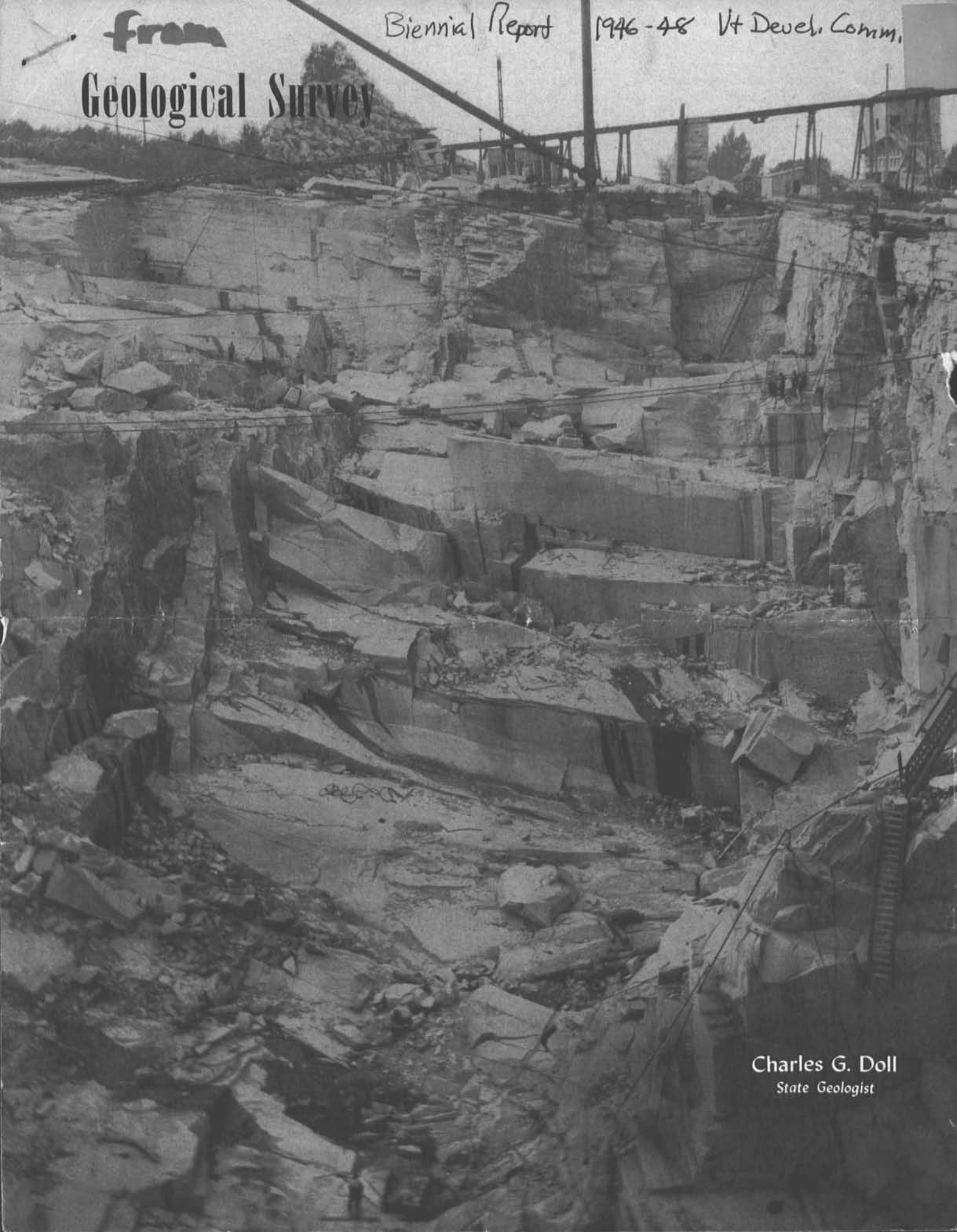
from

Biennial Report 1946-48 Vt Devel. Comm.

Geological Survey



Charles G. Doll
State Geologist

before the magazine could be produced on a regular and reputable basis. *Vermont Life* is admittedly published on a shoe string. The only other comparable magazine in the United States operates on a budget many times in excess of that available for *Vermont Life*. Yet Vermonters are accustomed to doing a great deal with small resources and the magazine proposes to continue without the excessive overhead which has normally accompanied magazine production. We are hopeful that an unsatisfactory method of operation can be rectified, so that the magazine may continue to expand its circulation and thus its influence, and that thereby it may improve its quality as well as its quantity.

The Editor-in-Chief throughout its existence has been Earle Newton. Mr. Henry Norton of Rutland was retained as business manager on a full time basis when it was originally presumed that advertising would be accepted. When decision was made to the contrary, Mr. Norton's appointment was terminated and for a considerable period the magazine operated without a business manager. As circulation increased, it became obvious that excessive handling costs on this aspect of the magazine could be conquered only by an efficient and streamlined circulation supervision. Mr. Walter R. Hard, Jr., came to the Development Commission as publicist in mid-1947, and was detailed half time in the position of Business Manager. His activities since that date have effectively reduced the confusion in subscription handling. Mrs. Joan McLeod has served as a most competent circulation assistant since the founding of the magazine. The magazine now operates with an editor half time, and in the business division, a business manager half time, a circulation assistant full time, and 2 to 3 clerical assistants. It is hoped that by further mechanization of circulation handling, the over balanced staffing on the circulation end of the magazine can be offset.

