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How conservation of natural resources is being taught in the public elementary and secondary schools of New England.

John H. P. Rodda
University of Massachusetts Amherst

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HOW CONSERVATION OF NATURAL RESOURCES
IS BEING TAUGHT IN THE PUBLIC
ELEMENTARY AND SECONDARY SCHOOLS
OF NEW ENGLAND

RODDA - 1953

HOW CONSERVATION OF NATURAL RESOURCES
IS BEING TAUGHT IN THE PUBLIC
ELEMENTARY AND SECONDARY SCHOOLS OF NEW ENGLAND

R/899

BY
JOHN H. P. RODDA

A problem submitted in partial fulfillment
of the requirements for the Master of
Science Degree

University of Massachusetts

1953

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CONSERVATION PLEDGE

I give my pledge as an American
to save and faithfully to defend from waste
the natural resources of my country --
its soil and minerals, its forests, waters and wildlife.

CHAPTER I
INTRODUCTION

CHAPTER I

INTRODUCTION

The Five Major Natural Resources. "The conservation of natural resources may be considered as applying in the following five major fields: (1) soils; (2) water; (3) forests, grasses and other vegetation; (4) wildlife, including bird and aquatic life; and (5) minerals. Any natural resource may be listed under one of these.

"Of these five resources, soil or land is the most important for the others all spring from or depend upon the land. Next in importance is water. The circulation of water (the hydrologic cycle) with the process of photosynthesis makes possible plant growth, the basis of animal life."¹ Thus, "the classifications, soil, water, forests and grasses, wildlife (including bird and aquatic life) and minerals is the accepted list of basic natural resources among natural resource authorities."²

Renewable and Nonrenewable Resources. "To understand conservation of natural resources, it is necessary to recognize that some resources, forests, grasses, wildlife and, in a broad sense, soils are renewable, and that minerals from a practical standpoint are nonrenewable or fund resources.

"Minerals stand in a category by themselves. The others

(1) Beard, Ward P. Teaching Conservation 1948. p. 29.

(2) Ibid. p. 31.

are all renewable resources. When the last gold has been taken out of a mine, there will never be any more in that mine.

"This fundamental difference between the renewable and nonrenewable resources makes a great difference in the conservation measures that apply."³

War and Natural Resources. "History is largely the story of man's efforts to get and to hold natural resources. The longevity of nations, the extent of their natural resources and the way they managed their resources are closely related. War should be studied from the natural resource standpoint. In war we dig our mines deeper and pump our oil faster. We scatter our metals in desert, jungle, and on the bottom of the sea. We cut our forests more ruthlessly. We overgraze our grasslands. Because bigger crops are needed and some important fertilizer materials are not available in sufficient quantities, soil fertility is reduced. Activities such as saving fuel and gathering scrap iron are commonly described, especially in war periods, as conservation. They should be recognized rather as war economies necessary because natural resources are already being drawn upon at a rate limited only by the available transportation or manpower. Despite these so-called "conservation" activities the natural resources may

(3) Beard, Ward P. op. cit. p. 31.

suffer devastating use.

"In total war, the total resources of one side are pitted against those of the other. As war progresses the resources of the belligerents are drawn upon more and more. Eventually the time comes when, because of physical limitations of natural resources and manpower, production on one side reaches its upper limit and then falls off in a vicious downward spiral of decreased production. (Reduced civilian manpower, because of the drain to military forces, and because of lowered living standards, produces less and less of vital materials.) Because of this decrease in production of vital war material, the fighting machine becomes less and less effective. The war is thus won, assuming equal fighting ability, by the side whose productivity is greater, and whose reservoir of resources, human and natural, can last the longer.

"The side whose resources, after cessation of fighting, are still more productive, is in the better position to win the peace."⁴

Conservation, Its Meaning and Scope. The term Conservation has a big meaning. It is true that Webster says that to conserve is to protect, to save, but this is the more obsolete meaning. As late as 1936, Wallace W. Atwood felt it necessary to state: "Conservation does not mean restric-

(4) Beard, Ward P. op. cit. p. 59-60.

tion from all use...."⁵ W. A. DuPuy had need to state in 1932 that "Conservation does not mean the hoarding of natural resources for a hazy indefinite future...."⁶ Although writers on conservation struggled to overcome this misinterpretation, it continued and may have caused Franklin Roosevelt first to choose the title National Resources Board and later National Resources Planning Board for a board whose functions in many respects corresponded to those of the National Conservation Commission of Theodore Roosevelt.

The more modern definition is -- keeping conditions sound or unimpaired. We might call it leaving to others what we ourselves enjoy. Conservation is opposite of extravagance, of exploitation; it is opposite of waste and squander; it is a semblance of good manners to the ways of nature, and to our fellow men.

Just a little over 300 years ago -- a short space of time in a world known for only 9,000 years of organized society but eons of geologic time -- America was a virgin land of plant and animal life. Vegetation covered the continent. In the rainbelt areas virgin forests stood in majestic glory. Some trees, like the sequoias, grew well

(5) Parkins and Whitaker, editors Our Natural Resources and Their Conservation 1936. p. 19.

(6) Wilbur, R. L. and W. A. DuPuy Conservation in the Department of Interior 1932. p. 154.

past the remarkable ripe age of 5,000 years; others simply got old and weak and toppled over in the wind. Where rainfall was less, the earth was carpeted with prairie grasses and sedges and chaparral which, like the forests of the coastal areas and other wet zones, helped to bind the earth together and keep it from being washed away by rainfall and lost forever to the sea. If we could have been alive then, as were such famous explorers as Raleigh, John Smith, LaSalle, Clarke, and others, we too would have seen the streams running cold and clear and evenly, and teeming with fish. Floods and droughts and pestilence were things yet to be experienced on such large scales as in recent times.

Our forefathers had no idea of how quickly an expanding human population could outdo the supplies of natural resources. Few, very, very few, indeed, had any idea of safeguarding for the future these life-sustaining supplies. Why should they? Were not these things -- limitless?

We know better today. We know that a different course should have been followed. We know the story now -- the denuded, cutover and burned forests; soil wasted and sapped of its strength; water muddied, poisoned and uncontrolled; wildlife persecuted, hunted and destroyed to the tune of already numerous extinct species, new and constant danger to others.

Generations ago citizens knew little about the complex laws of nature -- the multiple ties between all living life

and between living life and the less animate things like soil, which showed that an unhealthy condition in one segment of nature would eventually do harm to all others. At the turn of the present century scientific forestry was a new concept; lumber was still cheap and plentiful; soil and water problems were hardly recognized as national problems; guns and new ammunition and the automobile had not yet made too severe inroads on our wildlife; few people had ever thought of land management, forest fire control, game refuges, soil classification, climatic changes in relation to land use; furthermore, the word conservation had but a vague meaning, nothing like its meaning today.

Then came men like Theodore Roosevelt and Chief Forester Gifford Pinchot, who saw the use of natural resources as one big problem. Deliberately they set about to select a term that would best embody their policy, tersely stated -- wise use. They chose -- Conservation. It still means -- wise use -- to those who administer natural resources. The term -- management for sustained yield -- is now commonly used to express this concept. Colonel Greeley, Fearnow, Leopold, Bennett, Gabrielson followed -- men with visions, who worked for a crusade to make America wise resource use conscious -- and the era of a new type of thinking began.

The true and broad meaning of conservation should, basically, be made part of the awareness of every man, woman

and child in daily life. To understand how a tree grows or how the water table works in the ground or how animal life is involved in the complex order of things is as important in basic education as the ability to read, write, and do arithmetic. Youngsters should be familiar with the bedrock principles of conservation, otherwise, they may grow up completely ignorant of the very things that make life worthwhile.

These things, these fundamental principles are as important in education as learning the basic three R's because "It is believed that no child is too young to grasp some of the concepts of conservation."⁷

Yes, young people, in fact all of us, must learn the relations between air, sunlight, plants, animals, minerals, water, and man. They must realize that man should work with nature, not against her. Youngsters must be taught that democracy is a system of government by the will of the people and that the good of everyone must transcend what is good for the individual. The concept of greatest good for the greatest number for the longest time must be applied to everyone and everything -- including our resources -- if we are to keep our way of life.

Through eons of time, nature had done a superb job of

maintaining order and balance in America without interference from man. America was blessed with natural wealth. A rich empire was created. It grew out of the sun and substance of the good earth itself. But in the process nature's balance has been upset. After three hundred years of recklessness this balance has reached dangerous proportions. It should be the will and the ever-increasing aim of all citizens to restore as much of this balance as possible. For it is only in that balance that we can ever hope to find our great destiny as a nation.

This paper concerns itself with the methods by which Conservation of Natural Resources is being taught in the Elementary and Secondary Schools of New England. It is hoped that an adequate picture of the present status of the New England States along conservation lines will be the end product of the paper.

CHAPTER II

OUTLINE OF PROCEDURE AND
EXPLANATION OF THE QUESTIONNAIRE

CHAPTER II

OUTLINE OF PROCEDURE AND EXPLANATION OF THE QUESTIONNAIRE

Outline of Procedure -- Because of the impracticability of a personal visitation to each of the one hundred and twenty elementary and secondary school systems involved in this problem, for the purpose of making a comprehensive study to determine the provisions currently being made for the teaching of conservation of natural resources in the New England public schools, a check-list questionnaire was used to gather the desired data. Copies of the check-list and its accompanying letter of transmittal are included as Appendices I and II. A follow-up letter, sent out to more than one-half of the schools is included as Appendix III.

As will be noted, the letter of transmittal was directed to twenty superintendents in each New England State. The names of the individual superintendents at the one hundred and twenty school systems were obtained by writing to the commissioners of education of each New England State requesting a directory or list of superintendents. Each State Board of Education complied furnishing complete lists of superintendents for each state. In this way it was made possible to direct one hundred percent of the letters of transmittal to persons whose names were definitely known in towns picked at random throughout each New England State, thus a representative sampling is hoped for as a result.

Each superintendent was asked to fill out the questionnaire himself, or arrange to have it filled out by someone or several persons under his charge and return it in an enclosed, self-addressed stamped envelope. Since some superintendents have several schools under their jurisdiction, a more comprehensive picture results upon compiling data from the questionnaires. In reality -- many more than the eighty-six schools are represented by the returned questionnaires.

The Questionnaire -- The questionnaire was designed to determine the nature of seven broad features of the conservation program of the public elementary and secondary schools of New England. Through the seven major divisions of the questionnaire it was endeavored to determine: (1) the extent of integration in the teaching of conservation of natural resources in the public elementary and secondary schools of New England; (2) the extent that conservation of natural resources is being taught as a required subject in the New England public schools, the number of grades involved plus the pupil enrollment in these classes; (3) how well conservation education material is presented in the public elementary and secondary schools of New England; (4) how supplemental conservation education material is presented by the public schools of New England; (5) the extent that New England public schools have class field trips,

the range of grades involved, frequency of these field trips and the extent that field projects are undertaken by individuals or groups; (6) the extent that public elementary and secondary schools of New England have properties where conservation of natural resources can be practiced, extensiveness of these properties and availability of other properties; and (7) the extent of student interest in conservation of natural resources as the result of conservation education in the public elementary and secondary schools of New England.

In order to obtain the information desired regarding the first division, the superintendent was allowed three full lines to describe the extent of integration of conservation of natural resources with other subjects, or to say whether or not conservation of natural resources was taught as a separate subject. It was felt that this information could be used to establish facts pertaining to the beginning of significant activity in the field of conservation education at public schools in New England.

"Is conservation of natural resources taught as a required subject in your school?" was the question asked in the second major division of the questionnaire. If the answer was a positive one, the respondent was asked to state the number of grades involved and the total pupil enrollment in these classes, in the blank spaces provided for the answers. Thus the formulation of the extent that conserva-

tion of natural resources is being taught as a required subject was an important end product.

Thirdly, the check-list endeavored to gather information pertaining to how well conservation education material is being presented in each superintendent's school system. Here again, the primary reason for gathering such information was for the purpose of obtaining a truer picture of the magnitude of the conservation education problems at public schools in New England. Under this division, six methods of teaching conservation were listed. Alongside each of these were three blank spaces labeled well, poorly and not at all, where a check mark might be placed if the situation existed.

Through the fourth major breakdown of the questionnaire, it was attempted to establish certain facts pertaining to the presentation of supplemental conservation education material. To this end the respondent was asked to check, in the blank spaces provided, any of the twelve audio-visual aids used in teaching conservation education. Five additional blank spaces were provided where the respondent could indicate any other aids used in teaching conservation which he might consider noteworthy.

"Does your school have class (nature or conservation) field trips?" was the first question asked in the fifth major breakdown of the questionnaire. If the answer was a positive one, the respondent was asked to tell, in the blank

spaces provided, how many grades participated and the frequency of the field trips. This was highly important because it was an indicator of true success in the teaching of conservation education. The fourth question asked under this division was "Do you have field projects?" If the answer was a positive one, the respondent was next asked to check whether they were individual or group projects. Following this was a check-list of four popular field projects with their opposing blank spaces to be filled in as they applied. Three blank spaces were provided where the respondent could indicate any other projects which he considered noteworthy. The last question was considered important because it took into account another form of pupil activity along conservation lines -- whether it be an individual or group effort.

In the sixth major breakdown of the questionnaire, it was attempted to determine if the public schools of New England have properties where conservation could be practiced. "Does your school have properties where conservation can be practiced?" was the first question in this division. If the answer was a positive one, the respondent was asked to tell how extensive the properties were. It was felt that this information could be used to establish facts regarding the proximity and size of conservation areas in relation to field trips and field projects. The respondent then was asked to indicate what other properties were available. City

parks was opposed by a blank space where a check mark might be placed if they were being used. Four blank spaces were then provided where the respondent could list any other properties which he might consider noteworthy.

The final point dealt with student interest in conservation of natural resources as a result of conservation education. Through this last major breakdown it was attempted to establish facts pertaining to the concept of the greatest good for the greatest number for the longest time. Thus the carry over effect of the students might be determined by their outward acts along conservation lines. "Do you think the students are interested in conservation of natural resources as the result of conservation education?" was the question asked. If the answer was a positive one, the respondent then was asked to check in the blank spaces provided: -- by law obedience, planting trees, wildlife protection and fire prevention. Four blank spaces were provided where the respondent could indicate any other activities which he might consider noteworthy.

Because of the limitations imposed by a questionnaire and the possibility of misinterpretation, the last statement was included at the end of the seventh division, i. e. "Please describe any other formal or informal training in conservation offered by your school". The respondent was then allowed a sizable space to write in any information which he didn't think was adequately covered previously.

The types of public elementary and secondary schools returning questionnaires from the New England States can be found on Chart I.

