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Some factors affecting health knowledge dissemination among high school pupils

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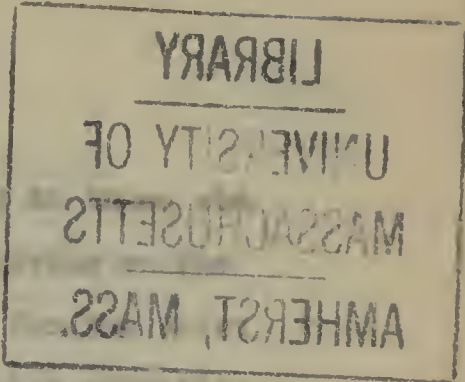
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SOME FACTORS AFFECTING HEALTH KNOWLEDGE
DISSEMINATION AMONG HIGH SCHOOL PUPILS

SULLIVAN - 1932

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SOME FACTORS AFFECTING HEALTH KNOWLEDGE DISSEMINATION
AMONG HIGH SCHOOL PUPILS.



1932
BY
JOHN A. SULLIVAN

[Faint, illegible text from the thesis body follows]

"THESIS SUBMITTED FOR DEGREE OF MASTER OF SCIENCE."

"MASSACHUSETTS STATE COLLEGE, AMHERST."

ACKNOWLEDGMENTS

I wish to acknowledge my indebtedness to those who have so kindly assisted in this study by giving me the information sought in the questionnaire. For the point of view herewith set forth relative to health education, I am indebted to Massachusetts State College, which has given me five years of opportunity for study and association, making possible a sympathy for the changing point of view in education which recognizes the value of health. Most of all, I am indebted to the members of the committee who have guided me in this study, Professors Orton Clark, John Lentz, and Winthrop Welles. It is largely to Professor Welles that I owe the inspiration for this study.

May, 1932 John A. Sullivan

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I. Introduction

A. General Attitude Today Toward Health

The present attitude toward health is a realization that prevention is far better than a cure. A sufficient sewer system, pure water, clean streets, the removal of garbage and rubbish, all may be provided by the local government to promote the health of the people. Common drinking cups and common towels in public places, which have often been carriers of disease, are now generally forbidden by law. Ordinances against spitting on sidewalks, in street cars, and in public halls, are common but, unfortunately, are not always observed.

The failure of some localities to enforce laws has served to re-emphasize the importance of education. Continued stress is being placed upon the need of education if legislation is to be made effective and enforceable.^{1.} There are several illustrations of the fact that legislation fails when a group of citizens are not ready for the step not educated to it. For example, one of the causes frequently cited as a reason for the failure of enforcement of the Education Act in England (Fisher Bill, 1917) is the fact that people were not ready for the reforms involved. Our own Shay's Rebellion and the

1. Twenty-Sixth Yearbook, Part II, page 15, (1927) "The School as a Conscious Agency for Social Improvement".

national Prohibition Amendment are other examples.

We must look to the school as one of the agencies for the development of a positive attitude toward health. ^{1.} Payne has shown that in specific instances, the use of certain methods has resulted in increased attention in the community to aspects of home and community health.

B. Health Education an Essential Part of General Education

Health education today is the most vital factor in our entire school program. It is given primary recognition in the seven "Cardinal Principles of Secondary Education" as laid down ^{2.} by the Commission on the Reorganization of Secondary Education. Health education is given preference over principles of much longer standing and is classed as tremendously important by the Commission on the Reorganization of Secondary Education. The other cardinal principles of education, as laid down by the Commission, are: command of fundamental processes; worthy home-membership; vocation; civic education; worthy use of leisure; and ethical character.

That health education has assumed a position of world importance is shown by the fact that at the Edinburgh meeting of the World Federation of the National Education Association, ^{3.}

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1. Payne, George - "Education in Health", 1921
 2. Bureau of Education Bulletin 1918, No. 35, pages 11-15
 3. Rice, Emmet A. - A Brief History of Physical Education, 1927, page 253

July 25, 1925, the organization adopted a resolution affirming its belief that "health education is the fundamental basis of all successful education".

In view of the fact that health education is accepted as a necessary factor in school programs, both nationally (as shown by the attitude of the Commission on the Reorganization of Secondary Education) and internationally (as shown by the resolution of the World Federation of the National Education Association), the teaching of health, so as best to relate it to present conditions and to spread health knowledge, becomes a primary function of education.

Since health education is considered an essential part of general education it is the duty of the schools to solve the problem of health knowledge dissemination. Let us now consider a discussion of the necessity for determining effective agents or media for health teaching in Secondary Schools.

C. Necessity for Determining Factors Affecting Health Knowledge Dissemination Among High School Pupils.

Interest in health education has been widespread in elementary education, but has hardly been touched in secondary education. Apparently there is little recognition of its need among high school administrators. However, there is a growing recognition of its importance and health teaching is gradually being introduced into high school programs.

Because of the lack of interest in health teaching for the high school in the past there has been little literature written on the subject. For that reason the high school health teacher

is at a loss in regard to the material that should be presented. It seems futile to extend the elementary school health program into the high school. Picture the high school teacher following the Health Outline established for the first six grades at Fargo, North Dakota,¹ for example. How much would be accomplished by the high school teacher urging the pseudo-sophisticated student to drink milk, eat vegetables, and go to bed early?

Since it would be unwise to extend the elementary school health program into the high school what source has the secondary school teacher for material? The average high school text on hygiene is not satisfactory. Compare the stupidly repetitious texts on hygiene designed for high school students with their texts in chemistry, or world history, or biology. The health educator has apparently underestimated the mental ability of the high school student.

Surely there must be some standards, some authorities, some accepted principles. The health education teacher must search for the most valuable material in the scattered and limited literature available. He must formulate his own course, and he must measure the value of his course.

The need of doing something about health education is so apparent, the experience in attempting it so limited in content, method, and results that the teacher of health is all at sea as

1. Health Education for Kindergarten and Grades I-VI, Fargo Public Schools, 1930.

to this needed phase of the general education program. We want people who are finishing high school to go away with the knowledge that will insure something of the ability to protect and conserve this indispensable item of personal health. What activity in school years and school environment, what studies, what reading, what contacts, what methods will insure possession of the needed health knowledge? In other words what are the factors affecting health knowledge dissemination among high school pupils? It shall be the aim of this study to try to determine some of the possible factors.

Because the course in health education for boys was part of the teaching load assigned to the writer when he began work in the Litchfield High School in September, 1930, the question of how to give effective instruction in health put him on his mettle to learn something about the factors that determine the effectiveness of such instruction. There was at once the question to be faced as to whether instruction in health should be direct through a planned course or indirect through allied courses. The answer lay in the results that might be obtained by use of a definite course of instruction compared with those from a school as nearly similar as possible, where no such course is given and these in turn compared with results obtained from a number of miscellaneous schools.

II. Review of Literature

Much literature has been published regarding health teaching for elementary schools. Practically all studies in regard to the field of health teaching have been carried out in the first six or eight years of a child's school program. For instance, the "Report of the Joint Committee", highly valued by the elementary school teacher, is not helpful to the high school teacher. "Health in High Schools", "Health Trends in Secondary Education", "An Analysis of Education Objectives and Outcomes in the Field of Health Education", the Department of Superintendence Sixth Yearbook, "The Organization and Administration of Health Education in the Secondary Schools of the United States", "A Scientific Basis for Health Instruction

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1. Health Education: A Program for Public Schools and Teacher Training Institutions. Report of the Joint Committee National Education Association, Washington, D. C., 1925
 2. Health in High Schools. National Tuberculosis Association, 1930
 3. Health Trends in Secondary Education. American Child Health Association, 1929
 4. An Analysis of Education Objectives and Outcomes in the Field of Health Education
 5. Department of Superintendence Sixth Yearbook, 1928, Part III. Health and Physical Education in the Junior and Senior High School, pages 457-486.
 6. Stetson, F. H. and Cozens, F. W., The Organization and Administration of Health Education in the Secondary Schools of the United States. University of Oregon Publication Educational Series, Vol. 1, No. 2, 1927

1. In Public Schools", "Health Subject Matter in Natural Sciences",^{2.}
 and "A Study of the Relationship Between Health Knowledge and
 Health Habits of High School Pupils",^{3.} are the important health
 studies that may be of aid to the secondary school. However,
 this literature merely furnished a helpful background. There
 is no suggestion of attempt to demonstrate the most efficient
 way to health instruction. If health is taught directly, the
 teacher must organize his own course and determine for himself
 such questions as: What are the objectives of health teaching
 considered necessary by authorities? What constitutes a health
 program? Should health be taught directly or indirectly, through
 some scientific course, such as biology? What is the way to
 put pupils of the high school into possession of the necessary
 knowledge?

Then too, there is a lack of tests and measurements for
 health work that employ the principles of objectivity, relia-
 bility, and validity. In relation to testing for health knowl-
 edge there are only two good standardized tests - the "Gates-

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1. Cairns, L., A Scientific Basis for Health Instruction in Public Schools, University of California Publications in Education, Vol. 2, No. 5, 1929
 2. Chappellear, Claude S., Health Subject Matter in Natural Science, No. 341, Bureau of Publications, Teachers College, Columbia University, 1929
 3. Beeman, Marjorie A., A Study of the Relationship Between Health Knowledge and Health Habits of High School Pupils, Massachusetts State College

1.
 Strang Health Knowledge Test", and the "Pryor Health Knowledge
 2.
 Test". Health achievement has but few good tests; the best
 3
 two being the "Baldwin-Wood Tables"; on a weight-height-age
 4.
 basis, and the "National Achievement Standards". It would
 seem then, that any intelligent effort at health teaching must
 wait until further investigation has been made into the
 question of where the teaching effort is likely to yield best
 results in its application and how we can know the degree
 of our success.

1. Gates-Strang Health Knowledge Test, Teachers College, Columbia University, New York City, 1925
2. Pryor Health Knowledge Test, Kansas State Teachers College, 1930
3. Baldwin-Wood Table. Department of the Interior, Washington, D. C.
4. National Achievement Standards, National Recreation Association, 315 Fourth Avenue, New York City

III. Problem Stated

In view of the apparent situation regarding health teaching in secondary schools, which is one of semi-darkness and uncertainty, this study has been made in the effort to answer the question: What are some of the factors affecting health knowledge dissemination among high school pupils? The problem of answering this question must be approached with the understanding that within the limits of this one study there can be no positive determination of factors with positive, dependable results. The results are indicative only. Much longer and wider investigation will be needed before we can say with decision: This is the agency to use in health teaching; this is the content to be taught; this the method that gives best returns.

The present study considers only a few of the factors affecting the teaching of health. A careful study of all the influences would keep a group of health education students busy for several years. There is, however, an attempt to discover the proper content of a health course. The topics considered are wholly tentative, subject to confirmation by the discoveries of science. An estimate as to the importance of health taught as a separate course is made by a comparison of a group having a special health course with a group not having this training. The study goes a step further and attempts to show that possibly there is value in biology for the

teaching of health. The subject of whether or not health should be taught as a separate subject or indirectly through some such course as biology must be further investigated and this thesis must receive verification by the results of future experimentation.

The purpose of this study is to determine the feasibility of teaching health as a separate subject in the high school. The study is based on a survey of health teachers in high schools in the state of Ohio. The results of the survey are presented in Chapter II. The study also includes a review of the literature on health education in the high school. The study is limited to the state of Ohio and to the high school level.

CHAPTER I
THE PROBLEM

The purpose of this study is to determine the feasibility of teaching health as a separate subject in the high school. The study is based on a survey of health teachers in high schools in the state of Ohio. The results of the survey are presented in Chapter II. The study also includes a review of the literature on health education in the high school. The study is limited to the state of Ohio and to the high school level.

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1. Health Education in the High School, American Health Education Society, 1930.

IV. The Scope of This Thesis

A. The Present-Day Status of Health Education in Secondary Schools

In this investigation, the first step was an inquiry into the present-day status of health education in secondary schools. It must be realized that health education means more than health instruction; health development, i. e. physical education and health protection are included. In order to give proper instruction in health, there is need for the realization of the position of instruction in a well organized health program. Hence, Unit 6. defines the accepted status of health education in secondary schools. This preparatory step furnishes us with a background and paves the way for the dissertation.

B. The Objectives of Health Teaching Considered Necessary by Authorities Formulated into a Course Presented at Litchfield High School

The second step applies to that phase of a health program known as health teaching. Chapter I deals with the formulating of a health course and the presentation of this course in the Litchfield High School. Materials used are found in Appendix I.

C. Results in Teaching a Definite Course in Health Compared with Those from a School Where No Health Course Was Taught

The third step in this investigation is to determine the amount of health knowledge gained at Litchfield, Connecticut, High School, by a comparison of these health knowledge test

1. Health Trends in Secondary Education, American Child Health Association, 1929

results in Litchfield with a control high school at Lenox, Massachusetts. In addition to this comparison of two schools, Chapter II shows the similarity between the two communities in order to establish the fact that Lenox High School is a control school.

D. Possible Contribution of Biology in Teaching Health

The final step in this thesis is to examine the possible contributions of biology in the study of health. In this study, five additional high schools are considered and the health knowledge scores of pupils taking biology are compared with those who do not take biology. This study is compared with a similar investigation in a health study made last year.¹

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1. Beeman, Marjorie. A Study of the Relationship Between Health Knowledge and Health Habits of High School Pupils. Massachusetts State College, 1931.

V. Procedure

Before any of these topics may be considered, it must be understood that this study is confined wholly to boys' classes and that it shall be the purpose of this thesis to limit its discussion to this extent, without becoming entrammelled in the question of the share taken by girls in the subject under discussion.

Without proceeding further, the writer shall define "health knowledge" as "a reasonable understanding of the basic physiological operation of the organs of the body, a reasonable understanding of the conditions leading to optimum civic sanitation, plus a reasonable understanding of the exterior forces leading to the demolition or the unbalancing of the ordinarily harmonic bodily functions". The expression "health" in itself, shall be construed throughout this thesis to mean "the harmonious functioning of all bodily organs". Health teaching shall be defined as "the controlled dissemination of correct information concerning personal health, civic sanitation, and disease control".

Unit 6, which deals with the presentation of the status of health education in secondary schools, is worked out from literature already written upon the subject. In addition, the consideration of that phase of health education known as health development, and first aid service is partly based upon the writer's personal experience.

The formulation of health objectives is also made from recent literature. Authorities and textbooks were consulted. Objectives are determined with the idea of using them as a basis for teaching a health course. The teaching of a health course was the writer's conception of the best possible method to teach health. Authorities are cited.

The author adapted a test of eight questions from the famous Gates-Strang Health Knowledge Test¹ to make a comparison of health knowledge gained in Litchfield and a control school where no health was taught. This same test is used to compare the pupils in additional high schools who have taken biology and those who have not taken biology.