VERMONT LIFE

Disbursements

	Apr. 25, 1946 to June 30, 1946	July 1, 1946 to June 30, 1947	July 1, 1947 to June 30, 1948	*Total* Apr. 25, 1946 to June 30, 1948
Salaries	$921.95	$2,417.10	$7,896.42	$11,235.47
Travel	76.76	659.25	460.86	1,196.87
Postage, Telephone, Express	.....	580.12	1,365.58	1,945.70
Addressing Supplies	.....	.....	792.50	792.50
Printing	220.44	13,104.86	24,886.05	38,283.35
General Plates	.....	4,873.53	10,285.00	15,158.53
Paper	.....	5,750.29	14,466.97	20,217.26
Photography & Art Work	21.02	320.96	1,037.34	1,379.32
Writers' Fees, Photo Prizes	.....	.....	694.66	694.66
Miscellaneous	.....	15.80	138.56	154.36
Total Disbursements	$1,240.17*	$27,721.91*	$62,023.94	$90,986.02

Receipts

	Apr. 25, 1946 to June 30, 1946	July 1, 1946 to June 30, 1947	July 1, 1947 to June 30, 1948	*Total* Apr. 25, 1946 to June 30, 1948
To State Treasurer	$00.00	$14,597.14	$45,867.17	$60,464.31
Cash on Hand June 30, 1948	.....	.....	73.96	73.96
Accounts Receivable June 30, 1948	.....	.....	.....	1,493.00
Total Receipts	$00.00	$14,597.14	$45,941.13	$62,031.27
Total Disbursements to June 30, 1948				$90,986.02
Total Receipts (Less inventory) to June 30, 1948				62,031.27
Total Operating Deficit for 2 Years, 2 Months				$28,954.75

*From Publicity appropriation.

Walter Hard, Jr., *Business Manager*

General Statement

When the Geologist came into office on July 1, 1947, he was engaged in mapping the Jay Peak quadrangle, a continuation of work begun the previous year. It was already late in the season to get new projects started, largely because geologists are rarely available during the field season. Completion of the Jay Peak quadrangle will require more field work, as the mountainous terrain is heavily wooded and the geology is very complex.

An exhibit of rocks and minerals of economic value, at the Eastern States Exposition in September, produced much favorable comment. The success of this exhibit has led to the installation in the spring of 1948 of a similar but permanent display in the Fleming Museum at the University of Vermont.

The summer field season of 1948 began about three weeks before the close of the fiscal year. At this time geological mapping was begun on the Rochester and East Middlebury quadrangles. Work on the Castleton quadrangle will be completed this fall.

The survey of ground water and lakes was also underway. In order to carry on the lake work efficiently the purchase of an outboard motor was necessary. This has facilitated the work greatly and made possible more accurate results than could otherwise have been obtained, since with it, drifting from a located contour point could be prevented. A 360-foot sounding line with lead constituted the other major item of equipment. After the technique of sounding was perfected and a suitable method of procedure developed, surveying of the lakes was begun. By the end of the three-months season it is anticipated that about 20 lakes in northeastern Vermont will have been completed, depending upon the division of this work with that on ground water.

Plans for the Cuttingsville project indicate an active summer for the Geologist at that locality.

During the past year some equipment necessary for geological surveying was purchased.

The Survey performs a service to the people of the State in identifying mineral and rock samples and reporting the results personally to the sender. Even though many of these samples prove to be valueless, some of them might be important guides to mineral deposits of commercial magnitude, and so the Survey continues to welcome the sending of specimens.

A Program of Mapping

With the release of the Burke Mountain quadrangle, which may be expected soon, the State will be completely mapped topographically on a scale of one mile to the inch. In recent years the topography has been remapped in some parts of the State on a scale of one mile to two inches. These maps are of great importance as a base in the geologic mapping of an area, and their availability makes possible a systematic program of rock and mineral exploration in conjunction with detailed mapping. Such a program, if consistently followed, would result in the completion of a geologic map of Vermont which would be widely used, as indicated by the numerous requests for one. In this connection it might be mentioned that, at the present time, the only geologic map of the State is the rather antiquated one published by Hitchcock in 1861. Geology has since made considerable progress and with competent personnel using modern geological methods a creditable geologic map can be made. It is quite impossible to make a geologic map of Vermont at the present time with the small amount of new data at hand.

Besides having a general interest, a geologic map of Vermont showing localities and rock formations of economic promise, would be valuable both to the existing and to any potential mineral industries. With regard to the latter, among the inquiries about mineral deposits are those received from industrial concerns outside of the State. Apparently due to the increasing shortage of marketable timber, some lumber companies have become interested in the geology of their properties with the idea of possible mineral exploitation, and are among those requesting maps. It is perhaps not sufficiently realized that as a structural material, lumber is in many ways being replaced by mineral products. With the demand for the latter growing it would appear that now is an opportune time to investigate our own mineral resources, and the most economical way to do this is by means of a methodical mapping program.

Recognizing the importance to the State of geologic mapping, the Geological Survey proposes a program of systematic mapping over a period of ten years which would in that time, possibly sooner, produce a complete geologic map of the State.