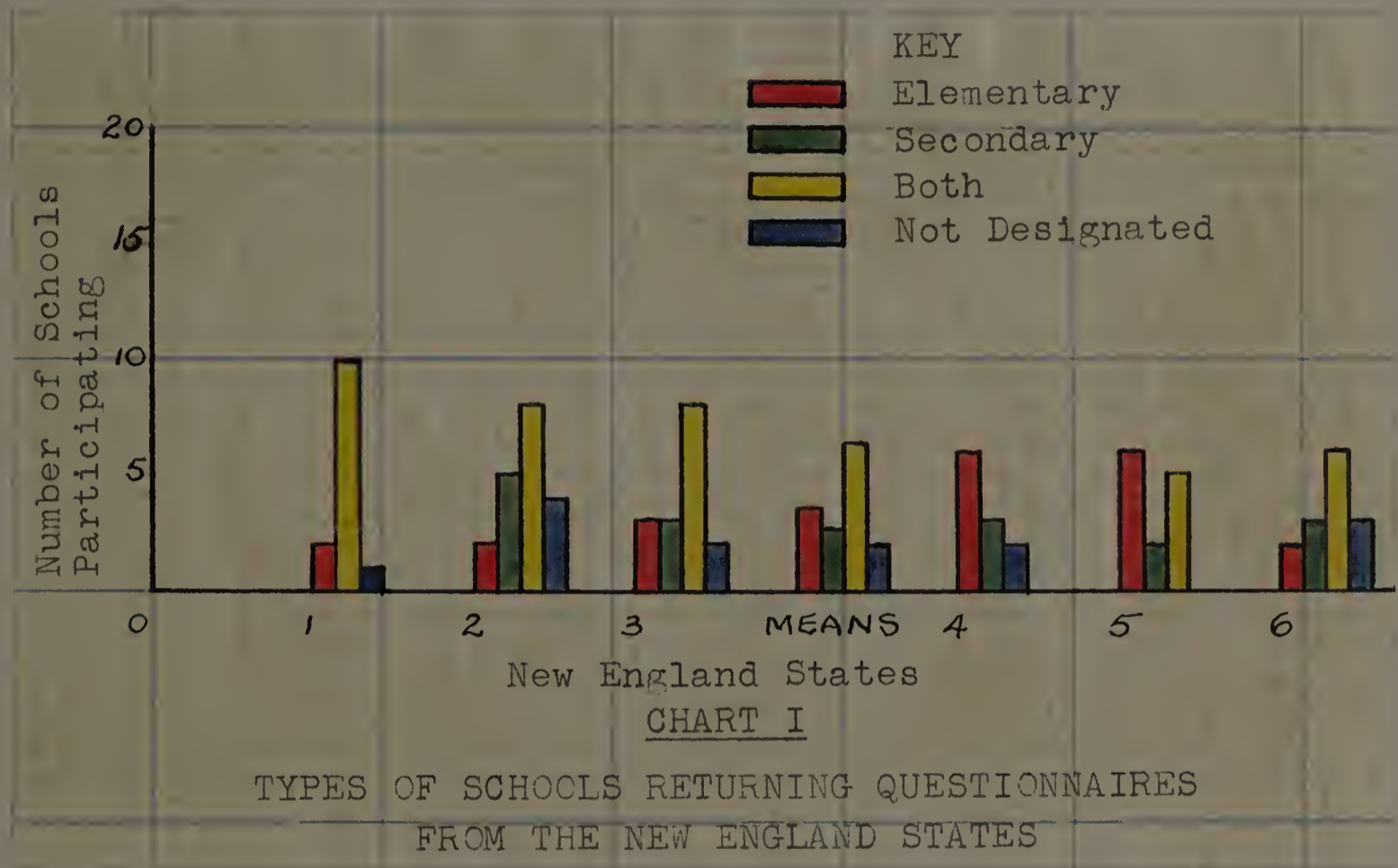
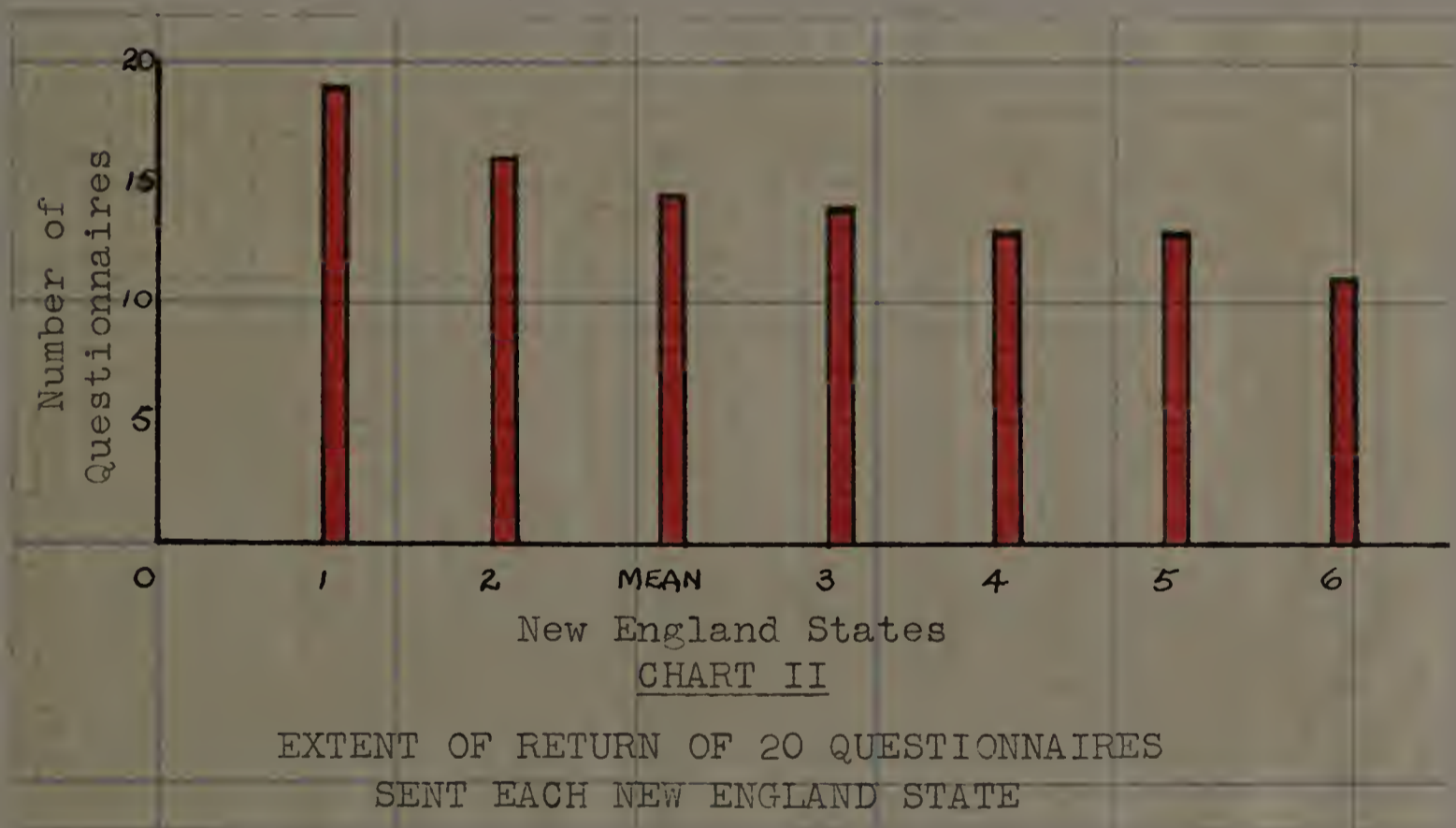


Chart I indicates that the largest number of schools returning questionnaires was composed of both elementary and secondary students. The color of the bar which represents this combination is yellow. In addition, it can be seen in Chart I that the remainder of the bars are colored red, green and blue, meaning that elementary, secondary and schools not designated are represented. Thus the means for the types of schools returning questionnaires, i. e. elementary, secondary, both and not designated, are three and five-

tenths, two and sixty-seven hundredths, six and seventeen hundredths and two and no hundredths respectively.

As was stated in the beginning of this chapter, one hundred and twenty elementary and secondary school superintendents in New England were sent questionnaires. As this study is written, there are eighty-six returns on which it is based. This is a return of seventy-two percent. The extent of return of twenty questionnaires sent each New England State can be found on Chart II.



As will be noted, there were nineteen returns from State One, sixteen from State Two, fourteen from State Three, thirteen from State Four, thirteen from State Five and eleven from State Six. The mean number of question-

naires returned by each New England State was fourteen and thirty-three hundredths.

This study to determine how conservation of natural resources is being taught in the public elementary and secondary schools of New England is, then, based on almost three-quarters of the school systems contacted.

CHAPTER III

TEACHING OF CONSERVATION OF NATURAL RESOURCES AS
A SEPARATE SUBJECT OR INTEGRATED
WITH OTHER SUBJECTS

CHAPTER III

TEACHING OF CONSERVATION OF NATURAL RESOURCES AS A SEPARATE SUBJECT OR INTEGRATED WITH OTHER SUBJECTS

Planning Necessary -- "Since conservation may be a logical part of the instruction on different grade levels, and in several subjects, careful planning is necessary to assure an effective program. Such planning may involve most of an entire school system.

"In too many schools conservation, if taught at all, has been taught by one or two science or social studies teachers. While better than none, instruction in one subject, biology for example, does not give students an adequate understanding of the relation of conservation of natural resources to other fields of subject matter such as geography and economics. Of more importance is the fact that students get an inadequate conception of the influence that the natural resources exert in each person's daily life. Moreover, unless the one or two teachers are teaching required courses not all students receive instruction in conservation.

"This situation indicates the need for a careful consideration of conservation on the part of superintendents, principals, supervisors and curriculum directors as well as teachers. Conferences of teachers should include reports and discussions on the significance of conservation education, on progress made in other schools, on available and

suitable materials for each phase of conservation, on concepts as distributed in scope and sequence charts and most important of all on the meaning and implications of conservation as a socio-economic policy.

"In developing a program in conservation education for a school, it does not matter what the organization or type of school, there is some way or ways in which conservation can be taught in that school."¹

Methods Compared -- There are several methods for teaching conservation of natural resources. The more prominent ones are presented below:

Method I. A separate course in conservation, either required or elective.

a. If taught by a specially trained teacher, the advantages are: (1) centralizes responsibility in one teacher; (2) the best qualified teacher in the school could be selected and given the opportunity to specialize; (3) students would be more conservation-minded because of the importance given the subject when it is coordinated with other subjects; (4) its vocational guidance value would be greater; (5) some students who have little interest in other subjects could be interested in a properly taught course in conservation.

(1) Beard, Ward P. Teaching Conservation 1948. p. 38.

However, there are disadvantages: (1) because of ramifications of conservation into many fields it would be difficult to get a well qualified teacher; (2) the difficulty of scheduling a separate course in an already crowded schedule; (3) unless made a required course, all pupils would not be able to schedule it.

b. If a separate course in conservation, either required or elective, is taught cooperatively by several teachers, the advantages are: (1) should provide enriched content and broader viewpoint for students; (2) group planning of conservation course by teachers should have beneficial influence on the teaching of the regular subjects; (3) students would be more conservation-minded because of the importance given the subject when it is coordinated with other subjects; (4) its vocational guidance value would be greater; (5) some students who have little interest in other subjects could be interested in a properly taught course in conservation.

The disadvantages are: (1) the difficulty of scheduling a separate course in an already crowded schedule; (2) unless made a required course all pupils would not be able to schedule it; (3) difficulty of scheduling the time of several teachers; (4) difficulty of placing responsibility for the course and developing sustained pupil-interest with changing teachers.

Method II. Instruction through a core curriculum -- con-

servation concepts taught in a variety of units, not as separate units on conservation.

The advantages are: (1) all pupils get instruction in conservation; (2) cooperative planning by teachers is necessary.

The disadvantages are: (1) difficulty of a reorganization of the school from the conventional subject curriculum; (2) teachers in core curriculum are not likely to have much training or background in conservation.

Method III. Conservation units in standard subjects or courses.

The advantages are: (1) responsibility is assigned; (2) gives individual teachers an opportunity to develop strong units in conservation; (3) avoids administrative problems.

The disadvantages are: (1) possible lack of training and background in conservation of some teachers.

Method IV. Conservation taught incidentally in standard subjects or courses.

The advantages are: (1) group planning of conservation course by teachers should have beneficial influence on the teaching of the regular subjects; (2) avoids administrative problems.

The disadvantages are: (1) instruction in conservation likely to be non-existent or ineffective.

Methods II and III appear to be the most adaptable and

effective. Both of these are programs of integration.

Methods of Teaching Conservation of Natural Resources in the Public Schools of New England -- Of the eighty-six responding school systems, eighty-nine and five-tenths percent reported that conservation of natural resources is being taught by integration with other subjects. The subjects mentioned by the respondents in filling out the questionnaires were: natural sciences, science, general science, economics, social studies, all elementary and most High School subjects, English, reading, vocational agriculture, practical arts, biology, geography and agriculture courses.

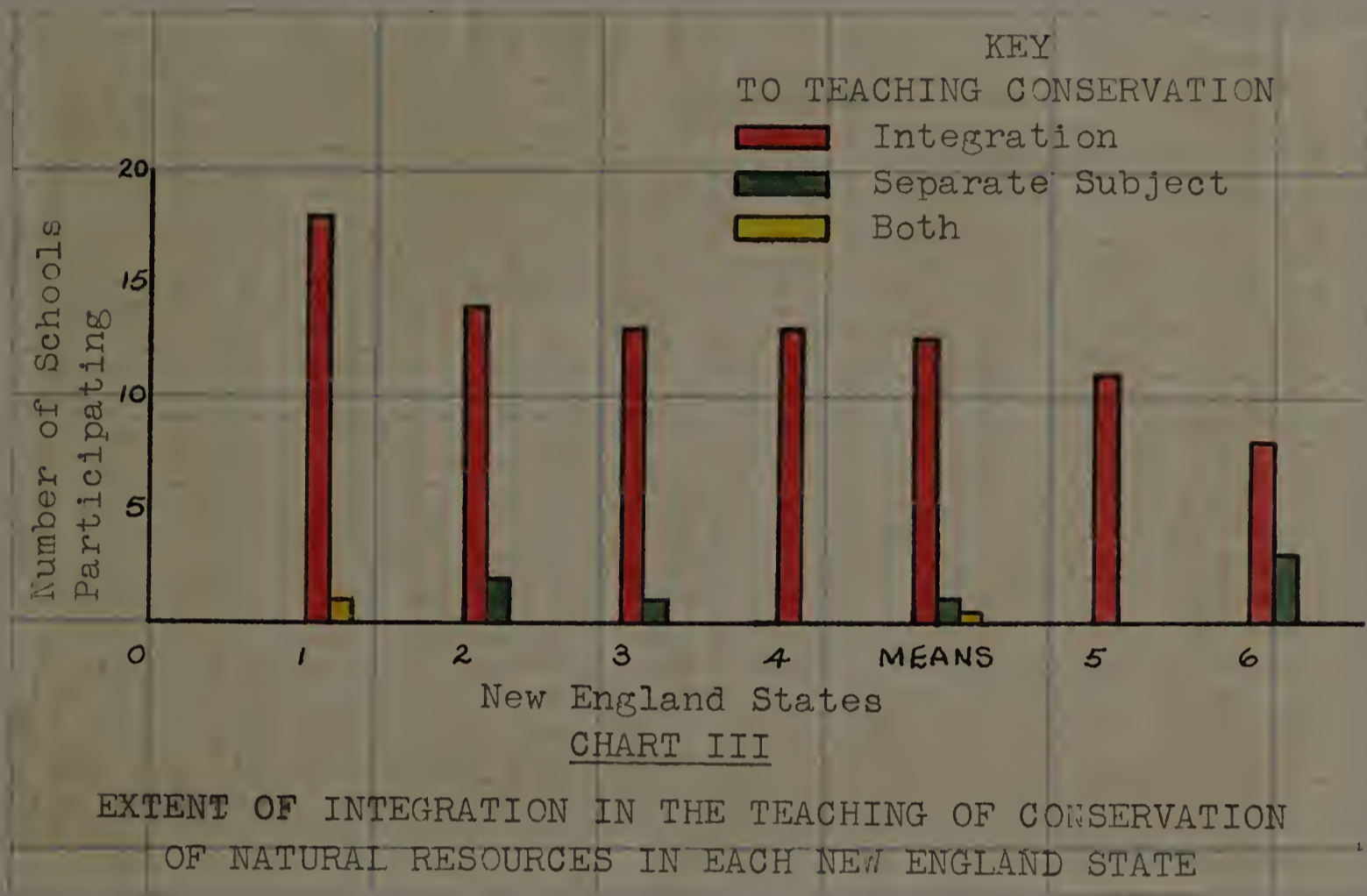
Seven hundredths percent of the respondents reported that conservation of natural resources was being taught as a separate subject. Of these, five respondents specifically stated that conservation was unit taught. Three respondents reported that the state Audubon Society taught conservation as a separate subject.

