STATE OF CONNECTICUT

THIRTY-FOURTH

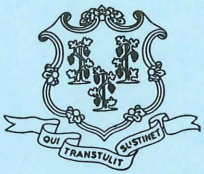
BIENNIAL REPORT

OF THE COMMISSIONERS

OF THE

STATE GEOLOGICAL AND NATURAL HISTORY SURVEY

1969-1971



STATE GEOLOGICAL AND NATURAL HISTORY SURVEY
OF CONNECTICUT
A DIVISION OF THE DEPARTMENT OF AGRICULTURE AND
NATURAL RESOURCES

1971

BULLETIN 104

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STATE GEOLOGICAL AND NATURAL HISTORY SURVEY
OF CONNECTICUT

A Division of the Department of Agriculture
and Natural Resources

Honorable Thomas J. Meskill, *Governor of Connecticut*

Joseph N. Gill, *Commissioner of the Department of Agriculture and Natural Resources*

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February 25, 1971

Honorable Thomas J. Meskill
Governor of Connecticut
State Capitol
Hartford, Connecticut

Dear Governor Meskill:

I have the honor to trasmit to you, herewith, on behalf of the Commissioners of the State Geological and Natural History Survey, in compliance with past custom, the Thirty-fourth Biennial Report of the Survey, covering the two years ending December 31, 1970.

This report which has been prepared by Dr. Joe Webb Peoples and his staff for the Commissioners summarizes the progress made by the Survey in its geologic and natural history programs including the educational program at Dinosaur State Park which attracted more than 200,000 visitors in the two years.

Sincerely yours,

Joseph N. Gill

Joseph N. Gill
Commissioner of Agriculture
and Natural Resources

The price of this Bulletin is 25¢. Additional copies may be ordered from the State Librarian, Hartford, Connecticut 06115 (postpaid; Connecticut residents must add sales tax). Like all publications of the Connecticut Geological and Natural History Survey, one copy is available, free of charge, to public officials, exchange libraries, scientists, and teachers, who indicate to the State Librarian, under their official letterhead, that it is required for professional work. A List of Publications of the State Survey is also available from the State Librarian on request.

THIRTY-FOURTH BIENNIAL REPORT OF THE COMMISSIONERS OF THE STATE GEOLOGICAL AND NATURAL HISTORY SURVEY

1969-1971

HISTORY AND ORGANIZATION

The State Geological and Natural History Survey was created by the 1903 statutes of the General Assembly (Chapter 133, Public Acts of 1903) as amended in 1915 (Chapter 185) and 1945 (H.B. No. 1145, P.A. No. 301, Sect. 2227). These statutes set up a board of Commissioners to be in general charge of the Survey. This Commission includes the Governor of the State, and five active scientists, appointed by the presidents of Connecticut College, Trinity College, University of Connecticut, Wesleyan University, and Yale University. (Currently the scientific members of the Commission include two geologists, two biologists, and a botanist.) Each Commissioner serves "without further appointment until his removal from the state, death, or resignation, unless sooner removed for cause." The Commissioners choose as Director of the Survey one of the appointed members of the Commission. (Pertinent portions of the statutes are quoted in the Appendix, which also include a list of the Superintendents or Directors of the Survey since its inception.)

Public Act No. 637 of the January 1959 Assembly placed the Geological and Natural History Survey in the newly organized Department of Agriculture and Natural Resources.

The 48 state geological surveys differ widely in scope as well as in appropriation. Very few have, as that of Connecticut does, a natural history function as well as a geological one. A majority have groundwater studies and many cooperate with the U.S. Geological Survey in topographic mapping.

The aims of the Connecticut Geological and Natural History Survey were set forth in the first Biennial Report in 1904 as follows:

> The Survey is styled, in the Act for its establishment, a Geological and Natural History Survey. This title, and the still more explicit language of Section 2, we have understood as requiring that attention

> should be given both to the rocky framework of the state and to its vegetable and animal life—both to the Geology of the state and to its Botany and Zoology. The language of that section further implies that three distinct aims should be regarded in the work of the Survey: first, the advancement of our knowledge of the geology, botany, and zoology of the state as a matter of pure science; second, the acquisition and publication of such knowledge of the resources and products of the state as will serve its industrial and economic interests; third, the presentation of the results of investigations in such form as to be useful in the educational work carried on in the various schools of the state. These three aims, the purely scientific, the economic, and the educational, we have endeavored constantly to keep in mind in all plans which have been made.

The needs of the state are changing and continual adjustment is necessary in adapting programs to these aims, the purely scientific, the economic, and the educational. New products are needed to serve the state in preserving its environment, and plans are being developed to produce new types of maps and reports.

During the past two years the Survey's activities were administered by the Director, Dr. Peoples, acting on a part time basis. He was assisted by Sidney Quarrier, Supervising Geologist, and the Secretary, Mrs. Louise Henney. In June, Richard Krueger joined the staff as Geologist and took over the responsibility for the educational program at Dinosaur State Park, thus giving Mr. Quarrier more time for general administration. Dr. Henry Aldrich who edited maps for several years felt he could no longer continue as Map Editor. His long experience as Secretary of the Geological Society of America and editor of their publications made him very valuable to the Survey. Dr. Lou Page, though her residence is now in Houston, Texas, is again editing for the Survey on a part time basis. Other part time staff personnel include Dr. C. L. Remington of Yale, editor and planner of the entomological series; Dr. Harold Bannerman, consulting economic geologist who has represented the director at a number of meetings and conferences and has advised on a variety of problems; and Dr. Bernice Wheeler of Connecticut College who served as consultant in 1969 on the natural history program.

ACCOMPLISHMENTS SINCE JANUARY 1969

The two calendar years 1969 and 1970 were active ones. During these two years:

1. The Survey's educational program at Dinosaur State Park provided more than 10,000 school children with lecture tours of the site and more than 200,000 visitors came to the Park to view the site with its numerous new and revised exhibits.

2. The geologic mapping program was advanced both by part time personnel working for the State in 10 quadrangles and by the U.S. Geological Survey staff under a cooperative agreement working in 19 quadrangles.

3. The publications by the State include two bulletins, one quadrangle report, one guidebook, one report of investigations, and one list of publications. In addition, one bulletin was revised, one reprinted, and two editions of the Dinosaur Park leaflet were printed. The U.S. Geological Survey published 6 geologic quadrangle maps, most with a short text, 14 aeromagnetic maps, and miscellaneous papers.

4. Mapping of the bedrock has been completed on most quadrangles in the State and a great many manuscripts are in various stages of preparation, editing, and review. The compilation of aeromagnetic maps of the remaining 36 quadrangles is in process.

5. A gravity map was compiled and is ready for review and final completion.

6. The U.S. Geological Survey has had a radar map of Connecticut prepared which will be released in open file in 1971.

DINOSAUR STATE PARK

Since August 1966 when the dinosaur tracks were discovered at Rocky Hill, Connecticut, Survey personnel have played a significant part in the development and educational use of the site. During the last two years the Survey has been conducting a program which utilizes exhibits and trained interpreters to explain the park's geological and paleontological phenomena. This program is presently being enlarged to include other aspects of the natural environment which relate to the paleohistory of Rocky Hill. Figure 1 is a sketch of the current layout of the park with a brief description of present and potential use.

The tremendous public interest in dinosaurs is indicated by the continually increasing attendance. The park had 112,322 visitors in 1970; it was the second consecutive year in which attendance exceeded 100,000. Also in 1970 guided tours were given to 162 groups of school children (7,340 individuals).

Dinosaur State Park has earned a good reputation with the park-visiting public and with educators. Its staff is accommodating and interested in individual visitors and their questions. Interpreters are on duty at the park seven days a week, April 1 to November 30, to conduct groups on tours, usually 45 to 90 minutes long, and to give individuals as much attention as time allows. Nearly all the interpreters are high school teachers or college students who have had some training in geology and/or natural science, and who are employed by the Survey on a part time, seasonal basis. As attendance grows it will become necessary to increase the number of interpreters to serve the visitors and school groups.

In July of 1970 Richard Krueger, formerly of the Rochester Museum, joined the staff and took over the responsibility for the educational program at the park. Sidney Quarrier, who had supervised the educational staff and program since the opening of the park, is now working with the Survey's geological program.

