33-35	3.75
VIII	36-42	5.00
IX	43-48	5.00

CLASSIFICATION OF SURVEY BULLETINS

From the beginning the Survey bulletins have been of two kinds as follows:

1. Administrative reports.
2. Scientific bulletins.

The former give an account of the organization and policy of the Survey and a report of the progress of the Survey work but contain little or no real scientific matter.

The scientific bulletins have dealt with geology, botany and zoology, and whether consciously or unconsciously have been somewhat evenly divided between these three subjects. Now geography has been added to the list of subjects. The classified list of bulletins by numbers is as follows:

Administrative reports: Bulletins 1, 9, 12, 17, 21, 25, 27, 28, 32, 35, 38, 45, and 50.

Geology: Bulletins 4, 6, 7, 8, 13, 18, 23, 24, 29, 30, 33, 40, 41, 44, 46, 47, and 51.

Botany: Bulletins 3, 5, 10, 11, 14, 15, 36, 37, 42, 43, and 48.

Zoology: Bulletins 2, 16, 19, 20, 22, 26, 31, 34, and 39.

Geography: Bulletin 49.

DISTRIBUTION OF SURVEY PUBLICATIONS

All bulletins issued by the Survey are distributed by the State Librarian, Mr. George S. Godard, who is the Distribution and Exchange Agent for the Survey. These publications are distributed liberally to colleges and universities, geological and natural history surveys, scientific societies and public libraries.

Many important scientific books and papers are received by exchanges and otherwise. These are deposited in the State Library at Hartford and help to form a most valuable reference collection, which is constantly being increased.

These bulletins have also been sent rather freely on request to scientists that specialize in the subjects covered by the bulletins, and to teachers and other residents of Connecticut. Other persons have been able to purchase them at prices that barely cover the cost of printing and transportation.

Until there is an improvement in present conditions it may not be possible to print additional bulletins although several manuscripts are now awaiting publication. Undoubtedly some persons ask for Survey bulletins, not because they are particularly interested in their contents, but because they may be obtained without cost. It would seem as if anyone especially interested in a subject would willingly pay the small price charged. The Commissioners have considered the advisability of selling the bulletins, for a time at least, to all persons and business firms who desire to pay for them.

Mr. Godard writes as follows:

"I think the Connecticut Geological and Natural History Survey is to be congratulated on the standard established and subjects already covered in the several bulletins published. The wide and persistent demand which comes from all parts of our country and abroad for certain of these bulletins, some of which are out of print, indicates that the publications are meeting a real need.

"As Distribution and Exchange Agent of the Survey since its establishment, I have been in close personal touch with the requests for, and letters of commendation upon, the several bulletins published by the Connecticut Geological and Natural History Survey, from all parts of the civilized world. Such letters of appreciation would of themselves form an interesting bulletin should they be published. They are certainly appreciated and constitute one form of helpful Connecticut publicity.

"We are advising inquirers that Bulletins 1, 2, 3, 6, 7, 11, 12, 13, 28 and Volumes I and II are out of print and no longer available for distribution.

" To individuals from outside the state requesting the same, we are stating that our supply of the bulletins on insects (Nos. 16, 22, 31, 34 and 39) for free distribution to individuals outside the state is exhausted, but that upon receipt of the required amount, we will be pleased to send the bulletin or bulletins, if they so desire.

"There has been an unusually large demand for Bulletin 51 on the Minerals of Connecticut. All the bulletins are popular, but those most frequently requested are perhaps No. 14, Catalogue of the Flowering Plants and Ferns of Connecticut; No. 20, The Birds of Connecticut; No. 42, The Algae of Connecticut; No. 47, The Glacial Geology of Connecticut; No. 49, Public and Semi-Public Lands of Connecticut. There is a constant demand for all the bulletins on insects (which we are taking care of as above stated). There is also a large demand for Volumes I and II and Bulletins 11 and 12, which, of course, we are unable to furnish.

"Requests for bulletins are received practically every day. In fact it is most unusual if a day passes without such requests".

The following table shows the date of issue, size of edition, and the number of copies now on hand of each bulletin and bound volume published by the Survey. It will be noted that Bulletins 1, 2, 3, 6, 7, 12, 13, and 28 are already out of print and can be furnished only in the bound volumes. That there is a constant demand for the scientific bulletins is shown by the number of copies on hand, in the right-hand column.

INVENTORY OF PUBLICATIONS

BULLETINS

Number	Year of Issue	Size of Edition	Copies on Hand
1	1904	3,000	out of print
2	1905	3,500	out of print

3	1905	3,500	out of print
4	1905	3,500	181
5	1905	3,500	296
6	1906	4,000	out of print
7	1907	3,500	out of print
8	1907	3,500	285
9	1906	3,000	619
10	1908	3,500	200
11	1908	3,000	out of print
12	1908	3,000	out of print
13	1910	3,500	out of print
14	1910	4,000	472
15	1910	3,500	855
16	1911	3,500	262
17	1910	3,000	782
18	1911	3,500	1,060
19	1912	3,500	1,120
20	1913	4,500	457
21	1912	3,000	1,125
22	1916	3,500	341
23	1915	4,000	1,150
24	1915	4,000	801
25	1915	2,900	239
26	1918	3,000	627
27	1917	2,900	1,089
28	1919	2,500	out of print
29	1920	2,500	815
30	1920	2,500	372
31	1920	3,000	534
32	1920	2,900	385
33	1925	2,500	1,764
34	1923	3,000	367
35	1924	2,500	1,420
36	1926	3,000	1,486
37	1926	3,000	1,581
38	1927	2,500	404
39	1927	3,000	775
40	1927	3,000	1,346
41	1927	3,000	736
42	1928	3,000	1,303
43	1928	3,000	1,271
44	1928	3,000	1,327
45	1929	2,500	1,050
46	1929	3,000	1,515
47	1930	4,000	2,498
48	1930	4,000	749
49	1930	4,000	2,077
50	1931	2,500	1,132
51	1931	4,000	2,234