The normal time requirement for the completion of an area the size of a topographic quadrangle, is three years. The most economical cost to the State would be to engage geologists of graduate student grade during the summer months. These students would be under expert supervision, as the results of their field work would be incorporated in a thesis, an essential requirement for a higher degree at a university. Thus it may be seen that the benefits are mutual, as the State will be getting good quality geological mapping done relatively inexpensively and the student will gain experience from his field work.

The area still unmapped geologically is the equivalent of approximately 28 topographic quadrangles. The estimates tabulated below are based upon previous experience and show the one-man cost per quadrangle for a period of nine months in three years (the time normally necessary to map a quadrangle):

Wks.		Mos.		Yrs.				
		3	x	3	x	$100 per mo.	$900	Salary
4	x	3	x	3	x	$ 25 per wk.	$900	Board & Lodging
				3	x	$200 per season	$600	Travel Expenses
							$2400	Total

Thus, the total expenditures for a program of 28 quadrangles comes to $67,200. The distribution of this sum over a period of ten years will vary, of course, according to the plan adopted. The following plan which is preferable, has the advantage of keeping annual additions in personnel at a fairly constant, low figure, which reduces the danger of interruptions in the program during times of manpower shortage and permits better supervision of the work. Also, by staggering the program, a great influx of reports and thus a considerable burden on the printing fund at any one time is prevented. On the other hand, the annual expenditures vary considerably, although the grand total remains the same.

Plan 1

1	2	3	4	5	6	7	8	9	10	Duration of program in years
3	3	3	3	4	4	4	4			New personnel—1st year of mapping
	3	3	3	3	4	4	4	4		Same personnel—2nd year mapping
		3	3	3	3	4	4	4	4	Completion of work—3rd year mapping
3	6	9	9	10	11	12	12	8	4	Number of men in field each year
$2400	$4800	$7200	$7200	$8000	$8800	$9600	$9600	$6400	$3200	Annual expenditures
$7200		14,400		16,800		19,200		9600		Biennial appropriations

Another procedure in which the annual expenditures are uniform, appears in the plan below. However, it might be extremely difficult to locate the number of men required at the beginning of each three-year period, as shown in the plan.

Plan 2

1 2 3	4 5 6	7 8 9	10	Duration of program in years
10	10	8		Number of men in field during each 3-year period
$24,000	$24,000	$19,200		Expenditures for each 3-year period.

It is earnestly hoped that the Geological Survey will be favored with the funds necessary to pursue this planned mapping program. Among the New England states possessing geological surveys, Vermont ranks fourth in the amount appropriated for geological work, according to figures compiled for 1947 by the secretary of the Association of American State Geologists. The exploited mineral wealth in Vermont far exceeds that of any other New England state, the total annual production amounting to more than $20,000,000. The State of Vermont spends one-fiftieth of one percent of this sum for the work of the Geological Survey at the present time. Some of our mineral industries are expanding their operations, due either to increased business or to new discoveries resulting from exploratory work.

With the funds requested made available for this program, the Geological Survey will be in a position to continue its work more effectively.