The Survey's staff and the employees of the State Park and Forest Commission have worked cooperatively on a daily basis to maintain

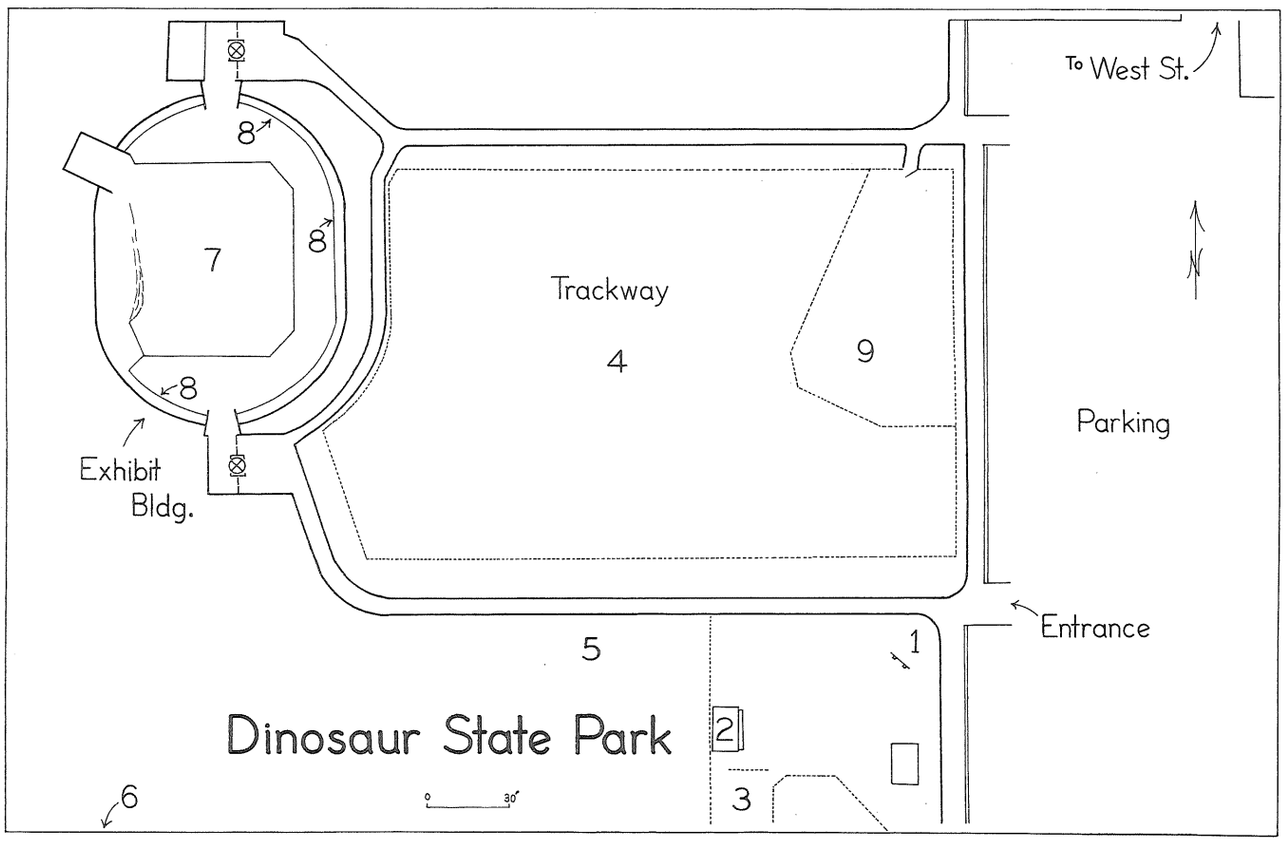

Fig. 1. Sketch of current layout at Dinosaur State Park with a brief description of present and potential use.

AREA	DESCRIPTION

1. Introductory exhibit area; rock slabs and signs serve as an introduction to the Park. Some of the functions of this area will be transferred to a new introductory area in the exhibit building.
2. Concession stand which sells educational materials, souveniers, and snacks.
3. Casting area where visitors make plaster casts of dinosaur tracks. This is a very popular activity, and the area will be enlarged to meet the needs of increased useage.
4. Main dinosaur trackway; presently covered with plastic sheeting and hay for protection. This is the most spectacular feature at the Park, and every effort is being made to devise a suitable method for uncovering it during the summers.
5. Rock exposures adjacent to the main walkway. The exposure is used to illustrate the nature of and features preserved in the sedimentary rocks. Further excavation and development is planned here.
6. Nature trail, used with school groups to show the relationships of living organisms to each other and to their physical environment. Additional trails and exhibits are being developed for this area.
7. Exposed dinosaur trackway inside of exhibit building. Several hundred dinosaur tracks are visible on 4,000 sq. ft. of exposed bedrock.
8. Supplementary exhibits covering various related subjects, such as geologic time, evolution, fossils, etc. A great deal of work is being done designing new and improved exhibits for this area.
9. Outdoor exposed trackway; used primarily with school groups. In this area students are able to walk on and examine closely dinosaur tracks exposed in the rock.

and improve the facilities. The same kind of cooperation is even more desirable in matters of operational policy and long range planning.

Except for a brief period during the summer of 1969, the large outdoor trackway (see fig. 2) has been under a protective blanket since it was discovered in 1966. It is regrettable that this trackway, the most impressive display and the primary reason the park was created, has not been open for public viewing. This area cannot be left open during the winter months because of the deterioration that takes place. Either a large protective building has to be constructed over the trackway or an efficient, economical, and removable covering perfected before this area can be opened up for exhibit. A concerted effort is being made to find a practical solution to make at least a portion of this outdoor trackway available for viewing.

During the last two years many exhibits related to the theme of the dinosaur trackway have been placed in the temporary exhibit building. The earliest exhibits experimented with various methods of presenting information and much has been learned from public reaction to these preliminary designs. More sophisticated, permanent exhibits are currently being designed and installed in the present building.

A particularly severe storm in December of 1969 collapsed the exhibit building and ripped a large hole in the fabric at the north end. The structure remained frozen to the ground for the rest of the winter and was repaired and reinflated in May of 1970. There was some damage from water and ice to the underlying trackway and the skin of the building suffered numerous rips and abrasions. A large portion of the interior skin was badly discolored where it was in contact with the ground.

In 1970 the study of living plants and animals became a regular part of the park's educational program with the addition of a "Triassic garden" containing living representatives of primitive plants, and with the development of a nature trail in the wet woodland on the southern side. Plans call for an improved garden and additional trails in 1971.

In the long run it is envisioned that the park will play a significant role in natural science and natural resource education. In order to realize this potential it is vitally important that some additional land be acquired to the south and west of the present site.

GEOLOGIC PROGRAM

Quadrangle mapping

For a number of years the major geologic activity of the Survey has been the preparation of two types of geologic maps on a quadrangle basis Each has as its base a topographic quadrangle map on the scale of 1:24,000, and on this base is shown the distribution of geologic formations by color pattern overprint. The surficial map shows only the unconsolidated deposits of such materials as sand, clay, peat, and glacial till; the bedrock map shows the distribution and, by appropriate sym-