The Gates-Strang Health Knowledge Test was the only available health knowledge test with known objectivity at the time the pupils were tested in the Fall of 1930. This fact was established with the aid of the library service of the American Child Health Association. Since then, H. C. Fryor of Kansas State Teachers College has published two health knowledge tests.² The returns from the Gates-Strang Health Knowledge Test may be

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1. The Gates-Strang Health Knowledge Test. Complete Series, Bureau of Publications, Teachers College, Columbia University, New York City, 1925
 2. Health Education. A Brief Bibliography for Administrators and Instructors of Health Education in Junior and Senior High Schools. American Child Health Association, 1931, page 3.

taken as excellent evidence of possession of health knowledge since "Health Trends in Secondary Education" (mentioned in review of literature), on page 139, considers the test as the only health knowledge test that "illustrates the essential principle of objectivity of measurements".

Those who wish to discover the health knowledge of individual pupils rarely use the complete series of questions included in the Gates-Strang Health Knowledge Test. To do so would involve some repetition of subject matter. Also, the complete series could not be finished in the length of time allotted to the average high school class period. Various educators and publishers have adapted tests of from sixty to eighty questions. The eighty questions that were used in this study were the same eighty questions given to the students of New York high schools in mimeographed form during the year 1929, as part of a series of character and personality tests.

VI.
The Present-Day Status of Health Education
in Secondary Schools

As was previously stated, the purpose of this thesis is an attempt to answer the question: What are some of the factors affecting health knowledge dissemination among high school pupils? Before we begin the dissertation it would be wise to consider health knowledge dissemination, i. e. health teaching, in its proper perspective in relation to a health education program. Health teaching is only one of the several factors considered necessary on a successful, well-balanced, and complete health schedule.

Present-day school health programs of important health centers such as Newton, Massachusetts,^{1.} and Berkeley, California,^{2.} recognize a three-fold division for any complete health schedule, namely: health development, health protection, and health teaching. Besides these three important topics, this unit considers two special problems in relation to secondary school health programs: mental hygiene and the health of the teacher.

A. Health Development in Secondary Schools

Health development is the basis for the American school physical education program. We must acquire highly resistant

1. A School Health Study of Newton, Massachusetts, Monography No. 5, Metropolitan Life Insurance Company

2. Health Trends in Secondary Education, American Child Health Association, page 2

nervous systems adequate for our civilization. To this end highly organized programs of physical education have been planned - all tending toward the development of health with incidental tendencies toward mental training, character building, and physical coordination.

Each well organized secondary school physical education program aims to be a benefit to all rather than to a limited few. "If the physical education teachers are interested in all around physical development of the students instead of developing winning teams, they can do a great deal toward giving adequate health ideals". A sufficiently varied program should be given so that every student may engage daily in some form of supervised exercise without harmful results. The general outline of such a course would follow some such program as:

Fall Term: Volley ball, field ball, captain ball, and speed ball, with tournament in each;

Winter Term: Marching, setting up exercises, apparatus, group games, and basketball;

Spring Term: Baseball, long base, track and field events, and a field day

The present tendency in high school physical education departments is to make use of squad leaders - who direct the activities of the class according to a previous plan devised

1. Health in High Schools, National Tuberculosis Association, 1930, page 39.

by the teacher. Aside from the fact that this plan relieves the teacher of a considerable burden, it has the advantage of developing leadership, confidence, and initiative in the squad leaders.

B. Health Protection in Secondary Schools

Health protection, as it is understood today, involves hygienic building, health examinations, follow-up service, building sanitation, communicable disease control, accident prevention, first aid service and hygienic school conditions.

One of the most pertinent features of modern health protection is the problem of hygienic building. The heating, lighting, and ventilation; the toilet and drinking facilities; the proper classroom seating conditions; all these enter into a consideration of the question of hygienic appointments of the school building.

Health examinations in which records are kept and checked with previous tests have proved of inestimable value in modern teaching. Biennial examinations are now advocated in many states to establish such checks. A recent innovation in American towns where health examinations disclose danger of tuberculosis in pupils is to follow up examinations by free treatment, free milk, and a determined effort to check the disease development.

Health records facilitate the use of health examinations for follow-up work. The purpose of records is to give a

living, growing picture of the whole child, physically, mentally, emotionally, and socially. There is need, therefore, of periodic health examinations, mental examinations, intelligence tests, physical and mental ability tests, determiners of vocational fitness, character indicators, and tests of social and psychological development.

The problem of preventing the spread of communicable disease in secondary schools is one which every community faces. It has been found that not as much time need be spent upon it in high school as in the lower grades since communicable diseases are not as prevalent at the high school as at the grade school age. Colds have been found to be the largest single factor in the spread of communicable diseases and modern educators are marshalling their forces to prevent spread of disease through colds by sending home pupils found to have colds.

As a means of guaranteeing first aid service, "first aid cabinets" are maintained in almost every school. Iodine, liquid soap, aromatic spirits of ammonia, unguentine, sterile gauze, white adhesive tape, a clinical thermometer, eye cup, boric acid, sweet oil, oil of cloves, sodium bicarbonate, elastic bandages, absorbent cotton, scissors, safety pins, triangular bandages - these are to be found among the contents of every well equipped "first aid cabinet".

Two principal factors enter into the establishment of hygienic school conditions. The first is the stress which is

now being laid upon shower baths following participation in athletic drills or games. Home economic departments are more and more emphasizing the importance of a second principal factor, planning hot lunches for pupils, with a view to arranging balanced diets and preventing undernourishment through unbalanced diet which ordinarily prevails where there is no supervision of luncheon.

C. Health Teaching in Secondary Schools

Health teaching resolves itself into the inculcation of health habits and attitudes and the rendering of information regarding sanitation, nutrition, physiology, personal hygiene, and mental hygiene. Care should be taken that the gaining of information does not take the place of the living-experience of the pupils and does not become the main objective. The sound pedagogical idea of "practice - information - more practice" is, and must be, the procedure. The courses of study are so planned as to be the natural outgrowth of the health experiences of the teacher and pupils in the school-room.

The teaching of health in the public schools and particularly in the high school is gradually assuming a position which is really in proportion to its importance. With the thrusting

1. A School Health Study of Newton, Massachusetts, Monograph No. 5, Metropolitan Life Insurance Company, page 29.

aside of the veil which during the middle nineteenth century kept all personal knowledge in obscurity so far as the average school student was concerned, there is coming a deepening recognition of the part which adequate health knowledge can play in individual and group development.

The teaching of sanitation; the acquainting of the pupil with the most modern theories concerning the necessities of civic cleanliness; the teaching of nutrition, thus enabling the pupil to control his own diet as to give him a satisfactory regimen, and, conversely, to acquaint him with the danger of modern fads, "reducing", "eighteen-day diets", "tomato diets", and so on; the teaching of physiology, thus giving the pupil an intimate knowledge of the processes which keep his own body in existence, and thus deepening his personal knowledge of his own strengths and weaknesses; the teaching of personal hygiene, and in this way fostering the youth's care of his body; and the teaching of mental hygiene, giving the youth a firm basis for future happiness: all these form lesser divisions of the great main problem of teaching health.

D. Special Problems in Health Education in Secondary Schools

Two other topics of unquestioned importance occupy a place of prominence in any discussion of secondary health education. These are mental hygiene, particularly in reference to adolescents, and teachers' health.

The creation of mental health among adolescents requires

the fullest application of the educational essentials which are called by Dr. W. D. Burnham, "the imperatives"^{1.} of adolescent training. These are: (1) self-discovery - the introduction of varied subject matter and many activities into the high school program gives opportunity for the adolescents to get a valuable insight into their recently acquired powers; (2) integration of personality - every individual should have some all-absorbing task; (3) doing of worthwhile tasks; (4) successful accomplishment - achievement gives the stimulus which is essential to the development of all individuals; (5) development of social virtues; and (6) social success.

"Mental hygiene" says Dr. Mary W. McConaughy of Mount Holyoke College, lecturing at the Jones Library in Amherst, Massachusetts, December 10, 1929, "is the finding of happiness, not in the commonest things but in the deepest of things; learning to understand our fellow men at their best and at their worst; understanding by contrasting; climbing steadily toward a certain goal". It is this fact which must be deeply imprinted upon the mind of the adolescent while he is still plastic, can still be shaped to the mold. To each boy one might say: "Ye are green wood, see that ye warp not". Through this process the inhibitions which, in this modern machine age, so

1. Terman, Lewis M. The Hygiene of the School Child, 1914, page 15

often stunt, twist and deform the most perfect personalities, will become, what they rightly are, of negligible importance.

The teacher's health is of great importance in health education. If the teacher is an exponent of good health the pupils will tend to imitate him, for impressionable youth is more likely to respond to the practices of the teacher than to his precepts. Some of the things that communities are trying to do for the teacher's health are: (1) the establishment of rest places in school; (2) providing facilities for recreation; (3) finding adequate living quarters; and (4) giving selective physical examinations.

^{1.}
J. Hart discovered that eighty-eight per cent of the teachers' absences were caused by twenty-one per cent of the teachers, and that forty per cent of the absences were caused by three per cent of the teachers, through sickness. Considering this, the placing of health examinations for teachers as first among the requirements for teachers' health by the Metropolitan Life Insurance Company, Monograph No. 4, becomes additionally significant.

These items, of health development, health protection, and health teaching, together with special problems of mental

1. An Investigation of the Sickness Data of Public Elementary School Teachers in London, 1904-1919. Journal of the Royal Statistical Society, Vol. 85, parts, May 1922, pages 349-92

hygiene and the teachers' health, indicate outstanding divisions of the present-day position of health education as described in well formulated specific programs now in operation in the secondary schools of many important centers. Let us now turn to consideration of a health course as proposed for the high school at Litchfield, Connecticut.

The first step in the development of a health course is to determine the needs of the community. This is done by a survey of the health conditions of the community. The next step is to determine the scope of the course. This is done by a study of the health conditions of the community and the needs of the community. The third step is to determine the content of the course. This is done by a study of the health conditions of the community and the needs of the community. The fourth step is to determine the method of instruction. This is done by a study of the health conditions of the community and the needs of the community. The fifth step is to determine the personnel who will teach the course. This is done by a study of the health conditions of the community and the needs of the community. The sixth step is to determine the materials to be used in the course. This is done by a study of the health conditions of the community and the needs of the community. The seventh step is to determine the evaluation of the course. This is done by a study of the health conditions of the community and the needs of the community.

THE DEVELOPMENT OF A HEALTH COURSE

The first step in the development of a health course is to determine the needs of the community. This is done by a survey of the health conditions of the community. The next step is to determine the scope of the course. This is done by a study of the health conditions of the community and the needs of the community. The third step is to determine the content of the course. This is done by a study of the health conditions of the community and the needs of the community. The fourth step is to determine the method of instruction. This is done by a study of the health conditions of the community and the needs of the community. The fifth step is to determine the personnel who will teach the course. This is done by a study of the health conditions of the community and the needs of the community. The sixth step is to determine the materials to be used in the course. This is done by a study of the health conditions of the community and the needs of the community. The seventh step is to determine the evaluation of the course. This is done by a study of the health conditions of the community and the needs of the community.

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CHAPTER ITHE FORMULATION AND PRESENTATION OF A HEALTH COURSEAT LITCHFIELD HIGH SCHOOL

In organizing and putting into operation the 1930-1931 health course for Litchfield High School, the writer gave attention first to the formulation of health aims. After this basic task had been completed the actual course was carefully built around these objectives, with due thought to the modern principle of education, that learning should start from the interest of the pupil rather than from that of the teacher. This theory of interest is applicable to the present study, for it increases the amount of knowledge obtained, and the purpose of the direct course in health is to give health knowledge. The following chapter measures the amount of health knowledge obtained in the direct course and checks the results with a control school.

1. The formulation of Health Objectives

The formulation of a one-credit course in health at Litchfield High School lead the author to an investigation of health objectives in the State of Connecticut. A careful examination reveals studies of objectives in the field of physical education but none in the field of health. The Connec-

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1. Mossman, Lois C. Changing Conceptions Relative to the Planning of Lessons, Teachers College, Columbia University Contribution to Education, No. 147; 1926

ticut State Manual of Physical Education in its treatment of health education only quotes from Chapter 399, Public Acts of 1921. This act merely states that health should be taught. The course would include "instruction in personal and community health and safety".

A perusal of Charters' "Curriculum Construction"^{1.} shows no study of health education. Bobbitt, in his list of specific objectives,^{2.} assigns thirty-nine objectives to the field of "physical development and maintenance". Bode, however,^{3.} criticises these objectives as "subjective and confusing".

The Chicago Schools Journal for October, 1925, is devoted to problems of teaching health. Page 163 is devoted to a "health program". It includes: (1) knowledge of the human body; (2) physical examination of each child; (3) follow-up on defects; (4) knowledge of sanitation principles; (5) ability to operate heating plants and plumbing fixtures; (6) civic aspects of knowledge of nutrition, rest, and energy; (9) mental hygiene; and (10) some sex hygiene.

The Detroit Course of Study in Health Instruction gives the aims of health education as follows: (1) the control of physical ability; (2) the control of growth; (3) the control

1. Charters, W. W., Curriculum Construction, 1923

2. Bobbitt, Franklin, How to Make a Curriculum, 1924

3. Twenty-Sixth Yearbook, 1927, N. S. S. E., part I, page 460

of illness; (4) the control of accidents; (5) the control of defects; and (6) the control of energy and vitality.

The Pennsylvania State Course of Study in School Health states the following goals of health instruction: (1) habits and standards; (2) knowledge, facts regarding cleanliness, etc.; (3) better living through ideals of health, beauty, and service; and (4) a sense of individual responsibility and standards of health for the community.

In the formulation of objectives it was realized that objectives should aim at the control of the health of individuals and exclude material of minor importance. It was also realized that health is many sided and that each control deserved separate statements. And, finally, it was realized that each control was not distinct, but inter-related with other controls. Thus the following objectives were set up: (1) the control of personal hygiene; (2) the control of civic sanitation; (3) the control of the physiological systems of the body; (4) the control of disease; (5) the control of accidents; and (6) the control of first aid treatment.

The above classification is by no means perfect. But it does attempt to include the standards set up by authorities in the field of health education. Also, it does not vary in essentials from material included in the textbooks mentioned in the bibliography of this thesis. After the objectives were formulated in the fall of 1930 the next step was to present a one hour a week course to all of the boys in the high school.

2. The Presentation of the Health Course

The health course given to the boys of Litchfield High School during the year 1930-1931 was a natural outgrowth of the desires of the pupils rather than a formal outline devised at the beginning of the year by the instructor.

The author believes in the modern principle of education that learning should start from the interest of the pupil rather than from that of the teacher. Each lesson is planned from questions asked by the pupils. Hence, the lesson-planning is not formal and it should not be.

"It is evident that lesson-planning, based upon formal steps of instruction is not suitable to the needs of today. There is a general dissatisfaction with the attempt to mold lessons according to these formal steps and at the same time conduct the class work according to modern principles of education".

During the entire course, the health controls formulated in Part I of this chapter were borne in mind by the instructor. Special attention was given to questions pertaining to the objectives. It is interesting to note, however, that these questions almost invariably dealt with the objectives.

1. Mossman, Lois, Changing Conceptions Relative to the Planning of Lessons, Teachers College, Columbia University Contribution to Education, No. 147, 1926

In addition to a discussion of questions asked and the assignment of text book reference material upon these questions, such stimulating teaching devices as motion pictures, dramatics, and laboratory work were employed for the dissemination of health knowledge.