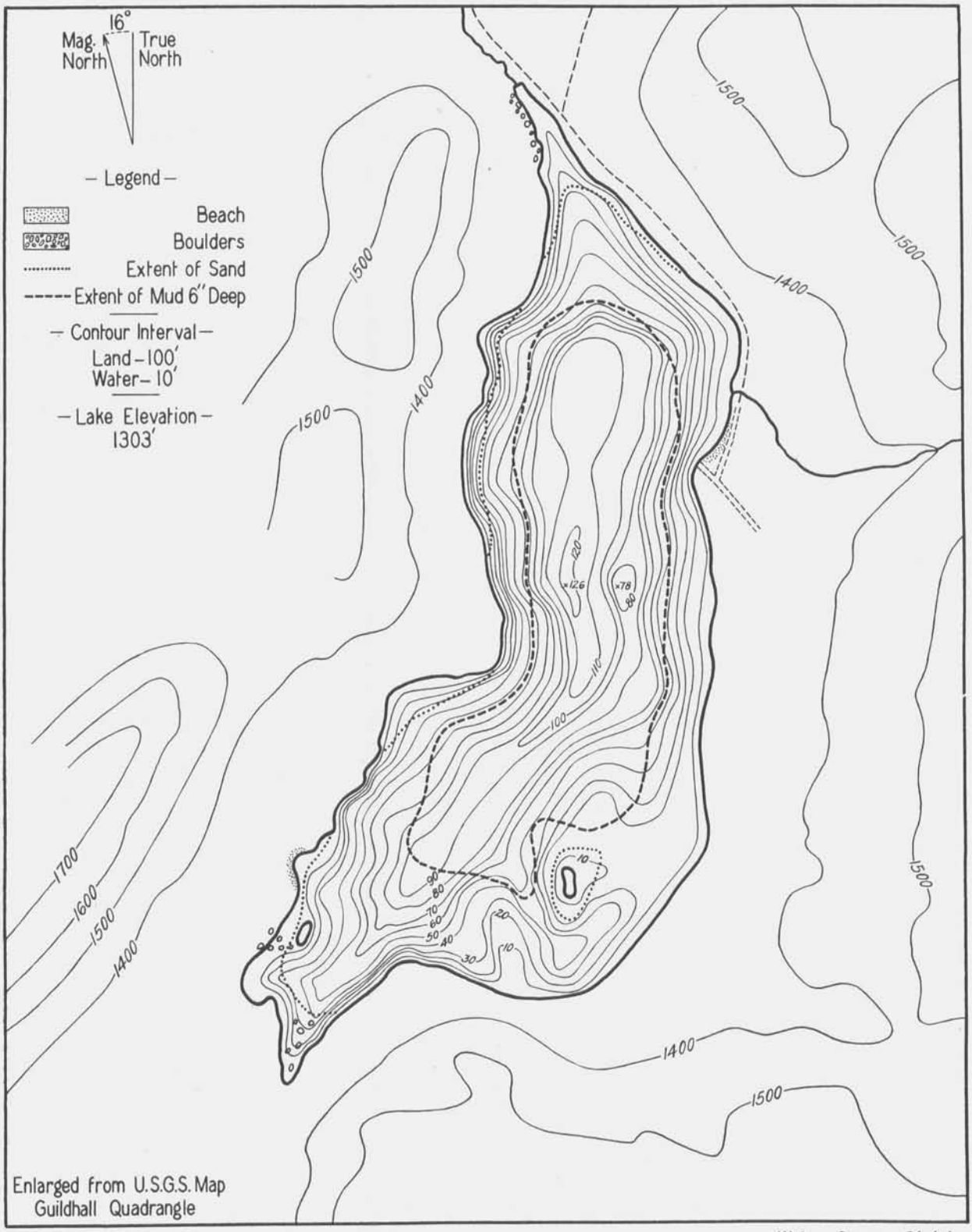
The Ground Water and Lakes Survey

In the spring of 1948 the Development Commission appropriated the special sum of $1800 for the purpose of compiling data on and making a study of our ground water supply during three months of this summer. Ground water is a very important resource which is used daily by urban and rural industrial plants and inhabitants of the State. The increased use of ground water for industrial and domestic purposes in recent years has caused some Vermont communities to augment their present water-supply systems and, in so doing, they have been forced to tap new ground water sources with varying success. Water is a vital necessity on every farm and plays an important part in the daily activities.

The ground water program consists of gathering data on existing wells from drillers' logs,—locations, depths, rates of flow, levels of water, types of aquifer, etc. This information

Example of a portion of a modern geologic map showing complexity of rock formations and structures in the copper belt of eastern Vermont.

MAIDSTONE LAKE



Vermont Geological Survey
Charles G. Doll, Director

Water Survey Division
John R. Mills, Surveyor

accompanied by a ground water map will make the search for subsequent water sources more economical and will permit predictions of depth and yield. In this new branch the Geological Survey welcomes cooperation with well drillers active in the State; such cooperation should be to mutual advantage. An occasional visit by a well driller is indicative of the water problems encountered in uncharted ground.

In order to facilitate progress and enlarge the scope of this work, a cooperative project has been discussed with a representative of the United States Geological Survey. As with the existing cooperative topographic survey, the amount contributed by the Vermont Geological Survey is matched by the United States Geological Survey.

The cooperative work will consist largely in studying water level fluctuations in selected observation wells in different parts of the State. The data collected is important, as it discloses the conditions in an aquifer during pumping operations and permits estimation of the level below which water should not be taken.

In discussing a cooperative project with the District Geologist of the United States Geological Survey it was found that at least $6000 would be necessary to carry on the work satisfactorily, $3000 to be contributed by each party.

The lakes survey is a project concerned with contouring the bottoms of our major lakes with the purpose of determining their geological nature, depths, and the types and distribution of sediments on their bottoms. These maps have aroused considerable interest already and should prove useful in fields other than geology. The accompanying figure, page 26, an underwater map of Maidstone Lake (original on a scale of 5 inches to the mile) is a sample of the type of work this survey is doing.

The Cuttingsville Project

A gift of $15,000 to the State by Mr. George A. Ellis and designated for exploratory work on metallic deposits in the State, has been made available to the Geological Survey. After an examination of the old mine workings at Cuttingsville and on the basis of a recommendation made in a report on the locality by Mr. H. M. Kingsbury, Consulting Mining Geologist, and formerly with the Vermont Copper Company at South Strafford, it was decided to explore this ground by means of a small amount of diamond drilling either to confirm or disprove the presence of minable ore.

Work has been started on this project in preparation for the drilling operations which are expected to begin some time in August. An important part of the preparatory work will be the plane table mapping of the locality on a scale of 50 feet to the inch. This will permit drafting of the geologic structures on a workable scale and the placing of drill-hole sites with greater accuracy.

Topographic Mapping

A cooperative project with the United States Geological Survey has been in existence for some time. The appropriation on the part of the State continues to be $2000 on the dollar-for-dollar basis. As stated elsewhere in this report, certain areas in the State are now being remapped on a scale of two inches to a mile. Vermont is now about 98 percent mapped by quadrangles on the scale of one mile to the inch, and the issuance of the one remaining quadrangle is not far off.

Survey Publications

The publication of the series of biennial reports of the State Geologist has been discontinued. Instead, separate bulletins will be published for the Geological Survey by the Development Commission. This new arrangement has the advantage in that material can be published whenever ready and not be required to wait until the end of the next biennium.