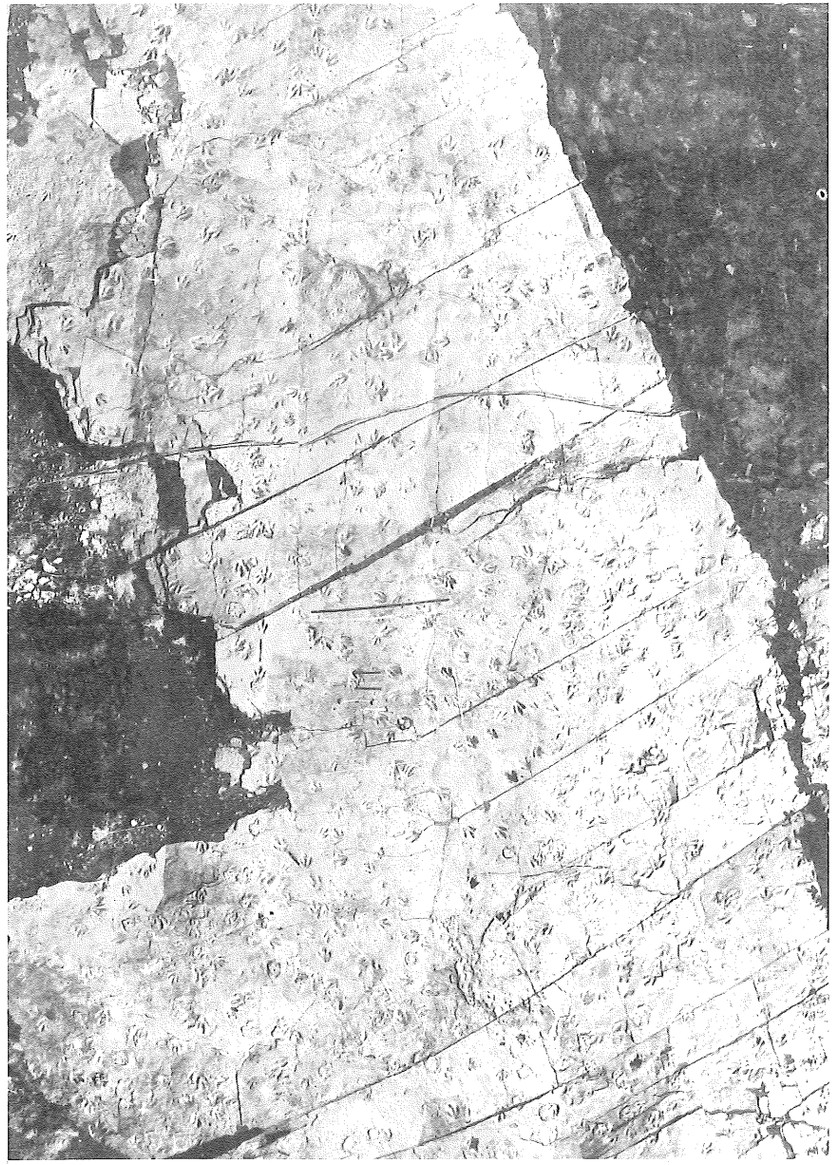

Fig. 2. A photo-mozaic of a portion of the large outdoor trackway at Dinosaur State Park. There are nearly 1,000 dinosaur footprints on this 60 by 80 foot exposure of rock. The three toed tracks are about 12 inches long.

bols, the structure of the rock formation as interpreted by the geologist. The primary basis for the interpretation is the examination of the rock outcrops in the field, but the geologist also makes laboratory studies and uses such bore hole records and geophysical data as are available.

During the last two years geologic mapping has been pushed both by university personnel working for the State Survey on a part time basis (see table 1), and by federal geologists under a cooperative agreement with the U.S. Geological Survey. The progress to date is shown in several ways in index maps (figs. 3 and 4) and in tables 2, 3, and 4. The apparent discrepancies in the tables are due to the fact that the quadrangles do not contain the same number of square miles since some overlap in adjacent states and others in Long Island Sound have less than a full quadrangle of land area.

Table 1. — Geologic field activity, 1969-71, Connecticut Geological and Natural History Survey

Quadrangle	*Type of Map*	*Geologist*	*University*
†Clinton	Surficial	Flint	Yale University
*Clinton	Bedrock	Thurrell	Rochester University
*Essex	Surficial	Flint	Yale University
†Norwalk North	Bedrock	Kroll	Syracuse University
*Old Lyme	Surficial	Flint	Yale University
†Southbury	Bedrock	Scott	Florida State University
†South Canaan	Bedrock	Gates	Univ. of Wisconsin
*†Stamford	Bedrock	Frank	Syracuse University
*Willimantic	Surficial	Clebnik	Univ. of Massachusetts
*Winsted	Bedrock	Martin	Earlham College

*Field work started since Jan. 1, 1969
†Field work completed

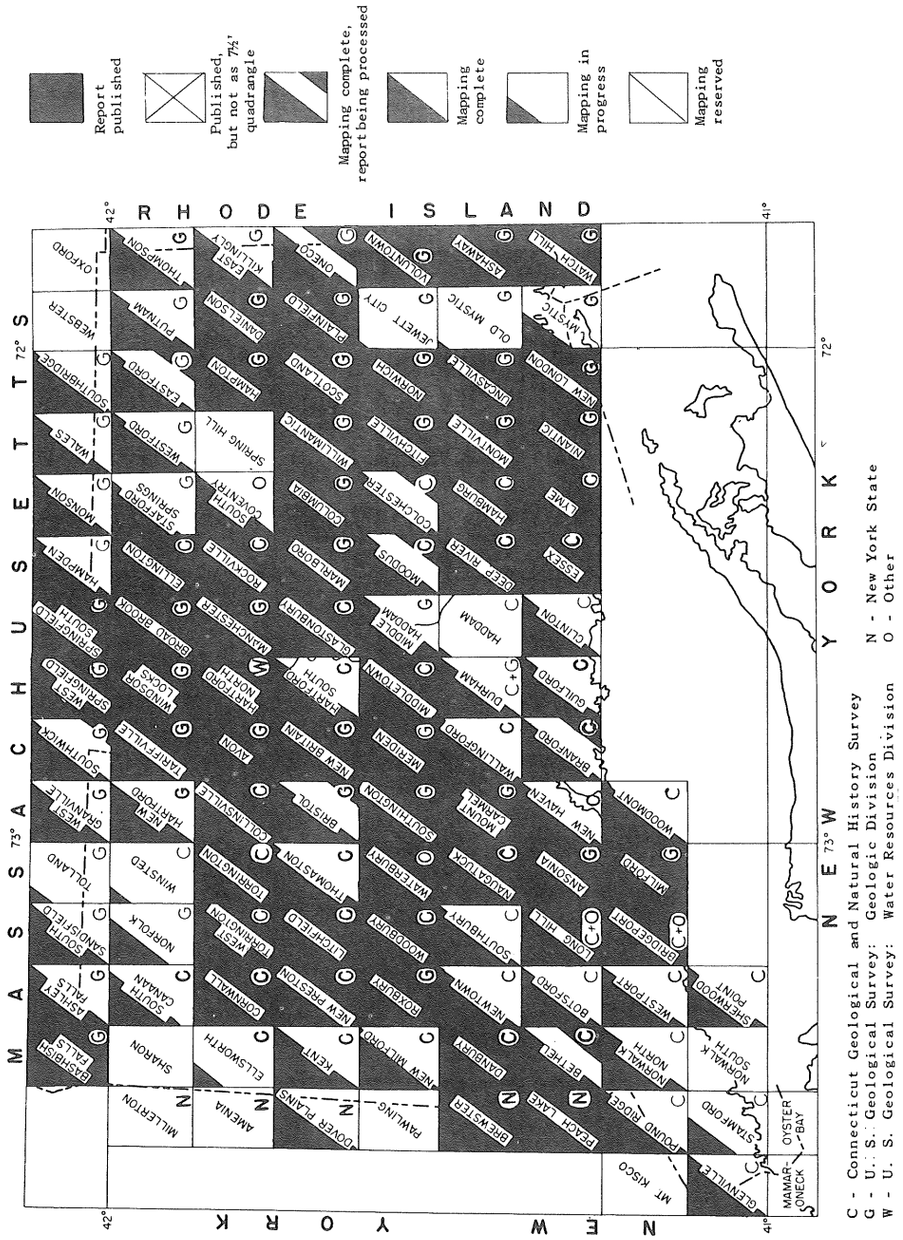

Fig. 3. Status of bedrock geologic mapping as of Jan. 1, 1971.