Appendix I gives a detailed outline of the lesson unit of the health course as presented at Litchfield High School.

The following is a list of the health courses offered at Litchfield High School. The first course is a one-semester course in health for freshmen. The second course is a one-semester course in health for sophomores. The third course is a one-semester course in health for juniors. The fourth course is a one-semester course in health for seniors.

The health courses are designed to provide the student with a general knowledge of the principles of health and to develop the student's ability to apply these principles to his own life. The courses are also designed to provide the student with a knowledge of the health habits which are necessary for the maintenance of good health. The courses are also designed to provide the student with a knowledge of the health habits which are necessary for the prevention of disease.

The health courses are also designed to provide the student with a knowledge of the health habits which are necessary for the promotion of good health. The courses are also designed to provide the student with a knowledge of the health habits which are necessary for the prevention of disease.

CHAPTER IIA COMPARISON BETWEEN LENOX, MASSACHUSETTS, HIGH SCHOOL
AND LITCHFIELD, CONNECTICUT HIGH SCHOOL

The health knowledge results of teaching a definite course at the Litchfield, Connecticut, High School are compared with a control school where no health was taught. The control school is Lenox, Massachusetts, High School.

In the comparison of these two high schools the author will show (1) that both schools have a similar background in regard to the status of health education in the state; (2) that Lenox really was a control school; (3) that the author was unbiased in the presentation of the course; (4) the results of the tests given to both schools.

1. The similarity between Massachusetts and Connecticut regarding health education.

It was quite natural that the writer should consider both a Massachusetts and a Connecticut high school. Massachusetts is his home state, and the Massachusetts State College is the recipient of this thesis; Connecticut is the state where he is carrying out this study, and where he teaches. Besides these obvious reasons for selecting a Massachusetts high school and a Connecticut high school, there is a more basic reason - both states are similar in respect to their laws requiring the teaching of health.

For the purpose of demonstrating the similarity between Massachusetts and Connecticut regarding health education, the

	Compulsory Health and Physical Education Laws.	State Director.	Comprehensive Health Education Program.	Indefinite Program.	Physical Education the Basis for Progress.	Little Health Education Attempted.	No Health Education Program.	Physical Education or Combined Manual Issued.	Special Health Bulletins.
1 Alabama	Xa	X	X					X	X
2 Arizona							X		
3 Arkansas	U					X			
4 California	X	X	X					X	X
5 Colorado							X		
6 Connecticut	X	X	X					X	X
7 Delaware	X				X				
8 Florida	X	X	X					X	X
9 Georgia	X			X					
10 Idaho	U			X					
11 Illinois	X				X				
12 Indiana	X			X					
13 Iowa	X		X					X	
14 Kansas	U			X					
15 Kentucky	X	X	X					X	X
16 Louisiana	R	X	X						
17 Maine	X				X				
18 Maryland	X	X			X				
19 Massachusetts	X	X	X					X	
20 Michigan	X	X	X					X	
21 Minnesota	X	X	X					X	
22 Mississippi	No								
23 Missouri	X	X	X					X	X
24 Montana	U				X				
25 Nebraska					X				
26 Nevada	X		X						
27 New Hampshire	U			X					
28 New Jersey	X	X	X					X	X

	Compulsory Health and Physical Education Laws.	State Director.	Comprehensive Health Education Program.	Indefinite Program.	Physical Education the Basis for Progress.	Little Health Education Attempted.	No Health Education Program.	Physical Education or Combined Manual Issued.	Special Health Bulletins.
29 New Mexico	R			X					
30 New York	X	X	X					X	Xb
31 North Carolina	X				X			X	
32 North Dakota	X			X				X	
33 Ohio	X		X						
34 Oklahoma						X			
35 Oregon	X				X			X	
36 Pennsylvania	R	X	X					X	X
37 Rhode Island	X			X				X	
38 South Carolina	X			X					
39 South Dakota							X		
40 Tennessee	X			X					
41 Texas							X		Xc
42 Utah	R		X					X	
43 Vermont	R			X					
44 Virginia	X	X	X					X	X
45 Washington	Op					X		X	
46 West Virginia	R	X	X					X	
47 Wisconsin	X		X					X	X
48 Wyoming							X	X	
T o t a l		16	20	11	8	3	6	23	12

Key to Study

- | | | | |
|-----|---|---|---|
| X | - This feature in effect | U | - Strongly urged by State Department of Education |
| No | - Law not in operation | a | - For junior high schools only |
| Op. | - Law optional for high schools | b | - For elementary schools only |
| R | - Regulation by State Department of Education | c | - Bulletins on home nursing |

In the above study there are four factors that are undesirable features in the state health program. These factors are: (1) Indefinite Program; (2) Physical Education the Basis for Program; (3) Little Health Education Attempted; (4) No Health Education Program. Neither Connecticut nor Massachusetts are checked for any of these undesirable points. A state with an indefinite program in health shows that there is no fixed responsibility for health work. The teacher has no guide posts for directing health education. The result may be that either no or inefficient health work is carried out. When physical education is the basis for the health program, health teaching is apt to be neglected. And when the state attempts little or no health work, the schools tend to follow suit and spend their time emphasizing the phases of education that are well planned out by the State Department of Education.

There are five desirable features, namely: (1) Compulsory Health and Physical Education laws; (2) State Director; (3) Comprehensive Health Education Program; (4) Physical Education or combined Manual Issued; (5) Special Health Bulletins. When laws are definite in regard to health or physical education,

results are more likely to be obtained in regard to the advance of these subjects than when there are no definite state laws. Directors are valuable in organizing health work. Comprehensive programs serve as guides to teachers. And manuals further aid teachers, especially when they furnish instructions. Health bulletins also serve as aids to busy teachers who have health as one of the several subjects on a heavy teaching schedule. Connecticut has all five of the desirable points. Massachusetts has all of the desirable points, except the Special Health Bulletins. Only eleven other states show a record equally as good.

From the above analysis, it is evident that both Massachusetts and Connecticut rank highly in health education for secondary schools, for Connecticut is excelled by no state, and Massachusetts, in one point, is excelled by only six states. However, an examination into the laws of both states and an interpretation of these laws show that there is much room for improvement. Laws regarding the teaching of health are vague and the interpretation of these laws show their weaknesses.

In the Massachusetts State Law, Chapter 71, General Laws, Section I, there is the following statement: "In connection with physiology and hygiene, instruction as to the effects of alcoholic drinks and narcotics on the human system, and as to tuberculosis and its prevention, shall be given to all pupils in all schools under public control".

Doctor Moore, Massachusetts State Pediatrician, claims that this law applies to high schools, but that there is no way of enforcing the law. The state has to depend upon gradual education to impress upon school committees the importance of health work.

In the Connecticut State Law, Chapter 399, Public Acts of 1921, Section I, there is the following statement: "There shall be established and made a part of the course of instruction in the public schools of this state a course in health instruction and physical education".

Doctor Prohaska, Connecticut State Health and Physical Education Director, claims that there is nothing to "prevent" the teaching of health in the high school if it seem to be advisable.

The author wrote to both Doctor Moore and Doctor Prohaska for an interpretation of the state laws in regard to the teaching of health in the high school. These letters and their answers may be found in Appendix II.

From the above investigation it seems plain that whether or not a secondary school, in either Massachusetts or Connecticut, teaches health depends upon the administrative authorities.

It was merely a matter of chance that the writer took a Connecticut high school that taught health, for his experiment, and a Massachusetts high school that did not teach health, for a control school. The reverse might just as well have happened, for many Massachusetts high schools teach health and many Connecticut high schools do not.

2. Lenox a Control School

It is necessary at this point to show that Lenox High School was a control school, i. e., that the students of the Lenox High School were in the same state of readiness as those of the Litchfield High School to acquire health knowledge.

If there was a great deal of difference between the mental abilities of these two groups, the entire study would be useless. It was quite natural that the first step in comparing the two schools was to determine the mental ability of the two groups. Table 1 shows the records made by the two schools on the well-known Terman Group Test of Mental Ability, Form A. This test was given in the Fall of 1930 by Mr. Carroll, Athletic Director of Lenox High School in Lenox, and by the author at the same time in Litchfield.

TABLE 1

Record Made by Both Lenox and Litchfield High
in the Terman Test.

Litchfield High School--A

Lenox High School--B

	: Upper	:	Median	:	Lower	::	Number
	Quartile	:		:	Quartile	:	Examined
	A B	:	A B	:	A B	:	A B
Freshmen	7 7	:	10 11	:	3 5	:	20 23
Sophomores	6 6	:	8 8	:	3 4	:	17 18
Juniors	2 6	:	3 6	:	1 2	:	6 14
Seniors	7 3	:	8 4	:	1 3	:	16 10
Totals	22 22	:	29 29	:	8 14	:	59 65
Percent	37 34	:	49 44	:	14 22	:	100 100

Table 1 was made out on the grade norms of the Terman Group Test of Mental Ability. These norms are based on over forty thousand scores. Litchfield High School placed thirty-seven percent in the upper quartile compared with thirty-four percent in the upper quartile by Lenox High. There were forty-nine percent in the median group for Litchfield and forty-four percent in this group for Lenox. Litchfield had fourteen percent in the lower quartile while Lenox placed twenty-two percent in this lower group. The quartile classification was used because it was the basis for analysis suggested in the teachers' directions for giving the test. Since this classification is standard it is sufficient in the present comparison of two groups. Apparently both schools are normal to slightly above average in intelligence. Hence, in these schools the boys had about the same opportunity, in respect to intelligence, for acquiring health knowledge.

In order to make the comparison more definitely on the basis of equality, an investigation was made of home conditions of the pupils in order to ascertain something of the background of their parents and learn whether or not the boys in either group received any information regarding health from classes and organizations besides regular classroom work in health. These facts were ascertained by the preliminary questions asked on the Health Knowledge Test (see Appendix 3). The answers to these

questions were tabulated.

The logical questions to ask regarding the background of the parents were whether or not they were foreign born, and the education and occupation of the fathers. Table 2 refers to the nativity of parents of the boys in Litchfield and Lenox High Schools.

There is no attempt made to establish for a fact that nativity of parents affects the health knowledge of the pupils. Table 2 is shown in order to establish this point of similarity in background so that the nativity of parents could not be brought up later as evidence that Lenox was not a control school.

TABLE 2

Nativity of Parents of Pupils in Both Lenox and
Litchfield High School.

	<u>Litchfield High School--A</u>		<u>Lenox High School--B</u>	
	Number	Percent	Number	Percent
Neither foreign born	: 38	: 64	: 39	: 60
Both parents foreign born	: 11	: 19	: 15	: 23
Father, only, foreign born	: 8	: 14	: 8	: 12
Mother, only, foreign born	: 2	: 3	: 3	: 5
T o t a l	: 59	: 100	: 65	: 100

There are sixty-four percent of the boys in Litchfield High School are sixty percent of the boys in Lenox High School who have native-born fathers and mothers. Litchfield had

nineteen percent of boys with both parents foreign born, while Lenox had twenty-three percent. Litchfield has fourteen percent of boys with fathers only, foreign born, while Lenox has twelve percent in this group. There are three percent of the mothers only, foreign born in Litchfield, and five percent in Lenox. Thus it will be seen that both groups are about the same in this respect, Litchfield having but a slightly higher percentage of native-born parents than Lenox.

Table 3 shows the education of fathers of the boys in both groups.

TABLE 3

Education of FatherLitchfield High School and Lenox High School

Litchfield High School--A	Lenox High School--B	
	A Number	A Percent
Common School	34	58
High School	11	19
Business College	2	3
College or University	3	5
No statistics	9	15
T o t a l	59	100

Both Litchfield and Lenox boys' fathers have fifty-eight percent in the group with only a common school education. Nineteen percent of the fathers in both groups have a high school education. Eight percent of the Litchfield fathers and seven

percent of the Lenox fathers attended institutions of higher learning. There are no statistics given for fifteen percent of the Litchfield group and sixteen percent of the Lenox group. Thus one may readily see that there is an almost perfect agreement in regard to the extent of education of fathers.

TABLE 4

Father's Occupation

Litchfield High School and Lenox High School

Litchfield High School--A	Lenox High School--B	
	Number	Percent
	A	B
Professional	4	3
Agriculture	15	9
Business	19	19
Laborer	15	19
Deceased	1	5
No statistics	5	10
T o t a l	59	65

There are seven percent of the Litchfield fathers engaged in professional work, while five percent of the Lenox fathers are thus engaged. Twenty-five percent of the Litchfield fathers devote their time to agriculture while fourteen percent in Lenox are so engaged. Thirty-two percent of the Litchfield fathers are engaged in business, compared with twenty-nine thus engaged in Lenox. In Litchfield, twenty-five percent of the fathers are engaged as laborers, while Lenox has twenty-nine percent so

employed. Of the Litchfield fathers there are eleven percent deceased or with no statistics, as against twenty-three percent for this group in Lenox. Although there is not quite the same agreement in the field of fathers' occupations as in the other comparisons, there is sufficient agreement in them to indicate the similarity of background of both groups of boys.

Other questions (see Appendix 3) showed a similarity between the two towns. Two Litchfield and three Lenox students were foreign born. The number of students in both communities who had received health information from such organizations as the Community Nurse, Boy Scout Organization, dental clinics, et cetera, was almost negligible.

In regard to the question as to whether or not health had been studied as a separate course, it should be noted that all Lenox boys had received a junior high school course in health. There is one question, however, that showed a widespread difference between the two groups. No biology is taught in the Lenox High School. On the other hand, Litchfield High School has a biology course that includes health instruction.

We conclude then, that Lenox High School was a control school. Both Lenox and Litchfield High School pupils are normal to slightly above average in intelligence. Furthermore, the students of both schools have a similar background in respect to nativity of parents, and the education and occupations of fathers. Therefore, the students of both schools appeared to be in the same state of readiness to receive health knowledge.

Health knowledge was given directly to the Litchfield boys, while no health course was given to the control school at Lenox. During the school year, however, some of the Litchfield boys had a course in biology that included health instruction.

The fact that Litchfield High School had a course in biology and Lenox High School has not a course in biology has an important bearing upon this study. Biology is an indirect method of teaching health and many consider indirect health knowledge dissemination of more value than direct teaching. Up to this time, however, the question has not been investigated.

The writer, in teaching biology at Litchfield High School, spent one third of the time devoted to this course upon health instruction, with half of such time devoted to laboratory work. Nineteen of the boys took the course; their average improvement in the health knowledge test was 8 questions right. The remaining forty boys showed an average improvement of 3 questions right.

Immediately the question arises: Is not health taught through the scientific means of biology with laboratory work more apt to produce lasting health knowledge, than health taught as a separate study? This question is considered in the next chapter to this thesis.

3. Justification for Teaching Own Course in Litchfield.

The knowledge gained by Litchfield, Connecticut, High School students in the course outlined in Appendix 1 was checked in the

following manner: On September 10, 1930, a test adapted by the writer from the Gates-Strang Health Knowledge Test - the only recognized objective health knowledge test - was given to all of the pupils in Litchfield High School. On the same date this test was also given to pupils of Lenox, Massachusetts, High School. In order to find out how much knowledge had been gained during the year, the same test was given to both schools on May 6, 1931. The test appears in Appendix 3. The object of giving this test was to note how much health knowledge might naturally be absorbed without any special course in health.