BOUND VOLUMES

Volume	Year of Issue	Size of Edition	Copies on Hand
I	1905	600	out of print
II	1908	600	out of print
III	1910	600	155
IV	1914	600	183
V	1916	600	227
VI	1921	400	179
VII	1926	300	179
VIII	1928	300	163
IX	1931	300	225

LEGISLATION ESTABLISHING THE STATE GEOLOGICAL AND NATURAL HISTORY SURVEY

The State Geological and Natural History Survey was established in 1903 by act of the General Assembly (Chapter 133, Public Acts of 1903) and amended in 1915 (Chapter 185, Public Acts of 1915) to include as one of its commissioners the president of the Connecticut College for Women.

This act as amended is now Sections 2227-2230, Chapter 122, page 759 of the General Statutes, revision of 1930, and reads as follows:

STATE GEOLOGICAL AND NATURAL HISTORY SURVEY

Sec. 2227. Appointment and duties of commission. The State Geological and Natural History Survey shall continue to be under the direction of a commission composed of the governor, the president of Yale University, the president of Wesleyan University, the president of Trinity College, the president of the Connecticut Agricultural College and the president of the Connecticut College for Women, or so many of them as shall accept such office, each of whom shall serve without compensation, but shall be reimbursed for expenses incurred in the performance of official duties; and said commissioners shall have general charge of the survey, and shall appoint as superintendent of the same a scientist of established reputation, and such assistants and employees as may be necessary; and they shall also determine the compensation of, and may remove, all persons employed by the commission.

Sec. 2228. Objects of survey. Said survey shall have for its objects: (1) An examination of the geological formation of the state, with special reference to such economic products as building stones, clays, ores and other mineral substances; (2) an examination of the animal and plant life of the state, with special reference to its economic and educational value; (3) the preparation of special maps to illustrate the resources of the state; (4) the preparation of special reports, with necessary illustrations and maps, which shall embrace both a general and detailed description of the geology and natural history of the state.

Sec. 2229. Reports; distribution and sale. Said commissioners shall cause to be prepared a report to the general assembly before each meeting of the same, showing the progress and condition of the survey, together with such other information as they may deem useful or as the general assembly may require. The regular and special reports of the survey, with illustrations and maps, shall be prepared for publication, and, when printed, the reports shall be distributed or sold by the commissioners as the interests of the state and of science may demand, and all moneys obtained by the sale of the reports shall be paid into the state treasury.

Sec. 2230. Disposition of material collected. All material collected, after having served the purpose of the survey, shall be distributed by the commissioners to the educational institutions of the state in such manner as to be of the greatest advantage to the educational interests of the state, or, if deemed advisable by said commissioners, the whole or any part of such material shall be put on permanent exhibition.

FINANCIAL STATEMENT

BIENNIAL PERIOD FROM JULY 1, 1929 TO JUNE 30, 1931

Receipts

Appropriation for biennial period ending June 30, 1931		$8,000.00

Expenditures

Salaries and wages	$4,710.14	
Printing and illustrations	64.69	
Stationery and office supplies	78.05	
Postage	19.33	
Telegraph and telephone	7.85	
Express	4.51	
Chemical analyses and rock sections	155.25	
Traveling expenses	1,021.44	
Miscellaneous	33.75	
Total		$6,095.51
Balance, June 30, 1931		$1,904.49

ANNUAL PERIOD JULY 1, 1931 TO JUNE 30, 1932

Receipts

Appropration for year ending June 30, 1932		$4,000.00

Expenditures

Salaries and wages	$2,719.70	
Stationery and office supplies	6.20	
Postage	8.15	
Telegraph and telephone	1.55	
Express	2.13	
Chemical analyses and rock sections	64.00	
Traveling expenses	822.60	
Miscellaneous	43.00	
Total		$3,667.33
Balance on hand June 30, 1932		$332.67

SIX-MONTHS' PERIOD JULY 1, 1932 TO DECEMBER 31, 1932

Receipts

Appropriation year July 1, 1932 to June 30, 1933		4,000.00
Balance on hand June 30, 1932		332.67
Total		$4,332.67

Expenditures

Salaries and wages	$1,480.00	
Stationery and office supplies	22.35	
Postage	3.00	
Telegraph and telephone	.71	
Scientific apparatus and supplies	1.50	
Chemical analyses and rock sections	37.80	
Traveling expenses	640.87	
Miscellaneous	3.09	
Total		$2,189.32
Balance on hand December 31, 1932		$2,143.35

APPROPRIATIONS

At the start in 1903, the Survey appropriation was $3,000 for the biennial period, and the work was conducted on this basis until 1917, when the General Assembly increased the biennial appropriation to $6,000. This appropriation was renewed by each General Assembly until 1927, when it was raised to $8,000, $6,500 being for scientific work and $1,500 for office expenses. In 1927 and for 1929, $10,000 was requested, but not granted nor even recommended by the State Board of Finance and Control. The same amount ($10,000) was requested of the General Assembly of 1931 and received the support of the recommendations of the State Board of Finance and Control. Nevertheless, this increase was not granted by the General Assembly. In view of the present financial situation the budget Committee in 1932, requested that the appropriation be reduced to $6,000 for the biennial period from July 1, 1933 to June 30, 1935, and the budget items were submitted accordingly.