Drilling at Cuttingsville

No bulletins have as yet been published, but a report on the geology of an area in the eastern part of the State is in process and is expected to appear during the coming winter. Other reports will follow in the next year. All work performed under the auspices of the Geological Survey will appear in these bulletins. The demand for geological information of the State is quite appreciable and might be expected to increase with the publication of new bulletins.

Budget Requested

The following budget has been requested for the next biennium, July 1, 1949 to June 30, 1951:

	July 1, 1949 to June 30, 1950	July 1, 1950 to June 30, 1951
Geological Mapping, Plan 1 (p. 24)	$2400	$4800
Plan 2 (p. 24)	8000	8000
Ground Water Survey-cooperative	3000	3000
Lakes Survey	1800	1800
Equipment and Supplies	300	300
Salary and Expenses of State Geologist	2625	2625
(Including Plan 1)	$10125	$12525
(Including Plan 2)	$15725	$15725

FINANCIAL STATEMENT

July 1, 1947 to June 30, 1948

RECEIPTS:

Appropriation Fiscal Year 1948	$200,000.00	
Carry-over Publicity Department 1947	562.19	
Credit for Paper Inventory on hand (Vermont Life)	6,670.80	
Transfer of Funds from Secretary of State	33.33	
Transfer of Funds from Fish & Game Commission	687.52	
and from State Forestry Commission (to cover their share of costs of Eastern States Exhibit)	687.52	
Transfer from Fish & Game Commission—sale of Cabin at Sportsmen's Shows	2,178.00	
Refunds—miscellaneous	61.40	
Total Receipts	$210,880.76	
Total Disbursements	210,818.58	
Balance	$62.18	

DISBURSEMENTS:

Carry-Over Bills 1946–1947:

Vermont Life	$6309.94	
Publicity Dept.:		
Printing	$3696.67	
Paper	957.28	
Space Advertising	15257.59	19911.54
Administrative Dept.:		
Shutler Expense	751.89	
Cerutti Salary	119.60	
Stream Gauging	1606.06	2477.55
		$28699.03

Commission Members:

Per diem	1343.91	
Expenses	753.46	2097.37

Administrative Dept.:

Salaries	13600.32	
Travel	1550.80	
Telephone, Telegraph & Express	910.51	
Office Equipment, etc.	4648.18	
Stationery, etc.	638.43	
Subscriptions & Memberships	517.48	21865.72

Research & Planning Dept.:

Salaries	15338.66	
Travel	1747.52	
Telephone, Telegraph, Postage	124.66	
Printing	79.45	
Services	317.14	
Special Equipment	100.21	17707.64

Industrial Development Dept.:

Salaries	4303.00	
Travel	545.49	
Telephone, Telegraph	140.97	
Miscellaneous	2.69	4992.15

Publicity Department:

Salaries	$11720.04	
Travel	175.51	11895.55

Office Expense:

Telephone, Telegraph	30.02	
Express & Trucking	226.10	
Miscellaneous	46.69	302.81

ADVERTISING:

Space Advertising:

Fall	3690.86	
Winter	7179.08	
Spring & Summer	8405.50	
Industrial	7221.90	
Annual Books	135.48	26632.82

Publications:

Winter Sports Folder	517.00	
Maps	745.44	
Vermont Tours	763.53	
Unspoiled Vermont	6656.85	
Long Trails	167.56	
Annual Service Books:		
Hotels & Tour. Homes	2776.48	
Farms & S. H. for Sale	1166.06	
Cottages & Camps, Rent	540.70	13333.62
VERMONT LIFE:		$62,023.94

ADVERTISING:

Miscellaneous Advertising:

In Vermont Newspapers	534.12	
Consolidated Tour. Guide	50.00	
National Survey	95.00	
Agric. Dept., Green Pastures	150.00	
Program Agric. Show	24.00	
Green Mt. Horse Assn.	20.00	$873.12
Clipping Services	140.52	
Information Services	3970.00	
Photography & Art Work	1686.18	$10866o.20
		$120858.56

Motion Pictures		6017.68
Sportsmen's Shows:		
Equipment for Exhibits, etc.	2913.59	
Catalogs	432.84	
Telephone, Express	198.14	
Electricity	45.83	
Art Work, Photography	118.24	
Travel	853.38	4562.02
Eastern States Exhibition		4018.41
Total Disbursements		$210,818.58

EASTERN STATES EXPOSITION BUILDING

July 1, 1947–June 30, 1948

RECEIPTS:

Appropriations for Fiscal Year 1948:		
For Building Management	$5,000.00	
For Building Repairs, etc.	3,678.17	$8,678.17
Transfer of Funds from Development Commission		2,643.37
Transfer of Funds from:		
Fish & Game Commission	1,256.60	
State Forestry	1,256.60	2,513.20
Refund—Miscellaneous		5.60
Total Receipts		$13,840.34
Total Disbursements		12,734.53
Balance		$1,105.81

DISBURSEMENTS:

Travel	$ 824.15
Salaries	556.50
Painting	3,463.00
Plumbing	2,581.83
Carpentry	4,023.11
Insurance	114.42
Equipment, Supplies, etc.	144.23
Trucking, Telephone, Telegraph	148.66
Photography	100.00
Planting	628.63
Miscellaneous	150.00
Total Disbursements	$12,734.53