There are three possible points of challenge that one may bring up in regard to the fact that the author taught his own course. In the first place, one might say that the health course given by the writer pointed toward the health test. In the second place, one might say that the objectives of the course were influenced by the test. And in the third place, one might say that the topics under the objectives were based upon the test.

First, the health course did not point toward the test. The writer did not look at the test questions during the entire period of the course to insure that an unbiased presentation of health knowledge might be given for experiemntal purposes.

Second, the objectives of the course were not influenced in any way by the test. The objectives of the course, as was stated before, were based upon authorities in the field of health education (see Chapter I, part I).

Third, the topics under the objectives were not based upon the test. Each individual topic was suggested by the pupils through their individual questions. (See Chapter I, part II, and Appendix I). The test, definitely objective, naturally covered the material given in the course, but the course did not coach for the test.

The writer acted unbiasedly in presenting health information and guidance. It seems fair to make this conclusion since, first, the health course given by the writer did not point toward the health test; second, the objectives of the course were not influenced in any way by the test; and third, the topics under the objectives were not based upon the test.

4. Results of Health Knowledge Test.

The results of the health knowledge test for both Litchfield and Lenox high schools are given in Table 5.

The test given was the eighty questions adapted from the Gates-Strang Health Knowledge Test. (See Appendix III). This same test was given to both groups at both times.

Table 5 shows, for each individual boy who answered the eighty questions on the Health Knowledge Test given in Appendix 3, the number of questions marked wrong on September 10, 1930, the number marked wrong on May 6, 1931, and the improvement or the drop in number of questions marked correct of the former date over the latter date. Statistics are shown for both the Litchfield group and the Lenox group. Fifty-three of the Litchfield boys out of fifty-nine boys show an improvement in scores for May over the previous September. Only twenty-eight of the Lenox boys out of the sixty-five show an improvement for May over the previous September. The average improvement for Litchfield High School during the school year was +4.52 per individual, while Lenox High School showed a drop of - 1.30 per individual. The total improvement of questions marked right for the May examination over the September examination was +266 for Litchfield, while Lenox took a drop to - 84.

Since the Health Knowledge Test (see Appendix 3) was adapted from one accepted as objective by educators, unquestionably, the boys in Litchfield had a greater health knowledge than the boys in Lenox. This indicates that possibly health knowledge

TABLE 5

<u>Litchfield High School</u>			<u>Lenox High School</u>		
Number Wrong Sep 10 '30:	Number Wrong May 6 '31:	Improve- ment	Number Wrong Sep 10 '30:	Number Wrong May 6 '31:	Improve- ment
37	31	+6	26	25	+1
21	16	+5	30	27	+3
24	25	-1	32	29	+3
21	17	+4	59	40	-1
17	15	+2	22	30	-8
21	17	+4	30	28	+2
14	11	+3	21	31	-10
17	9	+8	33	32	+1
42	40	+2	27	24	+3
12	11	+1	29	33	-4
13	11	+2	23	32	-9
22	14	+8	23	21	+2
16	12	+4	29	27	+2
20	19	+1	26	26	0
18	15	+3	20	21	-1
21	15	+6	22	30	-8
15	9	+6	41	41	0
17	16	-1	22	20	+2
30	25	+5	32	32	0
20	14	+6	41	29	+12
19	14	+5	24	27	-3
15	13	+2	28	21	+7
24	22	+2	26	27	-1
33	17	+16	29	34	-5
18	13	+5	34	29	+5
17	10	+7	27	18	+9
17	14	+3	22	39	-17
19	18	+1	32	27	+5
16	18	-2	17	18	-1
22	15	+7	22	29	-7
10	10	0	25	30	-5
20	14	+6	20	17	+3
17	13	+4	27	39	-12
22	14	+8	20	29	-9
19	18	+1	13	10	+3
19	18	+1	19	17	+2
11	12	-1	22	30	-8
16	16	0	29	27	+2
29	18	+11	19	23	-4

Litchfield High, Cont'd.

Lenox High, Cont'd.

Number Wrong Sep 10 '30:	Number Wrong May 6 '31:	Improve- ment.	Number Wrong Sep 10 '30:	Number Wrong May 6 '31:	Improve- ment.
22	18	+4	40	28	+12
17	16	+1	31	33	+ 8
19	15	+4	26	32	-6
24	20	+4	28	33	-5
20	15	+5	29	30	-1
15	10	+5	17	20	-3
20	11	+9	16	18	-2
19	17	+2	14	24	-10
27	17	+10	29	22	+ 7
26	25	+1	24	23	+1
22	13	+9	23	32	-8
26	23	+3	30	28	+ 2
15	13	+2	28	30	-2
31	21	+10	32	31	+1
30	18	+12	29	24	+5
27	18	+9	28	32	-4
27	18	+9	25	33	+1
26	15	+11	30	28	+2
22	15	+7	28	31	-3
18	17	+1	23	22	+1
			22	24	-5
			29	29	-1
			20	21	-1
			16	27	-11
			21	25	-4
			33	37	-4
1234	968	+266	1709	1793	-84

Number of Cases - 59

Number of cases - 65

CHAPTER IIIVALUE OF BIOLOGY IN TEACHING HEALTH

Much criticism has been made regarding health taught as a separate subject. Many think that health could best be taught through some such high school subject as biology. Here health could be taught scientifically with a laboratory background. Health topics are recommended in the study of biology by the National Society for the Study of Education.¹ The book "Health in High Schools"² by the National Tuberculosis Association, 2nd edition, in reference to health courses in the high school, says: "Their puerility is only rivalled by that of some of the sex education and character education propaganda". This puerility is not inherent in the subject matter. The science of caring for the human body is complex enough to call for the best efforts of mature minds.

Chapter II showed, among other things, that the boys in Litchfield High School appeared to obtain more health knowledge from biology than from a special course in health. Chapter III further investigates this tendency of biology to be valuable in the teaching of health.

The health knowledge test referred to in Appendix 3, was given to five additional high schools of approximately the same size,

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1. Thirty-first Yearbook, Part I, (1932) N. S. S. E. Program for Teaching Science, Page 221-242
 2. Health in High Schools, National Tuberculosis Association (1930)

character, and make up as that of Litchfield High School and Lenox High School. These schools were: Thomaston High School, Thomaston, Connecticut; Simsbury High School, Simsbury, Connecticut; Woodbury High School, Woodbury, Connecticut; Bloomfield High School, Bloomfield, Connecticut; and Lee High School, Lee, Massachusetts. The purpose of the test was to compare the health knowledge of the pupils who were taking biology or who had taken biology with the health knowledge of the pupils who had not taken biology. There were four hundred and forty pupils considered in this case study.

Tables 6, 7 and 8 show that there was little difference between the Litchfield and Lenox group and the special group of five high schools considered in this study. The reason for including these tables for the purpose of comparison was explained in Chapter II.

TABLE 6

Nativity of Parents. (Special Group)

	Number	Percent
Neither parent foreign born	310	70
Both parents foreign born	97	22
Father, only, foreign born	22	5
Mother, only, foreign born	11	3
T o t a l	440	100

In regard to nativity of parents, the special group shows seventy percent to be native born. This percentage is slightly higher than Litchfield, with sixty-four percent native born, (see Table 2) and Lenox, with sixty percent native born (see Table 2). The number of parents foreign born in the special group is correspondingly lower than the number in either Litchfield or Lenox. The difference, however, is not great enough to show an appreciable difference in background.

TABLE 7

Education of Father. (Special Group)

	Number	Percent
Common School	206	46
High School	135	31
Business College	7	2
College or University	49	11
No statistics	43	10
T o t a l	440	100

Table 7, referring to the special group, compared with Table 3 referring to Litchfield and Lenox, shows that the education of fathers was a little better in the special group than in either the Litchfield or the Lenox group. Fifty-eight percent of both Litchfield and Lenox fathers received only a common school education, while forty-six percent received such an education in the special group. Nineteen per-

cent of both the Litchfield and the Lenox fathers received at least a high school education compared with thirty-one percent of the special group thus educated. Eight percent of the Litchfield fathers and seven percent of the Lenox fathers attended institutions of higher learning, compared with thirteen percent of the special group so educated.

TABLE 8

Occupation of Father. (Special Group)

	Number	Percent
Agriculture	155	35
Business	43	10
Professional	22	5
Laborer or Trade	162	36
Miscellaneous	3	1
Deceased	7	2
No statistics	48	11
T o t a l	440	100

Table 8, referring to the special group, compared with Table 4, referring to Litchfield and Lenox, shows a greater difference than appeared in the comparison of Litchfield and Lenox with Tables 6 and 7 covering the special group.

In the professional group Litchfield places seven percent of the fathers, Lenox five percent and the special group five percent. In agriculture, Litchfield fathers have twenty-five percent, Lenox fourteen percent and the special group twenty-

five percent. In business Litchfield has thirty-two percent, Lenox twenty-nine percent and special group ten percent. Twenty-percent of the Litchfield fathers are engaged as laborers; Lenox has twenty-nine percent and the special group leads with thirty-six percent.

Thus, a reasonable similarity exists in the background of parents among the Litchfield and Lenox, and the special group.

Tables 9 and 10 give a comparison between the results of those, in the special group of five high schools, who were biology students or had studied biology and those who had never studied biology.

TABLE 9

Non-biology Pupils. (Special Group)	Number of Cases.	Average number of questions marked wrong.
Freshmen	146	34
Sophomores	40	31
Juniors	20	27
Seniors	12	25
T o t a l	218	29

Studies by classes were made in Tables 9 and 10 as well as by the two groups as a whole to determine whether or not one class, such as the freshman class, would have much effect upon the average. The freshmen did have a larger average number of questions marked wrong in Table 13 than in any other class. However, let us compare the other classes. In the sophomore

class of the non-biology group the average number of questions marked wrong was thirty-one compared with only twenty-four in the biology group. The juniors had an average of twenty-seven marked wrong in the non-biology group compared with twenty-three in the biology group. The seniors had an average of twenty-five wrong in the non-biology group compared with twenty-one in the biology group. The total average number of questions marked wrong in the non-biology group was twenty-nine, as compared with twenty-three wrong in the biology group.

TABLE 10

Biology Pupils (Special Group) (Took Course in Year)	Number of Cases.	Average Number of questions marked wrong.
1930 - 1931	97	24
1929 - 1930	69	23
1928 - 1929	56	21
T o t a l	222	23

A comparison of those in the special group who had studied health in contrast with those who had not showed a gain of a fraction of one percent right of the former over the latter group. The biology students, on the other hand, showed an average gain of six questions right over the pupils who had not studied biology.

This case study of four hundred and forty students indicates that health knowledge seemed to come to them more readily through a study of biology than through a separate study of health.

1.

Miss Marjorie Beeman has made a study of high school juniors in five Massachusetts towns. One of the points in her study was a comparison, in results of the health knowledge test, of the average scores of boys who had studied biology and those who had not.

The following is her Figure XXIV:

Table of scores of boys who have and have not studied biology or hygiene, each town

Town	T1	T2	T3	T4	T5
Biology or hygiene	71.7	72.1	67.4	75.5	69.7
No biology or hygiene	70.0	67.0	69.9	72.0	64.7
Difference	1.7	5.1	-2.5	3.5	5.0

T1	Amherst, Massachusetts
T2	Chicopee, Massachusetts
T3	Greenfield, Massachusetts
T4	Westfield, Massachusetts
T5	West Springfield, Massachusetts

In general the average scores of those who have studied biology or hygiene are higher than those who have not. However, this did not hold true in the case of Greenfield.

Miss Beeman's results are not quite as positive as those found by the writer (see Tables 9 and 10). Two possible ex-

1. Beeman, Marjorie, - "A Study of the Relationship between Health Knowledge and Health Habits of High School Pupils", Massachusetts State College, 1931

planations can be given for this fact: first, Miss Beeman did not distinguish between biology and hygiene; and second, the test given by Miss Beeman was her own and consequently may not have the known objectivity in the same degree as the Gates-Strang Test.

The writer's study shows that there was an average gain of six questions right for the biology pupils (see Tables 9 and 10) over the non-biology pupils, in a special study of five high schools, on the test adapted from the Gates-Strang Health Knowledge Test (see Appendix 3). Miss Beeman shows that there was an average gain of 2.5 in the score of the biology or hygiene pupils over the non-biology or hygiene group. It seems then, from these two studies, that there is value in the study of biology in relation to the acquisition of health knowledge, and that a course in biology is more beneficial for the purpose of acquiring lasting health knowledge than is a special course devoted solely to health.

In an endeavor to put the above information into immediate and practical use, the writer sent the letter which appears in Appendix 4, to Doctor Orwin Bradford Griffin, Superintendent of Schools, Litchfield, Connecticut.

CHAPTER IVS U M M A R Y1. Possible Contribution of this Thesis to the Work in
Education

(a) A presentation of the modern status of health education in secondary schools, as taken from the best authorities, which includes: (1) health development; (2) health protection; (3) and health teaching.

(b) A formulation of six objectives in health education based upon aims in health education stated by authorities in the field. These objectives are: (1) the control of personal hygiene; (2) the control of civic sanitation; (3) the control of the physiological systems of the body; (4) the control of disease; (5) the control of accidents; (6) the control of first-aid treatment.

(c) The organization of a health course based upon the desires of the pupils and guided along the lines of health objectives (given in Appendix 1).

(d) An examination to show the value of a direct health course by a check with a control school. The result was that during a school year those who had a direct health course showed an average increase of +4.52 questions right, while those in the control school where no health was taught showed an average drop of -.84 questions on the test adapted from the Gates-Strang Health Knowledge Test (see Appendix 3).

(e) An experiment showing that possibly biology is more valuable in teaching health than a special course in health. In a special study of five high schools those who had studied biology showed that their average questions marked right was six more than the average of those who had not studied biology. The same test mentioned in (d) of summary was given to this group.

2. Limitations of this Thesis.

(a) Objectives formulated are not final. They are subject to the discoveries and advances of science.

(b) The statistics are not formidable enough to form an unquestionably positive conclusion in regard to the value of biology in teaching health. Also the value of biology may be attacked from other angles. This thesis, in regard to the value of biology and health knowledge shows only a tendency and not an established fact.

3. Suggestions for Experimentation and Research.

(a) Further examination and experimentation in regard to the value of biology in teaching health.

(b) Further consideration of disseminating health knowledge among secondary school pupils.

(c) Tests and measurements in regard to health work and health practice.

(d) Health education programs worked out in the small high school. A suggestion for such a program is the following

daily schedule of the health director of Long Prairie, Minnesota:

DAILY SCHEDULE OF HEALTH DIRECTOR,

LONG PRAIRIE, MINN.