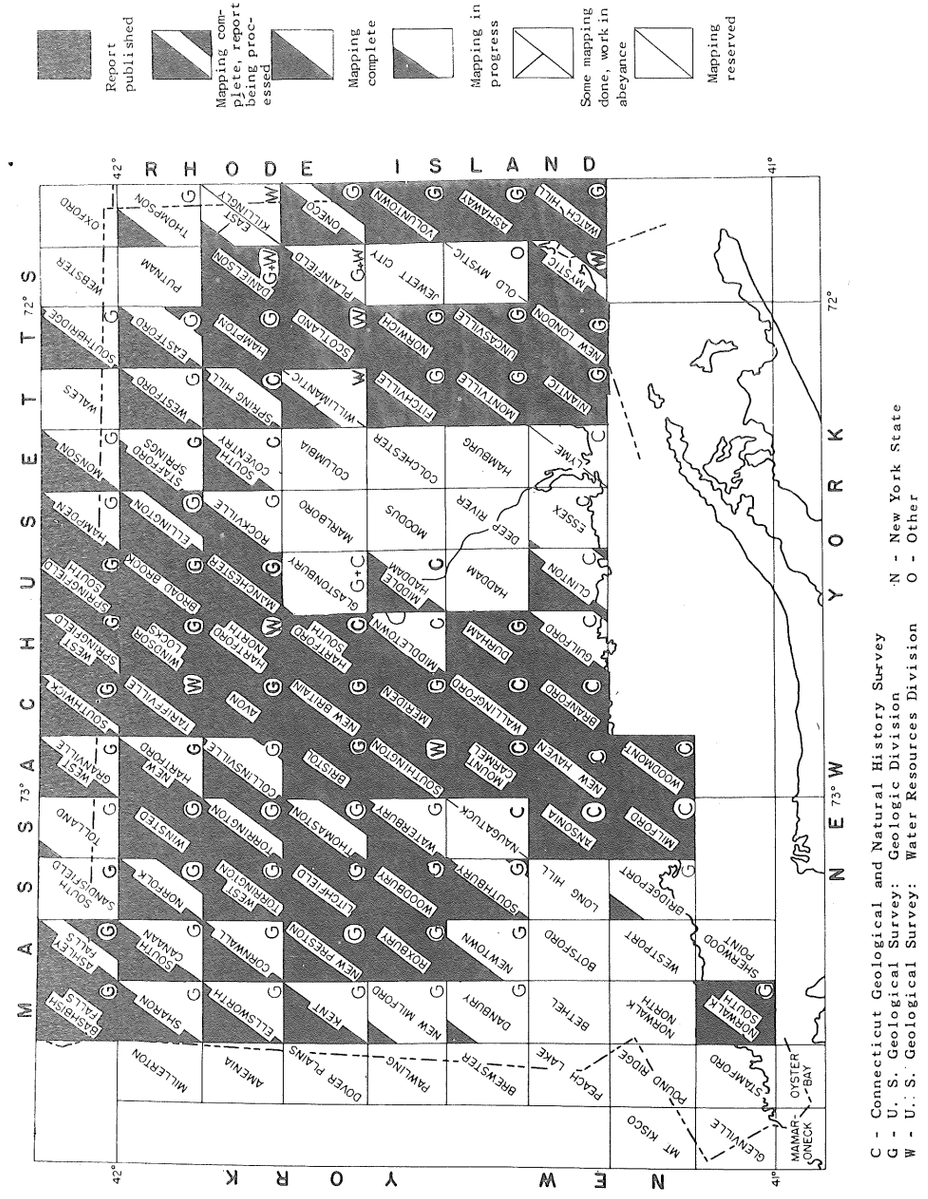

Fig. 4. Status of surficial geologic mapping as of Jan. 1, 1971.

Table 2. — Status of geologic quadrangle maps and manuscripts as of January 1, 1971

U.S. GEOLOGICAL SURVEY		*CONNECTICUT GEOLOGICAL AND NATURAL HISTORY SURVEY*	
Bedrock	*Surficial*	*Bedrock*	*Surficial*
	Published		
GQ-121 Roxbury	GQ-119 New Britain	MS-3 Litchfield	QR-10 Wallingford
GQ-134 Avon	GQ-137 Windsor Locks	MS-5 New Preston	QR-12 Mt. Carmel
GQ-144 Norwich	GQ-138 Uncasville	QR-3 Woodbury	QR-14 Branford
GQ-199 Mt. Carmel	GQ-145 Bristol	QR-4 Ellington	QR-18 New Haven and Woodmont
GQ-200 Southington	GQ-146 Southington	QR-5 Glastonbury	
GQ-223 Hartford North	GQ-147 Avon	QR-6 Rockville	QR-20 Hartford South
GQ-335 Willimantic	GQ-148 Montville	QR-7 Danbury	QR-23 Ansonia and Milford
Bull. 1161-I Fitchville	GQ-150 Meriden	QR-8 Middletown	
GQ-370 Tariffville	GQ-165 Norwich	QR-9 Naugatuck	
GQ-388 Windsor Locks	GQ-176 New London	QR-11 Cornwall	
GQ-392 Scotland	GQ-223 Hartford North	QR-13 Deep River	
GQ-403 Ashaway	GQ-329 Niantic	QR-15 Essex	
GQ-426 Ansonia	GQ-392 Scotland	QR-16 Collinsville	
GQ-427 Milford	GQ-410 Watch Hill	QR-17 West Torrington	
GQ-433 Manchester	GQ-433 Manchester	QR-19 Hamburg	
GQ-434 Broad Brook	GQ-434 Broad Brook	QR-21 Old Lyme	
GQ-436 Voluntown	GQ-468 Hampton	QR-22 Waterbury	
GQ-468 Hampton	GQ-469 Voluntown	QR-24 Long Hill and Bridgeport	
GQ-481 Plainfield	GQ-485 Fitchville	*QR-25 Torrington	
GQ-494 New Britain	GQ-507 Bashbish Falls		
GQ-507 Bashbish Falls	GQ-611 Roxbury		
GQ-537 West Springfield	GQ-660 Danielson		
GQ-574 New London	GQ-678 Springfield So.		
GQ-575 Niantic	GQ-712 Ashaway		
GQ-576 Uncasville	GQ-718 Norwalk So.		
GQ-592 Columbia	GQ-727 West Torrington		
GQ-609 Montville	GQ-756 Durham		
GQ-655 Watch Hill	*GQ-782 New Preston		
GQ-678 Springfield So.	*GQ-798 Tariffville		
GQ-696 Danielson	*GQ-848 Litchfield		
GQ-738 Meriden	*GQ-871 Winsted		
*GQ-791 Marlborough	*GQ-896 Woodbury		
	In press		
GQ-930 Oneco	GQ-891 Southwick	QR-27 Moodus and Colchester	
	GQ-892 West Springfield		QR-26 Spring Hill
	GQ-917 Oneco		
	GQ-936 Ashley Falls		
	GQ-939 Torrington		
	GQ-940 Mystic		
	GQ-965 Ellington		
	GQ-983 Norfolk		
	GQ-984 Thomaston		
	In review		
Eastford	Eastford	Clinton	
Bristol	Collinsville	Guilford	
	Southbury		

*Published in the years 1969 and 1970

Table 3. — Status of Connecticut geologic mapping based on the total of 4,882 square miles as of Jan. 1, 1971.

Bedrock mapped by U.S.G.S.	43%
Bedrock mapped by C.G. & N.H.S.	47%
Bedrock mapped by all agencies	90%
Surficial mapped by U.S.G.S.	55%
Surficial mapped by C.G. & N.H.S.	13%
Surficial mapped by all agencies	68%
Bedrock published by all agencies	52%
Surficial published by all agencies	38%

Table 4. — Summary of quadrangle geologic mapping in Connecticut (Connecticut Geological and Natural History Survey and U. S. Geological Survey)

	Bedrock			*Surficial*		
	1/1/67	1/1/69	1/1/71	1/1/67	1/1/69	1/1/71
Number of quadrangles covering state	111	111	111	111	111	111
Quadrangle maps published	37(33%)	50(45%)	54(49%)	25(22.5%)	35(31%)	40(36%)
Quadrangle maps in press	13	1	3	4	3	10
Quadrangle maps in review	2	3	3	11	11	6
Quadrangle maps for which field work completed	15	30	43	7	14	13
Quadrangles partly mapped	16	10	11	15	15	12
Total number of quadrangle maps completed at least through field-work stage	68(61%)	84(76%)	93(84%)	47(42%)	63(57%)	69(62%)

As can readily be seen the field work has progressed far ahead of publication in the last two years but the U.S.G.S. has 10 quadrangles in press and manuscripts on 16 others are either in review or in preparation. The State Survey has 3 quadrangles in press, 2 being edited, and expects to receive manuscripts on several others during 1971.

The U.S. Geological Survey has recently concentrated much of their mapping on the quadrangles bordering Massachusetts. The field work on this strip should be nearly completed during 1971. Surficial mapping has also been carried out in western Connecticut.

The bedrock geology of Connecticut is very complex and there are many uncertainties concerning the interpretation of structure and geologic history. Nevertheless, the maps furnish very important basic data useful for a great number of purposes, from hydrologic studies and urban planning to the geologic history of the area.

The surficial mapping has shown the distribution of glacial deposits, and the sediments deposited by the meltwater, as well as more recent deposits such as swamp deposits, and alluvium. In the Housatonic Valley of western Connecticut evidence of pre-glacial karst topography has been found. The cavernous structures may well have a bearing on ground water resources in the area. Changes of drainage have also been shown which are of great interest in interpreting past drainage history.

For the last several years a strong effort has been made to overcome the almost complete dearth of modern geologic mapping in southwestern Connecticut. Mapping of the bedrock was completed in the Norwalk North, Southbury, and Stamford quadrangles during the biennium and reports and maps on these quadrangles are in preparation. Reports on the Botsford, Glenville, Westport, and Newtown quadrangles are promised in the next year. There will remain only the Norwalk South quadrangle to map since Leo Hall has mapped the Connecticut parts of the Pound Ridge and Mount Kisco quadrangles and will prepare reports on these quadrangles after he has mapped the New York portions for the New York Science Service.

The geologic field activity of the Survey during the last two years is shown in table 1.

In addition to quadrangle mapping the Connecticut Survey supported two other geologic projects in 1970. D. G. Brookins, of Kansas State University, continued his geochronologic studies on the ages of pegmatites and other rocks in south central Connecticut. He will present some of his results at the meeting of the Northeastern Section of the Geologic Society of America in Hartford, March 18-20, 1971.