STATE GEOLOGIST

July 1, 1947–June 30, 1948

RECEIPTS:

Appropriation Fiscal Year 1948	$4,000.00	
Total Disbursements	3,667.13	
Balance	$ 332.87	

DISBURSEMENTS:

Salaries	$1,799.15
Travel	749.51
Telephone, Telegraph, etc.	7.07
Equipment	883.03
Printing	36.00
Exhibit at Eastern States	58.93
Photography	50.00
Miscellaneous for Analyses service, etc.	83.44
Total Disbursements	$3,667.13

FINANCIAL STATEMENT

July 1, 1946–June 30, 1947

RECEIPTS

Development Commission		
Total Appropriations	$30,000.00	$30,000.00
Publicity Service		
Balance brought forward	10,322.22	
Total Appropriations	55,100.00	65,422.22
Total Receipts		$95,422.22

EXPENDITURES

Development Commission		
Salaries of Director & Employees	$20,163.64	
Expenses of Director & Employees	962.48	
Per Diem & Expenses of Commission	908.96	
Office Equipment	1,228.31	
Miscellaneous Expense	765.36	
Water Conservation Board Report	775.00	
Stream Gauging	4,653.94	29,457.69
Publicity Service		
Salaries of Director & Employees	$9,466.93	
Advertising	11,098.01	
Printing	9,809.46	
Photos & Movies	1,149.45	
Information Services	3,925.00	
Hotel & Tourist Home Survey	580.55	
Miscellaneous Expense	1,108.72	
"Vermont Life" Magazine Expense	27,721.91	64,860.03
Total Expenditures		$94,317.72

SUMMARY AND CONCLUSIONS

Research and Planning—During the biennium this division of the Commission has completed compilation of and has published: Town and City Financial Statistics Report, Survey of Vermont Ski Facilities, and Evaluation of the Ski Business in the Town of Stowe.

The research division has completed: a survey on trends in Vermont vacation business, an outline of basic data essential in planning economic development in the state, estimates of value of Vermont vacation business, a survey on the use of duplicating equipment in state departments, assisted in surveys on community housing in St. Johnsbury, Brattleboro and Montpelier, and prepared a state and county organization chart.

Work in progress by the division includes: an analysis of state space advertising, a revision of the Directory of Manufactured Products and Industries, basic data studies for selected areas, a land use map, a state outline map, and a town and county statistical abstract.

The research division also has completed studies on position openings available in agriculture for displaced persons, collaborated with the New England Council in preparation of the New England Vacation Business Inventory and a Study of New England Plastics Industries, assisted in establishment of the Bradford Strawberry Cooperative and in Vermont maple products displays, and studied market outlets for other than first-grade fruits.

Additional activities of the division included: operating a statistical information service, a special drafting service for other state departments, and establishment within the Development Commission of an office of the United States Department of Commerce.

The continuation of existing projects and the revision of existing data by the research and planning division are required in the operations of other Development Commission divisions and by other state departments.

Industrial Development—Activities have included:

1. Efforts to enlist support of all interested groups in inventorying available plant space and sites.

2. Serious efforts to attract interest of firms looking for new locations in Vermont as a place to locate, and including visits to the home plants, etc.

3. Distribution of Industry Lives Happily in Vermont and the Directory of Manufactured Products and Industries, prepared by the Commissioner of Industrial Relations. This is being revised for publication in early 1949.

4. Servicing of inquiries for firms from which to buy Vermont products.

5. Cooperation in making a survey of Vermont plants, of importance in Industrial Mobilization, with the hope that more of these plants will be allocated to some specific branch of the Armed Services, and will be considered in the current procurement problem.

6. Promotional work with chambers of commerce and other like groups in making community and industrial surveys.

Chief difficulty encountered is shortage of available space. Very few firms apparently are interested in building. Lower cost power would be in some cases a favorable factor, although the disadvantage we have here apparently is shared by the rest of New England.

It should be recognized that the rest of the states are pushing industrial development aggressively and that the campaign will be intensified with any let-up in employment. Vermont must be prepared to fight to hold what it has to replace what may be lost, as well as to persuade new plants to locate here.

Shows, Displays and Moving Pictures—Eastern States Exposition—The Vermont building by the 1947 Legislature was placed under Development Commission jurisdiction. Successful shows were staged during the annual Exposition with cooperation by other state departments and business firms.

Other shows—The Commission directed state participation in the 1948 New England Sportsmen's and Boat Show at Boston, the National Sportsmen's Show in New York, and the Philadelphia Sportsmen's Show as well as at Vermont fairs and local shows. For the first time in its 20 years of exhibition at the Boston show Vermont in 1949 will have the feature display. Special window displays of Vermont material were provided for metropolitan department stores, travel agencies and shows. The Commission was instrumental in organization in 1947 of the Vermont Winter Sports Council.

Motion Pictures and Motion Picture Promotion—At the end of the biennium production of three sound and color 16 mm moving pictures neared completion, all produced for the Commission by Bay State Film Productions, Inc. The films, available for free use by out-of-state and Vermont groups, cover Vermont's year-around recreational attractions, Vermont skiing, and the only film in existence on newly-born beavers. Contract was signed for production in collaboration with the Department of Agriculture of a film on Vermont agriculture. A coast-to-coast demand has developed for the use of state films for television productions.