Twelve thousandths percent of the respondents stated that conservation was taught both as a separate subject and integrated with other subjects.

Twenty-three thousandths percent of the respondents reported that conservation of natural resources was not taught in their school systems.

Extent of Integration -- The extent of integration in the teaching of conservation of natural resources in each

New England State can be found on Chart III.



As will be noted, three colors are used on the bars: red designating integration, green indicating that conservation is being taught as a separate subject and yellow showing that conservation is being taught as both a separate subject and integrated with other subjects.

Chart III shows that State One reported eighteen school systems integrated conservation of natural resources with other subjects, State Two -- fourteen, State Three -- thirteen, State Four -- thirteen, State Five -- eleven and State Six -- eight.

The means for the methods of teaching conservation, as indicated on Chart III, i. e. integration, as a separate subject and both of the preceding are twelve and eighty-three hundredths, one and no hundredths and seventeen hundredths respectively.

CHAPTER IV

CONSERVATION OF NATURAL RESOURCES

TAUGHT AS A REQUIRED SUBJECT

CHAPTER IV

CONSERVATION OF NATURAL RESOURCES

TAUGHT AS A REQUIRED SUBJECT

Curriculum by Law -- "Since 1929, at least eight states -- Arkansas, Florida, Georgia, Kentucky, Maryland, North Dakota, Oklahoma, and Wisconsin -- have added legislation requiring school instruction in natural resources. Conservation has thus moved from a concern of colleges and universities alone to that of the entire public-school system. The Kentucky law of 1944 is a good example of this kind of legislative requirement. It is entitled "An Act Relating to the Teaching of the Conservation and Preservation of Natural Resources in the Public Schools of Kentucky," and reads in part:

'Whereas, the natural resources of this state -- forests, soil, water, minerals, and wildlife -- have been exploited and destroyed so that coming generations will be deprived of their privilege of economic welfare, therefore,

'Be it enacted by the General Assembly of the Commonwealth of Kentucky:

'Instruction in all phases of conservation and preservation shall be included in the curriculum of the public schools of Kentucky, and textbooks regarding the proper use and production of forests, soil, water, minerals, and wildlife shall be prepared or selected by the State Textbook Commission, for this purpose.'

"This Act, like similar ones in other states, places

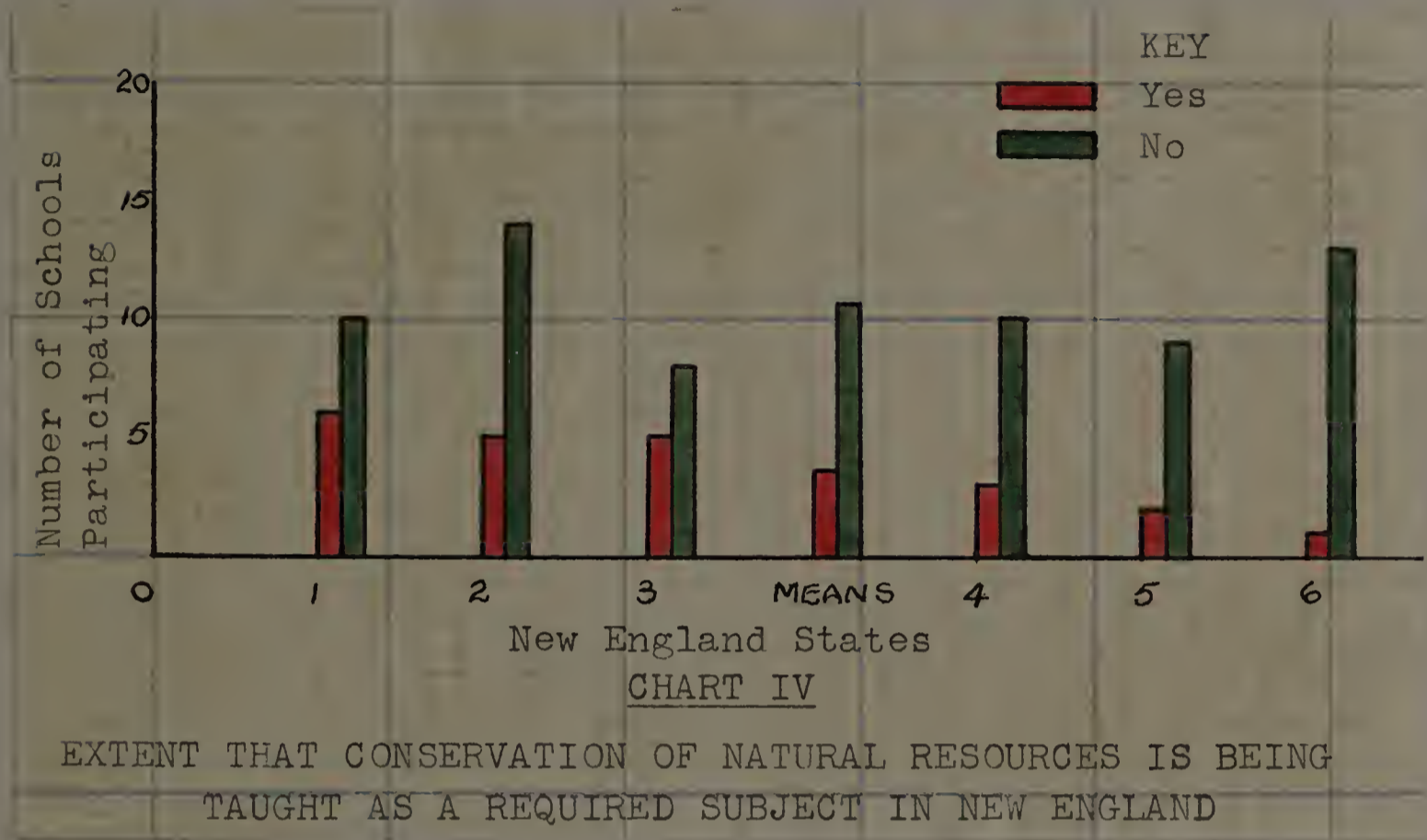
direct responsibility on the schools to modify harmful practices in use of resources. It also directs the state school officials to make sure that adequate instructional materials are provided for this purpose, even to the extent of preparing them as needed.¹"

Curriculum in New England's Public Schools -- The teaching of natural resources as a required subject in the public elementary and secondary schools of New England varies in each state except two. No New England state reported that conservation of natural resources is being taught as a result of state law.

Of the eighty-six school systems returning questionnaires, twenty-five and six-tenths percent stated that conservation of natural resources is being taught as a required subject in their schools. Seventy-four and four-tenths percent of the respondents said that conservation of natural resources was not taught as a required subject in their school systems.

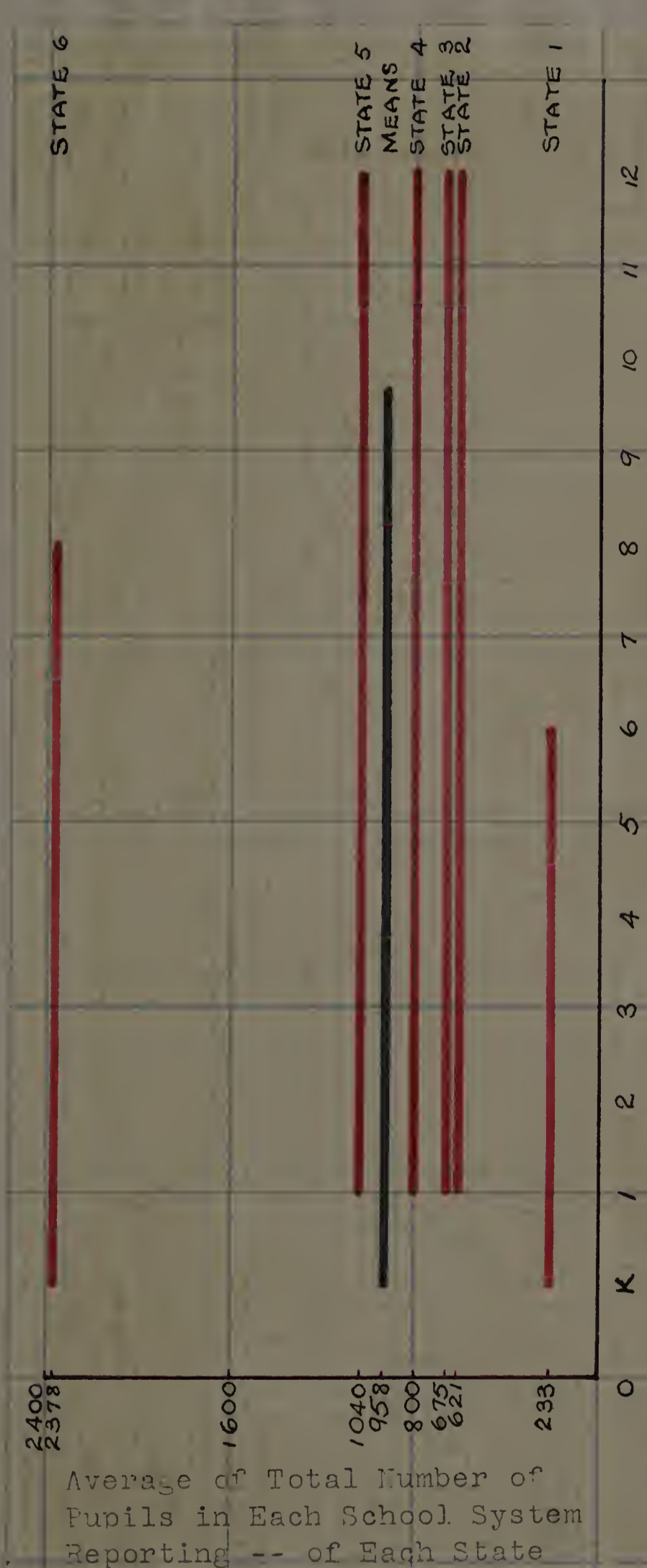
Extent That Conservation of Natural Resources Is Being Taught as a Required Subject -- The extent that conservation of natural resources is being taught as a required subject in New England's public schools can be found on Chart IV. Two colors are used on the bars on Chart IV, i. e. red and

(1) McGlothlin, W. J. et al. Large Was Our Bounty 1948. p. 126.



green, indicating an affirmative or negative answer to the questionnaire. As can be seen, State One led the rest of the states with six affirmative replies, followed by State Two with five, State Three -- five, State Four -- three, State Five -- two and State Six -- one reply. The means for the affirmative and negative replies are three and sixty-seven hundredths and ten and sixty-seven hundredths respectively.

Number of Grades Involved and the Total Pupil Enrollment in These Classes -- Chart V summarizes the number of grades involved in the teaching of conservation of natural resources as a required subject and the total pupil enrollment in these classes. Since the number of grade combina-



Number of Grades
CHART V

RANGE OF GRADES INVOLVED IN THE TEACHING OF CONSERVATION
OF NATURAL RESOURCES AS A REQUIRED SUBJECT IN NEW ENGLAND

Average of Total Number of Pupils in Each School System Reporting -- of Each State

tions varied for each New England State, the author felt obliged to include them in range form. Thus Kindergarten was considered as a grade. The total pupil enrollment fluctuated to such a degree, in these required conservation classes, that the author averaged each state's reported enrollment to present in chart form.

Thus, as can be seen on Chart V, State One teaches conservation of natural resources as a required subject from the Kindergarten through the sixth grade with an average enrollment of two hundred and thirty-three pupils in the classes; State Two teaches grades one through twelve with an average enrollment of six hundred and twenty-one pupils; State Three teaches grades one through twelve with an average enrollment of six hundred and seventy-five pupils; State Four teaches grades one through twelve with an average enrollment of eight hundred pupils; State Five teaches grades one through twelve with an average enrollment of one thousand forty pupils; and State Six teaches from the Kindergarten through the eighth grade with an average enrollment of twenty-three hundred and seventy-eight pupils.

The mean number of grades taught conservation of natural resources as a required subject is ten and sixty-seven hundredths. Since Kindergarten was included as a grade, this is indicated on Chart V by the bar colored blue which shows nine and two-thirds actual grades plus Kindergarten.

The mean number of pupils enrolled in these classes is nine hundred and fifty-eight. This is indicated on Chart V by being opposed by the blue bar.

CHAPTER V

SOME CONSERVATION EDUCATION PROBLEMS
IN THE PUBLIC SCHOOLS OF NEW ENGLAND

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SOME CONSERVATION EDUCATION PROBLEMS IN THE PUBLIC SCHOOLS OF NEW ENGLAND

Teachers Can Take The Lead -- "In this field as in every other, however, the essential key to continued advance is the teacher himself. Such teacher-education programs as described, whether pre-service or in-service, are unfortunately few and scattered. What then might be done by the individual teacher who feels concerned about wise resource-use, desires to develop an emphasis on resources in his own instruction, yet must direct his own study? What helps can he find? Where can he secure guides to individual study and action? How might he proceed "on his own" to develop increased competence in education on resources?"

"There is no easy or single answer to these questions but two suggestions may be offered: (a) use a variety of learning experiences in self-education as in classroom teaching, and (b) seek significant instructional materials and experiences from varied sources."¹

Two Methods Used In Learning Experiences -- A number of different ways can be used to learn about natural resources. Direct, first-hand experience in seeing and solving problems of natural resource-use is the most vivid.