The need for studies of some of the mineral deposits of Connecticut has long been recognized. Dr. Wesley Bryers made a preliminary study of clay deposits. Through the cooperation of the Department of Transportation and the U.S. Geological Survey Water Resources Division samples of clay were collected in eastern Connecticut and arrangements are being made to have these tested by the U.S. Bureau of Mines. This project will be continued in 1971.

Aeromagnetic maps

The contours of an aeromagnetic map show variations in the earth's magnetic field. The magnetic data is collected by low altitude airplane flights with special instruments that measure the magnetic field. Local variations in the magnetic field are often caused by concentrations of magnetic minerals in the rock formations. Sometimes these variations delineate ore deposits of magnetic minerals, but more often they show the characteristic pattern of a specific rock type. The latter permits geologists to "see through" the soil and surficial materials, to identify various types of rock, and to plot the areas underlain by these rocks. In many instances the aeromagnetic maps have helped to direct the activities of field geologists and have significantly increased the accuracy of the geologic maps and reduced the amount of field work required. For example, the basalt or traprock that forms the prominent north-south ridges in central Connecticut has a characteristic magnetic pattern and the aeromagnetic maps clearly show the presence of this rock even though it is covered by other materials.

The U.S. Geological Survey has completed the flying of the whole State and compilation of all quadrangles is in progress. Aeromagnetic maps covering 56 quadrangles have been published, and the 12 quadrangles in press will be printed by July, 1971. The remaining maps are being compiled and will be ready for printing later in the year. As soon as all the quadrangle maps are published an aeromagnetic map of the entire state will be compiled on the scale of 1:125,000. See figure 5 for the status of aeromagnetic surveys as of Jan. 1, 1971.

Gravity map

Another geophysical tool valuable in interpreting subsurface relationships, the location of possible mineral deposits, and in interpreting geologic history is the gravimeter which measures variations in earth's magnetic field. A U.S. Geological Survey field party in 1967 completed a gravity survey of the southern half of Connecticut. In 1968 R. W. Bromery of the University of Massachusetts continued this study in northern Connecticut. He has now completed the survey and is compiling a map on the scale of 1:125,000 to be published in cooperation with the U.S. Geological Survey.

Radar map

Remote sensors of various kinds are being applied increasingly to aid earth problems. The radar is a new tool for earth scientists. The U.S. Geological Survey has a radar map of Connecticut and Massachusetts which will be on display in Hartford at the March meeting of the Northeastern Section of the Geological Society of America. Both east- and west-looking "aerial photographic" maps have been made. Large-scale bedrock and surficial features are visible and these maps in conjunction with other information should aid greatly in interpreting the complex geology of Connecticut. They are expected to be particularly helpful in locating probable faults.

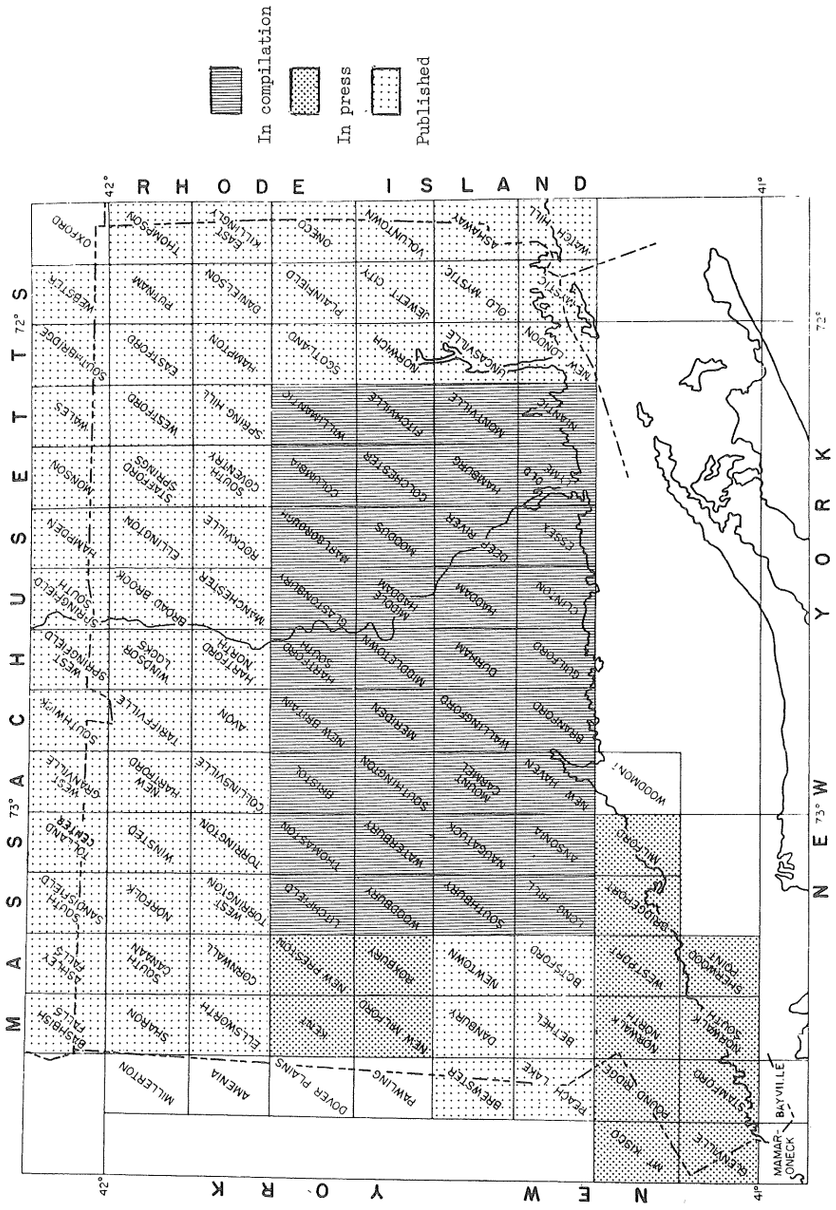

Fig. 5. Status of aeromagnetic surveys as of Jan. 1, 1971.

Environmental geology

In recent years there has been much discussion about problems of the environment, and for some time many state geological surveys have been actively working on urban and environmental problems. Illinois, Kansas, California, and Texas have done notable work in this area. The report by the Illinois Survey on McHenry County has already become a classic in illustrating how information on basic geology, soils, hydrology, etc., when combined, can be used very effectively in planning. The U.S. Geological Survey announced in 1969 a $3,000,000 environmental study with HUD of the San Francisco Bay Region. At the same time they announced they wished to choose other areas for pilot studies of this type. Six other areas were chosen in 1970 for initiation of pilot studies: Connecticut Valley, Pittsburgh, Denver, Phoenix, Baltimore-Washington, and Puget Sound. Discussions have been held on the plan for the Connecticut Valley project. One reason for the choice of this area was the availability of good geologic maps, especially surficial maps so essential to understanding environmental problems. The U.S.G.S. is prepared to make a grant of funds to the State Survey provided an equal amount of state services can match this grant. These urban pilot studies will involve all parts of the Federal Survey, not primarily one division as is true of most of their cooperative programs. State and local agencies must be involved broadly to make the study successful.

The U.S. Geological Survey has chosen to start the project in Hartford where bedrock and surficial mapping, water and soil studies, are available. Working with various groups they will seek new ways to present data for use by planners, legislators, engineers, contractors, and the general public. Slope maps and maps showing thickness of unconsolidated materials are just some of the new types of maps being considered. Additional data on chemistry of rocks, soils, and ground water will be required. It is expected that a long range plan will be prepared in 1971. In the meantime the U.S.G.S. and the State Survey are pressing the basic mapping under their continuing cooperative program since these maps will be essential in the environmental program.

Tentatively a strip bordered by 72°7½′ W and 73° W longitude has been chosen for the Connecticut Valley project. Since the kinds of maps already in progress are the raw material for the new environmental approach, effort will be made this year to complete mapping underway in the corridor and also to participate with the U.S.G.S. in work on new modes of interpretation.

Cooperation with other agencies and with universities

The Survey has continued its close contact and exchange of information with geologists working on the groundwater problems of the State in the cooperative program between the State Water Resources Commission and the U.S. Geological Survey. Dr. Flint's mapping along the Long Island Sound is in part planned to give basic data which will be needed in the water inventory study of the lower Connecticut River.