Landscaping and considerable repairs to the Vermont building at Springfield, Mass. are necessary. An augmented motion picture appropriation is needed to produce con-

tracted films and to provide additional motion picture and television prints of existing films, as well as to defray costs of film servicing, shipment and booking.

PUBLICITY SERVICE—Promotional activities have centered in three major classifications—space advertising, circulation of a variety of publications and information services. Each bears a relationship to the other two.

Newspaper and magazine advertising bring a demand for booklets and, in many cases, for detailed information on vacations, industries and agriculture. The spring campaign covers places for sale, spring fishing and summer vacations. A winter campaign, a fall foliage schedule, industrial sites advertising and miscellaneous agricultural ads have been carried on.

Hundreds of thousands of pieces of literature have been printed and distributed directly to interested people and through widely scattered travel centers. Heavy correspondence of the office has been supplemented by informational service of chambers of commerce, booths and the aid of interested Vermonters and organizations.

Trends of business have been studied and surveys of advertising results and the vacation business in general have been conducted by the research and planning division co-operating with the publicity staff.

Rising costs are causing curtailment of plans for advertising and printing. More space in magazines and newspapers should be used and some of the publications should be improved to meet the steadily rising competition of other states and areas.

VERMONT LIFE—Publication started with the Autumn issue of 1946 and by July 1 of 1948 circulation had increased to 50,000 copies per issue, including 14,000 paid subscriptions, two-thirds of these to out-of-state residents, 1200 copies distributed free to Vermont public schools, and the balance sold on newsstands.

In its first eight issues *Vermont Life* carried 86 articles on 19 general subjects. Thirteen were on places to visit, ten on sports and recreation, and seven each essays on Vermont and on winter sports.

Operating on a flat sum *Vermont Life* was forced to cut the numbers of copies printed below the sales demand. Continuing without the use of revenues from the sales of the magazine and continuing the policy of no advertising it is estimated that revenues might equal costs when the circulation per issue reaches the neighborhood of 100,000 copies.

If *Vermont Life* is to expand to supply copies to meet the present and potential demand, it must secure an augmented appropriation or the use of receipts plus an appropriation.

GEOLOGICAL SURVEY—Activities of the Survey during the biennium included installation of a Vermont rock and mineral display at the Fleming Museum, University of Vermont as a permanent exhibit. A special rock identification service was maintained by the Survey.

In the process of completion are: geological mapping of the Jay Peak quadrangle, geological mapping of the Castleton quadrangle, publication of the Burke Mountain topographical quadrangle, publication of a report on the geology of a section of eastern Vermont, and bottom contour mapping of 20 northeastern Vermont lakes.

Work was begun by the Survey on: geological mapping of the Rochester and East Middlebury quadrangles, on ground water surveys, and exploratory drilling at Cuttingsville under the $15,000 gift by George A. Ellis.

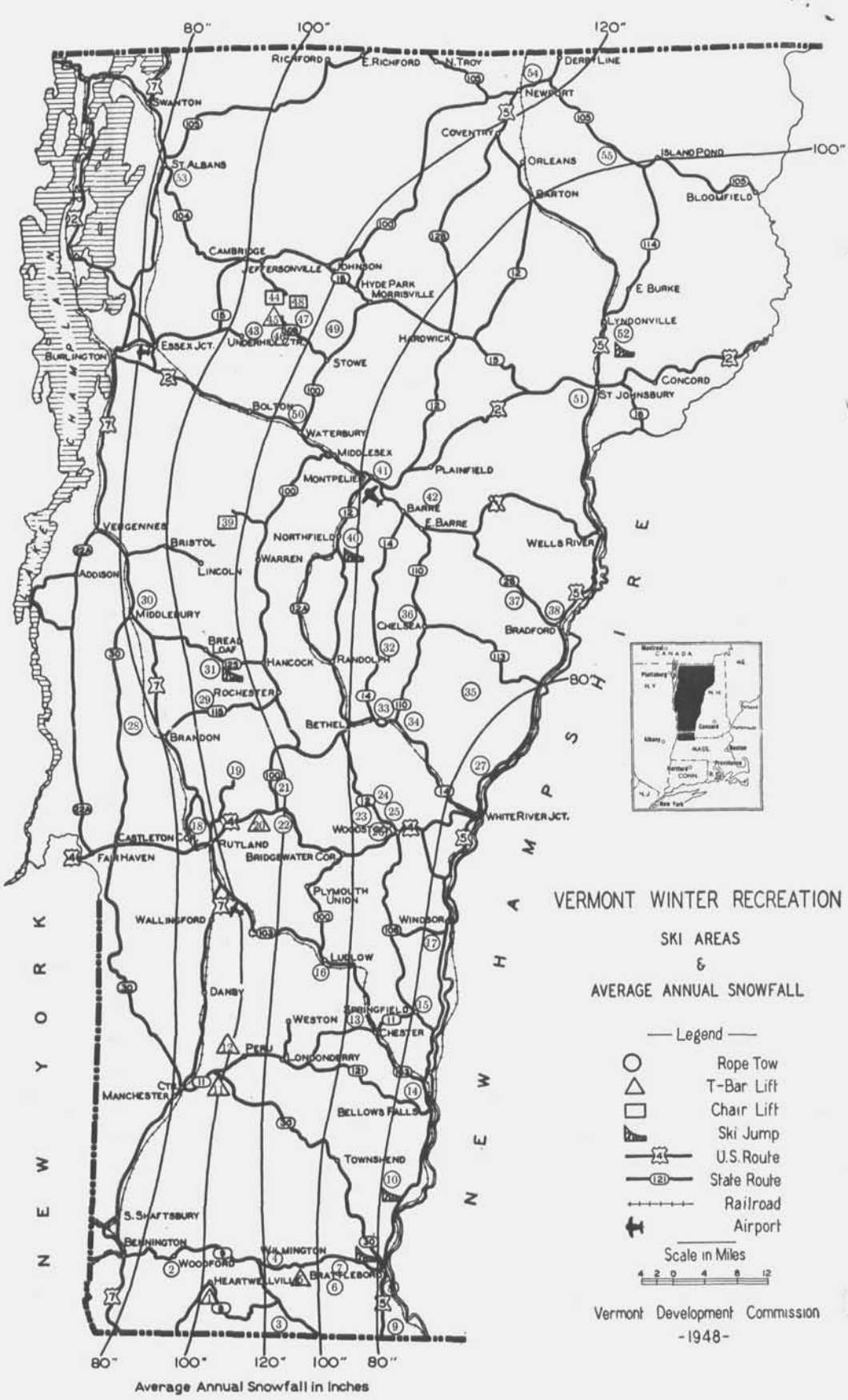
The Burke Mountain quadrangle will complete the Vermont topographic mapping on a one inch to one mile scale. The last Vermont geological map was published in 1861. It is recommended that $67,200 be expended over the next 10 years to complete geological mapping of 28 quadrangles. An adequate ground water survey will cost $3000 in state funds, $2200 more than now available.