(1) McGlothlin, W. J. et al. Large Was Our Bounty 1948. p. 138.

But that direct experience must be supplemented by other types of experience, such as documentary materials, if learning is to be fully effective.

A learning experience such as documentary materials is a vicarious medium and includes books, magazines, leaflets, teacher instruction and lecturers among others.

The direct approach is found in community experiences which include conservation speakers, field trips, surveys and service projects among others.

A Comparison of How Well Conservation Education Material Is Presented in the Public Schools of New England --
On Table I can be found a comparison of how well conservation education material is presented in the public elementary and secondary schools of New England.

Of the eighty-six returned questionnaires, seventy percent of the respondents stated that teacher instruction of conservation education was presented well, fifteen percent of the return said it was presented poorly but in no case was it presented not at all.

Textbooks figured second in the extent of return. Sixty-five percent of the respondents stated that conservation education was presented well, twenty-three percent of the return said that textbook material was presented poorly and four hundredths percent of the return stated that it was not presented at all.

Leaflets followed next, sixty-two percent of the res-

TABLE I

A Comparison of How Well Conservation Education Material Is Presented in the Public Elementary and Secondary Schools of New England

Materials	The Number of School Systems Reporting					
	Well	% Return	Poorly	% Return	Not at all	% Return
Textbooks	56	65	20	23	3	.04
State Conservation Magazine	36	42	18	21	8	.09
Leaflets	53	62	15	17	0	0
Teacher Instruction	60	70	13	15	0	0
Speakers	34	40	13	15	14	16
Lecturers	18	21	14	16	24	28
Totals	257	300	93	107	49	44.13
Means	42.83	50.00	15.50	18.00	8.17	7.36

pondents stated that conservation education was presented well, seventeen percent of the return said leaflet material was presented poorly but in no case was it presented not at all.

Continuing with Table I, state conservation magazines next figured in prominence, forty-two percent of the respondents stated that conservation education was presented well, twenty-one percent of the return said that state conservation magazine material was poorly presented and nine hundredths percent of the return stated it was not presented at all.

In fifth place in the amount of return, speakers on conservation education were considered. Forty percent of the respondents stated that these speakers presented their material well, fifteen percent of the return said the material was poorly presented and sixteen percent of the return said that speakers did not present any conservation education material.

The final point dealt with by the questionnaires was lecturers, twenty-one percent of the respondents stated that these lecturers presented their conservation education material well, sixteen percent of the return said that the material was poorly presented and twenty-eight percent of the return said lecturers did not present any conservation education material.

From an objective viewpoint, the mean number of docu-

mentary materials and community experiences reported well was forty-two and eighty-three hundredths, while the mean percentage of return was fifty and no hundredths.

The mean number of documentary materials and community experiences reported poorly was fifteen and five-tenths, while the mean percentage of return was eighteen and no hundredths.

The mean number of documentary materials and community experiences reported not at all was eight and seventeen hundredths, while the mean percentage of return was seven and thirty-six hundredths.

CHAPTER VI

THE PRESENTATION OF SUPPLEMENTAL
CONSERVATION EDUCATION MATERIAL

CHAPTER VI

THE PRESENTATION OF SUPPLEMENTAL CONSERVATION EDUCATION MATERIAL

Two Other Methods Used in Learning Experiences -- In Chapter V, it was said that there were a number of different ways to be used to learn about natural resources. Two methods of learning experiences were considered, i. e. documentary materials and community experiences.

In Chapter VII, some phases of community experiences, using the direct approach, will be taken up more fully.

In the present chapter, two other methods of supplementing direct experience are considered, i. e. audio-visual aids and constructing activities, both of which have the vicarious approach in learning experiences.

Audio-visual aids, as a learning experience, includes maps, charts, graphs, objects, specimens, models, pictures, slides, filmstrips, motion pictures, recordings and radio programs among others.

As a learning experience, constructing activities include drawing, painting, modeling, mural-making, dramatizing, constructing and displaying among others.

Using a Variety of Learning Experiences -- Since no single learning project or unit of work is likely to use all of the foregoing experiences in conservation education, every good program should include one or more experiences of each major type; "for example, one should read and talk about the physical, economic, and social aspects of re-

sources and their wise use; should study pictures and charts, see slides, filmstrips, and motion pictures; might draw, paint, or model relevant data; and should surely hear conservation speakers, take field trips to see conservation needs and procedures, and survey local problems and resources. An excellent procedure is to study a particular section of land, mapping its devastated areas, analyzing its reclamation possibilities and appropriate technics, planning ultimate and needed next steps, recommending accordingly, and then actually engaging in conservation efforts as a part of community service.

"All four types of experience should be used in balance if effective learning is desired. This is as true for the adult as for the child."¹

How Supplemental Conservation Education Material Is Presented by the Public Schools of Each New England State --

On Table II can be found a summary of the data from the eighty-six returned questionnaires in regard to the presentation of supplemental conservation education in the public schools of New England. The only vicarious method of learning experience considered was audio-visual aids. However, the respondents filled in other vicarious methods under "any others" in the questionnaire. These learning

(1) McGlothlin, W. J. et al. Large Was Our Bounty 1948. p. 139.

TABLE II

How Supplemental Conservation Education Material Is Presented
By The Public Schools Of Each New England State

	State						Totals	Means
	1	2	3	4	5	6		
Slides	10	11	6	3	8	5	43	7.17
Sound Motion Pictures	10	18	14	6	11	13	72	12.00
Silent Motion Pictures	5	6	0	5	3	2	21	3.50
Posters	10	16	13	8	11	8	66	11.00
Bulletin Boards	8	11	13	8	10	10	60	10.00
Sketches	2	5	2	3	10	0	22	3.67
Cartoons	5	2	5	2	3	0	17	2.83
Charts	5	10	6	5	10	3	39	6.50
Flannelgraphs	2	0	2	2	0	2	8	1.33
Filmstrips	10	11	13	8	13	8	63	10.50
Photographs	10	8	6	5	10	5	44	7.33
Colored Films	8	9	3	2	6	2	29	4.83
Any Others: --								
Art Units		2			1		3	.50
State Essay Contests			2				2	.33
Exhibits					1	1	1	.17
Sand Tables					1		1	.17
Stuffed Animals						2	2	.33
School Newspapers					1		1	.17

experiences included State Essay Contests and School Newspapers -- documentary materials; Stuffed Animals -- audio-visual aids; and Art Units, Exhibits and Sand Tables -- constructing activities.

On Table II, considering New England as a whole, is shown Sound Motion Pictures leading all conservation education material used with a mean of twelve and no hundredths; Posters followed next with a mean of eleven and no hundredths; with the remaining means following in this respective order: Filmstrips -- ten and five-tenths, Bulletin Boards -- ten and no hundredths, Photographs -- seven and thirty-three hundredths, Slides -- seven and seventeen hundredths, Charts -- six and five-tenths, Colored Films -- four and eighty-three hundredths, Sketches -- three and sixty-seven hundredths, Silent Motion Pictures -- three and five-tenths, Cartoons -- two and eighty-three hundredths, and Flannelgraphs -- one and thirty-three hundredths.

Under "any others" on Table II is shown Art Units leading the other supplemental conservation education material with a mean of five-tenths; followed by State Essay Contests and Stuffed Animals with the same mean of thirty-three hundredths; and finally Exhibits, Sand Tables and School Newspapers with identical means of seventeen hundredths.

CHAPTER VII

FIELD TRIPS AND FIELD PROJECTS
IN THE CONSERVATION EDUCATION PROGRAM

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FIELD TRIPS AND FIELD PROJECTS IN THE CONSERVATION EDUCATION PROGRAM

Relation of Conservation to Nature Study -- "Conser-
vation and nature study are synonymous to many persons.
Nature study has values apart from the teaching of conserva-
tion concepts. To attempt to make all nature study meet
the specifications of conservation would be unwise. It
would be more logical to look upon nature study as one of
those subjects in which conservation concepts may readily
be taught. Elementary conservation concepts of mutual
helpfulness or protection may be developed in nature study
in the lower grades. Nature study should provide a child
with an interest in nature and with attitudes that will
enable him to get more important conservation understand-
ings out of subsequent subjects. Each year the pupil
should be given instruction in an increasing number of forms
and examples of interdependence and competition.

"Some conservationists have questioned whether nature
study, or elementary science as commonly taught develops
any of the major conservation concepts sufficiently to
justify calling such study conservation education. Their
criticism has been that a great part of nature study, as
so frequently taught, deals with individual species of
plants and animals as separate and isolated information.
Time has been spent studying some exotic insect of no local
significance when a study of an insect that plays a part in

the destruction of production of some locally important resource would be far more valuable. Often the fundamental principle of conservation, natural balance or interdependence, has been neglected. There certainly is just grounds for not designating such nature study as conservation education. The study of unrelated species is not the best nature study and has little significance in developing conservation concepts.

"The teacher who creates pupil interest in the things of nature and emphasizes interdependence is making a major contribution to conservation education. The more complex principles of conservation can be developed in later years.

"Whether or not we recognize the instruction at the lower elementary level as conservation education is relatively unimportant. Whether or not the teacher develops interest and the rudiments of use, protection and interdependence of things in the child's environment is important. Nature study so taught is good nature study and also training in conservation.

"It is not important that the child use the term "conservation" until later than his nature study course. Instead, simpler terms such as "protecting," "helping," "planting," "feeding" should be used. Some teachers claim that the term "conservation" can be used as early as the second or third grade. The author is of the opinion that those teachers are not fully aware of the complexity of the

conservation concept and that the eighth grade would be a better time for its introduction.

"Some of the newer elementary science books present the idea of interdependence of things in nature in simple terms. If with this improvement in teaching material, the teachers of nature study can be given a better understanding of what conservation means, then nature study will certainly contribute much to the program of conservation education."¹

The School Journey As a Field Trip -- Observation and direct experiencing may be found in educational literature under the headings of excursion, journey, trip, and tour. The term school journey is the more meaningful and appropriate in current use since it implies travel and study of long or short duration.

A school journey is thus synonymous with a field trip since it complies with the same requirements and outcomes. Kinder states "the school journey can be defined as a teaching technique involving any definitely organized travel made primarily with an educational motive in mind. The journey grows out of the students' need for firsthand data to assist them in solving their problems. It involves an organized plan by which students journey to places where

(1) Beard, Ward P. Teaching Conservation 1948. pp 52-54.

the data exist in natural form or functioning order. Although many materials may be brought to the school for firsthand study, there are numerous other materials, situations, relationships, and phenomena, which, because of their bulk, immobility, or diversity cannot be taken into the classrooms. If these materials are to be studied directly, students must go to them. The interpretation given to school journey at this time includes trips of a few minutes, illustrated by the teacher who takes his class into the schoolyard to observe a tree or the building of a wall, as well as the long journey consuming an entire day or several days. These journeys may be taken during school hours or they may be planned for Saturdays or after school hours. Finally, the discussion here eliminates trips or excursions which are not primarily taken for study purposes, such as trips taken by athletic teams for contests, picnics, and graduation class excursions. Such affairs do not involve teaching techniques, except in remote ways.²"

Field Trips As Outdoor Laboratories -- "If conservation is to be well taught, outdoor laboratories are a necessity. These need not be elaborate. Most schools have school grounds. Even big cities have parks. Cemeteries, city dumps, new houses going up, road cuts, a vacant lot,

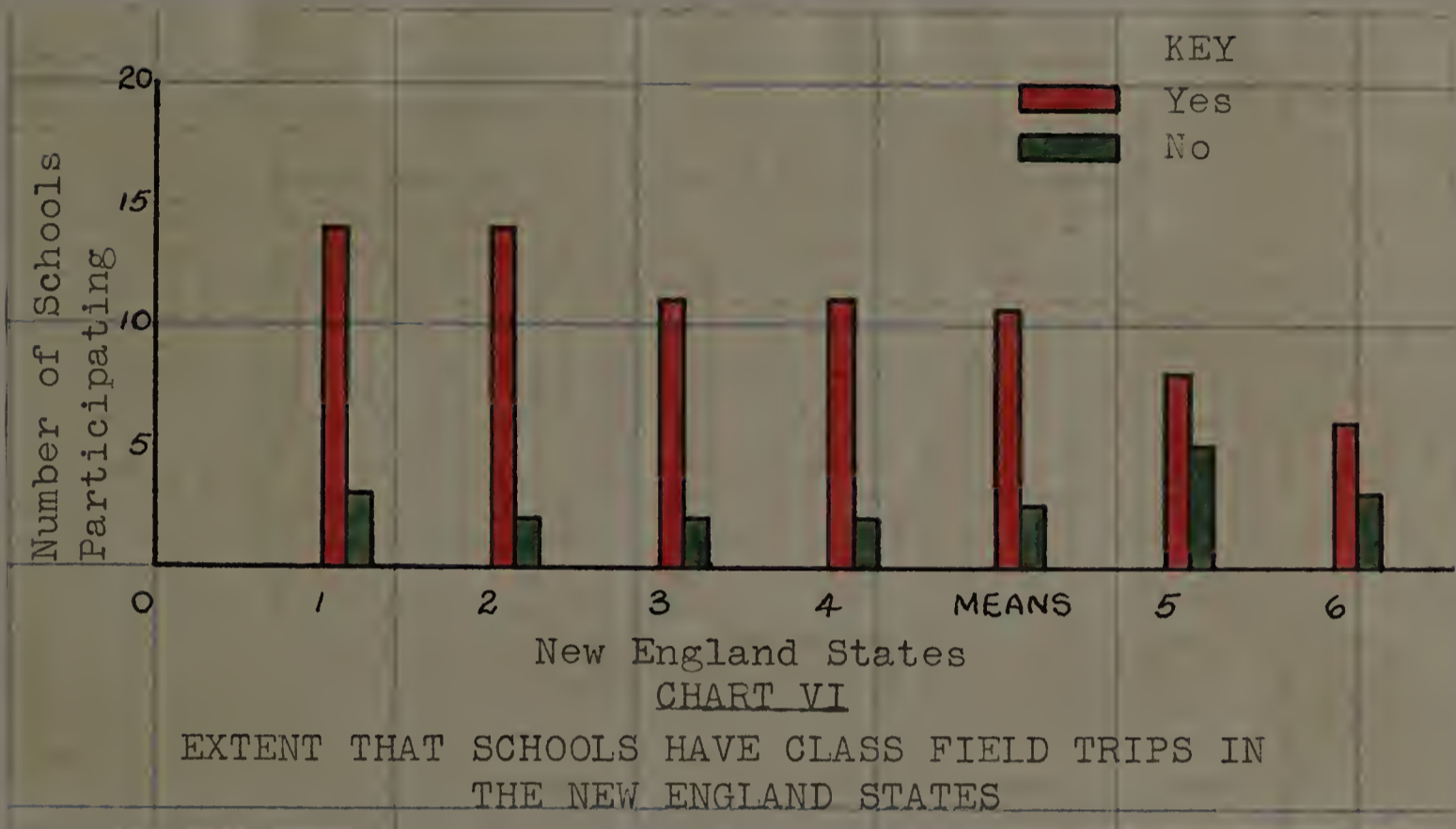
(2) Kinder, James S. Audio-Visual Materials and Techniques 1950. pp 385-386.

all offer opportunities to get out and see relationships of soil and water, trees and wildlife. The opportunities exist everywhere."³

Extent That Public Schools Have Class (Nature or Conservation) Field Trips in the New England States -- Of the eighty-six school systems returning questionnaires, seventy-four and four-tenths percent stated that class (nature or conservation) field trips were being participated in. Twenty percent of the respondents said that class (nature or conservation) field trips were not participated in.