Hour	Monday	Tuesday	Wednesday	Thursday	Friday
9 to 10	Grade in- spection and demon- stration	Grade in- spection and demon- stration	Grade in- spection and demon- stration	Grade in- spection and demon- stration	Grade in- spection and demon- stration
10 to 11	Biology	Biology	Biology	Biology	Biology
11 to 12	Biology	Biology	Biology	Biology	Biology
1 to 2	Physical examina- tions and home calls	Senior High G y m. Junior High	Physical examina- tions and home calls	Physical examina- tions and home calls	Senior High G y m. Junior High
2 to 3		Junior High G y m.			Junior High G y m.
3 to 4		G y m.			G y m.

The health director in this case is the school nurse.

The gymnasium periods for boys are not shown on this schedule.

The athletic coach teaches these classes and cooperates with the health director in planning the work.

APPENDIX I

Lesson Units In Health Education, Litchfield High School, 1930-31.

September 10, 1930. First day of school.

All pupils were given a series of eighty questions that the author adapted from the "Gates-Strang Health Test".

September 17, 1930. Free discussion period.

Some of the questions asked by the pupils are:

"What are the requirements for a healthy body?"

"What is the best way to keep in condition for an athletic team?"

"Was Edison correct when he said that one needs only a few hours of sleep?"

"Should a boy who works on a farm be excused from his physical education classes?"

"What is a vitamin?"

"Why do boys usually stand straighter than girls?"

"Is it true that too much exercise is harmful?"

Upon the basis of the above questions, through the Socratic method, the following topics were developed pertaining to health:

1. Food

2. Exercise

3. Sleep

Reference: Chapter 25, "Biology and Human Welfare", by Peabody and Hunt.

September 24, 1930. Further development of health topics:

4. A Wholesome outlook on life.

5. Cleanliness.
6. Posture.
7. Elimination of waste from the body.
8. Proper clothing.
9. Visits to doctors and dentists.

Assignment: A paper on "What I Want To Study In Health".

October 1, 1930. Reading and discussing of papers on health.

The drawing up of a definition of health knowledge from the papers read - "A reasonable understanding of the basic physiological operations of the organs of the body, a reasonable understanding of conditions leading to optimum civic sanitation, plus a reasonable understanding of the exterior forces leading to the demolition, or the unbalancing of the ordinarily harmonic bodily functions."

The following are three papers, the first written by a freshman, the second by a sophomore, and the third by a senior, which are chosen as representative papers:

1. "I think health is one subject we should all be taught and what we all should know about. I think in health the first thing we should know is the building of the body. We also should know the proper foods and exercises to build a strong body. Exercise is good for the muscles but too much is not good for you. The proper foods for the body are foods containing fats, carbohydrates, proteins, minerals, and vitamins. Dark bread is also good for you because it helps digestion. Rest is also important; a person at the age of 14 or 15 should sleep at least nine hours, keeping his

window wide open. The main parts of a person are the head, trunk and limbs. The head should be protected because of the brain and eyes. A person should always know what to do in case of a cut vein, nose bleed or any cuts or wounds."

3. "I think that in the health course this year we should have notebooks in which can be kept the notes of each health lesson. The notebook can be passed in each quarter for a mark. The teacher can give quizzes now and then to check up on the pupil to see how well he has kept his notes and in studying them. When the pupils come to class the teacher can ask questions about the things that were covered and explained in the lesson previous to this one. The teacher can also collect the notebooks at different times to see if the notes are being kept up to date. If at any time a question arises it can be brought up in class and discussed. I don't think that we should have books which we can take the assignments from."

3. "This year's course would interest me if disease germs and different diseases were explained more fully. Many people with diseases seldom know how they get them and what the cure is, if there is any.

I presume that if this topic should be taken up, the health course would be covered in all its branches. Health, of course, must begin at home. Personal health and community health go side

by side. To my understanding, if one of these two is corrupted disease springs up. The question is in what way they spring up and the cause for it.

There are many disease germs which I know about, that is, I know what diseases they bring on. That is of no help to me for I don't know how they go about it, how they can be prevented, and how they can be overcome when they once take hold. There are many more which I don't know anything at all about.

Toxins, anti-toxins, serums, and all that sort of thing interests me a great deal but I admit that I am practically ignorant as to their functions and the processes by which they are made.

Quarantines interest me also. Which diseases should be quarantined, and for how long? What are the rules which should be lived up to in cases that are quarantined? There are many questions that can be asked concerning this topic. I've tried to ask the ones which I think important, but still I can't fill two or three pages asking questions.

Disease germs and diseases are to me at the present time pretty interesting. I would like to learn more about them if possible. I intend to continue in this line later and any help I can get now will be handy later."

Reference: Chapter 26, "Biology and Human Welfare", by Peabody and Hunt.

October 8, 1930. Five minute quiz on Chapter 25, "Biology and Human Welfare", by Peabody and Hunt.

Open discussion period - questions were asked the instructor by the pupils. The following are some of the questions:

"Should I keep off my ankle that I turned in yesterday's soccer practice?"

"Why can't we study some first aid in this course?"

"Why did you permit R. . . . to remain out at practice yesterday when you knew he had a 'Charley-horse'?"

"What is a good treatment for a black eye?"

"What is the best way to stop a bleeding nose?"

"Is it possible to cure flat feet?"

The above questions led to a discussion of first aid through lectures and notes taken by pupils. The following subjects were discussed in reference to first aid:

Wry neck.

Charley-horse.

Shin splints.

Cramp of muscles.

Stone bruise.

Bone bruise.

Treatment of wounds.

The instructor's definition of first aid was considered. "What to do until the doctor comes".

Reference: "The Trainer's Bible", by S. E. Bilik, M. D. , pages 199-225
 October 15, 1950. Brief review of previous week's work.

A continuation of the discussion on first aid. The following topics were considered and notes taken:

"Strawberry".

Black eye.

Nose bleed.

Ingrowing nails.

Flat feet.

Blisters.

Shocks.

Fainting.

Reference: "The Trainer's Bible", by S. E. Bilik, M. D. , pages 225-254.
 October 22, 1950. Five minute quiz on first aid.

Open discussion period - questions asked the instructor by the pupils. The following are some of the questions:

"Do all germs carry disease?"

"What does toxin and anti-toxin mean?"

"Is tuberculosis hereditary?"

"Why do mad dogs foam at the mouth?"

"What causes cancer?"

"Why do people often die in closed-in garages?"

"Why do we have to get vaccinated before we start school?"

"Why are some diseases quarantined and others not?"

"How can water carry disease?"

"What does fumigation mean?"

"Is tuberculosis curable?"

"Is the hookworm the same as the tapeworm?"

The above questions furnished a basis for several weeks work. In view of the above questions disease was classified into three groups, namely:

"1. Communicable diseases, or those which are transmitted from man to man, and from animals to man, directly or indirectly by a specific virus or infective agent, such as measles, scarley fever, diphtheria, mumps, whooping cough, etc., are commonly referred to as 'contagious' diseases because they are spread ordinarily through the more or less direct contact of persons.

"2. Occupational diseases, or those which are due to the action upon the human body of various poisons or harmful agents found in certain places and conditions of employment, or produced in a number of industrial processes. Such cases are lead poisoning, arsenic poisoning, arsenic poisoning, mercury poisoning, carbon monoxide poisoning, and many others,

"3. Disease of unknown origin, such as cancer, pellagra, etc.

Reference: Outline of Public Health Course No. 60, Massachusetts State College, Section 10, pages 1 - 3.

October 29, 1930. Brief review of previous week's work.

Control of communicable disease. Topics considered were:

1. Registration of disease.
2. Identification of disease.
3. Isolation and supervision of the patient.
4. Quarantine of exposed persons.
5. Immunization of exposed persons.
6. Investigation of sources and modes of infection.
7. Release of patient from control (on termination of disease as demonstrated by physical examination and laboratory tests).
8. Renovation of premises.

Reference: Outline of Public Health Course No. 60, Massachusetts State College, sections 11- 13.

November 5, 1930. Brief review of previous week's work.

Tuberculosis and its prevention. Topics considered were:

1. The nature of the disease.
2. Historical development of control;
 - a. Pasteur
 - b. Dr. J. A. Villemin
 - c. Professor J. Cohnheim
 - d. Koch
 - e. Edward Livingston Trudeau

3. Prevalence and economic importance.

Reference: "Advanced Biology", by Wheat and Fitzpatrick, Chapter 43

November 12, 1930. Brief review of previous week's work.

Tuberculosis and its prevention, continued:

4. Requirements for the prevention of tuberculosis.
 - "a. Good registration of cases in order that those

who are sick may be prevented from transmitting their disease to others.

b. Provision for treatment at public expense for many patients in their homes, in hospitals, and in sanatoria.

c. Health education and health instruction of children and parents for the betterment of their bodily resistance to the disease.

d. Elimination of occupational and environmental handicaps to right living.

e. Elimination of slums.

f. Proper diet.

g. Free use of natural health aids.

1. Fresh air.

2. Sunshine

3. Outdoor life."

Reference: Outline of Public Health Course No. 60, Massachusetts State College, Section 15.

November 19, 1930 Five minute test on the control of communicable diseases and tuberculosis.

A consideration of Hookworm Eradication.

1. Distribution in the United States.

- a. prevalent in southern states.

2. Economic status due to hookworm infestation.

3. How the prevalence of the disease has been reduced.

4. The case with which this disease may be removed.

5. The work of the public health nurse.

Reference: Outline of Public Health Course No. 60, Massachusetts State College, Section 17.

December 3, 1930. Brief review of previous week's work.

Rabies and its control. Topics considered were:

1. Ancient ideas on the treatment of rabies.
2. Pasteur's experiments with saliva and blood.
3. Pasteur's experiments with dried brain and spinal cord.
4. The first vaccination of animals against rabies.
5. The first vaccination of a person against rabies.
6. The effect of the discovery of vaccination against rabies on the world.

Reference: "Advanced Biology", supra, Chapter 42.

December 10, 1930. Brief review of previous week's work.

Diphtheria, Scarlet Fever, and Tetanus. Topics considered were:

1. The causative organism of diphtheria.
2. The work leading to the discovery of anti-toxin.

3. The Schick test and its importance.
4. Scarlet fever compared and contrasted with diphtheria in cause, prevention, and treatment.
5. Why prevention of disease is more to be desired than the cure.
6. Similarity between tetanus and diphtheria.
7. The relation of tetanus to different types of wounds.
8. The cause for the reduction in number of deaths from tetanus.

Reference: "Advanced Biology", supra, Chapter 44.

December 17, 1930. Brief review of previous week's work.

Typhoid Fever. Topics considered were:

1. A comparison of typhoid fever statistics in the Spanish-American War and the World War.
2. The dangers of typhoid carriers to a community.
3. The value of an early diagnosis of typhoid.
4. Preparation and use of typhoid vaccine.
5. The importance of a traveler having typhoid vaccination over that of one staying at home.

6. How an investigation of a typhoid epidemic is carried out.
7. The danger of drinking water within city limits.

Reference: "Advanced Biology", supra, Chapter 45.

December 31, 1930. Brief review of previous week's work.

Colds. Topics considered were:

1. Causes of different kinds of colds.
2. The effects of colds on the body.
3. How colds are spread.
4. How the vitality of the body may be kept high so that colds may be prevented.
5. How epidemics of colds in schools may be prevented.
6. A comparison of influenza to common colds.

Reference: "Advanced Biology", supra, pages 473 - 477.

January 7, 1931. A ten-minute quiz on communicable diseases.

Defenses against diseases. Topics considered were:

1. Three ways in which bacteria enter the body.
 - a. Alimentary canal.
 - b. Respiratory tract
 - c. Skin openings.
2. Three ways in which bacteria attack the body.
 - a. Destroy tissue.
 - b. Toxins they produce
 - c. Protein food attached.

3. Natural defenses of the body.

- a. Intact skin and mucuous membrane.
- b. White blood corpuscles.
- c. Antibodies.

4. Other means of protection.

Reference: "Advanced Biology", supra, Chapter 48

January 14, 1931. Brief review of previous week's work.

Immunity. Topics considered were:

1. Life and work of Metchnikoff.
2. Ehrlich's experiments with dyes and chemicals on bacteria.
3. Natural and acquired immunity.
4. Specific inoculations for a person traveling.
5. Active and passive immunity.

Reference: "Advanced Biology", supra, Chapter 49.

January 21, 1931. Mid-year examination in health was given, as follows:

I.

"True-False (Put a plus sign before each statement that is true and a minus before each statement that is false. If a statement is only partly true it should be marked minus. Score will be the number right minus the number wrong.) 40 points.

1. Vesalius aided the study of health by using agar-agar in the study of bacteria.
2. Sunlight kills many bacteria.
3. Cold is favorable to the growth of bacteria.
4. The main purpose of spores in bacteria is reproduction.
5. Agar is a Japanese seaweed.
6. If one is hungry between meals it is a good idea to drink a glass of water.

7. Posture does not count while one is sleeping.
8. If one is cheerful while eating, it follows that food will be digested better.
9. Since noise does not allow one to relax it follows that one should not talk at table.
10. At present there is more of a tendency to emphasize the preventative rather than the curative side of medicine.
11. One who thinks that he is sick may feel as miserable as one who is actually ill.
12. A boy who has plenty of wood to cut at home should be excused from physical education in the high school.
13. Health is the first aim in secondary education.
14. An athlete with a "charley-horse" should keep his leg still for two days.
15. "Shin splints" are caused by improper food.
16. Dirt should be kept in a small cut in order to protect the cut from bacteria.
17. A "strawberry" should be treated with unguentine.
18. To stop a nose bleed one should lie down.
19. The feet of a person who has fainted should be raised.
20. Ice water is a good relief for a person with a shock.
21. A bone bruise is caused by failure to warm up before practice.
22. A "wry neck" should be massaged with olive oil.
23. We should consult, doctor, dentist, and oculist at regular intervals and at least once a year.
24. Stiles discovered the hookworm in the United States.
25. Lead poisoning is a communicable disease.
26. Scarlet fever is of unknown origin.
27. Smallpox can be prevented by vaccination.
28. Russia is encouraging the development of boxing.
29. The health officer should always accept the doctor's word in regard to release from quarantine.
30. Tuberculosis is a readily communicable disease.
31. One out of ten deaths in the United States is due to tuberculosis.
32. The first health officer was Moses.
33. It is impossible to prevent cancer since its origin is unknown.
34. Bacteria are a very complex form of plant life.
35. Bacteria are the simplest form of animal life.
36. Bacteria are sometimes neither helpful nor harmful.
37. An antiseptic is a chemical which kills bacteria.
38. Fumigation consists in the liberation of gas or fumes which kill bacteria.
39. Bacteria are important in the tanning of leather.
40. I have answered at least thirty of these questions right.

II - 20 points.

1. Food may be preserved by

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

2. Tuberculosis may be spread by

- a. _____
- b. _____
- c. _____
- d. _____

3. Typhoid may be prevented by

- a. _____
- b. _____
- c. _____

4. Methods used in the destroying of bacteria

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____
- f. _____

III - 10 points.

1. Four remedies for nose bleed are

- a. _____
- b. _____
- c. _____
- d. _____

2. The treatment for ingrowing nails is:

IV - 30 points.