The need for multidisciplinary studies has long been apparent and at several summer conferences on geology the possibility of products other than present maps has been discussed. For more than a year an *ad hoc* group including geologists, soil scientists, planners, etc. (from the University of Connecticut, Soil Conservation Service, the U.S. Geological Survey, State Geological and Natural History Survey, Highway Division of the Department of Transportation, the Connecticut Agricultural Experiment Station, and the Office of State Planning) has met from time to time to discuss ways to produce integrated products. The primary purpose was to consider ways and means by which pertinent scientific and technical data, derived from geologic, hydrologic, and soils investigations, can be correlated, integrated, and presented in concise but easily understood, readable form which can be conveniently used by persons who may or may not have specific training in the earth sciences, but who have responsibility in the decision-making aspects of such activities as town planning, formulation and/or administration of zoning regulations, maintenance of public water supplies, pollution studies and control, etc.

CONFERENCE ON CONNECTICUT GEOLOGY

The annual Conference on Connecticut Geology was held in Middletown on July 30 and 31 in 1970. The first day an open meeting was held with emphasis on exploration of geology, its use in environmental geology, and the interrelationships with other disciplines. In addition to the geologists working directly on problems in Connecticut, members of the Soil Conservation Service, the Agricultural Experiment Station, the Water Resources Commission, State Department of Health, Bureau of Highways, regional planners, geologists, engineers, and chemists from various universities were present. In the afternoon, James R. Balsley of Wesleyan University and Assistant Director of the U.S. Geological Survey, spoke on the new environmental program of the Federal Survey and the new types of products they hope to produce in cooperation with HUD and other state agencies. Reference was made to the pilot study of the San Francisco Bay Area already underway. The U.S.G.S. in planning to do several other pilot areas if granted the funds is considering the Connecticut Valley as an area of interest. A strong point in its favor is the considerable amount of basic geologic and hydrologic work already done.

On July 31 small groups of geologists met to discuss special problems of several general areas. One half day session was spent on the bedrock problems of eastern Connecticut and alternate interpretations of the stratigraphy and structure of that area. Some believe in a great fold with the sequence in part of the area reversed from its original position. The same distribution is explained by a number of faults without reversal of sequence on a large scale. Until critical evidence is obtained both views will have to be kept in mind.

The group discussion of the bedrock problems of western Connecticut had a similar difference of view in some of the stratigraphic-structural problems. A field conference in critical areas after the gravity and aeromagnetic maps are available may help to resolve the problem before the final completion of the state map.

One group reviewed the progress in mapping the glacial geology of western Connecticut. A possible pre-Wisconsinan glacial lake which extended into Massachusetts was described as well as a complex series of small lakes which presumably drained south down the Housatonic River but may have drained into New York State. Farther south, in the area from New Milford to Danbury, a system of several glacial lakes was described in the Still River Valley.

In another conference geologists who have worked in the quadrangles included in the corridor along which the replacement of Route 44 might be located, met with Harry Siebert of the Dept. of Transportation to discuss the geologic problems which might bear on highway planning.

WORK ON CONNECTICUT GEOLOGY

In addition to university personnel engaged in work for the State Survey, other research on geologic problems in Connecticut is being carried out at a number of institutions both in and out of the State. In past biennial reports mention of some of the projects which came to our attention was made and we have learned that in several cases cross-fertilization of research was a direct result. Again we include a list with no claim to completeness.

Brooklyn College graduate students:

Blackbeer, L., Triassic dinosaur tracks at Granby, Massachusetts.

University of Connecticut, Marine Sciences Institute staff:

Dowling, J., Geophysical investigations of Block Island, Fishers Island, and Long Island Sound.

University of Connecticut staff:

Aitken, J., Bedrock geology of the South Coventry and Spring Hill quadrangles.

Thomas, H., Translation of natural resource data into potential land/water use data along a section of the Willimantic River.

Earlham College undergraduates:

Pigage, L., Bedrock geology of a portion of the Winsted quadrangle.

Tuttle, C., Geological investigation of the Canaan Mountain allochthon.

Williams, P., Bedrock geology of a portion of the Winsted quadrangle.

Edinboro State College staff:

Bryers, W., Mineralogy and potential uses of clay deposits in the Quinebaug River Basin and in West Cornwall, Connecticut.

Franklin and Marshall College undergraduates:

McDonald, N., Paleontology and paleoecology of a Triassic black shale near Durham, Connecticut (senior thesis). W. Cornet, a graduate student at the University of Connecticut, has been working on this project also.

Kansas State University staff:

Brookins, D., and Methot, R., Continuing studies in geochronology in Connecticut.

University of Massachusetts graduate students:

Kroll, R., Structure and petrology of the northern part of the Barndoor intrusions, north central Connecticut. (Masters thesis)

University of North Carolina staff:

Weigand, P., and Ragland, P., Geochemistry of Mesozoic dolerite dikes from eastern North America. (Contr. Mineral. and Petrol., v. 29, 1970)

University of Pennsylvania staff:

Klein, G., Deposition of Triassic sedimentary rocks in separate basins, eastern North America. (G.S.A. Bull., v. 80, Sept. 1969)

University of Rochester staff:

Lundgren, L.

1) The Honey Hill fault zone in eastern Connecticut.
2) Deformation of the Hebron Formation in the Honey Hill fault zone.

University of Rochester graduate students:

Ebblin, C., The Honey Hill fault zone between Gardner Lake and the Preston Gabbro.

Thurrell, R., Amphibole assemblages in the Guilford and Clinton areas, Connecticut.

Syracuse University graduate students:

Frank, C., Relationships between coexisting plagioclase and hornblende in the Harrison gneiss in southwestern Connecticut.

Kelley, G., Deglaciation of the Housatonic River Valley in northwestern Connecticut.

University of Vermont graduate students:

Caldwell, K., Analysis of selected minerals in pelitic schist in the Newtown quadrangle.

Wesleyan University staff:

deBoer, J.

1) Continuation of work on the paleomagnetism of the Connecticut Triassic rocks with graduate and undergraduate students.
2) Paleomagnetic dating on the Westerly Granite, Narragansett Pier Granite, Nonewaug Granite, and pegmatites in the Middletown area.

Wesleyan University graduate students:

Apps, W., Study of rounding of granite cobbles in Long Island Sound at the old granite quarry at Millstone Point.

Haeni, F., Seismic investigations on the bedrock channel of the Connecticut River at Middletown, Middle Haddam, and Old Saybrook.

Pond, L., Paleomagnetic and stratigraphic study of the Triassic rocks in the Pomperaug Valley.

Wesleyan University undergraduates:

Larkins, G., Wibberly, J., and Zajac, M., An analysis of magnetic anomalies in the Kent and Cornwall areas and their relationship to previously worked iron deposits in the same area.

Western Connecticut State College staff:

Groff, D., Continuous monitoring of the dissolved oxygen concentrations in the Still River and a microbiological profile of organic pollutants.

University of Wisconsin graduate students:

Brauner, M., Petrologic study of the Housatonic Highlands gneiss and the Dalton Formation in the South Canaan quadrangle. (Masters thesis)

Yale University staff:

Armstrong, R., and Besancon, J., A Triassic time scale dilemma: K-Ar dating of Upper Triassic mafic igneous rocks, eastern U.S.A. and Canada and post-Upper Triassic plutons, western Idaho, U.S.A. (Eclogae Geol. Helv., 63, April 1970)

Berner, R., and others, Carbonate alkalinity in the pore waters of anoxic marine sediments. (Limnology and Oceanography, v. 15, no. 4, July, 1970)

Galton, P., A study of the Upper Triassic dinosaurs of the Connecticut Valley.

Godchaux, M., and Orville, P., Microcline and orthoclase-bearing pegmatites, southeastern Connecticut. (Abst. EOS, v. 51, no. 4, 1970)

Gordon, R., A study of the physics of near shore processes in coastal Connecticut.

Rhoads, D.

1) Animal sediment relationships in Long Island Sound.
2) Deepwater oyster aquaculture in Long Island Sound.
3) Use of Long Island Sound as a source of ceramic construction material.

Yale University graduate students:

Hewitt, D., An experimental and field investigation of the progressive metamorphism of micaceous limestones. (Ph.D. thesis)

Lewis, D., Petrology and geochronology of the Mount Prospect Complex.

Seideman, D., Geochronometric studies in the Waterbury Dome area.

NATURAL HISTORY PROGRAM

Publications

Bulletin 103, "Connecticut's Venomous Snakes" by Richard C. Petersen, is a description of the Timber Rattlesnake and the Northern Copperhead written for the layman. This useful report is the first Survey publication with full-color plates. A bulletin on saltwater fishes of Connecticut, now being edited, will be a companion to "Freshwater Fishes of Connecticut" published in 1968.