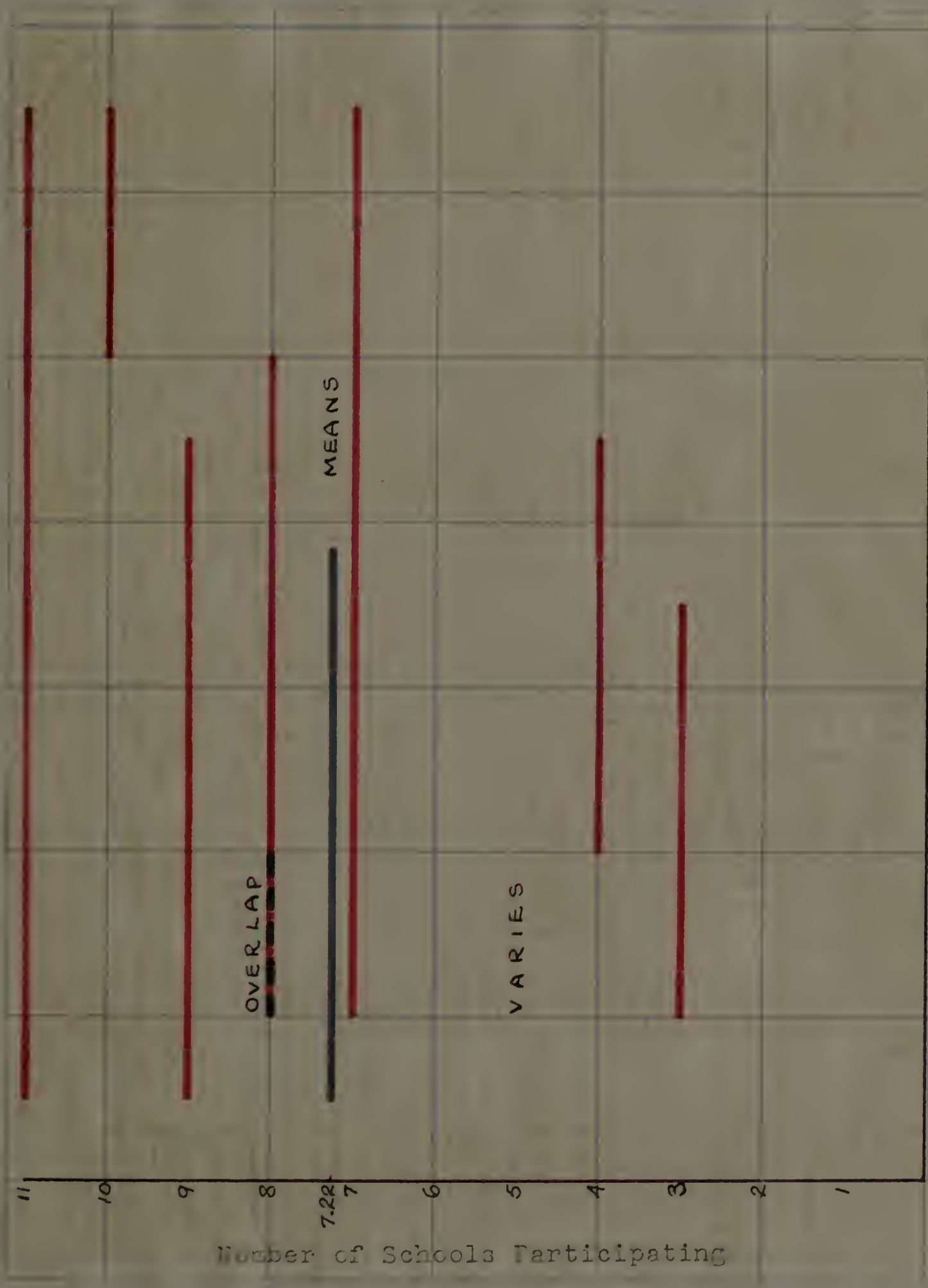
The extent that public schools have class field trips in the New England States can be found on Chart VI. Two colors are used on the bars on Chart VI, i. e. red and green, indicating an affirmative or negative answer to the questionnaire. As can be seen States One and Two led the rest of the states with fourteen affirmative replies apiece, followed by States Three and Four with eleven replies apiece, State Five -- eight, and State Six -- six affirmative replies. The means for the affirmative and negative replies are ten and sixty-seven hundredths and two and eighty-three hundredths respectively.

(3) Ross, Helen B. "Conservation Education In Elementary Schools". The Science Teacher. XVIII, No. 1 (Feb. 1951) p. 32.



Range of Grades Involved In Class (Nature or Conservation) Field Trips In the New England Public Schools --
Chart VII summarizes the number of grades participating in class (nature or conservation) field trips. Since the number of grade combinations varied to such a degree in the school systems replying to the questionnaires, the author felt obliged to group them in range form. Thus Kindergarten was considered as a grade.

As can be seen on Chart VII, three school systems have class field trips from grade one through the sixth grade; four school systems have class field trips from the third grade through grade eight; five school systems have class field trips with grades that vary each year; seven school



Number of Schools Participating

School Grades
CHART VII

RANGE OF GRADES INVOLVED IN CLASS FIELD
 TRIPS IN NEW ENGLAND

systems have class field trips from grade one through grade twelve; eight school systems have class field trips from grade one through grade nine; eight school systems (overlap) have class field trips from grade one through grade three; nine school systems have class field trips from Kindergarten through grade eight; ten school systems have class field trips from grade nine through grade twelve; and eleven school systems have class field trips from the Kindergarten through the twelfth grade.

The foregoing grades represent seventy-five and six-tenths percent of the returned questionnaires.

The mean number of grades involved in class field trips is seven and seventy-five hundredths. Since Kindergarten was included as a grade, this is indicated on Chart VII by the bar colored blue which shows six and three-quarters actual grades plus Kindergarten.

The mean number of school systems participating in class field trips is seven and twenty-two hundredths. This is indicated on Chart VII by being opposed by the blue bar.

Frequency of Class (Nature or Conservation) Field Trips Taken By the Public Elementary and Secondary Schools of New England -- On Table III can be found a summary of the data from the eighty-six returned questionnaires in regard to the frequency of field trips taken.

Considering New England as a whole, it will be seen on

TABLE III

Frequency of Field Trips Taken By The Public Elementary And
Secondary Schools Of New England

	State	1	2	3	4	5	6	Totals	Means
		<u>Returns</u>							
Yearly				5	1	2	2	10	1.67
1-2 Times Per Year				3				3	.50
2 Times Per Year				2				2	.33
2-3 Times Per Year			5				3	6	1.00
2-4 Times Per Year						3		3	.50
2-5 Times Per Year		2						2	.33
3 Times Per Year		3			2			5	.83
3-4 Times Per Year			2					2	.33
6-10 Times Per Year					2			2	.33
12 Times Per Year				2	1			3	.50
Occasionally		3	3					6	1.00
Frequently							3	3	.50
Weekly--Fall and Spring		3						3	.50
When Needed			3	2		3		8	1.33
Often in the Fall			2					2	.33
Several Per Year						2		2	.33

Table III that the number of field trips taken Yearly leads all the other frequencies with a mean of one and sixty-seven hundredths; followed by field trips taken When Needed with a mean of one and thirty-three hundredths; next the field trips taken Two-Three Times Per Year and Occasionally have the same means of one and no hundredths; in fourth place are field trips taken Three Times Per Year with a mean of eighty-three hundredths; fifthly the field trips taken One-Two Times Per Year, Two-Four Times Per Year, Twelve Times Per Year, Frequently, and Weekly -- Fall and Spring have identical means of five-tenths; and finally the field trips taken Two Times Per Year, Two-Five Times Per Year, Three-Four Times Per Year, Six-Ten Times Per Year, Often in the Fall and Several Per Year have the same means of thirty-three hundredths.

Supplement to Field Trips -- Field Projects -- "Conservation offers the teacher and pupils real life problems. Unless instruction in natural resource management gets out of doors it will lack effectiveness. Conservation deals with material things. So must conservation instruction.

"All instruction in conservation should provide field work. The teacher should go over the ground ahead of time and plan what to observe and what to do. It is not necessary that the pupils have long preliminary instructions previous to observation trips if the teacher is prepared to keep their eyes "popping" as he reveals a new world to them.

A discussion of the things learned and their significance should follow each trip. A good teacher will not be content with field trips in which the students only look at something. Every student studying conservation should carry out real conservation projects. City pupils may well be encouraged to spend a summer or two employed on a farm, in a forest or other primary production area.

"If the trip involves work experience such as building a dam, terracing, tree planting, developing a wildlife food area, the students and teacher should plan and make preliminary trips to survey the area to be developed. This should be followed by making detailed work plans before actual work is started.

"First-hand experience on a real problem is necessary to give the students an understanding that conservation is practical. Anything short of that is inadequate and may only lead to disillusionment after school days. Term papers, making of booklets, making collections may have their place but the solution of an actual problem on the land is the ultimate test for effective teaching of conservation."⁴

Ross states in "The Science Teacher" that "In the long run pupils and teachers must go outside of the classroom and learn.

(4) Beard, Ward P. op. cit. pp 83-85.

"The trip need not be far. The soil of the school ground may provide the first lesson. If the school ground is eroded and unplanted, it may serve as a basis for many lessons and activities. If it is planted, it may also provide much teaching experience.

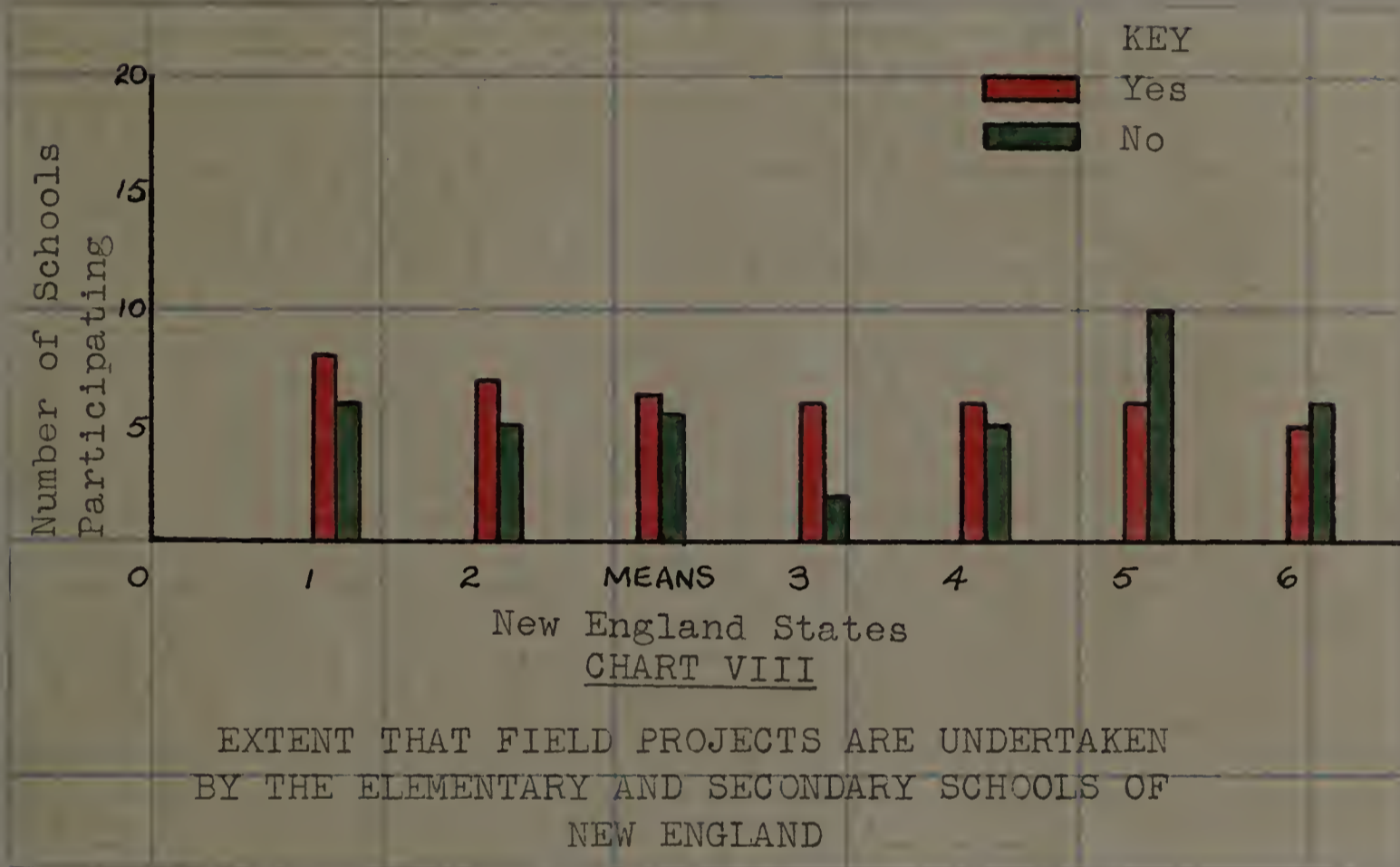
"Activities are another teaching device. The more real those activities are, the greater their value becomes. Thus, planting cover for wildlife is a better teaching experience than making a mural of a wildlife refuge. Filling a gulley on the school ground is a real experience. In doing it, children learn many techniques and a new pride in accomplishment that could never be accomplished by mere talk. Furthermore, there is likely to be much more transfer of learning to home and community situations."⁵

Extent That Field Projects Are Undertaken By the Public Elementary and Secondary Schools of New England --
Of the eighty-six returned questionnaires, forty-four and two-tenths percent of the respondents stated that their school systems have field projects; whereas thirty-nine and five-tenths percent of the respondents reported that their school systems did not have field projects.

On Chart VIII is shown the extent that field projects are undertaken by the public elementary and secondary schools of New England. On Chart VIII two colors are used

(5) Ross, Helen B. op. cit. p. 34.

on the bars, i. e. red and green, designating an affirmative or negative answer to the questionnaire.



As can be seen, State One led the rest of the states with eight affirmative replies; followed by State Two with seven; States Three, Four and Five had identical replies of six; and State Six -- five affirmative replies.

The means for the affirmative and negative replies are six and thirty-three hundredths and five and sixty-seven hundredths respectively.