1. The three principal forms of food are _____

2. Other food essentials are _____

3. Prevention of disease of unknown origin depends upon educating the public in _____ and _____.

4. Fixed periods at the end of which people will be released from quarantine is a _____ practice.

5. A "wry neck" is relieved by the application of _____ and _____.
6. Health authorities are concerned with _____ disease and _____ disease.
7. There are certain measures of disease control such as _____ and _____.
8. Such diseases as _____ and _____ should be placarded.
9. Tuberculosis may be prevented by _____ and _____.
10. Bacteria are found in _____ and _____.

January 29, 1931. Open discussion period. (Practice was just getting under way for the senior play). The question was asked "Why can't we give a health play?". Then one of the more ambitious boys suggested that all should write a health play. This suggestion met with wide-spread approval. All the boys promised to have a health play ready for the following week.

"Teachers now realize that it is not what is poured into brains that educates, but what the brains grasp for themselves through their own faculties. What the teacher must do is to make the conditions right for such exercise, then be willing to sit back and let the boys and girls educate themselves."¹.

1. "Teaching Literature in the Grammar Grades and High School" Bolenius

February 4, 1931. The health plays were read, discussed, and commented upon. Some of the plays showed that the assignment was a rather ambitious one. Other plays were quite original and good. The pupils voted upon the two best plays. It was decided to put both plays on, the following week. Each author was to choose his own cast.

"The play impulse is deep in the heart of racial life. As the child develops, he passes through various stages from a primitive little savage to a young gentleman who brushes his teeth, takes off his hat to the ladies, and in general can be trusted in the drawing room. All through this development the dramatic instinct has been strong. The boy is not content only to read about Indians; he must himself be Big Chief. He is not satisfied to hear about the pioneer building his fort; he must make his own fort, and hold it with his comrades."¹

February 11, 1931. The following two plays were enacted quite successfully:

I.

"THE HEALTH CIRCUS"

(A Health Play for Boys - in One Act)

Characters

Joe - - - - - A boy of frail health.

Alan, James, Bill, Jerry - - - Boys of the neighborhood.

Tom, and seven other boys - - Members of the team.

Zum-Zum - - - - - The circus clown

1. "Teaching Literature in the Grammar Grades and High School," Bolenius, 1927.

Scene: Back yard of Joe's home.

- Jerry: Wait for me, can't you? What's all the rush? The parade isn't even in sight.
- James: Bill's afraid he'll miss seeing the elephants. That's the best thing in the whole circus, isn't it Bill?
- Bill: No —
- James: Well, what is the best thing?
- Joe: (Interested in conversation, from porch) The clown!
- Bill: Why, here's Joe, all bundled up as usual. Are you sick again?
- James: Hello, Joe - aren't you going to the circus parade?
- Joe: No. The doctor said I mustn't get off the porch. I've been pretty sick. That's why I haven't been to school.
- James: Fine time to be sick when there's a circus in town.
- Joe: I would like to see the funny clown. He makes people laugh, stands on his head and does tricks and things.
- Jerry: Gee, I'm glad I'm not sick (turns a cartwheel). I wouldn't miss the circus for anything.
- Bill: I'm sorry you can't come with us Joe. We'll tell you all about it when we come back. Come on, fellows, I think I hear music (voices off stage).
- James: Oh, Jack, hurry up! They're on Main Street now!
- Alan: They're coming this way! Hurry up! (Jack enters with baseball team).
- Jack: We'll finish this game after we've seen the parade; two more

innings'll finish them. We'll beat them all hollow. (Seeing

Joe) Hello, Joe. What's the matter? Are you sick?

Joe: Yes, the doctor said I mustn't get off the porch.

Jack: That's tough. Can't you even go to the circus?

Joe: No.

Jack: Too bad, too bad. (To fellows) Say, fellows, put your bats and gloves on the porch here; Joe'll watch them for us until we get back. Won't you, Joe?

Joe: (Picking up bat) Gee, I wish I were as strong as you fellows and could play on your team. Then I wouldn't have to take medicine and I could go to the circus to see the clown - ah well-

Jack: (Puffing out his chest) We're a husky lot, we are; and play ball! say, you should see us on the field.

(Voices off stage) Hey, Jack, hurry up! Here's the parade, don't miss it.

Zum-Zum: Ho! Ho! me merry lad,
Come now! Don't look so sad;
The circus has come town.
The elephants and kangaroos
The chimpanzees by ones and twos
Are marching down the street.
Get you hat! Don't sit there glum!
Come and see the great Zum-Zum.
That's me.
I'm the funny, jumping clown;
I earn my living upside down.

Joe: (Smiling) My name is Joe, I live in this house.

Zum-Zum: Joe- - Joe, that's a fine name. But you're not sick? (Joe nods) Ah! That's a shame.

Joe: Yes, the doctor says I must bundle up tight and I mustn't get off the porch.

Zum-Zum: If I were a doctor I would say;
 Poor boy, your pulse is quite low today,
 Your tongue is coated, your eyes are sad,
 But there's a prescription will make you glad;
 Plenty of fresh air, sunshine and lots of good food,
 Plenty of milk and a merry mood.

Joe: (Laughing) That's just what the doctor said.

Zum-Zum: I am a doctor, but not the kind
 That gives out medicine all the time.
 I make'em laugh
 I make'em split their sides with fun
 And they are cured when I am done.
 Yes, boy, there's joy in my tonic.

Joe: Do you carry your tonic around in that tin bucket?

Zum-Zum: Why bless me, Joe, I've forgotten all about the mule. You see, I have a very excellent mule. His name is Diddle Dee.

Zum-Zum, that's me, and Diddle Dee
 Are always seen together.
 I ride him in the circus parade,
 And now he's thirsty and I'm afraid
 He'll carry me not another step farther
 Until I fetch him a pail of cold water.

Mule: (Off stage) Hee-haw -- Hee-haw -- Hee-haw.

Zum-Zum: Hold your horses and wag your tail; I'm coming, I'm coming.
 (To Joe) Quick! Where can I fill this pail with clear cold water?

Joe: In the house. Walk right in and help yourself.

Jack: (Returning with fellows) He's not here. Are you sure you saw him jump the fence?

Tom: He came this way, I'm certain.

Jack: (To Joe) Where is he?

Joe: Where is who?

Jack: The clown. Didn't you see him?

Joe: (Proudly) Oh, you mean Mr. Zum-Zum? Yes, I've seen him; he's still here.

Jack: (Looking around) You're kidding us.

Joe: No, I'm not.

Jack: Where is he then?

Joe: He came here especially to see me. We are old friends, Mr. Zum-Zum and I. He taught me some clever tricks, too, and he's going to take me to the circus on his very excellent mule.

Jack: Ha! Ha!. I don't believe it. You never saw him before.

Joe: Didn't I though? He's in my house this very minute.

Tom: You're kidding us, you know you are.

Zum-Zum: What ho, me merry lads!
 The circus has come to town.
 The elephants and kangaroos
 And chimpanzees by ones and twos
 Are marching down the street.
 Come with me and have some fun,
 Come and see the great Zum-Zum.
 That's me.
 I'm the funny, tumbling clown;
 I earn my living upside down.

Jack: Joe says you came here especially to see him. Did you really?

Zum-Zum: Why certainly -- certainly. I was passing by the house and I says to myself "That looks like Joe's house; I must step in and see if he's there". And sure enough, he was there in that

chair. We're old pals, Joe and me. And I am sorry to see that he is sick.

Jack: Are you going to take him to the circus on your mule? He can't go. The doctor won't let him.

Zum-Zum: Now you leave that to me.
The circus he'll see
Without moving an inch from his chair
We'll stage the show here
And you boys will be near
To help me entertain Joe.

Jack: Have a circus of your own, do you mean?

Zum-Zum: Yes, that's the idea.

Tom: That'll be great.

Zum-Zum: Now listen to me. In the road you will see a very excellent mule. Tied to him is a generous sack, filled with costumes and things for our show.

Jack: I'll get them - shall I?

Zum-Zum: Yes, hurry up now; then I will show you how to change yourselves into clowns.

Jack: Here they are, sir.

Zum-Zum: Open it up. There's a costume for every one.
This will fit you, and you'll go in that;
This one for you if you're not too fat.
Here's a Jim Dandy; here's one just your size.
Last, but not least, is a dream and a prize.
Now one, two, three jumps
Right into your gowns;
Quick as a wink we'll all be funny clowns.
Your Royal Highness, I beg your leave to present my worthy brothers.
We have heard that you have many ills
And would like to give up doctors' pills.
So we have come with our magic spell
To show you how to get well.

Joe: Do you really think I can get better?

(The circus goes on with stunts and Zum-Zum talking to Joe)

Zum-Zum: We have taught you the magic of our health Circus Ring
 You know our secrets and what foods will bring
 Health to your very door.
 Drink plenty of milk! It's the perfect food;
 A quart a day will change your mood;
 And every hour of your life will be a circus.
 Iron for firm muscles and lime for staunch bones;
 The strong man grows stronger and he is not alone.

Jack: The parade is coming back. May we march along with you?

Zum-Zum: Why certainly, that's the thing to do;
 We'll tell the other fellows what we just told Joe.

Mule: (Off stage) Hee-haw -- Hee-haw -- Hee-haw.

Zum-Zum: Why bless me, that's poor Diddle Dee;
 He's thirsty and he's crying for me.

Joe: I'm sorry to see you go. Will you come back again?

Zum-Zum: When the circus comes to town next year
 I'll look for you on the field near here
 Playing baseball with the boys.
 I'll find you there, healthy, robust and strong,
 If you follow my rules I'll not be far wrong.

Joe: I'm drinking lots of milk from now on; a quart a day or
 maybe more.

Zum-Zum: And every glass of milk you drink
 I want you to close your eyes and think
 Of the circus that lies in every drop
 Energy, strength, endurance and fun;
 Acrobat, tamer, strong man -- all in one.

(All exit).

2.

FLIES.

A One-Act Play

Scene I

A garbage pail. The fly family is talking over the events of the day.

Mr. Fly: Well folks, how did everything go with you today? I certainly had a good day.

All: Did you?

Mr. Fly: (Proudly) Yes. I spent the day at that old Jones house. Mr. Jones doesn't believe in screens so I got in easily enough. The baby there is sick so I went to visit him. I'll bet that my visit didn't improve him any because I walked all over his dinner with my dirty shoes on.

Mrs. Fly: You did have a pretty good day at that. I had an awful time. First, I went to the new house down at the corner, I couldn't even get in there. There were screens in every window. Then I went out to Smith's house. I found a hole in one of the screens there but everything in the house was covered up so that I couldn't get at it. No wonder no one is ever sick in any of those houses. I finally came home and went to bed.

Buster Fly: Tough luck, Ma. Your day was pretty well wasted, wasn't it?

Mrs. Fly: It sure was.

Miss Fly: I didn't have any luck either. Those wicked people who are putting in screens are making it hard for us to make a living. I wish I were a darning needle, for then I could take up sewing.

Mr. Fly: You might amount to more if you didn't run around so much. If you are not careful you will turn into a gadfly.

Buster Fly: Just the same, Dad, Sis is right. Those new fangled screens and revolutionary ideas are going to do for us.

Mr. Fly: Well, we can all go to the Jones house tomorrow. I guess that we can live there for a while.

Scene 2.

The Jones house, early the next morning. The whole fly family arrives.

Mr. Fly: Come on, folks! All set for a big day!

Mrs. Fly: Those look to me like screens.

Miss Fly: Same here.

Buster Fly: They sure are.

Mr. Fly: You stay here while I run around the house. (He goes off)

Mrs. Fly: If we can't get in here we are ruined.

Mr. Fly: (Coming back) Every window and door in the place has a new screen on. That doctor must have told them what to do.

Mrs. Fly: Oh dear, what can we do?

Mr. Fly: Nothing, we are doomed.

All: Science and invention have murdered us.

February 18, 1931.

The U. F. A. Film No. 137, "A World Unseen", was shown to the health class. This film dealt with the tiny organisms seen under a microscope. The instructor gave a short lecture on the economic and health phase of microscopic life. During the actual showing of this sixteen-millimeter non-inflammable safety stock film, features of particular interest to a health class were pointed out.

"In planning demonstration lectures and the use of visual aids, the teacher should bear in mind that students tend to become passive when observing or listening. Learning is an active process, and hence decreases as passivity increases. The success of a teacher in arousing and holding the attention of his class during a demonstration or a descriptive lecture is dependent upon several factors, among which personality traits would be listed; and the determining factors probably vary from teacher to teacher. There are, however, certain procedures which appear to be somewhat generally applicable. In case important details of a demonstration are likely to be overlooked, the teacher may direct the attention of the class to such aspects by saying 'Notice what happens. . . .', or 'Notice how'. Sometimes a preliminary discussion may raise a question that will serve to focus the attention of the student".^{1.}

1. "Directing Learning in the High School", Walter S. Monroe

March 4, 1951. Free discussion period.

Much interest in microscopic life was aroused by the showing of film. This fact may plainly be seen from the questions which were asked. These questions are listed as follows:

"Why do men working in the laboratory wash their hands after handling bacteria? What is the difference between bacteria and microbes? Are bacteria always harmful? Why do people say that bacteria are often helpful when we all know that they may cause many diseases? Is it true that air will kill some bacteria and help others? Are bacteria always present in milk? The film last week showed some agar plates - are bacteria that big? Why is bacteria called agar? How do bacteria aid agriculture? Are all germs bacteria? Will iodine kill germs? Are yeast cakes alive? I have a candy yeast here; it says on the advertisement that it contains as much yeast as an ordinary yeast cake; how can I find out whether this is true or not?

There was just time enough to carry out an experiment to answer this last question. The following experiment was carried out through the aid of biology and chemistry students:

Two flasks were procured; in one was placed the candy yeast and in the other was placed a yeast cake secured from the lunch room. In each flask was placed some grape sugar for the yeast to act upon. Then each flask was corked. A piece of glass tubing led from each flask into a glass of lime water. The bottle of lime water that was connected to the flask containing the yeast cake showed much more of white precipitate than the bottle connected to the flask containing

the candy yeast. - The results showed that there was some yeast but comparatively little in the candy yeast.

March 11, 1931.

A review of microbes.

A lecture on microbes. Topics considered were:

1. Types of microbes.
2. Harmful protozoa.
3. Structure of bacteria.
4. The importance of agar.
5. Conditions under which food will spoil.
6. Relation of antiseptics to growth of bacteria.
7. Aerobic and anaerobic bacteria.
8. Reproduction and spore formation.

Reference: "Advanced Biology", supra, Chapter 38.

March 18, 1931.

Brief review of previous week's work.

Beneficial activities of bacteria. Topics considered were:

1. Tanning of leather.
2. The importance of the decay process to agriculture.
3. Nitrogen fixation by bacteria.
4. Government aid to farmers for soil improvement.
5. Preparation of linen.
6. Curing tobacco.
7. Curing sponges.

Reference: "Advanced Biology", supra, Chapter 59.

March 25, 1931.

Ten minute quiz on microbes.

Oral review of microbes.