Entomology

For a number of years Dr. Charles L. Remington has planned and edited the distinguished series of entomology bulletins. No manuscripts have been available for publication in the last two years, but work on the stoneflies and dragonflies is nearing completion.

The Advisory Committee of the Connecticut Entomological Society met on March 3, 1970 to review the status of entomological projects in progress and they established some priorities for additional projects as follows:

1. *Diptera of Connecticut:* Since this series has been underway for many years every effort should be made to continue.

2. *Aquatic insects:* Because of the importance of these insects in biotic food chains as indicators of pollution and water types, the Committee feels that priority should be given to reports covering these groups.

3. *Hemiptera:* The Committee recommends a new revised edition of the 1923 bulletin on this group.

The Committee also recommended the inauguration of Survey sponsored field work to gather material for future entomological bulletins. Two recommended field projects were given financial support in the summer of 1970.

Ecology

The program of studying the vegetation pattern in the natural areas of the State was described in the Thirty-first Biennial Report. Manuscripts for two natural areas, Devil's Den and Canaan Mountain, are near completion.

In 1969 the Legislature passed Public Act No. 727 establishing a Connecticut System of Natural Area Preserves to be administered by the State Park and Forest Commission. The Act also provided for the creation of a Natural Area Preserves Advisory Committee to advise the Commission in the selection and management of the preserves.

The Advisory Committee needed the services of a biologist to survey and evaluate certain habitat types for suitability as natural areas. The Geological and Natural History Survey employed Dr. Terry Webster to carry out this assignment under the direction of the State Forester, Harry McKusick, Chairman of the Advisory Committee. In 1970 Dr. Webster surveyed the major white-cedar swamps within the State and submitted his preliminary report to the Advisory Committee.

Natural History Conference

A Survey sponsored Conference on the Natural History of Connecticut was held on October 24, 1970 at Connecticut College with forty four in attendance. A general session was followed by separate sessions on zoology, botany and marine biology. The conference was called to pool ideas and arrive at a consenus of opinion as to the course of the

natural history program, but the gathering also provided a much needed opportunity for the exchange of information.

Publication priorities were discussed at length and recommendations concerning the taxonomic series were made. Also, it was generally agreed that the Survey should publish non-technical guides to natural areas and state parks, as such booklets, dealing with the total habitat, could be useful and popular.

The recommendation for a comprehensive book on the natural environment of Connecticut met with approval. Such a book would contain short, but complete and accurate discussions of geography, geology, climate, water resources, flora, fauna, etc., with bibliographies. This could serve as a ready reference and source of information for students, teachers, and scientists.

The problem of the lack of facilities for natural history collections received considerable discussion. The systematic study of the plants and animals should, in part, be based on representative collections from all over the state to provide reliable data on distribution. Such collections are an important monitoring service of the natural environment. The group felt that the natural history function of the State Survey could include financial support for a research museum and a curator.

Work on natural history in Connecticut

In addition to the work financed by the Survey, biological and ecological studies concerning Connecticut are being carried out at a number of places. The following list, although far from complete, indicates the scope of work being done.

Connecticut College staff:

Niering, W.
1) Prescribed burning in field and forest communities of Connecticut.
2) Management of vegetation with herbicides.
3) Long range vegetation studies in Connecticut Arboretum.

University of Connecticut staff:

Pfeifer, H., A flora of Connecticut with keys for the identification of the native and introduced ferns and seed plants of the State with habitat notes and distributions in the cases of rare and unusual plants.

Stage, G., Pollination ecology of the North American species of *Lysimachia* (loosestrife), with current emphasis on Connecticut species.

Whitworth, W.
1) Anadromous fish study, Thames River survey.
2) Effects of temperature, dissolved oxygen, alum and salinity on white perch.
3) Age and growth of Connecticut fishes.

University of Connecticut staff and graduate students:

Schaefer, C., Neudeck, L., and Brown, R., A study of various aspects of the physiological ecology of rocky-shore snails, genus *Littorina.*

University of Connecticut graduate students:

Handler, G., Quantitative survey of benthic fauna of Beebe Cove, Noank, Conn., in connection with a study of the ecology of ophiuroids.

University of Hartford staff:

Maguder, T., Woodcock study program in Connecticut, breeding behavior and population dynamics.

University of Rhode Island staff:

Krueger, W., Systematic review of the stickleback fishes of the western North Atlantic.

Trinity College staff:

Brewer, R.
1) The population ecology of *Nassarius* (the mud snail), Beebe Cove, Noank, Conn.
2) Physical/chemical and faunal survey of the Farmington River and selected tributaries.

Wesleyan University undergraduates:

Yager, D., Survey of agricultural and forest soils for organisms able to degrade chlorinated hydrocarbon insecticides.

Yale University School of Forestry staff:

Voigt, G. K., Calcium uptake by white pine and red cedar in relation to old field succession in northwestern Connecticut.

National Marine Fisheries Service, Sandy Hook Sport Fisheries Marine Laboratory staff:

Azarovitz, T., Aerial surveys of surface water temperature in the discharge area of steam-electric stations using infrared detection techniques, Millstone Point, Conn., and Connecticut River.

Kendall, A., Smith, W., Berrien, P., and Fahay, M., Early life history of Atlantic coastal game fish.

Talcott Mountain Science Center staff:

Crawford, J., and Heisler, G., Natural history survey of two proposed pumped-storage hydroelectric project sites in northwestern Connecticut and southwestern Mass.

U.S. Bureau of Sport Fisheries and Wildlife, Hartford office staff:

Gustafson, R. D., The testing of chemicals and methods for control of pine mice populations in orchards.

U.S. Forest Service, Forest Insect and Disease Laboratory, Hamden staff:

Godwin, P., A continuing study of the physiology and genetics of forest insects of the northeast in relation to the ecology and control.

Houston, D., A continuing study of diebacks, declines and physiogenic disorders of northeastern forest trees.

Williams, C. B., Jr., A continuing study of the total impact of destructive insects on northeastern forests.

FINANCES

The appropriations for fiscal years 1956-1971 are shown in table 5. A financial statement for the period from July 1, 1968 to June 30, 1970 is given in table 6. The expenditures for printing were lower in both fiscal years than anticipated. Scheduling publication is very difficult since all the authors have other major obligations to their universities and frequently take longer to complete maps and manuscripts than expected. The fiscal year ending June 30, 1971 will see a longer list of publications, and many manuscripts are expected to be delivered during the next 12 months.

Table 5. — Appropriations 1956-1971 (Fiscal Year)

Year[1]	*Appropriation*	*Cooperative State Funds*	*Cooperative Federal Funds*
1956	$23,930	$20,000	$20,000
1957	16,535	20,000	20,000
1958	30,250	40,000	40,000
1959	32,250	40,000	40,000
1960	30,208	40,000	40,000
1961	27,513	40,000	40,000
1962	22,012	40,000	40,000
1963	22,114	40,000	40,000
1964	30,520	40,000	40,000
1965	28,645	40.800	40.800
1966	56,130	76,000	76,000
		30,000[2]	30,000[2]
1967	63,401	75,000	75,000
1968	65,434	75,000	75,000
1969	94,486	75,990	75,990
1970	92,092	75,000	75,000
1971	100,263	75,000	75,000

[1]Ending July 1
[2]Appropriation for state topographic map

Table 6. — Financial statement, biennial period, July 1, 1968 to June 30, 1970

Income	*Expenditure*	
	1968-1969	
Appropriation, $93,713	Salaries	$25,181
Cooperative with U.S. Geological Survey, $75,990	Fees	17,950
	Printing	8,129
Capital expenditure, $771	Dues	35
	General repairs	134
	Travel	5,243
	Sundry	7,830
	Office expenses	597
	Maps	2,083
	Motor vehicle rental	668
	Clothing	80
	Miscellaneous	416
	Total	$68,346
	Reimbursement from sales	5,981
	Total expenditure	$62,365
	1969-1970	
Appropriation, $88,192	Salaries	$28,477
Cooperative with U.S. Geological Survey, $75,000	Fees	19,604
	Printing	10,865
Capital expenditure, $500	Dues	48
	General repairs	233
	Travel	6,690
	Sundry	4,445
	Office expenses	202
	Maps	336
	Motor vehicle rental	1,236
	Clothing	66
	Postage	223
	Miscellaneous	279
	Total	$72,703
	Reimbursement from sales	3,768
	Total expenditure	$68,935
	1970-1971	
Appropriation, $99,263		
Cooperative with U.S. Geological Survey, $75,000		

APPENDIX

Statutes creating the Connecticut Geological and Natural History Survey, and amendments thereto

Sec. 24-1. 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 and a member of each of the faculties of Yale University, Wesleyan University, Trinity College, The University of Connecticut and the Connecticut College for Women. Each appointed commission member shall be designated by the president or other administrative head of the institution from whose faculty the member is drawn. Each person so designated, upon acceptance of such office, shall serve as such commissioner without further appointment until his removal from the state, death or resignation, unless sooner removed for cause. Any vacancy occurring in the membership of the commission shall be filled by a new designation by the president or other administrative head of the institution from whose faculty the vacated membership was originally drawn. Said commissioners shall have general charge of the survey, and shall choose as superintendent of the same one of the appointed members of the commission, and may appoint such assistants as may be necessary. The compensation to be paid such superintendent and such assistants shall be determined pursuant to the provisions of section 4-40. Each member of the commission shall serve without compensation, but shall be reimbursed for expenses incurred in the performance of official duties, except that the superintendent of said commission shall be compensated in the manner herein above prescribed. (1949 Rev., S. 3542.)