The Kind and Result of Field Projects In the Public Elementary and Secondary Schools of New England -- On Table IV can be found a summary of the data from the eighty-six

TABLE IV

The Kind And Result Of Field Projects In The
Public Elementary and Secondary Schools Of New England

	State	1	2	3	4	5	6		
		<u>Returns</u>						Totals	Means
Individual Projects		1		3	3		3	10	1.67
Group Projects		5		3	1	2	2	13	2.17
Both Projects			6	2	2	5		15	2.50
Spreading of Grain on Ice or Snow				3	2	3		8	1.33
Food Shelters Provided		2	3	2	5	3		15	2.50
Erosion of Soil Prevented			2	3	3	2	2	12	2.00
Bird Houses Erected		5	6	3	5	5	2	26	4.33
Any Others: --									
Science Fairs Held		1						1	.17
Farm Ponds Created					2			2	.33
Rodent Control Initiated					2			2	.33
Irrigation of Soil Learned by Doing					2			2	.33
More Interest Shown by Agricultural Classes							2	2	.33

returned questionnaires in regard to the kind and result of field projects in the public schools of New England. Four popular field projects were considered; however the respondents also filled in various other field projects under "any others", which they considered noteworthy.

On Table IV, considering New England as a whole, is shown the kind of field projects favored. Both Projects (a combination of Individual Projects and Group Projects) was most popular with a mean of two and five-tenths; followed by Group Projects alone with a mean of two and seven-tenths; and in last place was Individual Projects alone with a mean of one and sixty-seven hundredths.

The result of these field projects shows that Bird Houses Erected was the most popular with a mean of four and thirty-three hundredths; followed by Food Shelters Provided with a mean of two and five-tenths; the Erosion of Soil Prevented was third with a mean of two and no hundredths; and in last place was the Spreading of Grain on Ice or Snow with a mean of one and thirty-three hundredths.

Under "any others" on Table IV, in regard to the result of field projects, the respondents listed the following: Farm Ponds Created, Rodent Control Initiated, Irrigation of Soil Learned by Doing, and More Interest Shown by Agricultural Classes with identical means of thirty-three hundredths; and Science Fairs Held with a mean of seventeen hundredths.

CHAPTER VIII

PROPERTIES WHERE CONSERVATION CAN BE PRACTICED
BY THE PUBLIC SCHOOLS IN NEW ENGLAND

CHAPTER VIII

PROPERTIES WHERE CONSERVATION CAN BE PRACTICED

BY THE PUBLIC SCHOOLS IN NEW ENGLAND

Should the School Own or Lease Land? -- "Neither school ownership nor leasing of land is necessary. Often access to land can be secured in other ways. In many communities there are tracts of land that are considered wasteland, owners of which often are willing to have groups make improvements that will be an asset to the community. There are often tracts of public land on which there is need of erosion control or planting for productive purposes. An eroding road embankment can be used as a problem.

"Making a survey of the problem, reaching a decision and planning what should be done, getting approval from authorities to do certain things and solving the many problems of actually doing the work will provide real problems in conservation.

"Often the school grounds themselves present problems of erosion or possible better use of certain areas. In prairie regions the planting of a shelterbelt may be the conservation project.

"The county or community may have acquired, through tax delinquency, property that can be used by the school. In other cases grants have been made to the school by individuals or by the county. Often abandoned land can be purchased very reasonably by schools. In other cases tracts

of land in state or national forests have been turned over to a school for conservation study and practice. Some farmer may welcome assistance of a class in terracing, planting or caring for trees or in planting fish in a stream or pond on his land. The determined teacher can find land some place to work on.

"Conservation measures do not require the continuous attention that activities with livestock do, especially at times when the school is not in session. In the case of agricultural crops there are certain periods when immediate action is necessary. This is rarely the case with land devoted to forestry or wildlife. Operation of agricultural land usually involves more cash outlay than does a long-time program of conservation in non-agricultural production."¹

Whose Responsibility? -- "Before a school undertakes the management of land for teaching conservation there should be an understanding between the landowner, school officials and the teacher as to all aspects of tenure, joint planning and the extent to which classes will carry out conservation measures. That school is fortunate that has some member or members on the faculty who have had special training or experience in forestry, wildlife, soil

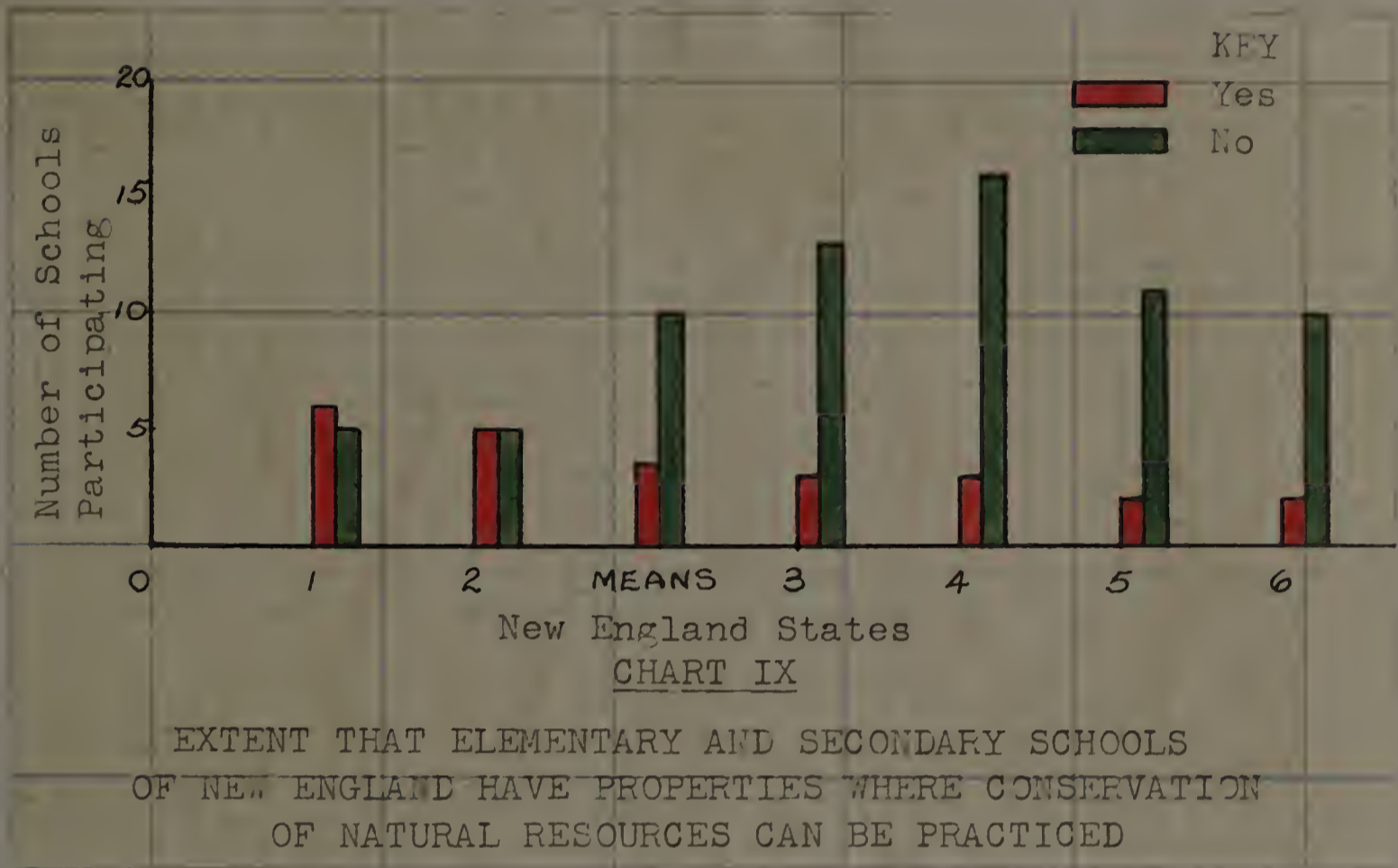
(1) Beard, Ward P. Teaching Conservation 1948.
pp 85-86.

and water management. In some cases the vocational agriculture teacher is given the responsibility for the overall planning for school operated lands. In case no one with such training is on the faculty, possibly the county agent, a representative of the Soil Conservation Service, the state or extension forester or a local forest ranger would be willing to act at least in an advisory capacity."²

Extent That Public Elementary and Secondary Schools of New England Have Properties Where Conservation of Natural Resources Can Be Practiced -- Of the eighty-six school systems returning questionnaires, twenty-four and four-tenths percent of the respondents stated that they had properties where conservation can be practiced; whereas sixty-nine and eight-tenths percent of the respondents stated that they did not have properties where conservation can be practiced.

The extent that public elementary and secondary schools of New England have properties where conservation of natural resources can be practiced can be found on Chart IX. Two colors are used on the bars on Chart IX, i. e. red and green, indicating an affirmative or negative answer to the questionnaire. As can be seen State One led the rest of the states with six affirmative replies; followed by State Two

(2) Beard, Ward P. Teaching Conservation 1948.
pp 86-87.



with five replies; States Three and Four -- three replies apiece; and finally States Five and Six with two affirmative replies apiece.

The means for the affirmative and negative replies are three and five-tenths and ten and no hundredths respectively.

Extensiveness of Properties Where Conservation of Natural Resources Can Be Practiced At Or Nearby the Public Elementary and Secondary Schools of New England -- On Table V can be found a summary of the data from the eighty-six returned questionnaires in regard to the extensiveness of properties where conservation can be practiced at or nearby

TABLE V

Extensiveness of Properties Where Conservation of Natural Resources Can Be Practiced
At Or Nearby The Public Elementary And Secondary Schools Of New England

	State	1	2	3	4	5	6		
		<u>Returns</u>						Totals	Means
Surrounding Area About Schools		2				2		4	.67
Small Area					1			1	.17
2 Acres			2					2	.33
5 Acres of Woodland					1			1	.17
20 Acres				1				1	.17
50 Acres						1		1	.17
Town Land					2			2	.33
Farm Lands						1		1	.17
Whole Island							2	2	.33
Unlimited					1			1	.17

the public schools of New England.

On Table V, considering New England as a whole, is shown Surrounding Area About Schools leading all other areas with a mean of sixty-seven hundredths; followed by Two Acres, Townland, and Whole Island with the same means of thirty-three hundredths; and finally Small Area, Five Acres of Woodland, Twenty Acres, Fifty Acres, Farmlands, and Unlimited with identical means of seventeen hundredths.

Other Properties Available Where Conservation of Natural Resources Can Be Practiced By the Public Elementary and Secondary Schools of New England -- On Table VI can be found a summary of the data from the eighty-six returned questionnaires in regard to other properties available for the practice of conservation by the public schools of New England. City Parks was the only property considered; however the respondents filled in various other properties under "any others" which they considered noteworthy.

On Table VI, considering New England as a whole, is shown City Parks leading all other properties with a mean of two and seventeen hundredths; followed by Farms with a mean of one and no hundredths; next is Wildlife Sanctuaries with a mean of sixty-seven hundredths; Woods and Fields in Area -- Private and Company Owned, Community Properties, State Parks, Salt Water Areas, and Fresh Water Areas with identical means of thirty-three hundredths; and finally

TABLE VI

Other Properties Available Where Conservation Of Natural Resources Can Be Practiced
By The Public Elementary And Secondary Schools Of New England

	State	1	2	3	4	5	6	Totals	Means
		<u>Returns</u>							
Woods And Fields In Area -- Private And Company Owned		2						2	.33
City Parks			3	2	3	3	2	13	2.17
Farms				2		2	2	6	1.00
Town Woodlands					1			1	.17
Wildlife Sanctuaries					2		2	4	.67
Community Properties						2		2	.33
State Parks							2	2	.33
Salt Water Areas							2	2	.33
Fresh Water Areas							2	2	.33

Town Woodlands with a mean of seventeen hundredths.

CHAPTER IX

MEASURING EFFECTIVENESS OF TEACHING CONSERVATION

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MEASURING EFFECTIVENESS OF TEACHING CONSERVATION

Methods of Testing Attitudes -- Instruction is effective when it meets the objectives for which it was given. Objectives in teaching conservation may vary with the group being taught.

Since information about natural resources is a means of reaching objectives in the development of attitudes and abilities, one method of measuring effectiveness of instruction is to use the common testing procedures to determine whether students have acquired the basic facts and know their relationships. Such testing is merely a beginning.

There are many attitudes regarding conservation. On one extreme is the protectionist, on the other is the liquidationist. The proper conservation attitudes lie somewhere between these.

Among the techniques in use in determining or measuring attitudes, beliefs or understandings regarding conservation of natural resources are: (1) The Five-Statement Choice -- "In this method the person indicates which of five statements, of varying degrees to each side of a median opinion (which is considered to be the correct one), most nearly agrees with his opinion of the way in which a natural resource should be handled. For example, the person being tested is asked to indicate which statement in

each set of five he considers as most accurately describing his view on the problems in several fields of conservation."¹

Thus a comprehensive test of this kind may deal with attitudes toward forest use, picking of wild flowers or wildlife management which are the ultimate objectives.

(2) Degree of Agreement -- "Another evaluation device is the statement to which a person may agree or disagree to varying extent. For example, he may (1) disagree absolutely, (2) with limitations, (3) be indifferent to, (4) agree with limitations, or (5) agree unqualifiedly to certain statements concerning conservation."²

(3) Individual Performance -- "The Student's Outdoor Creed may serve as a standard for evaluation of training in conservation.

THE STUDENT'S OUTDOOR CREED

I believe that my outdoor manners reflect what I am at home.

I believe that public property is for all of us and that I should play fair in its use.

I believe in securing permission before using or entering another's property and will leave it without damage.

I believe in absolute safety with firearms and will observe all precautions in their use.

(1) Beard, Ward P. Teaching Conservation 1948.
p. 108.

(2) Ibid. p. 113.

I believe in taking only legal fish and game and will do my part in their propagation.

I believe in keeping waters, highways and camp grounds clean.

I believe that carelessness with fire is a crime against humanity and will do all in my power to keep America beautiful and productive, and will do something constructive with our natural resources each day I spend in the out-of-doors." ³ (4) Social Performance -- "The final measure of the effectiveness of conservation teaching with respect to recreation, for example, will be (1) the enactment or repeal of laws to encourage proper use of natural resources, (2) a decrease in game law violations, (3) a decrease in man-caused forest fires, (4) a decrease of vandalism in public recreation areas, (5) a decrease in specialization of conservation interests by laymen, that is, fewer persons interested in maintaining only one species of animal for selfish reasons.

"The training of those who will become farmers may be evaluated by specific indicators such as (1) the acreage of legumes they raise, (2) the maintenance of crop yield per acre with livestock manures and other fertilizers, (3) the methods of tillage used to prevent erosion, (4) the extent of their cooperation in conservation programs, and (5)

(3) Beard, Ward P. op. cit. p. 113.

their adaptation of crops to type of soil and topography.