Open discussion and question period. The following are some of the questions asked:

"Why can't we study more about our own body? What did the Indians do without dentists? Why is it more important to be happy while eating? Why are fried foods hard to digest? How is food digested? What is the best way to stop bleeding? Why is the body so much warmer than the air outside of the body? What makes the heart beat? How does drinking water help get rid of a cold? What is the best way to give artificial respiration? How does a fan help purify the air in a motion picture house? What is a balanced diet? What causes rickets?"

April 1, 1931.

A development of the topic Food Nutrients.

Factors mentioned were:

1. Definition of a food and a nutrient.
(Food includes nutrients and waste)
2. Elements in food used for fuel.
3. Elements in food used to build tissue.
4. Vitamins and their value in the diet.
5. Deficiency diseases.

Reference: "Advanced Biology", supra, Chapter 11.

April 8, 1931.

Brief review of previous week's work.

Teeth and their care. Topics discussed were:

1. Arrangement, number, and kind of temporary teeth.
2. Arrangement, number, and kind of permanent teeth.
3. Hygienic method of cleaning teeth.
4. Relation of proper diet to good teeth.
5. Causes for bad teeth.

Reference: "Advanced Biology", supra, Chapter 12.

April 15, 1932

Brief review of previous week's work.

Digestion and absorption. Topics discussed were:

1. Causes for the stimulation of the flow of digestive juices.
2. Importance of eliminating the solid wastes of the body.
3. The importance of the villi in absorption.
4. Two classes of cathartics.
5. Unhygienic conditions frequently found among high school students and which may lead to digestive disorders.
6. The necessity for happiness while eating.

Reference: "Advanced Biology", supra, Chapter 14

April 22, 1931.

Brief review of previous week's work.

The circulatory system. Topics discussed were:

1. Reason for blood clotting.
2. A comparison of the red and white blood corpuscles.
3. How to take a pulse.
4. The path taken by a drop of blood.
5. The function of each system of circulation.

May 6, 1931.

In order to get a check on the health knowledge acquired during the school year, the same health knowledge test that was given on September 10, 1930, was given to all of the boys.

The outline cited below was followed for the remainder of the school year, 1930-1931.

May 13, 1931.

A ten minute quiz upon the digestive and circulatory systems.

The skin and kidneys.

1. Explanation of excretion.
2. Hygiene of the skin.
3. Relation of the work of the skin to the work of the kidneys.
4. The value of water to the skin and kidneys.

Reference: "Advanced Biology", supra, Chapter 18.

May 20, 1931.

A brief review of the previous week's work.

Respiration:

1. Mechanics of breathing.
2. Aims of ventilation.
3. Causes of discomfort in a poorly ventilated room.
4. Adaptions of the respiratory system.
5. The proper ventilation for a room.

Reference: "Advanced Biology", supra, Chapter 19.

May 27, 1931.

A brief review of the previous week's work.

The nervous system.

1. Stimulus and response.
2. Protection of the brain and spinal cord.
3. Structure and function of the cerebrum.
4. The unit of structure of the nervous system.
5. Reflex activities.

Reference: "Advanced Biology", supra, Chapter 22.

June 3, 1931.

A brief review of the previous week's work.

Oral review for final examination.

June 10, 1931.

Final examination in health, as follows:

"Health" - Final Examination

Plus or minus - 50 points

1. The feet of a person who has fainted should be lowered.
2. One should lie down when one has a nosebleed.
3. Pressure on the upper lip is good for a bloody nose.
4. Unguentine should be applied to a "strawberry".
5. A sprained ankle should be kept still for a week.
6. A muscle is more apt to be pulled in cold weather than in warm.
7. Massage relieved a stiff neck.
8. A leg with a charley-horse should be padded, protected and used.
9. To relieve a cramp, grasp the muscle of the belly and squeeze with considerable force.
10. Bone bruises are always more painful than those of soft tissue.
11. Liquid soap should be used to remove cinders from a cut.
12. A black eye should be treated with a hot water bottle.
13. When in doubt call a doctor for an injured person.
14. A sunstroke should be treated by a cold bath and ice on head and feet.
15. Heat exhaustion should be treated with blankets and by applying heat to the extremities.
16. Bacteria are always harmful.
17. Tuberculosis is caused by a protozoan.
18. An antiseptic is stronger than disinfectant.
19. Vesalius founded modern surgery.
20. Health and long life mean the same thing.

II - 150 points

Fill in:

1. The problem of city and town health has two chief phases (1) _____
(2) _____
2. Vital statistics means the registration of _____ and _____
3. Delinquency-Dependency and _____ constitute a vicious cycle.
4. Tuberculosis is fast becoming conquered because _____.
5. Some of the co-operative health agencies to assist in local health activities are _____

6. Three types of diseases are communicable, diseases of unknown origin and _____
7. Diseases against which there are available methods of immunization are _____
8. Such diseases as _____ should be placarded.

- 9. Hookworm is more prevalent in _____ United States than in _____ United States.
- 10. Fumigation is _____ disinfection.

U.S. DEPARTMENT OF AGRICULTURE
 BUREAU OF PLANT INDUSTRY
 WASHINGTON, D. C.
 APR 2 10, 1918

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APPENDIX 2

Box 21,
Litchfield High School
Litchfield, Connecticut

A p r i l 10, 1931

Fredrika Moore, M. D.,
Department of Public Health,
State House,
Boston, Massachusetts.

My dear Doctor Moore:

Am I wrong in supposing that the following quotation from Section I, Chapter 71, of the General Laws of Massachusetts, requires the teaching of health in the high school:

'In connection with physiology and hygiene, instruction., shall be given to all pupils in all schools under public control, except schools maintained solely for instruction in particular branches?'

If the law does include the secondary schools, why is it that many Massachusetts high schools under state supervision do not teach health?

Yours very truly,

John A. Sullivan

Instructor in Health

To the foregoing letter, Doctor Moore kindly sent the following reply:

The Commonwealth of Massachusetts
 Department of Public Health
 State House, Boston

April 14, 1931

Mr. John A. Sullivan
 Instructor in Health
 Litchfield High School
 P. O. Box 21
 Litchfield, Connecticut

My dear Mr. Sullivan:

You are correct in supposing that the law requires health to be taught in all public schools. It is true also that many of them, particularly high schools, are not complying with the law. The difficulty with our State is that there are no teeth in the law, so we have to depend upon gradual education to impress upon the school committees the importance of health work.

At the present time in Massachusetts we are having a drive on the health education in high schools. We are sending you, under separate cover, some suggestion which have been sent out to the principals of high schools. You will notice that we have made May Day an excuse for sending out this material but it is intended for permanent use.

The Massachusetts Tuberculosis League with this Department and the Department of Education has sent out to all the junior high school and senior high schools a questionnaire on their health education work.

If you are interested in seeing health education in secondary schools, Lynn is carrying out an experiment in its English High School. Revere has a simple form of health councils in all the schools including the elementary schools. Rockland is establishing a health council. Beverly and Plymouth are putting in health committees as part of an already established student council.

Trusting that this information will be of service to you, I am,

Cordially yours,

Fredrika Moore,

Pediatrician

The following is the Connecticut State Law in regard to health teaching:

Chapter 399, Public Acts of 1921

An Act providing for Health Instruction and Physical Education in Public Schools.

Section 1. There shall be established and made a part of the course of instruction in the public schools of this state a course in health instruction and physical education.

Section 2. The course in physical education shall be adapted to the ages, capabilities and state of health of the pupils in the several grades and departments and shall include exercises, calisthenics, formation drills, instruction in personal and community health and safety and in preventing and correcting bodily deficiency.

Section 3: The course herein prescribed shall be prepared by the Secretary of the State Board of Education and, when approved by the State Board of Education, shall constitute the prescribed course in physical education. With the approval of said board, said Secretary may employ experts to assist him in preparing such courses of instruction, and to assist in putting into operation the courses and work in the public schools of the state.

Section 4. Every pupil shall, excepting kindergarten pupils, attending the public schools of this state, take the course in physical training as herein provided, and such course shall be a part of the curriculum prescribed for the several grades. The standing of the pupil in connection with this course shall form a part of the requirements for promotion or graduation. The time devoted to such courses shall aggregate at least two and one-half hours in each school week, or proportionately when holidays fall within the same. Four-fifths of such time shall be given to physical education and one-fifth to the teaching of health.

Section 5. The State Board of Education shall adopt regulations fixing the necessary qualifications of teachers in physical education, shall require all students at the normal schools to receive thorough instruction in such courses, and shall provide such instruction for such students in attendance at the state summer schools as shall elect to take such instruction.

For an interpretation of the above law, the following letter was written to Elizabeth C. Nickerson, Director of the Bureau of Public Health Instruction:

Box 21
Litchfield High School
Litchfield, Connecticut

A p r i l 10, 1951

Elizabeth C. Nickerson
Director, Bureau of Public Health Instruction
State House, Hartford
Connecticut

My dear Miss Nickerson:

Does Chapter 399, Public Acts of 1921, require the teaching of health in the high school? It seems apparent that health should be taught in our secondary schools according to this law. Yet many of our high schools under state supervision make no provision for the teaching of health. Obviously state authorities are cognizant of the fact that no health is taught in many Connecticut high schools. If the law does apply to secondary schools why is it not enforced?

Very truly yours,

John A. Sullivan

Instructor in Health

The above letter was referred to Doctor Prohaska, State Physical Education Director, who made the following reply:

Connecticut State Board of Education
 Division of Physical Education and Health

Hartford, Connecticut

April 18, 1931

Mr. John A. Sullivan
 Litchfield High School
 Litchfield, Connecticut

Dear Mr. Sullivan:

Your letter of recent date, addressed to Miss Nuckerson of the State Department of Health, has been referred to me for reply.

Enclosed you will find a copy of the law which clearly provides for "Health Instruction and Physical Education in Public Schools", in Chapter 399 of the Public Acts of 1921.

Answering your question as to why many high schools do not give instruction in health or hygiene, I quote from a letter from our Mr. Sturges of the Division of Attendance and Employment.

"The matter referred to in the attached correspondence apparently is one that is within the discretion of both the town school committee and the state board of education as to where they will place the courses in health instruction."

Local school committees have the right to prescribe the courses in addition to those required by the statutes and the state may require courses in addition to those set up if it seems advisable.

There is nothing in the law to prevent the extension of this work in the high schools if it seems advisable, by either or both boards.

Very truly yours,

Charles J. Prohaska

Director

APPENDIX E

Health Knowledge Test

Adapted from the "Gates-Strang Health Knowledge Test"

Name _____ Age _____

School _____ Grade _____

Preliminary questions.

Fill in

1. Did you ever study biology in high school? _____
2. In what year in school did you study biology? _____
3. Did you study physiology or health in your biology course? _____
4. Did you study health as a separate subject? _____
5. Have you ever received instruction in health from:

The community nurse? _____

Boy Scout Organization? _____

Coaching or physical education? _____

Dental clinics? _____

Names of other organizations from which you have
received health instructions._____

6. Were you born in this country? _____
7. Were you parents born in this country? If not, write whether
father or mother or both were foreign born? _____
8. From what country did your ancestors originally come? _____
9. What is the occupation of your father? _____

10. Education of father? (State whether Common School, High School, Business College, College or University) _____

"HEALTH KNOWLEDGE TEST"

1. Of these games, the best one for developing the heart and lungs is
 - a..... spinning tops
 - b..... jacks
 - c..... tag
 - d..... marbles
 - e..... see-saw
2. In general, the best exercise for fourth grade boys and girls is
 - a..... work on the farm
 - b..... active out-door play
 - c..... running errands
 - d..... exercise in the gymnasium
 - e..... five minutes of arm exercises every day
3. The best way to practice deep breathing is
 - a..... to play games that require deep breathing
 - b..... to hold breath as long as you can
 - c..... to take breathing drills
 - d..... to breathe in while you count three
 - e..... to throw shoulders back
4. Besides playing some outdoor games, a business man should take each day five or ten minutes of special exercises which use
 - a..... leg muscles
 - b..... abdominal muscles
 - c..... muscles used in standing
 - d..... arm muscles
 - e..... hand muscles
5. The enemies which cause the death of most people today are
 - a..... Indians
 - b..... lions
 - c..... tigers
 - d..... flies
 - e..... snakes
6. Of the following the best way to prevent the spread of communicable disease is for all well people
 - a..... to keep all the windows closed
 - b..... to take medicine frequently
 - c..... to avoid close contact with sick people
 - d..... to work not more than six hours a day
 - e..... to keep the house warm

7. A child ought to stay home from school when he is sick because
- he may get tired
 - disease germs may get caught by others
 - people do not like to have sick children around
 - the school may be too warm.
 - he may not have to study if he stays home
8. Of the following it is most important for good citizens to know
- the capitals of all the states
 - the names of all the bones in the body
 - the chemical composition of water
 - the shape of sewer pipes
 - proper disposal of waste in his home
9. To have strong well-shaped feet a good thing to do is
-to wear thin soles in cold weather
 -to wear stiff, heavy shoes with metal arch supporters
 - to wear tightly fitting shoes.
 -never to walk without heels on shoes
10. One effect of warm still air in a room is
-to cause sickness and death at once
 -to make one feel less like working
 -to take away a headache
 -to make a person hungry
 -to make a person wide-awake and active
11. Underwear for temperate climates is best if made of material that is
-a heavy-weight
 -tightly woven
 -porous and light-weight
 -rough
 -thick
12. Face creams and powders are
-better for the skin than soap and water
 -sometimes useful to protect the skin from dirt and hot sun
 -good to use every day
 -needed for beauty and health
 -never harmful
13. The chief use of the hairs in the nose is for
-sneezing
 -smelling
 -breathing
 -catching dust
 -keeping out bad odors

14. While eating, it is a good thing
- a..... to talk about your troubles
 - b..... to worry about what you are eating
 - c..... to study your lessons
 - d..... to say nothing to anybody
 - e..... to feel comfortable and happy
15. Adenoids should be taken out because
- a..... they soon cause death
 - b..... they are always painful
 - c..... they are catching
 - d..... they are ugly
 - e..... they often cause earache, colds, and a badly shaped mouth
16. Frequent sore throat may be a sign that
- a..... you are getting malaria
 - b..... your tonsils are diseased and should be removed
 - c..... you talk too much
 - d..... you ought to live in a warmer climate
 - e..... you are drinking too much milk
17. One way the throat can be kept in good condition is by
- a..... gargling with warm, salt water occasionally
 - b..... loud singing and shouting
 - c..... eating cough drops
 - d..... breathing through the mouth
 - e..... coughing good and hard
18. The best way to form the habit of brushing the teeth every day is
- a..... to watch others brush their teeth
 - b..... to read all the tooth paste advertisements
 - c..... to brush the teeth every day for two years
 - d..... to think every day about wanting to form the habit
 - e..... to brush the teeth whenever you happen to think of it.
19. The best temperature for a room in which one is sitting reading is between
- a..... 50 and 54 degrees
 - b..... 65 and 68 degrees
 - c..... 72 and 75 degrees
 - d..... 76 and 80 degrees
 - e..... 80 and 85 degrees
20. The reasons for taking a cold bath are that they