Sec. 24-2. 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. (1949 Rev., S. 3543.)

Sec. 24-3. Reports; distribution and sale. Said commissioners shall cause to be prepared a report to the general assembly before each regular session of the same, showing the progress and conditions of the survey, together with such other information as they deem useful or as the general assembly requires. The regular and special report 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. (1949 Rev., S. 3544.)

Sec. 24-4. Disposition of material collected. All material collected, after having served the purposes 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. (1949 Rev., S. 3545.)

Superintendents and Directors of the Connecticut Geological and Natural History Survey

Superintendent or Director	Location of Survey Office	Dates
William North Rice	Wesleyan University	1903-16
Herbert Ernest Gregory	Yale University	1916-21
Henry Hollister Robinson	Yale University	1921-25
Wilton Everett Britton	Connecticut Agricultural Experiment Station	1925-39
Edward Leffinwell Troxell	Trinity College	1939-54
John Becker Lucke	University of Connecticut	1954-60
Joe Webb Peoples	Wesleyan University	1960-

Publications of the Connecticut Geological and Natural History Survey, Jan. 1, 1969 to Jan. 1, 1971

PUBLISHED

Bulletin series

Bulletin 102. Thirty-third Biennial Report of the Commissioners of the State Geological and Natural History Survey

Bulletin 103. Connecticut's Venomous Snakes, by Richard C. Petersen

Bulletin 84. (Reprint) Explanatory Text for Preliminary Geological Map of Connecticut, by John Rodgers, R. M. Gates, and J. L. Rosenfeld

Bulletin 96. Fossils of the Connecticut Valley, by Edwin H. Colbert, revised edition

Quadrangle maps and reports

QR. 25. The Bedrock Geology of the Torrington Quadrangle, by Charles W. Martin

Guidebooks

3. Stratigraphy and Structure of the Triassic Strata of the Gaillard Graben, South-Central Connecticut, by John E. Sanders

List of Publications 1969

Report of Investigations series

RI 5. Contributions to Geochronology in Connecticut, by R. L. Armstrong, and others

IN PRESS

Bulletin series

Bulletin 104. Thirty-fourth Biennial Report of the Commissioners of the State Geological and Natural History Survey

Quadrangle maps and reports

QR 26. The Surficial Geology of the Spring Hill Quadrangle, by Perry H. Rahn

QR 27. The Bedrock Geology of the Moodus and Colchester Quadrangles, by Lawrence Lundgren, and others

List of Publications 1971

Publications of the U.S. Geological Survey in Cooperative Program with the Connecticut Geological and Natural History Survey, Jan. 1, 1969 to Jan. 1, 1971

PUBLISHED

Geologic Quadrangle series

GQ-782. Surficial Geology of the New Preston Quadrangle, by Roger B. Colton.

GQ-791. Bedrock Geology and Magnetic Maps of the Marlborough Quadrangle, by George L. Snyder

GQ-798. Surficial Geology of the Tariffville Quadrangle, by Allan D. Randall (Cooperative with Connecticut Water Resources Commission)

GQ-848. Surficial Geology of the Litchfield Quadrangle, by Charles R. Warren

GQ-871. Surficial Geology of the Winsted Quadrangle, by Charles R. Warren

GQ-896. Surficial Geology of the Woodbury Quadrangle, by Fred Pessl, Jr.

IN PRESS

Geologic Quadrangle series

GQ-891. Surficial Geology of the Southwick Quadrangle, by Robert W. Schnabel.

GQ-892. Surficial Geology of the West Springfield Quadrangle, by Roger B. Colton and Joseph H. Hartshorn.

GQ-917. Surficial Geology of the Oneco Quadrangle, by D. Harwood and R. Goldsmith.

GQ-930. Bedrock Geology of the Oneco Quadrangle, by D. Harwood and R. Goldsmith.

GQ-936. Surficial Geology of the Ashley Falls Quadrangle, by W. Holmes and W. Newman.

GQ-939. Surficial Geology of the Torrington Quadrangle, by Roger Colton.

GQ-940. Surficial Geology of the Mystic Quadrangle, by J. Upson.

GQ-965. Surficial Geology of the Ellington Quadrangle, by Roger Colton.

GQ-983. Surficial Geology of the Norfolk Quadrangle, by Charles Warren.

GQ-984. Surficial Geology of the Thomaston Quadrangle, by Charles Warren.

U.S. Geological Survey publications not part of the Cooperative Program, but dealing with Connecticut geology, Jan. 1, 1969 to Jan. 1, 1971

PUBLISHED

Geophysical Investigations

GP-640. Aeromagnetic Map of the Sharon Quadrangle and Parts of the Ellsworth and Bashbish Falls Quadrangles

GP-641. Aeromagnetic Map of the South Canaan Quadrangle and Parts of the Cornwall and Ashley Falls Quadrangles

GP-642. Aeromagnetic Map of the Norfolk Quadrangle

GP-643. Aeromagnetic Map of the Winsted Quadrangle and Parts of the Torrington and Tolland Center Quadrangles

GP-644. Aeromagnetic Map of the New Hartford Quadrangle

GP-645. Aeromagnetic Map of the Tariffville Quadrangle

GP-646. Aeromagnetic Map of the Windsor Locks Quadrangle and Part of the Hartford North Quadrangle

GP-647. Aeromagnetic Map of the Broad Brook Quadrangle and Part of the Manchester Quadrangle

GP-648. Aeromagnetic Map of the Ellington Quadrangle

GP-649. Aeromagnetic Map of the Stafford Springs Quadrangle and Part of the South Coventry Quadrangle

GP-650. Aeromagnetic Map of the Westford Quadrangle and Part of the Spring Hill Quadrangle

GP-651. Aeromagnetic Map of the Eastford Quadrangle

GP-652. Aeromagnetic Map of the Putnam Quadrangle.

GP-653. Aeromagnetic Map of the Thompson Quadrangle and Part of the East Killingly Quadrangle

IN PRESS

GP-816. Aeromagnetic Map of the Kent Quadrangle

GP-817 Aeromagnetic Map of the New Preston Quadrangle

GP-818. Aeromagnetic Map of the New Milford Quadrangle

GP-819. Aeromagnetic Map of the Roxbury Quadrangle

GP-820. Aeromagnetic Map of the Mount Kisco Quadrangle

GP-821. Aeromagnetic Map of the Pound Ridge Quadrangle

GP-822. Aeromagnetic Map of the Norwalk North Quadrangle

GP-823. Aeromagnetic Map of the Westport Quadrangle

GP-824. Aeromagnetic Map of the Bridgeport and Milford Quadrangles

GP-825. Aeromagnetic Map of the Glenville Quadrangle

GP-826. Aeromagnetic Map of the Stamford Quadrangle

GP-827. Aeromagnetic Map of the Norwalk South and Sherwood Point Quadrangles

Publications of the Connecticut Water Resources Commission, Jan. 1, 1969 to Jan. 1, 1971

PUBLISHED

Bulletin 17. Water Resources Inventory of Connecticut, Part 4, Southwestern Coastal River Basins, by R. B. Ryder, M. A. Cervione, Jr., C. E. Thomas, Jr., and M. P. Thomas.

Bulletin 18. Hydrogeologic Data for the Southwestern Coastal River Basins, Connecticut, by M. P. Thomas, R. B. Ryder, and C. E. Thomas, Jr.

Bulletin 20. Hydrogeologic Data for the Lower Housatonic River Basin, Connecticut, by I. G. Grossman and W. E. Wilson.

Bulletin 22. Hydrogeologic Data for the Upper Housatonic River Basin, Connecticut, by R. L. Melvin.

Bulletin 23. A Proposed Streamflow Data Program for Connecticut, by M. P. Thomas and M. A. Cervione, Jr.