"The training of those who become lumbermen, miners, fishermen, likewise may be evaluated respectively by indicators, such as (1) the size of trees they cut, (2) the extent of stream pollution they cause, and (3) the size of fish they keep. For each of these occupations there are many other specific measures of the extent to which conservation is practiced and, therefore, of their understanding, attitudes and abilities in resource management.⁴" Thus the observation of students who have been taught conservation would indicate whether any transfer of learning has been accomplished in relation to the home or community situations.

Evaluation As Training -- "The teacher's interest in any testing program is to improve instruction. The traditional examination to determine a grade for the report card is inconsequential in comparison to effective instruction in training citizens to perform in accordance with the principles of conservation.

"The student should be acquainted with the standards used in evaluation and be expected to apply them to his own conduct and that of his colleagues. In other words, standards of action should be the aim of teaching conservation.

"The student also should be able to recognize degrees

(4) Beard, Ward P. op. cit. p. 114.

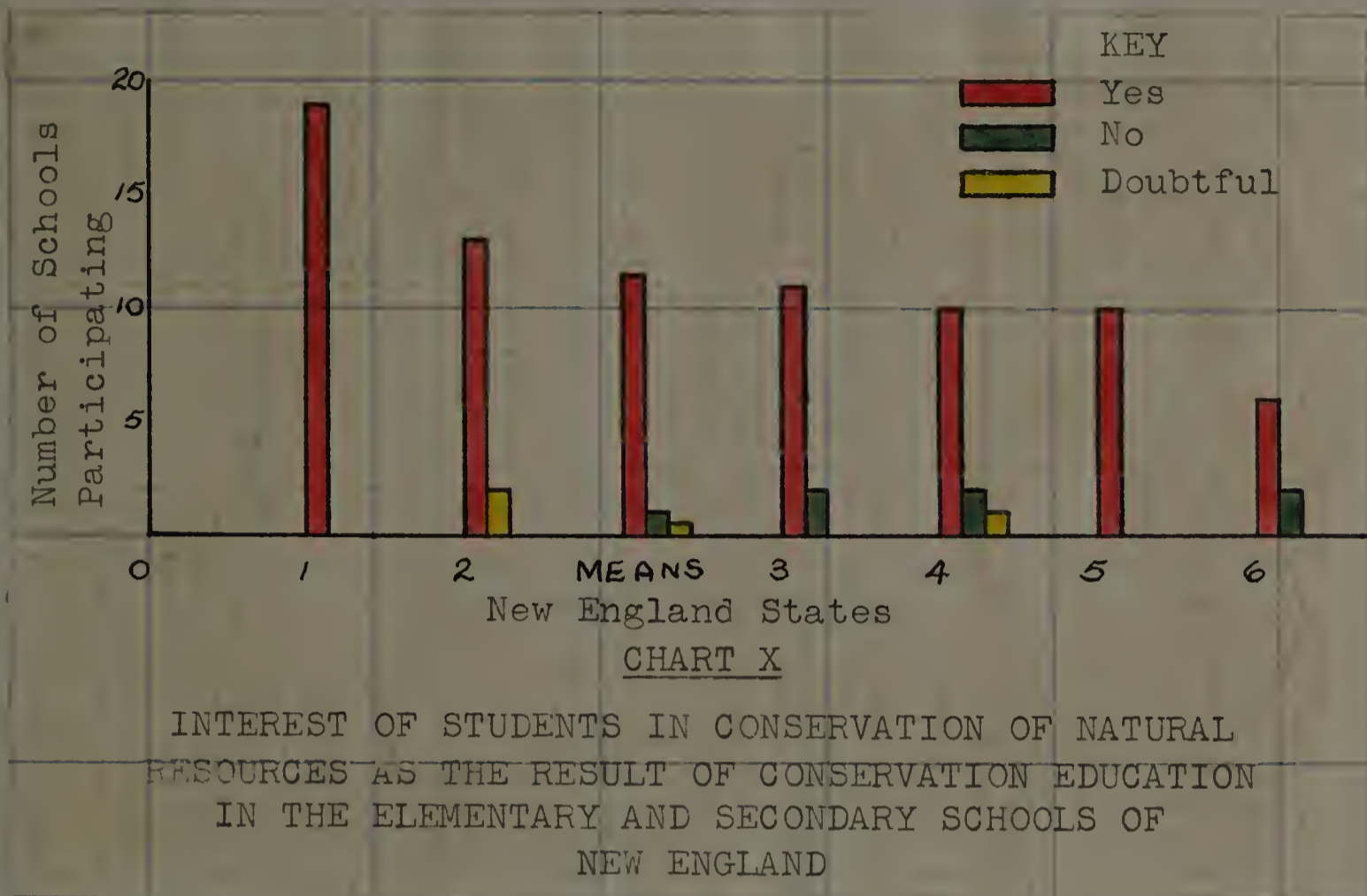
of achievement, that in one situation practice "X" may be the most justifiable at the time but that practice "Y", a degree better, should be expected in the future and that eventually practice "Z", the best that is known, is to be attained.

"Evaluation must start with and accompany instruction. Student attitudes should be determined at the start of a conservation unit as well as at the end. Progress must continuously be measured with respect to objectives."⁵

Extent of Interest of Students In Conservation of Natural Resources As a Result of Conservation Education In the Public Schools of New England -- Of the eighty-six returned questionnaires, eighty and two-tenths percent of the respondents stated that they thought the students are interested in conservation of natural resources as a result of conservation education. Seven hundredths percent of the respondents stated that they did not think the students are interested in conservation of natural resources as a result of conservation education; and thirty-five thousandths percent of the respondents expressed themselves as being in doubt.

The extent that students show interest in conservation of natural resources as a result of education along these lines can be found on Chart X. Three colors are used on the

(5) Beard, Ward P. op. cit. pp 114-115.



bars on Chart X, i. e. red, green, and yellow, designating an affirmative, negative or doubtful answer respectively to the questionnaire.

As can be seen, State One led the rest of the states with nineteen affirmative replies; followed by State Two with thirteen replies; next State Three with eleven replies; States Four and Five had identical replies of ten apiece; and finally State Six with six affirmative replies.

The means for the affirmative, negative and doubtful replies are eleven and five-tenths, one and no hundredths, and five-tenths respectively.

Indication of Interest of Students In Conservation of

Natural Resources As a Result of Conservation Education In
the Public Elementary and Secondary Schools of New England

-- On Table VII can be found a summary of the data from the eighty-six returned questionnaires in regard to the indication of interest shown by students as a result of training along conservation lines. Law Obedience, Planting Trees, Wildlife Protection, and Fire Prevention were considered; however the respondents filled in various other interests under "any others" which they considered noteworthy.

On Table VII, considering New England as a whole, is shown Fire Prevention leading all other interests with a mean of ten and eighty-three hundredths; followed by Wildlife Protection with a mean of eight and sixty-seven hundredths; next is Law Obedience with a mean of six and eighty-three hundredths; and finally Planting Trees with a mean of six and five-tenths.

Under "any others" on Table VII the respondents listed Better Farm Practices above all other interests with a mean of sixty-seven hundredths; followed by Conservation Camp Attendance, Aquarias Built, Terrarias Built, More Observant and Appreciative of Own Communities, Participation In State Forestry Essay Contests, Building of Camp Sites, and Better Youth Programs -- Scouting with identical means of thirty-three hundredths; and finally Classroom Activities Better Understood, Pursuing Higher Education To Make It A Career,

TABLE VII

Indication Of Interest Of Students In Conservation Of Natural Resources As A Result Of Conservation Education In The Public Elementary And Secondary Schools Of New England

	State							
	1	2	3	4	5	6	Totals	Means
	<u>Returns</u>							
Law Obedience	10	16	11	8	10	10	65	10.83
Planting Trees	8	5	8	3	10	5	39	6.50
Wildlife Protection	6	16	8	6	8	8	52	8.67
Fire Prevention	10	16	11	8	10	10	65	10.83
Any Others: --								
Conservation Camp Attendance		2					2	.33
Aquarias Built		2					2	.33
Terrarias Built		2					2	.33
More Observant And Appreciative Of Own Communities		2					2	.33
Classroom Activities Better Understood				1			1	.17
Participation In State Forestry Essay Contests				2			2	.33
Pursuing Higher Education To Make It A Career		1					1	.17
More Interest In Hunting And Fishing						1	1	.17
Better Farm Practices			1	1	1	1	4	.67
Building Of Camp Sites				1		1	2	.33
Better Youth Programs -- Scouting					1	1	2	.33
Prevention Of Pollution, Floods, Forest Destruction					1		1	.17

More Interest In Hunting and Fishing, and Prevention of Pollution, Floods, Forest Destruction with the same means of seventeen hundredths.

Other Formal or Informal Training in Conservation Education Offered By the Public Schools of New England --

On Table VIII can be found a summary of the data from the eighty-six returned questionnaires in regard to other formal or informal training in conservation education offered by the public schools of New England.

On Table VIII, considering New England as a whole, is shown Outside Aid From Future Farmers of America and Vocational Agriculture leading all other training in conservation with the same means of one and no hundredths; followed by Outside Aid From State Forest Fire Services and Conservation Curriculum Bulletin To Guide Teachers with the same means of sixty-seven hundredths; next is Projects in Science Field, Outside Aid From the U. S. Fish and Wildlife Service, Teacher Workshops In Conservation, and Outside Aid From Garden Clubs with identical means of five-tenths; Outside Aid From Pulp and Paper Companies, and Outside Aid From State Audubon Society with the same means of thirty-three hundredths; and finally Pilot Group of Ten Teachers Working Under The Department of Fish and Game, Cover Mans Made For Good Forestry Practices, and Arbor Day Exercises with identical means of seventeen hundredths.

TABLE VIII

Other Formal Or Informal Training In Conservation Education Offered By
The Public Elementary And Secondary Schools Of New England

	State	1	2	3	4	5	6		
		<u>Returns</u>						Totals	Means
Projects In Science Field		1	1			1		3	.50
Outside Aid From The U. S. Fish And Wildlife Service		1	1			1		3	.50
Outside Aid From State Forest Fire Services		1	1			1	1	4	.67
Outside Aid From Pulp And Paper Companies		1	1					2	.33
Teacher Workshops In Conservation			1			1	1	3	.50
Pilot Group Of 10 Teachers Working Under The Dept. Of Fish And Game			1					1	.17
Conservation Curriculum Bulletin To Guide Teachers		1	1	1	1			4	.67
Outside Aid From State Audubon Society					1		1	2	.33
Outside Aid From F.F.A.		1	1	1	1	1	1	6	1.00
Outside Aid From Garden Clubs					1	1	1	3	.50
Vocational Agriculture		1	1	1	1	1	1	6	1.00
Cover Maps Made For Good Forestry Practices						1		1	.17
Arbor Day Exercises							1	1	.17

CHAPTER X

SUMMARY AND CONCLUSIONS

CHAPTER X

SUMMARY AND CONCLUSIONS

Summary -- Conservation may be defined as "the wise use of our natural resources". These resources may be soil, water, forest and other plant life, wildlife, minerals including oil, and recreational and scenic assets, etc. It does not mean the mere preservation of all natural resources simply for the sake of preserving things, but the prevention of waste in their use.

To determine how conservation of natural resources is being taught in the public elementary and secondary schools of New England, a check-list questionnaire was sent to twenty superintendents picked at random, in each New England State.

The greatest number of returns came from school systems composed of both elementary and secondary students, as indicated on Chart I with a mean of six and seventeen hundredths.

Of the one hundred and twenty school systems contacted, eighty-six or seventy-two percent responded, as indicated on Chart II. The mean number of questionnaires returned by each New England State was fourteen and thirty-three hundredths.

The first factor to be determined was whether conservation of natural resources was taught as a separate subject or integrated with other subjects in the public

schools of New England. Planning is necessary in developing a conservation education program in a school. Four methods were discussed for teaching conservation of natural resources; and it was determined that instruction through a core curriculum, or conservation units in standard subjects or courses were the most adaptable and effective, since both involved programs of integration.

Of the eighty-six responding school systems, eighty-nine and five-tenths percent of the respondents stated that conservation of natural resources is being taught by integration with other subjects. Seven hundredths percent of the respondents reported conservation of natural resources was being taught as a separate subject. Twelve thousandths percent of the respondents reported that conservation of natural resources was taught as a separate subject and integrated with other subjects. Twenty-three thousandths percent of the respondents reported that conservation was not taught in their school systems.

As indicated on Chart III, the extent of integration in the teaching of conservation of natural resources in New England is represented by a mean of twelve and eighty-three hundredths.

The second factor was concerned with conservation of natural resources taught as a required subject in the public schools of New England. Since 1929, at least eight states have added legislation requiring school instruction

in natural resources. No New England State, as a whole, reported that conservation of natural resources is being taught as a result of state law; however twenty-five and six-tenths percent of the respondents stated that conservation of natural resources is being taught in the public schools as a required subject.

The extent that conservation of natural resources is being taught as a required subject in New England can be found on Chart IV. The data shows there are roughly three negative answers to every affirmative answer, i. e. the means for the affirmative and negative replies are three and sixty-seven hundredths and ten and sixty-seven hundredths respectively.

As indicated on Chart V, the mean number of grades taught conservation of natural resources as a required subject in New England is nine and two-thirds actual grades plus Kindergarten. The mean number of pupils enrolled in these classes is nine hundred and fifty-eight.

The third point to be determined pertained to how well conservation education material is being presented in the public schools of New England. Teachers can take the lead in developing increased competence in conservation education by using a variety of learning experiences in self-education as in classroom teaching, and by seeking instructional materials and experiences from varied sources. Two methods that are used in learning experiences,

i. e. documentary materials and community experiences, were discussed. Of the foregoing learning experiences, the former uses a vicarious medium; while the latter uses the direct approach.

Six of the foregoing learning experiences are listed on Table I. As indicated, seventy percent of the respondents stated that teacher instruction of conservation education was being presented well, fifteen percent of the return said it was presented poorly, but in no case was it presented not at all.

Sixty-five percent of the respondents stated that textbooks presented conservation education well, twenty-three percent of the return said it was presented poorly, and four hundredths percent of the return stated it was not presented at all.

Sixty-two percent of the respondents stated that leaflets presented conservation education well, seventeen percent said it was presented poorly, but in no case was it presented not at all.

Forty-two percent of the respondents stated that state conservation magazines presented conservation education well, twenty-one percent said it was presented poorly, and nine hundredths percent stated it was not presented at all.

Forty percent of the respondents stated that speakers presented conservation education well, fifteen percent

said it was presented poorly, and sixteen percent stated that speakers did not present any conservation education material.

Twenty-one percent of the respondents stated that lecturers presented conservation education well, sixteen percent said it was presented poorly, and twenty-eight percent said lecturers did not present any conservation education material.

The mean number of conservation education materials presented well, poorly, and not at all was forty-two and eighty-three hundredths, fifteen and five-tenths, and eight and seventeen hundredths respectively.