CONCLUSION—If Vermont is to maintain its favored position in the tourist and recreation business the pressure of serious competition makes it necessary to carry on a well-rounded publicity and promotion program. This situation also is true of Vermont's role in industrial development and in agricultural planning, as these functions become increasingly important in the economy of Vermont.

SKI Vermont

VERMONT SKI AREAS

1 Heartwellville: *Dutch Hill*
2 Bennington: *Woodford Area*
3 Halifax: *North River Trails*
4 Wilmington: *Wilmington Tow*
5 Brattleboro: *Hogback*
6 Brattleboro: *Bonnyvale Area*
7 Brattleboro: *Taterlane Tow*
8 Brattleboro: *Latchis Slope*
9 Brattleboro: *So. Vernon, Pine Top*
10 Putney: *Putney Area*
11 Manchester: *Snow Valley*
12 Manchester: *Big Bromley*
13 Chester: *Chester Area*
14 Bellows Falls: *Ski Bowl*
15 Springfield: *Springfield Club*
16 Ludlow: *Ludlow Area*
17 Windsor: *Mt. Ascutney*
18 Rutland: *Rutland Jr. College*
19 Rutland: *Chittenden, Mt. Top Club*
20 Rutland: *Pico Peak*
21 Rutland: *No. Sherburne, Retreat*
22 Rutland: *Sherburne Ctr., Ski Haven*
23 Woodstock: *Prosper Hill*
24 Woodstock: *Bunny's Tows*
25 Woodstock: *Gilbert's Hill*
26 Woodstock: *Mt. Tom Ski-Way*
27 Norwich: *Altow Slopes*
28 Sudbury: *Mt. Meadow Club*
29 Goshen: *Blueberry Hill*
30 Middlebury: *Chipman Hill*
31 Middlebury: *Bread Loaf*
32 E. Randolph: *Savage Ski Tow*
33 So. Royalton: *Fun Valley*
34 So. Royalton: *Central Vt. Tow*
35 So. Strafford: *Strafford Area*
36 Chelsea: *Whirl-A-Way Tow*
37 E. Corinth: *Northeast Slopes*
38 Bradford: *Village Area*
39 Fayston: *Mad River Glen*
40 Northfield: *Norwich University*
41 Montpelier: *Montpelier Tow*
42 Barre: *Stars Go By*
43 Underhill: *Ski Bowl*
44 Stowe: *Mt. Mansfield Lift*
45 Stowe: *Smuggler's Notch Lift*
46 Stowe: *Toll House Ski Area*
47 Stowe: *Strom's Tow*
48 Stowe: *Spruce Peak Area*
49 Stowe: *Wyck House Tow*
50 Waterbury: *Village Area*
51 St. Johnsbury: *Merry Hill Lodge*
52 Lyndonville: *Lyndon Club*
53 St. Albans: *Aldis Hill*
54 Newport: *Memphremagog Club*
55 Island Pond: *Brighton Club*



VERMONT WINTER RECREATION

SKI AREAS

&

AVERAGE ANNUAL SNOWFALL

— Legend —

Rope Tow
T-Bar Lift
Chair Lift
Ski Jump
U.S. Route
State Route
Railroad
Airport

Scale in Miles

4 2 0 4 8 12

Vermont Development Commission

-1948-

VERMONT

Green Mountain Magic