- a..... remove perspiration
 - b..... train the blood vessels in the skin to respond quickly to a change in temperature
 - c..... wash off dirt and grease
 - d..... make the heart beat more quickly
 - e..... exercise the whole nervous system
21. Cold baths are good for
- a..... everybody
 - b..... most people
 - c..... sick people
 - d..... old people
 - e..... few people
22. Of the following the best way to brush the teeth is
- a..... up and down with hard pressure on both jaws
 - b..... upward over the lower teeth and downward over the upper teeth
 - c..... back and forth across the front teeth
 - d..... along the edges of the teeth
 - e..... upward over the back teeth and across the front teeth
23. The most important time to clean the teeth well is
- a..... when you get up in the morning
 - b..... before lunch
 - c..... after lunch
 - d..... after school
 - e..... before going to bed
24. In general, the daily amount of sleep necessary is
- a..... 5 to 7 hours for children in high school
 - b..... 9 to 12 hours for children up to high school
 - c..... 8 hours for children in the third grade
 - d..... 6 hours for children in the sixth grade
 - e..... 6 hours in summer, 10 hours in winter
25. In dusting, the housekeeper should usually use
- a..... a feather duster
 - b..... a damp or oiled cloth
 - c..... a dry cloth
 - d..... a wet cloth
 - e..... a whisk broom

26. If you have a headache from studying too long, it is best
 a..... to keep right on until you finish the job
 b..... to tie a wet rag with ice-cold water around your head
 c..... to rest or play outdoors a while
 d..... to take a big dose of medicine
 e..... to study a while outdoors
27. The eyes become tired after too much reading or sewing because
 a..... the eyeballs get too much blood
 b..... the muscles of the eye have not had a chance to rest
 c..... the brain gets too many pictures
 d..... the lids have been kept open all the time
 e..... the eyeballs have not had any exercise
28. In reading, the light should come from
 a..... in front of the reader
 b..... all sides
 c..... below the level of the eyes
 d..... the right hand side
 e..... behind and above
29. After reading an hour or more
 a..... the eyes need a few minutes rest
 b..... the eyes need a half hours rest
 c..... the eyes need a full hour rest
 d..... no more reading should be done that day
 e..... the eyes do not need a rest
30. The best way to learn what different foods do for the body is
 a..... to read advertisements
 b..... to study scientific feeding experiments
 c..... to ask the grocer
 d..... to read the cook-book
 e..... to ask the butcher
31. Of the following reasons why too much sweet food is bad for children the best is because it
 a..... makes them thirsty
 b..... makes them fat
 c..... makes them eat less of other food
 d..... furnishes the body fuel
 e..... costs more than other food
32. Choose the whole wheat bread instead of white bread part of the time because
 a..... whole wheat bread has more iron and cellulose
 b..... whole wheat bread is easier to digest

- c..... whole wheat bread has more starch and sugar
d..... whole wheat bread has more calories for a given weight of bread
e..... whole wheat bread is cheaper
33. The most wholesome kind of candy to eat is
a..... rich, soft candy like chocolate creams
b..... highly spiced candy like red-hots and all-day suckers
c..... candy sold from an uncovered counter or cart
d..... homemade hard candy like molasses candy
e..... cheap brightly colored candy
34. Of the following most healthful meal for a growing boy is
a..... chicken pie
b..... string beans, asparagus, cabbage
c..... milk; roast beef, boiled eggs
d..... milk, bread and butter, spinach, dates
e..... roast beef, potatoes, turnips, beets, chicken salad jelly, mince pie, milk
35. If one is hungry a half-hour before supper time it is best
a..... to eat a meat sandwich
b..... to eat a few cookies
c..... to drink a glass of soda water
d..... to eat an ice cream cone
e..... to drink a glass of cold water
36. Here are some things for a school lunch. The best combination for health is
a..... meat sandwiches and buns
b..... cheese sandwiches and fruit
c..... ham sandwiches and ginger ale
d..... chicken sandwiches and a piece of chocolate cake
e..... frankfurter, roll and candy
37. Of these, the best reason why food should be well chewed is that
a..... it can be swallowed sooner
b..... the saliva begins to digest the starchy food
c..... less food is needed
d..... horses and dogs chew their food
e..... it is polite to chew thoroughly
38. Of these five foods, the food richest in vitamins is
a..... white bread
b..... beef steak
c..... spinach
d..... candy
e..... canned fruit

39. Of the following, the most important reason why fruits are health-ful is that they
- a..... furnish a large amount of energy
 - b..... contain a large percentage of water
 - c..... are rich in fat
 - d..... help prevent constipation
 - e..... come from the cuntry
40. The largest amount of fuel food is needed when a person
- a..... swims
 - b..... sleeps
 - c..... studies
 - d..... plays the piano
 - e..... washes dishes
41. Sugar, starch, and fat are especially needed for
- a..... giving energy
 - b..... building bone
 - c..... making blood red
 - d..... keeping the body clean inside
 - e..... preventing colds
42. Of the following, the best reason why lettuce is a valuable food is because it furnishes
- a..... warbohydrates and fat
 - b..... energy to give power to work
 - c..... vitamins and minerals
 - d..... protein for muscle building
 - e..... water and starch
43. The largest amount of protein is to be found in
- a..... rice, oatmeal, white bread
 - b..... milk, fish, eggs
 - c..... apples, bananas, oranges
 - d..... carrots, potatoes, turnips
 - e..... candy, cake, ice cream
44. Of the following protein is most needed for
- a..... preventing kidney trouble
 - b..... purifying the blood
 - c..... building the muscle
 - d..... cleaning out the large intestine
 - e..... building teeth
45. If we are not sure the water is safe to drink the best thing to do is
- a..... to keep it in the ice box
 - b..... not to drink any water

- c..... to boil it
 - d..... to drink tea instead
 - e..... to take a chance, and drink it anyway
46. Every boy and girl should drink
- a..... about one cup of water
 - b..... at least four cups of water
 - c..... almost two cups of water
 - d..... at least four quarts of water
47. Of the following the best reason why it is important to drink water is that it
- a..... thins the blood
 - b..... keeps body fluids normal
 - c..... makes a person fat
 - d..... keeps the body warm
 - e..... makes the kidneys work hard
48. The average size stomach of a grown person can hold comfortably about
- a..... 1 pint
 - b..... 3 pints
 - c..... 5 pints
 - d..... 8 pints
 - e..... 10 pints
49. Of the following food, the best to help keep the large intestine clean are
- a..... white bread, butter and jelly
 - b..... meat, eggs, and fish
 - c..... chicken soup, mince pie, and fudge
 - d..... candy, cake, chocolate
 - e..... vegetables, fruit, wheat bread
50. One good simple rule for preventing constipation is
- a..... take castor oil once a week
 - b..... take a sugar-coated pill every night
 - c..... drink one or two glasses of water on rising in the morning
 - d..... eat no raw fruit
 - e..... eat meat at least twice a day
51. Of these, the best foods for the teeth and gums are
- a..... raw cabbage
 - b..... chocolate cream drops
 - c..... cocoanut cake
 - d..... whitebread and butter
 - e..... eggs and fish

52. The clotting of blood in a cut
- a..... is harmful
 - b..... is caused by poison
 - c..... stops the flow of blood
 - d..... happens in impure blood only
 - e..... is a sign of weakness
53. When you have been cut a little
- a..... suck the cut
 - b..... cover the cut with a sterile bandage
 - c..... wrap it up in your handkerchief
 - d..... pick off the scab
 - e..... hold your hand over the cut
54. When a person faints you should
- a..... put a hot water bag on his head
 - b..... place him in a chair
 - c..... keep him out of a draft
 - d..... lay him flat, rub his temples, put his hands in cold water
 - e..... make him walk, fan him
55. To stop a nose bleed
- a..... press two fingers on the upper lip or against the side of the nose
 - b..... lie on the back
 - c..... lie on the floor, head low
 - d..... wipe out the nose with a handkerchief
 - e..... walk up and down quickly
56. In bandaging a cut on the arm or leg, a tourniquet should be put on
- a..... between the heart and the cut if the large artery has been cut
 - b..... above the cut if the vein is cut
 - c..... below the cut if an artery is cut
 - d..... only when the bleeding is slight
 - e..... only when the injured person faints
57. When a person seems dead from drowning
- a..... nothing you can do will help him
 - b..... give him whiskey
 - c..... keep him warm and quiet
 - d..... try artificial breathing every ten minutes for three hours.
 - e..... try Schaefer method artificial respiration for six or eight hours before giving up

58. Of the following the best reason why patent medicines should be avoided is because
- a..... they are more expensive than other medicine
 - b..... they often contain drugs which are bad for us
 - c..... they make people feel happy
 - d..... they make people poor
59. Of these, the chief cause of illness is
- a..... lack of health habits
 - b..... working hard during the day
 - c..... eating cheap foods
 - d..... the hurry and noise of city life
 - e..... bad luck
60. The most common way for bacteria causing typhoid fever and other intestinal diseases to enter the body is through the
- a..... feet
 - b..... pores of the skin
 - c..... mouth
 - d..... eyes
 - e..... nose
61. When you first begin to feel you are getting a cold, a good thing to do is
- a..... to take cough drops often
 - b..... to take patent cough syrup every hour
 - c..... to avoid all exercise and cold air
 - d..... to pay no attention to it, and go on with your work as usual
 - e..... to take a brisk walk and then go to bed
62. Anaemia, which is a disturbance of red corpuscles in the blood, is sometimes helped by
- a..... eating green vegetables
 - b..... sleeping 12 hours a night
 - c..... eating more starchy food
 - d..... studying hard in school
 - e..... taking little outdoor exercise
63. Mosquitos can be kept from growing in water by
- a..... putting oil on ponds
 - b..... taking fish out of the ponds
 - c..... putting salt in ponds
 - d..... letting weeds grow in ponds
 - e..... putting lime in ponds

64. Vaccination for smallpox and typhoid is used to
- clean out the body as castor oil does
 - kill germs as a germ killer does
 - make substances that destroy germs grow in the blood
 - find out if one is going to get the disease
 - help cure the disease after one becomes sick with it
65. People get disease germs most often from carelessness in regard to
- clothing and table cloths
 - books and papers
 - fingers and unclean food
 - dogs and horses
 - flowers and hay
66. Of the following diseases, the two that cause the largest number of deaths in our country are
- smallpox and chickenpox
 - tuberculosis and pneumonia
 - whooping cough and measles
 - hookworm disease and rheumatism
 - typhoid fever and boils
67. Tuberculosis is caused by
- bacteria which can grow in many parts of the body
 - having a father or mother who had tuberculosis
 - getting the feet wet
 - living in cold climates
 - mosquitos which carry the bacteria
68. Pneumonia is directly caused by
- chill
 - exposure to cold
 - wet feet
 - cold weather
 - bacteria
69. Harmful bacteria in the body may be destroyed by
- toxins
 - microbes
 - white blood corpuscles
 - iron
 - red blood corpuscles
70. The man who did the most to establish the germ theory of disease was
- Goldsmith
 - Cook

- c..... Pasteur
d..... Carpenter
71. Many epidemics of disease have been caused by
a..... lack of sleep
b..... night air
c..... lack of cleanliness
d..... long hours of work
e..... too much bathing
72. Alcoholic drinks cause one to
a..... work faster
b..... make fewer mistakes
c..... do better work
d..... do more work
e..... do poorer work
73. The players on champion athletic teams do not use alcoholic drinks because alcohol
a..... tastes bitter
b..... decreases accuracy and quickness of action
c..... is expensive
d..... makes one want to fight
74. One reason why people should not smoke is that it
a..... makes the skin yellow
b..... makes people stupid
c..... causes chills and fever
d..... often harms the lining of nose and throat
e..... is hard to learn how to smoke
75. School children should carry their school books or brief cases
a..... on the stronger arm
b..... on one hip
c..... by changing hands every few minutes
d..... always in the right hand
e..... always in the left hand
76. The bones of a child nine years old
a..... are more brittle than those of an old person
b..... contain more minerals than those of an old person
c..... are more easily broken than those of an old person
d..... are more easily bent than those of an old person
e..... are made of the same amount of each material as are those of an old person

77. Broken bones grow together
- a..... more quickly in children than in old people
 - b..... in a few days
 - c..... more quickly in adults than in children
 - d..... in a few hours
 - e..... not at all in the case of most children
78. One way to care for a baby's eyes is
- a..... to keep the baby in the dark
 - b..... to put germ killing drops in them every day
 - c..... to keep a very bright light from shining directly in the baby's face.
 - d..... to keep a veil over the baby's face
 - e..... to rub them if they look sore
79. The best thing for the nerves is
- a..... going to the movies every night
 - b..... going to church on Sunday
 - c..... plenty of rest and sleep
 - d..... reading ghost stories
 - e..... going automobile riding
80. When a child has been hurt by falling off a fence through being careless, he should
- a..... call it "bad luck"
 - b..... feel ashamed of himself
 - c..... be proud
 - d..... feel brave
 - e..... want others to be sorry for him

APPENDIX 4

Litchfield High School
Litchfield, Connecticut
M a y 19, 1931

Doctor Orwin Bradford Griffin
Superintendent of Schools
Litchfield, Connecticut

Dear Doctor Griffin:

This letter is written to suggest two possible changes in the courses I teach in our high school. The first change is in relation to the biology.. Biology, as it was taught this year, has three distinct divisions, namely: botany; zoology; and the application of biology to human welfare.

It seems that this course is spread out too much. The student is required to cover so many subjects that "getting over the ground" is emphasized rather than the ability to see a few things for himself. In spite of the modern tendency of "spoon feeding", I am still oldfashioned enough to believe that science education should be a training in the use of the scientific method rather than acquiring a mass of isolated information that may soon be forgotten.

I suggest that our biology course should not attempt to cover the whole field of biology. The course I have in mind would cover an elementary study of plants and animals. The object of this course would be to teacher the student something about the plants

and animals around Litchfield and to train him to make a few direct observations upon the actual material and to draw his own conclusions from these observations.

The course would stress the natural history phase of the subject. Habits, habitats and life histories would be emphasized. The human welfare aspect of biology (civic biology) should be given in a separate course.

This brings me to my second proposal, namely: that the present four-year one-credit course in health be superseded by a one-year four-credit course.

The fact that Litchfield High School offers four credits in health during its four year course is highly commendable. However, it frequently seems that much of this time is wasted. Health comes once a week during the four years. It comes at an hour that is usually free the rest of the week for the study of other subjects. Thus the pupils begrudge the infringement upon a regular study hour. In addition, any one-credit course violates one of the fundamental principles of learning - repetition. A third drawback of this course is that all four classes are together. Subject matter on the plane of a freshman is often laughed at by seniors; subject matter on the plane of seniors is beyond the grasp of the average freshman.

When my proposal that a four-credit junior course in civic biology with laboratory facilities be substituted for the present course in health was put before the boys in my health course, the response was very positive. Through vote, it was established that every boy in the

school favored the change.

It has been my personal experience and observation that health should be taught through biology. Fundamentals must be taught through laboratory procedures.

My proposal would leave the present sophomore biology course an elective. The course would be simplified in its scope to include only botany and zoology. Civic biology would be introduced into the curriculum to supersede the present one-credit four-year course in health. This biology course would be required during the junior years as a four-credit course.

Respectfully yours,

John A. Sullivan

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