The fourth point to be determined pertained to the presentation of supplemental conservation education material in the public schools of New England. Two other methods of supplementing direct experience were considered, i. e. audio-visual aids and constructing activities, both of which have the vicarious approach in learning experiences.

As indicated on Table II, considering New England as a whole, Sound Motion Pictures led all other conservation materials used with a mean of twelve and no hundredths. Other prominent conservation education materials used are Posters, Filmstrips, Bulletin Boards, Photographs, Slides, and Charts with means of eleven and no hundredths, ten and five-tenths, ten and no hundredths, seven and thirty-

three hundredths, seven and seventeen hundredths, and six and five-tenths respectively.

The fifth section was concerned with field trips and field projects in the conservation education program of the public schools of New England. Since class field trips may be held for the purpose of nature study or conservation education, the relation of Conservation to Nature Study was discussed. It is thought best to look on nature study as one of the subjects in which conservation concepts may readily be taught in the lower grades. Thus the student will be enabled to get more important conservation understandings out of subsequent subjects.

The School Journey was defined and shown to be synonymous with a Field Trip since it complies with the same requirements and outcomes. In like manner, Field Trips are shown to be Outdoor Laboratories.

Of the eighty-six school systems returning questionnaires, seventy-four and four-tenths percent stated that class (nature or conservation) field trips were being participated in. Twenty percent of the respondents said that class (nature or conservation) field trips were not participated in.

The extent that public schools have class field trips in the New England States is shown on Chart VI with a mean of ten and sixty-seven hundredths.

As indicated on Chart VII, the mean number of grades

involved in class (nature or conservation) field trips is six and three-quarters actual grades plus Kindergarten. The mean number of school systems participating in these class field trips is seven and twenty-two hundredths.

The frequency of class (nature or conservation) field trips taken by the public schools of New England can be found on Table III. The predominant frequencies are Yearly, When Needed, Two-Three Times Per Year, and Occasionally with means of one and sixty-seven hundredths, one and thirty-three hundredths, and one and no hundredths apiece respectively.

Since first-hand experience on a real problem is necessary to give the students an understanding that conservation is practical, field projects are a desirable end product of field trips.

Forty-four and two-tenths percent of the respondents stated that their school systems have field projects. As indicated on Chart VIII, the mean for the extent of these field projects in the public schools of New England is six and thirty-three hundredths.

The kind and result of field projects in the public schools of New England is indicated on Table IV. A combination of Individual Projects and Group Projects was most popular with a mean of two and five-tenths. The outstanding results of these field projects were: Bird Houses Erected, Food Shelters Provided, Soil Erosion Prevented,

and Spreading of Grain on Ice or Snow with means of four and thirty-three hundredths, two and five-tenths, two and no hundredths, and one and thirty-three hundredths respectively.

The sixth factor to be determined was properties where conservation can be practiced by the public schools in New England. It is not necessary for the school to own or lease land to practice conservation on. Access to land can be secured in many ways, i. e. contacting owners of tracts of land that are considered waste land, public land on which there is need of erosion control, grants made to the school by individuals or by the county, properties forfeited to the county or community for non-payment of taxes, etc. However, before a school undertakes the management of land for teaching conservation there should be an understanding between land owner, school officials and the teacher as to all aspects of tenure, joint planning and the extent to which classes will carry out conservation measures.

Twenty-four and four-tenths percent of the respondents stated that they had properties where conservation can be practiced. As indicated on Chart IX, the extent that public schools in New England have properties where conservation can be practiced is represented by a mean of three and five-tenths.

On Table V, the extensiveness of properties where conservation can be practiced at or nearby the public schools

of New England is shown. Surrounding Area About Schools led all other areas with a mean of sixty-seven hundredths; other areas in prominence were Two Acres, Town Land, and Whole Island with identical means of thirty-three hundredths.

On Table VI, other properties available where conservation can be practiced by the public schools of New England are shown. City Parks, Farms, and Wildlife Sanctuaries are dominant with means of two and seventeen hundredths, one and no hundredths, and sixty-seven hundredths respectively.

The final section of the study dealt with the interest of students in conservation of natural resources as the result of conservation education.

Four techniques in use in determining or measuring attitudes, beliefs or understandings regarding conservation of natural resources were discussed, i. e. The Five-Statement Choice, Degree of Agreement, Individual Performance, and Social Performance.

Since standards of action should be the aim of teaching conservation, the student should be acquainted with the standards used in evaluation and be expected to apply them to his own conduct and that of his colleagues. Thus evaluation should start with and accompany instruction.

Eighty and two-tenths percent of the respondents stated that they thought their students are interested in conserva-

tion of natural resources because of education along these lines.

As indicated on Chart X, the mean extent of student interest in New England's public schools is eleven and five-tenths.

The indication of interest of students in conservation of natural resources as a result of conservation education is shown on Table VII. The foremost interests are Fire Prevention, Wildlife Protection, Law Obedience, and Planting Trees with means of ten and eighty-three hundredths, eight and sixty-seven hundredths, six and eighty-three hundredths, and six and five-tenths respectively.

Other formal or informal training in conservation education offered by the public schools of New England is summarized on Table VIII. The outstanding training in conservation education is presented by Outside Aid From the Future Farmers of America, and Vocational Agriculture with means of one and no hundredths apiece respectively.

Conclusions -- The first and most obvious conclusion to be reached is that conservation of natural resources is being taught in a great majority of the New England public schools by being integrated with most of the elementary and secondary subjects. However, there is a small minority of the public schools yet to be reached by conservation education in any form.

2. Even though the New England States do not require

conservation of natural resources to be taught as a result of law, twenty-five and six-tenths percent of the responding school systems stated that conservation of natural resources is being taught as a required subject. This may be interpreted as a future trend; at least it is pointing in the right direction towards future curriculums concerning conservation.

Where conservation of natural resources is being taught as a required subject in New England, the mean number of grades involved is nine and two-thirds actual grades plus Kindergarten. It is significant to point out that Kindergarten is an excellent place for children to start to gather impressions of Nature Study in order to better understand the concepts of conservation in later grades. Since the mean number of pupils enrolled in the foregoing actual grades plus Kindergarten totals nine hundred and fifty-eight, this indicates sizeable classes being taught conservation of natural resources through most all of their elementary and secondary school years.

3. It is likewise significant that as a result of the question on how well conservation education material is presented in New England's public schools, the following answers developed:

(a) Roughly one-quarter of the school systems stated that Textbooks presented conservation education poorly.

(b) Slightly less than one-quarter of the school systems reported that State Conservation Magazines presented conservation education poorly; and some of the respondents stated that State Conservation Magazines did not present any conservation education.

(c) Less than one-quarter of the school systems reported that Leaflets presented conservation education poorly.

(d) Fifteen percent of the school systems reported that conservation education was presented poorly by Teacher Instruction.

(e) Fifteen percent of the school systems reported that conservation education was presented poorly by Speakers, and sixteen percent of the respondents stated it was not presented at all by these Speakers.

(f) Sixteen percent of the school systems reported that Lecturers presented conservation education poorly, and more than one-quarter of the school systems stated that conservation education was not presented at all by Lecturers.

Of the foregoing, all are in need of improvement; however State Conservation Magazines should be in the lead in presenting conservation education, and not show any debit side.

4. According to the means, supplemental conservation education material is best presented by Sound Motion Pic-

tures, followed by Posters, Filmstrips, Bulletin Boards, Photographs, Slides, Charts, and Colored Films in New England's public schools.

5. Class (nature or conservation) field trips are well established at a majority of the public schools in New England. The mean number of grades involved in these class field trips is six and three-quarters actual grades plus Kindergarten. This again may indicate a possible future trend in outdoor laboratories that could be improved upon by increasing the number of grades upward through the secondary school.

These field trips are taken at various times of the year, however Yearly appears to be the most popular, followed by When Needed, Two-Three Times Per Year and Occasionally.

Field projects are not as well established as class (nature or conservation) field trips in the New England public schools; even though field projects are intended to show the practical side of conservation. However, as more and more teachers both pre-service and in-service become acquainted with the techniques involved in conservation education through workshops, courses, laboratories, and camps; field projects will reach the status that they deserve.

New England School systems having field projects find that a combination of individual and group effort are the

most popular projects; and as a result Bird Houses Erected is the outstanding activity, followed by Food Shelters Provided, Erosion of Soil Prevented, and Spreading of Grain on Ice or Snow.

6. Almost one-quarter of the New England school systems contacted stated that they have properties where conservation can be practiced. However, this figure could well bear watching for future development; for if a trend were to develop towards increasing conservation education in the New England public schools, then more school systems would acquire or have access to properties.

There are four prominent sizes to New England public school properties where conservation can be practiced, i. e. Surrounding Area About Schools, Two Acres, Town Land, and Whole Island.

Other properties available where conservation can be practiced by New England's public schools are, in order of greater predominance: City Parks, Farms, and Wildlife Sanctuaries.

7. The greater majority of students in the New England public schools are interested in conservation of natural resources as the result of conservation education. This is indicated by such prominent outward acts as Fire Prevention, Wildlife Protection, Law Obedience, Planting Trees, and Better Farm Practices.

Other dominant formal or informal training in conserva-

tion offered by the New England public schools are: Outside Aid From the Future Farmers of America and Vocational Agriculture because they teach learning to do by doing.

Limitations -- The most significant limitation in the study stemmed from the questionnaire. Several of the respondents found it impossible to answer certain questions or parts of questions within the questionnaire, because the information called for was not on hand. The element of ambiguity caused some respondents to write in information in one section of the questionnaire, when it was more specifically called for in another section, making the task of compilation of data all the more difficult. For the purpose of clarification, one example of this difficulty follows:

On the first page of the questionnaire the respondent was asked whether conservation of natural resources was taught as a separate subject or integrated with other subjects. Under this section quite a number of respondents listed information pertaining to other formal or informal training in conservation offered by their school systems, when this information was really sought in the last section of the questionnaire.

Interpretation also presented problems. This will explain some of the vague terms used in some of the Tables, as the author presented his findings exactly as he received them.

In spite of the limitations imposed by the several inadequacies of the questionnaire, it is felt that the results of this study can be considered relatively reliable, and the problem as a whole a successful presentation of information which the author originally intended to procure.

APPENDICES

QUESTIONNAIRE

LETTER OF TRANSMITTAL

FOLLOW-UP LETTER

APPENDIX I

QUESTIONNAIRE

A Questionnaire to determine how conservation of natural resources is being taught in elementary and secondary schools of New England.

Name and title of person filling out this questionnaire:

Date: _____

Name of School: _____

Elementary or Secondary: _____

Location: _____

Definition of Conservation Education: Conservation, for the purpose of this Questionnaire, may be defined as "the wise use of our natural resources". These resources may be soil, water, forests and other plant life, wildlife, minerals including oil, and recreational and scenic assets, etc. It does not mean the mere preservation of all natural resources simply for the sake of preserving things, but the prevention of waste in their use. People who do not understand the nature of the resources themselves and of methods of prevention of waste will naturally not be interested and will naturally not take proper steps towards conservation. It is here that education must take one of its most important forward looking steps. It is here that the best educational practices must be adopted.

Please describe the following:

1. Is conservation of natural resources taught as a separate subject or integrated with other subjects?

Please answer the following:

2. Is conservation of natural resources taught as a required subject in your school? Yes ___ No ___

a. If so, number of grades _____

b. Total pupil enrollment in these classes _____

Please indicate the following information:

3. How well is conservation education material presented in your school?

	WELL	POORLY	NOT AT ALL
a. In your textbooks	_____	_____	_____
b. State conservation magazines	_____	_____	_____
c. Leaflets	_____	_____	_____
d. Teacher instruction	_____	_____	_____
*e. Speakers	_____	_____	_____
*f. Lecturers	_____	_____	_____

* On soils, water, forestry, wildlife, etc.

Please check the following information:

4. How is supplemental conservation education material presented?

- a. By slides _____
- b. Sound motion pictures _____
- c. Silent motion pictures _____
- d. Posters _____
- e. Bulletin boards _____
- f. Sketches _____
- g. Cartoons _____
- h. Charts _____
- i. Flannelgraphs _____
- j. Filmstrips _____
- k. Photographs _____

- l. Colored films _____
- m. Any others _____

Please answer the following:

5. Does your school have class (nature or conservation) field trips?

Yes _____ No _____

a. If so, how many grades participate? _____

b. How frequently are these field trips taken? _____

c. Do you have field projects? Yes ___ No ___

1. Individual or group _____

2. Spreading of grain on ice or snow _____

3. Food shelters provided _____

4. Erosion of soil prevented _____

5. Bird houses erected _____

6. Any others _____

Please supply the following information:

6. Does your school have properties where conservation can be practiced? Yes _____ No _____

a. If so, how extensive are they? _____

b. Indicate what other properties are available.

- 1. City Parks _____
- 2. Any others _____

Please answer the following:

7. Do you think the students are interested in conservation of natural resources as the result of conservation education?

Yes _____ No _____

a. If so, how is this indicated (Please Check) _____

- 1. By law obedience _____
- 2. Planting trees _____
- 3. Wildlife Protection _____
- 4. Fire Prevention _____
- 5. Any others _____

Please describe any other formal or informal training in conservation offered by your school:

Do you wish a summary of my findings?

Yes _____ No _____

APPENDIX II

LETTER OF TRANSMITTAL

448 Commercial St.,
Provincetown, Mass.,
September 2, 1952

Dear Superintendent:

I am a graduate student majoring in Education at the University of Massachusetts. My minor field is Wildlife Management.

My belief and interest is: Our standard of living can be maintained only if all people practice conservation of natural resources. It appears that these practices will not be followed until conservation of natural resources is taught to our younger people.

The purpose of this study is to present a picture of provisions currently being made regarding the teaching of conservation of natural resources in New England.

Your school system is one of the one hundred twenty (120) systems that have been chosen for the study.

I am, therefore, enclosing a questionnaire which I hope you will answer, or manage to have answered by someone or several persons in your schools. If I have an adequate number of returns, I plan to incorporate the gathered information into a Master's problem-thesis.

I will be glad to send you a summary of this study if you wish to have it. Kindly make this known on the proper blank in my questionnaire. Thank you for your cooperation.

Sincerely yours,

John H. P. Rodda

APPENDIX III

FOLLOW-UP LETTER

448 Commercial St.,
Provincetown, Mass.,
October 2, 1952

Dear Superintendent:

On September the second I sent you a questionnaire concerning how conservation of natural resources is being taught in your school system, along with a letter of transmittal. In the letter, I requested that you or someone else in your school system fill out the enclosed questionnaire and return it to me as soon as possible.

I realize that other more pressing duties may have kept you from attending to this matter; but because the responses which I have received from other elementary and secondary school systems are almost sufficient in number to warrant the writing of my study, I am anxious to hear from you.

Would you be so kind as to acknowledge this letter by sending me the information which I am seeking through my questionnaire?

Enclosed you will find another questionnaire and a letter of transmittal in case the originals were misplaced.

Sincerely yours,

John H. P. Rodda

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Approved by:

Chas. J. Oliver

(Problem Committee)

Date May 1953

